

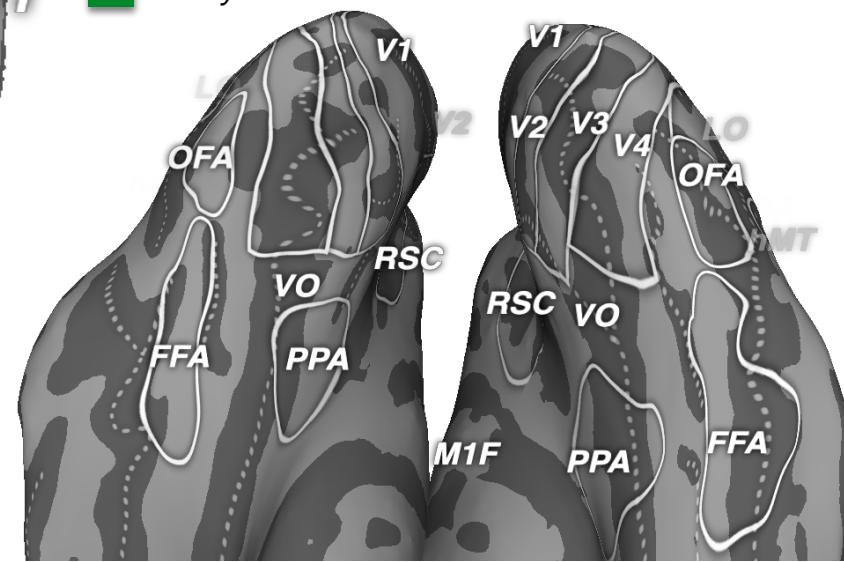
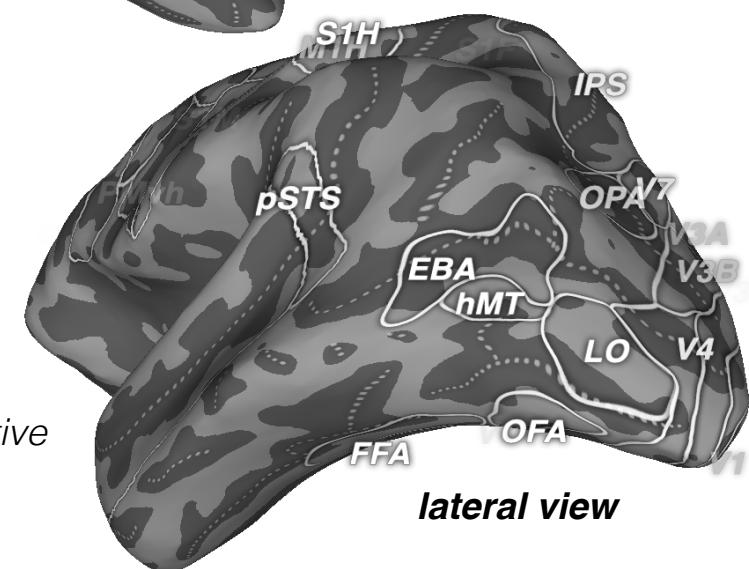
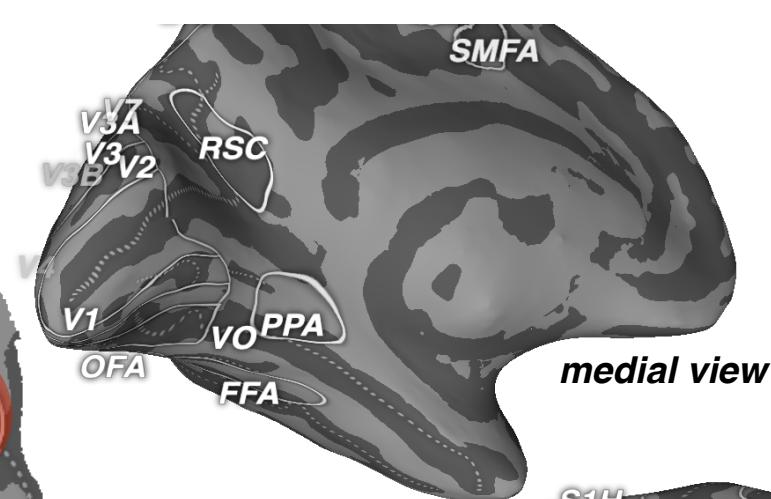
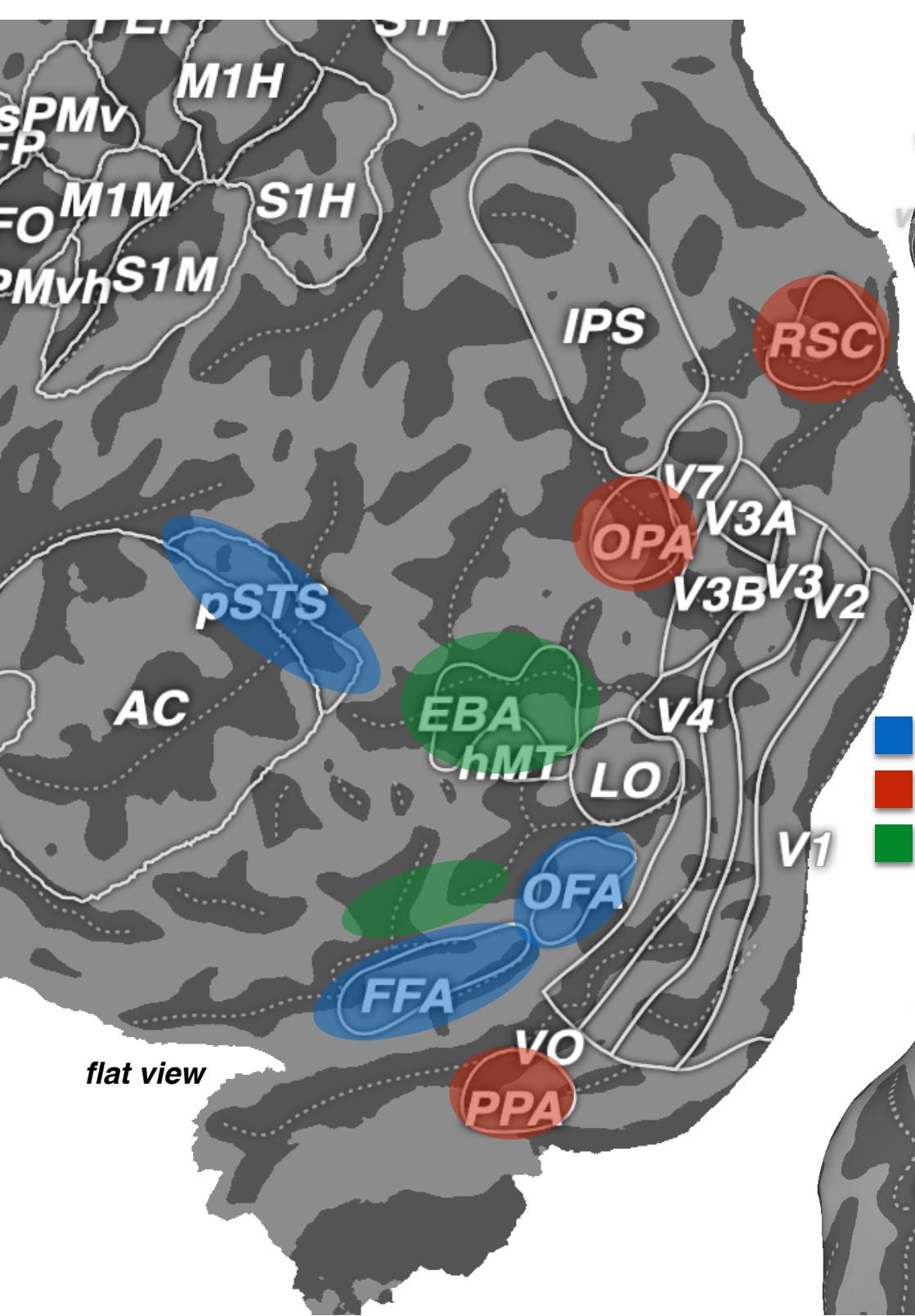
MAPPING HUMAN CORTEX

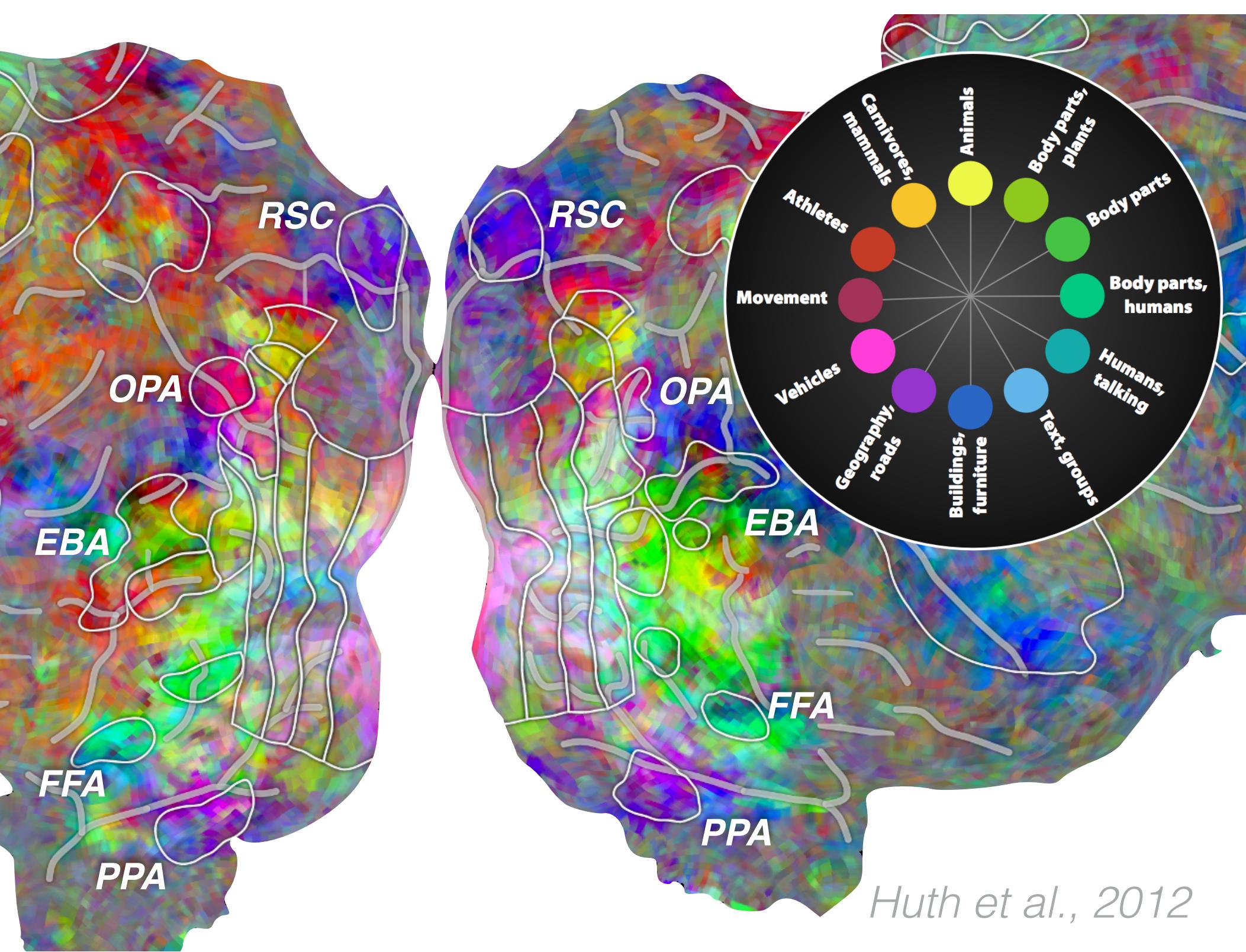
Prof. Alexander Huth

3.3.2021

WHEREFORES

- * We've been talking a lot about **how** visual cortex is organized
- * i.e. **what are** the different areas, & **what role** does each area play in visual perception





WHEREFORES

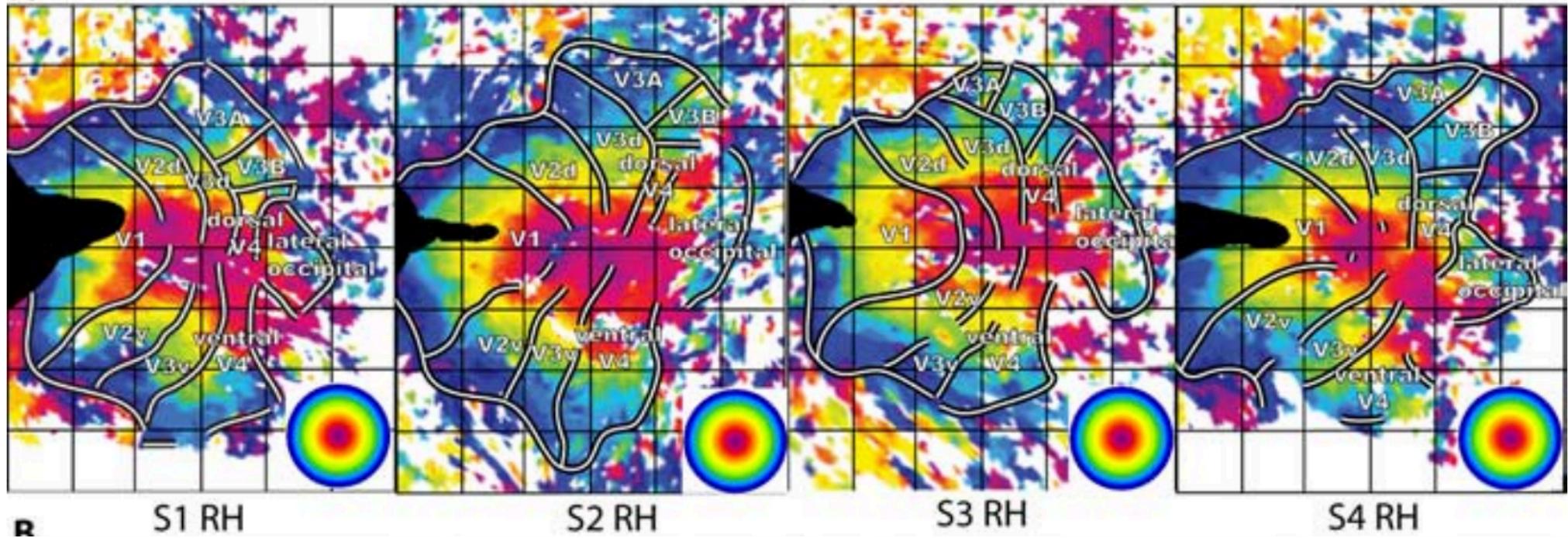
- * We've been talking about how visual cortex is organized
 - * ... but why is it organized that way?

THEORY: ECCENTRICITY

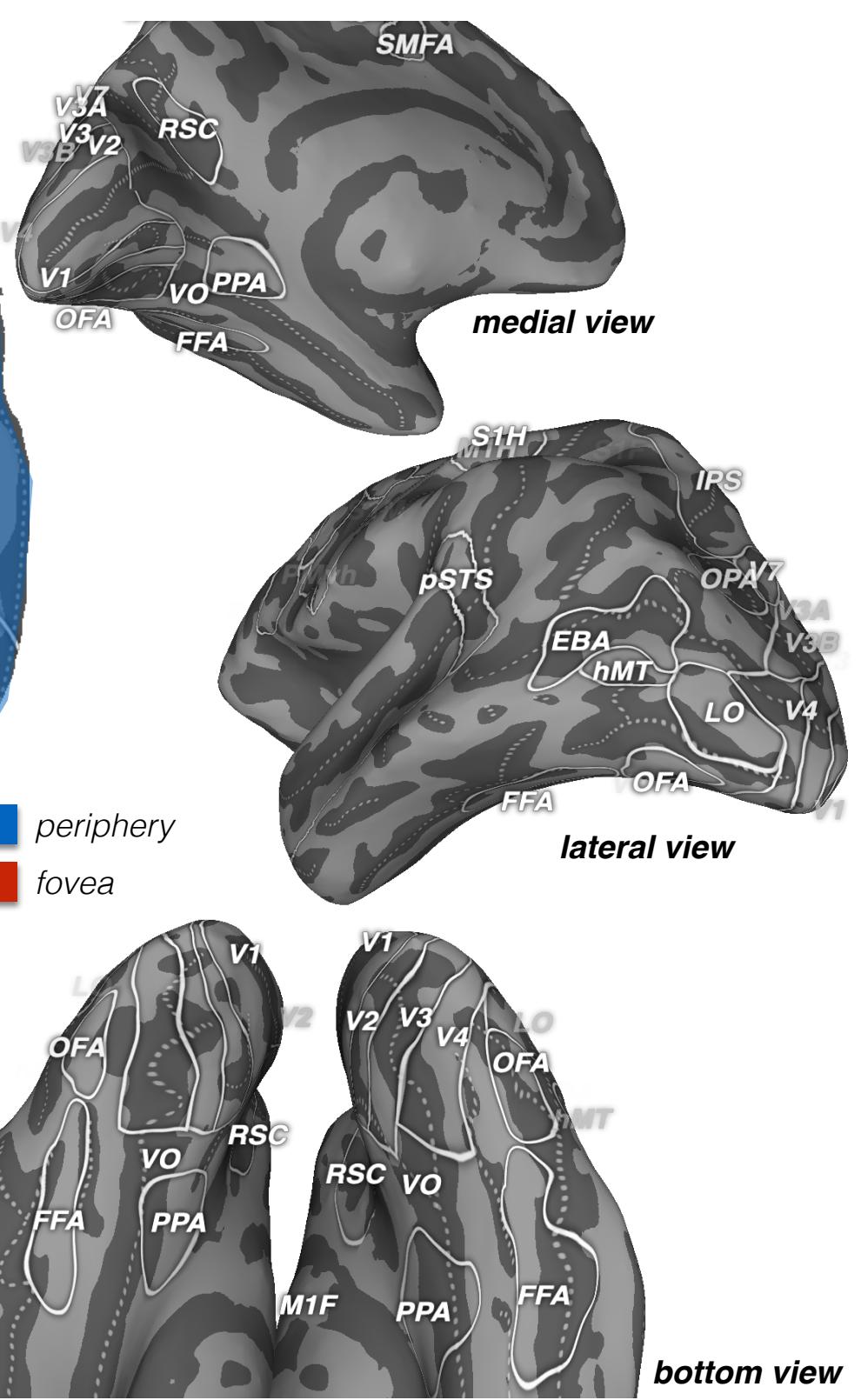
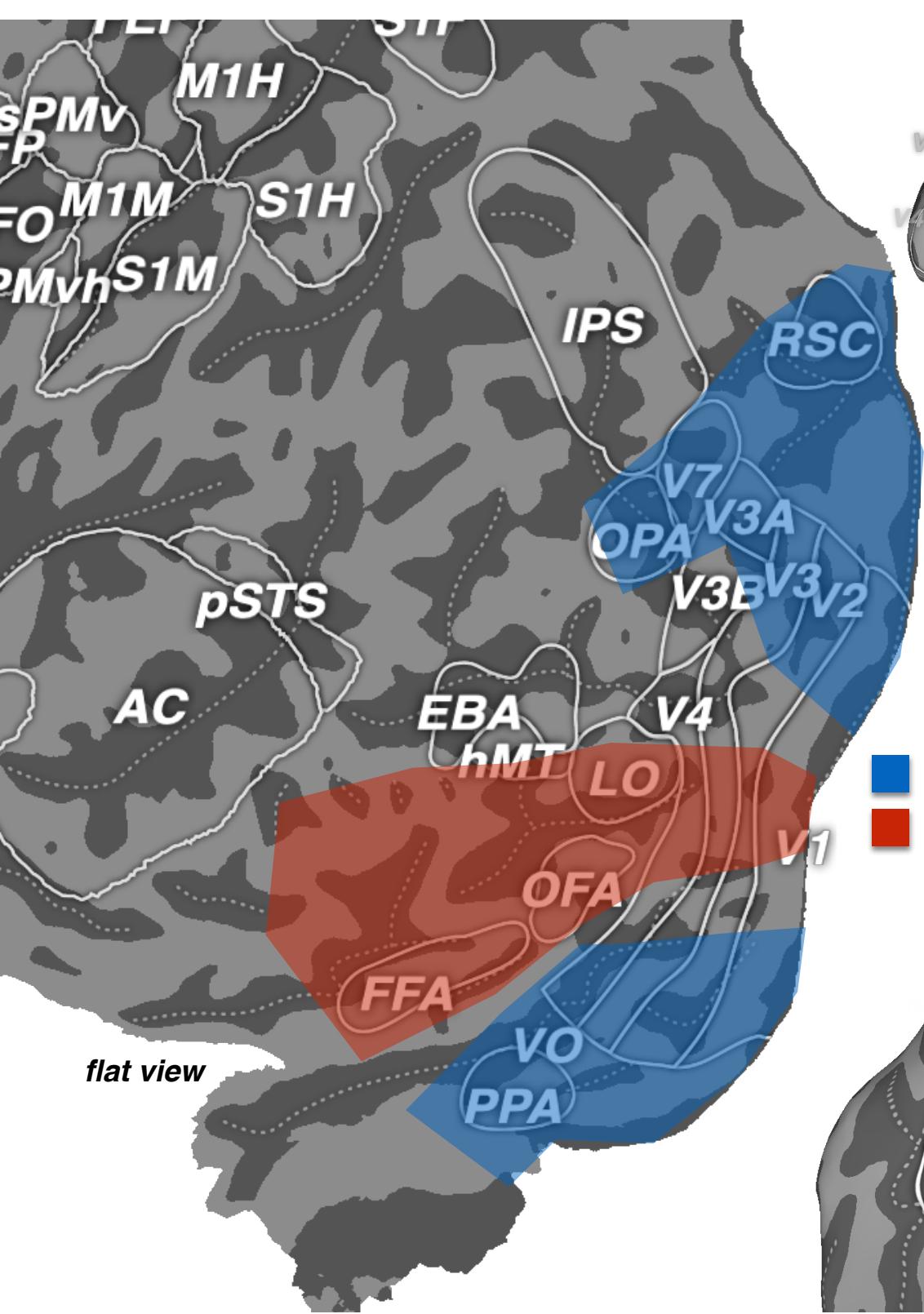
- * If a specific category is mostly experienced in some particular position within the visual field
 - * e.g. faces are usual **foveal**, because we look directly at them
 - * & buildings/rooms/environments are usual **peripheral**
- * Then maybe brain areas for that category are close to retinotopic areas for the corresponding location?

RETINOTOPIC MAPS

A



Hansen, Kay, Gallant (2007)



THEORY: ECCENTRICITY

- * This works for **faces** & **places**. What about other categories?
 - * **Text** - the visual word form area (VWFA) is almost overlapping with FFA - makes sense!
 - * What else?

MAKING PREDICTIONS

- * What if there was a category that was experienced *VERY SPECIFICALLY* in one part of the visual field by only some people?
- * Can we predict where that category will be represented?

Article | Published: 06 May 2019

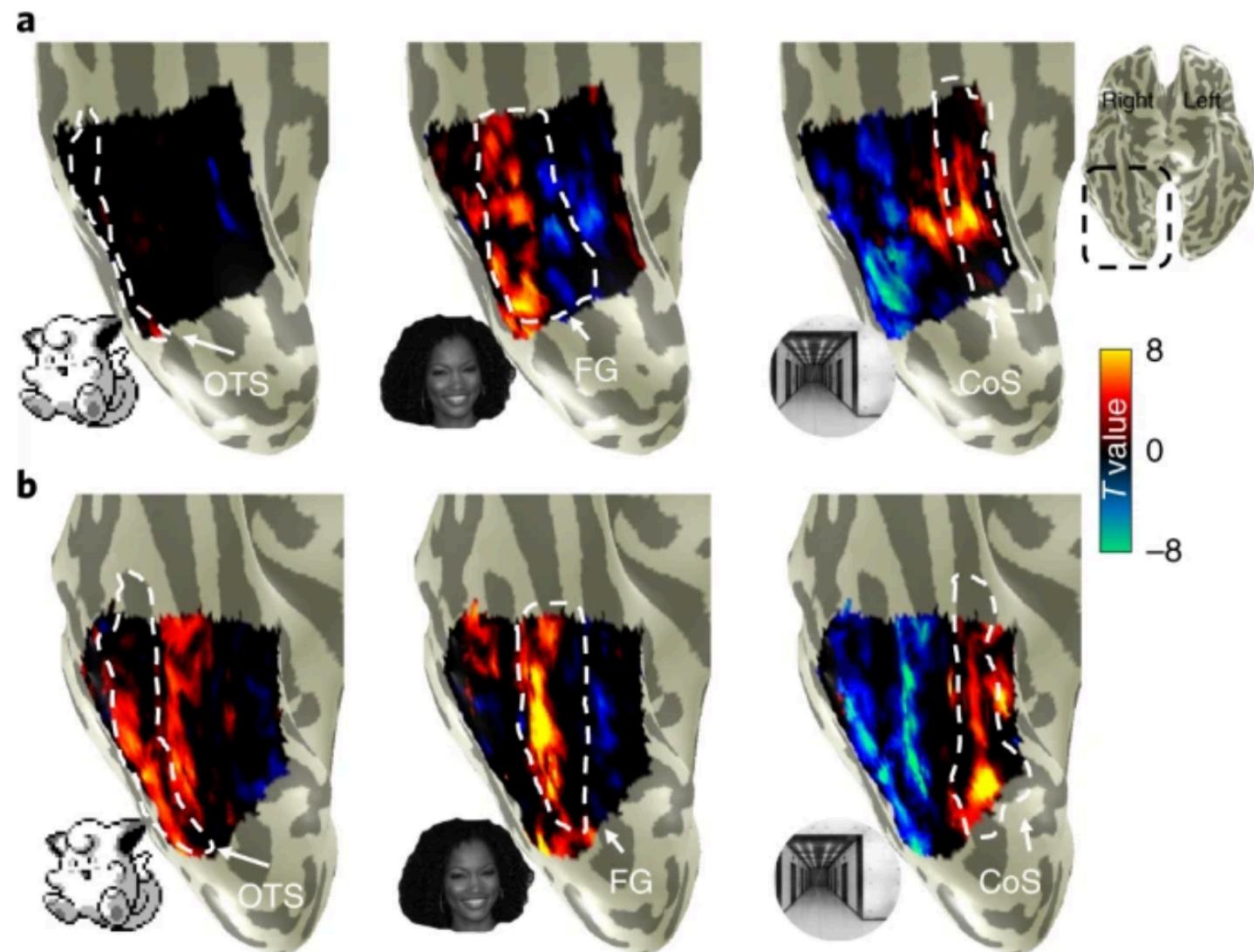
Extensive childhood experience with Pokémon suggests eccentricity drives organization of visual cortex

Jesse Gomez , Michael Barnett & Kalanit Grill-Spector

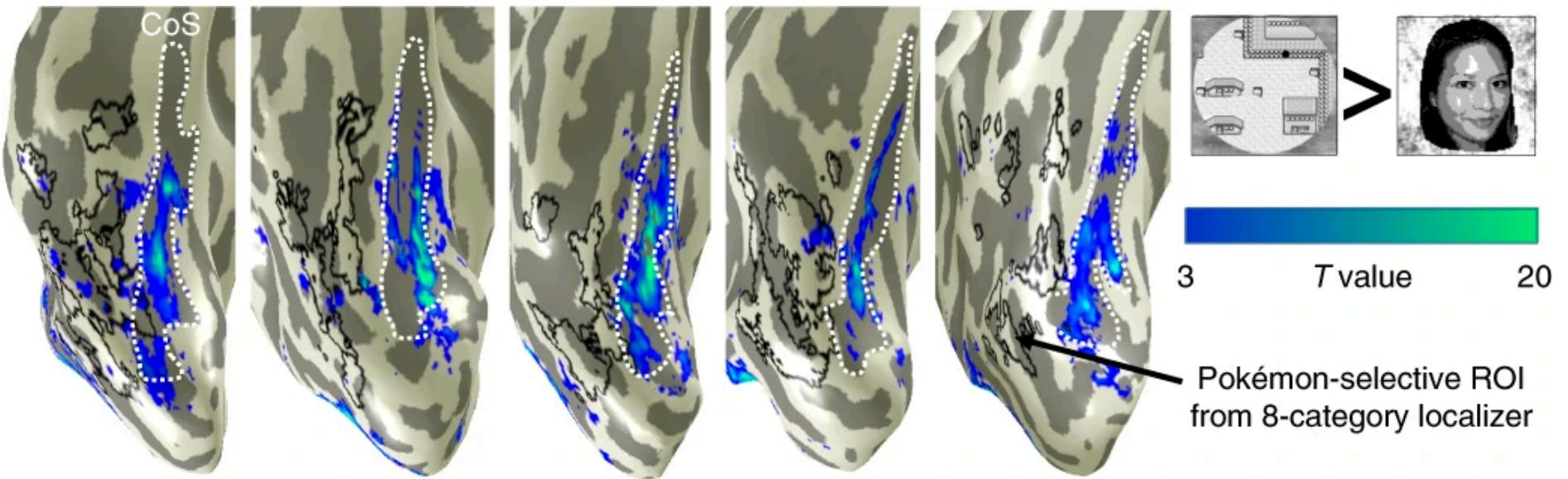
Nature Human Behaviour 3, 611–624(2019) | Cite this article

<https://www.nature.com/articles/s41562-019-0592-8>

Pokemon
naive:

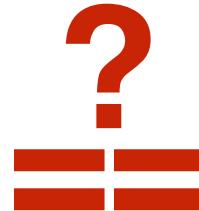
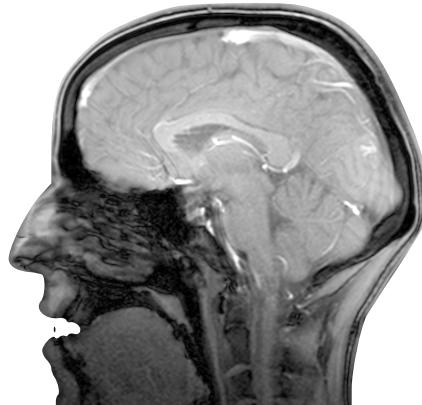
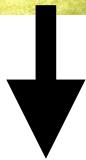


Pokemon
experienced:



Control: ***places*** from Pokemon elicit
responses in place areas (PPA)!

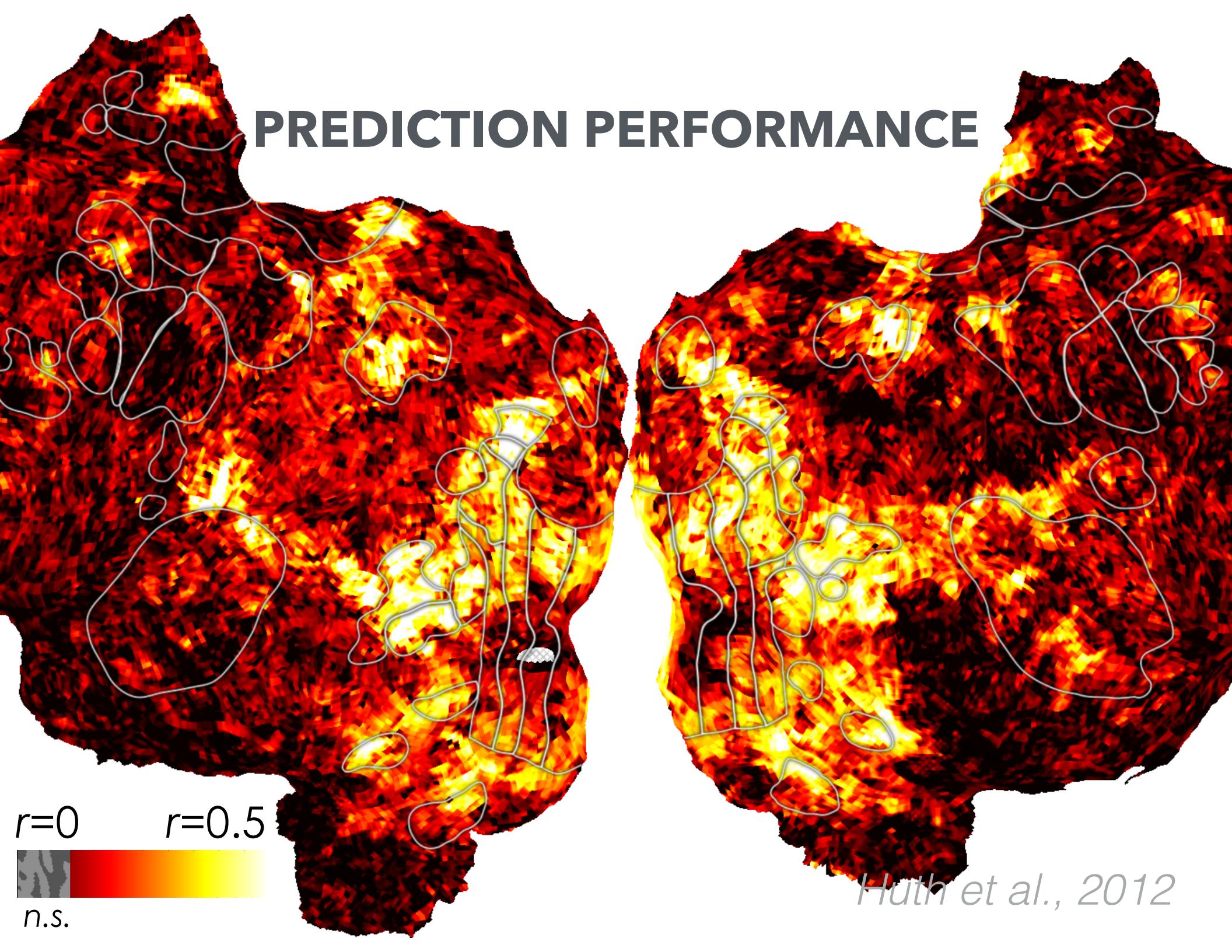
LANGUAGE V. VISION



“Dog”

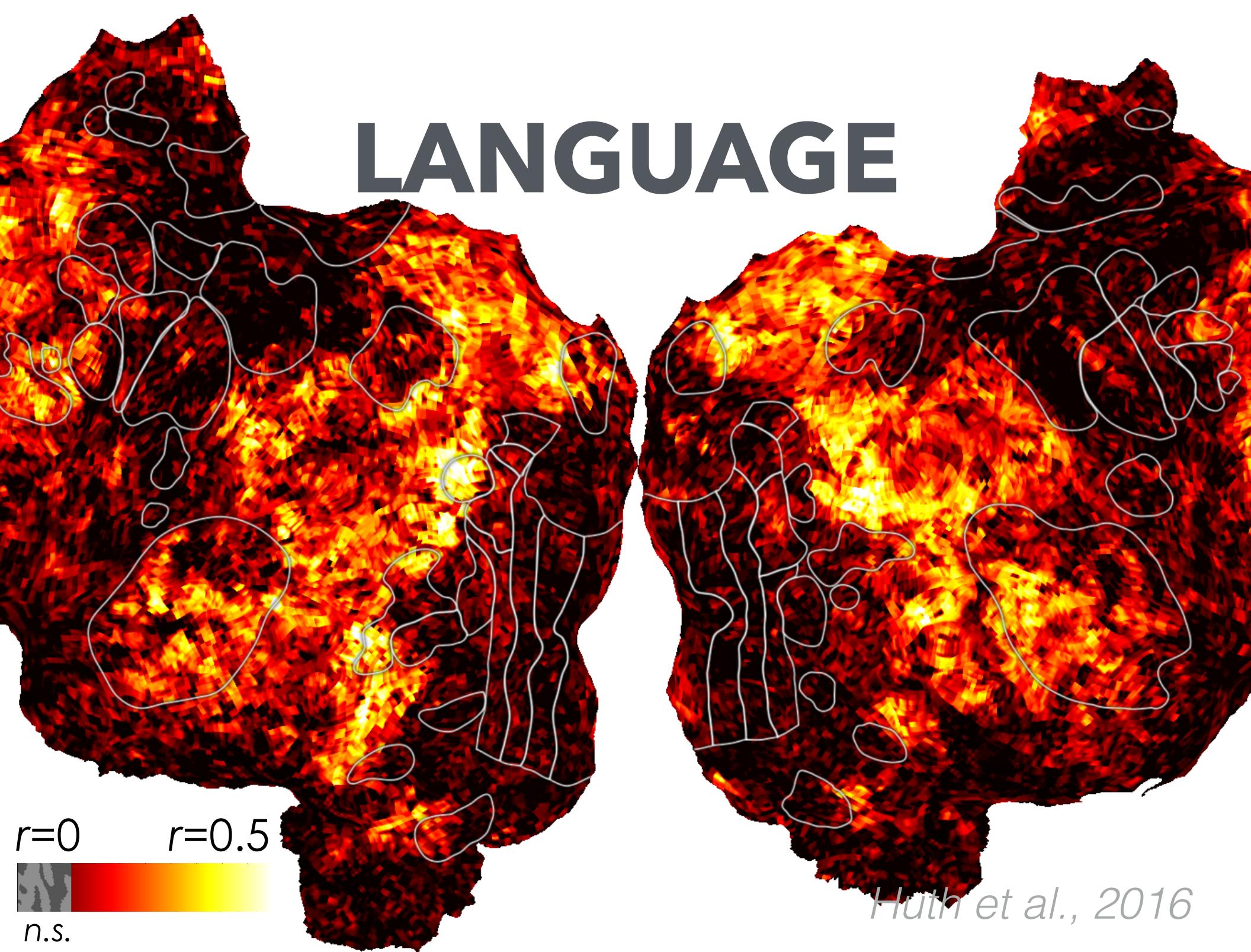


PREDICTION PERFORMANCE



Huth et al., 2012

LANGUAGE



EXPERIMENTS

Visual fMRI data

2h natural movies from
Hollywood movie trailers



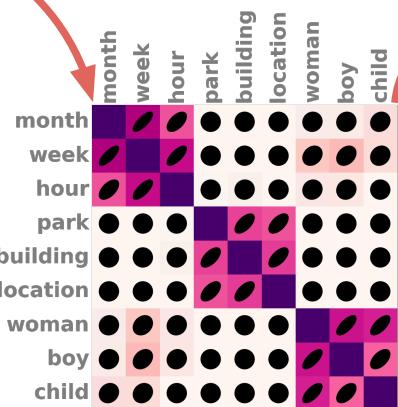
Language fMRI data

2.5h narrative stories from
The Moth Radio Hour

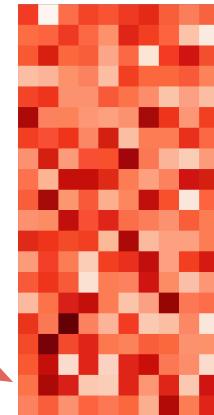


*"...she was removing photographs
from the walls and placing them in
little piles around the house..."*

5 subjects,
~15h MRI /
subject

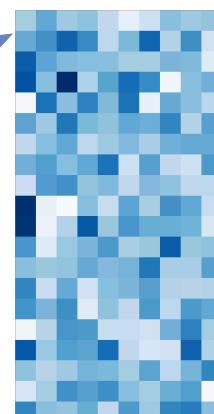


985 features



Visual semantic
models

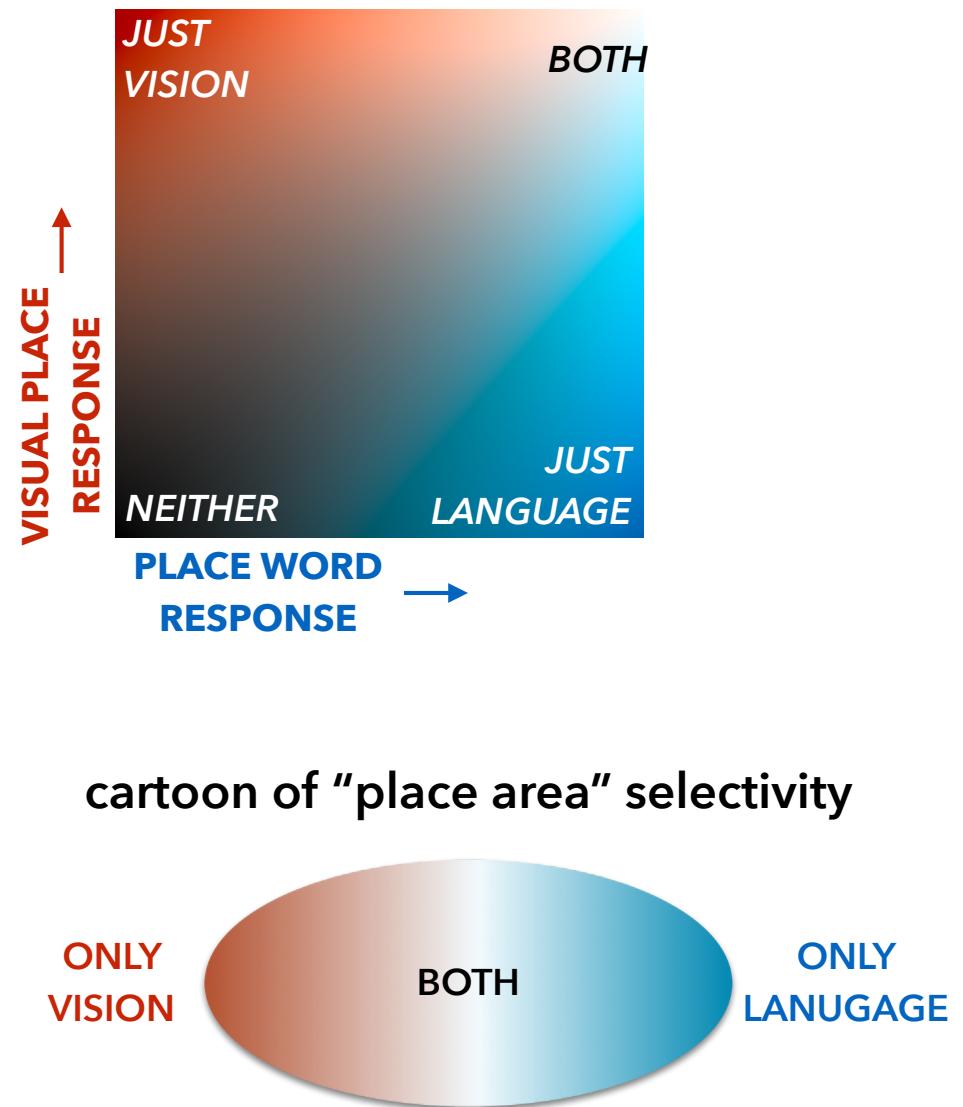
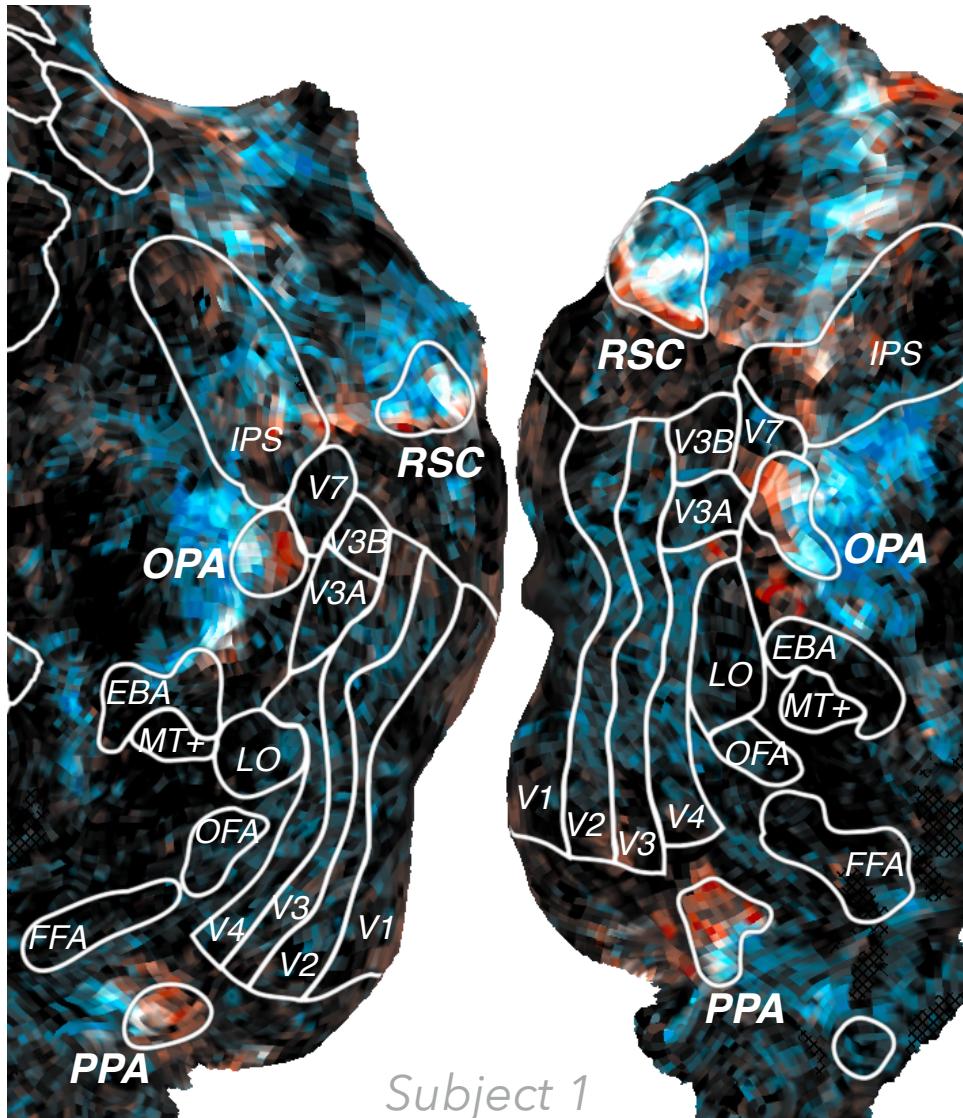
~80k voxels / subj.



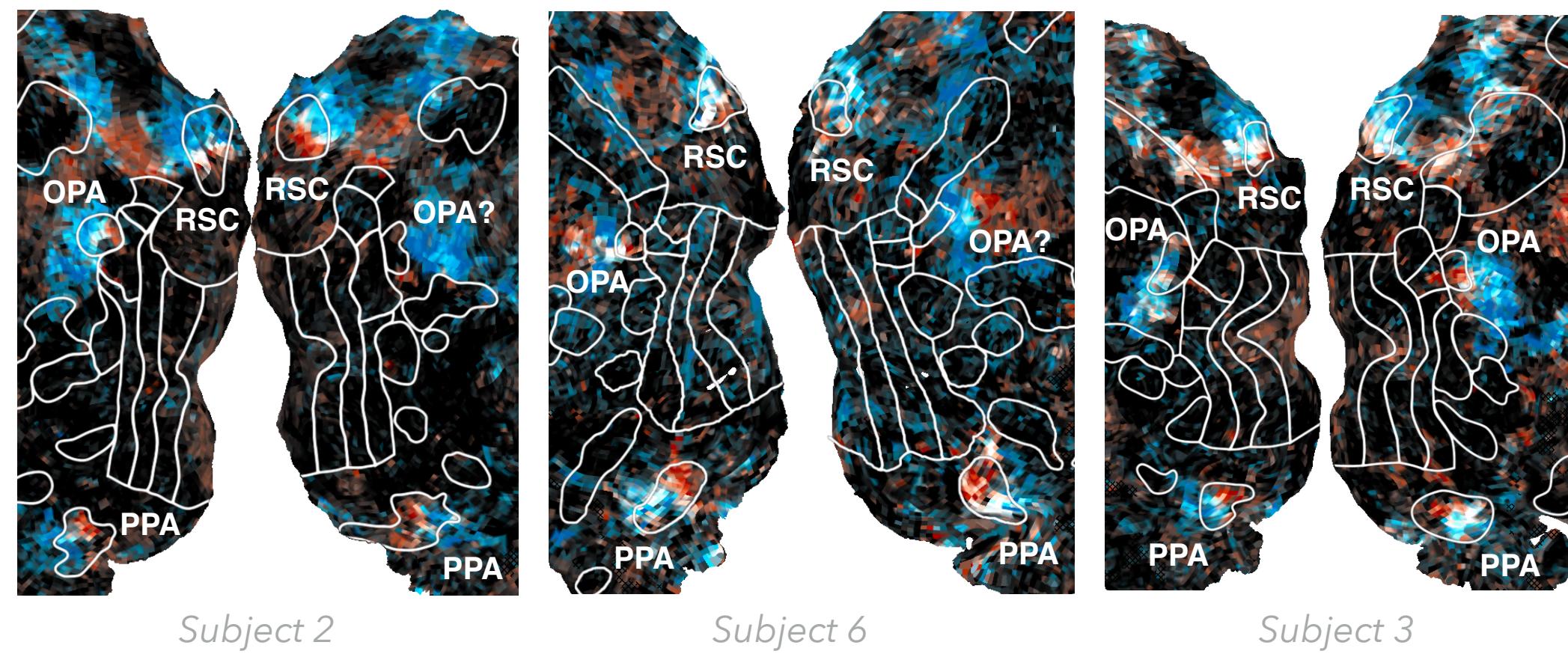
Language semantic
models

985 features

ONE CATEGORY: PLACES



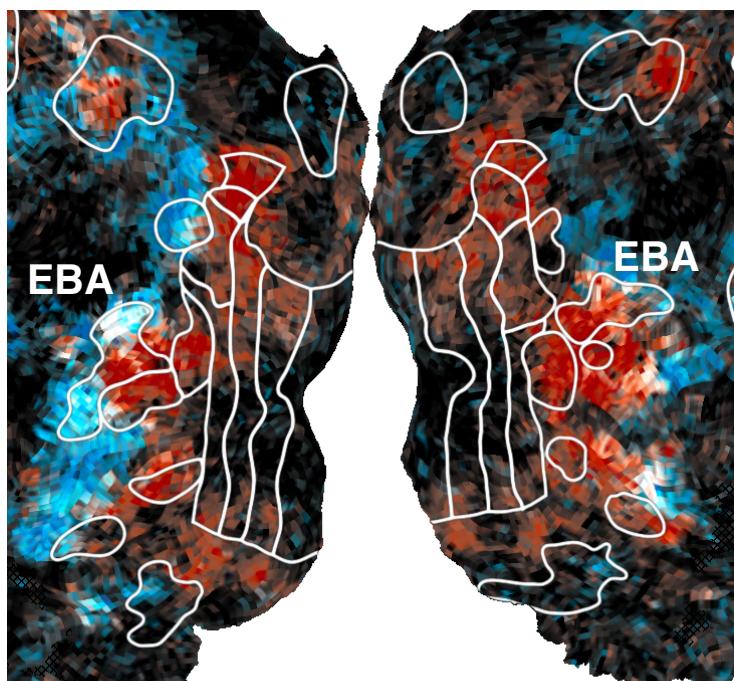
ONE CATEGORY: PLACES



GRADIENTS ALSO APPEAR FOR OTHER CATEGORIES

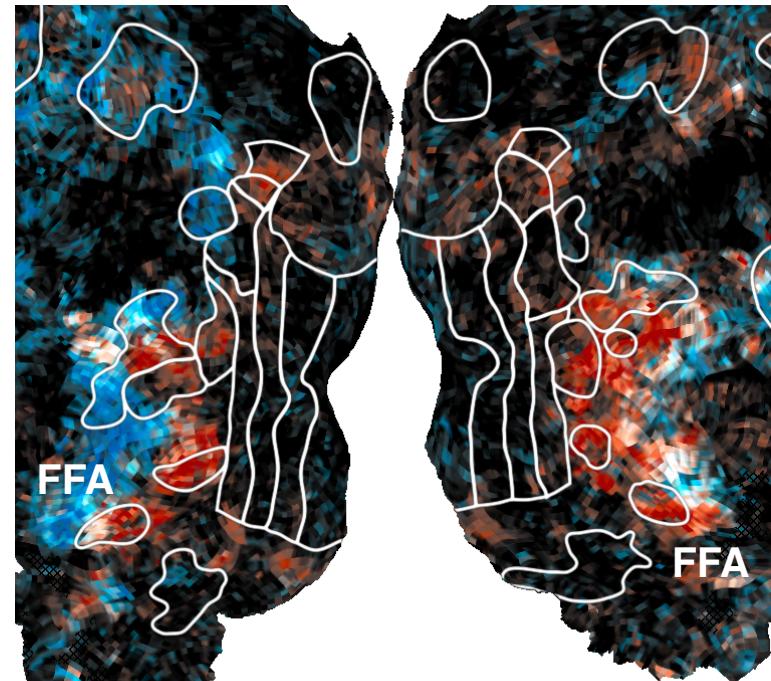
Subject 2

BODIES

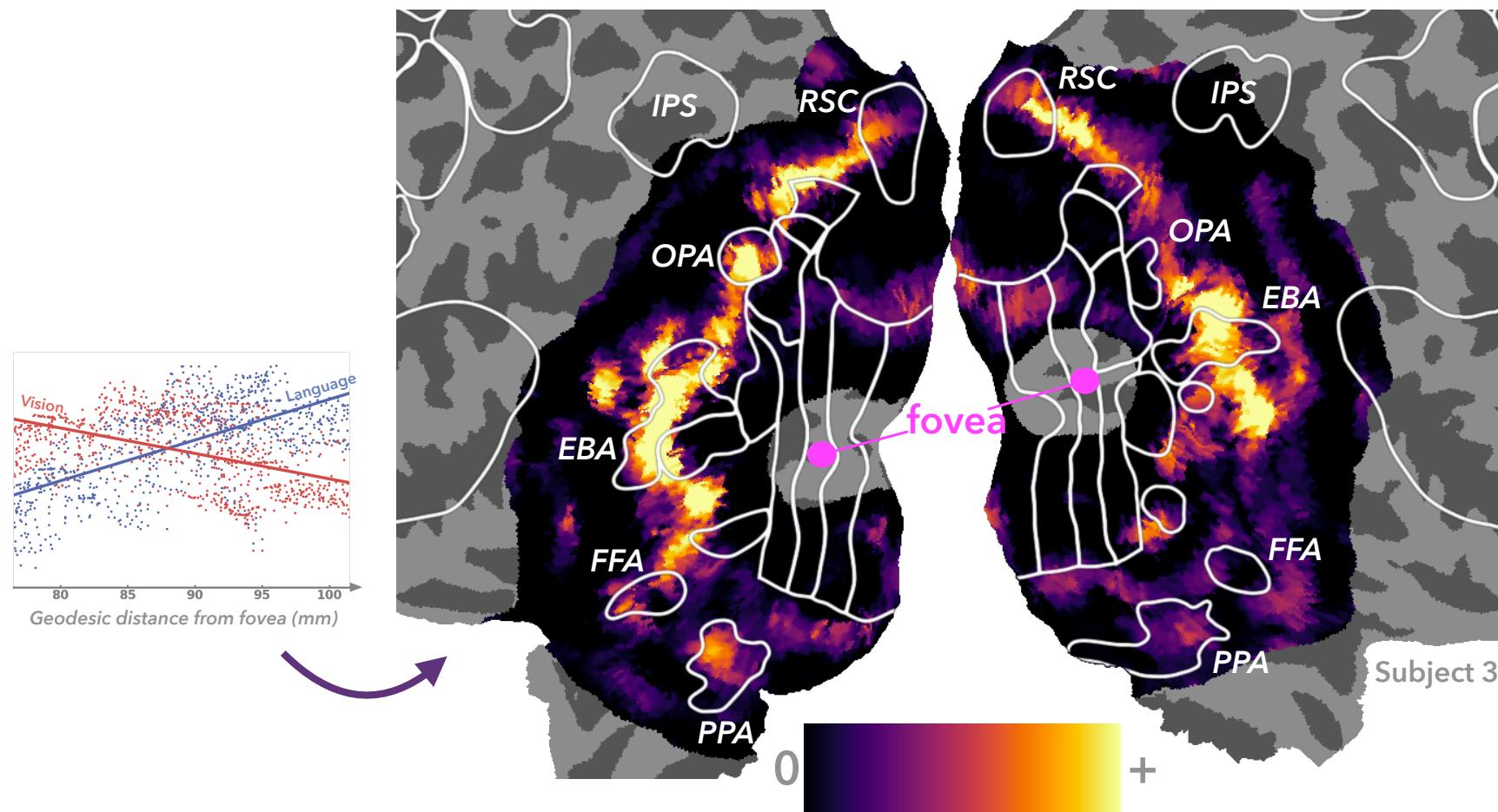


Subject 2

FACES



GENERAL PROPERTY!



Sara Popham



UNTIL

NEXT

TIME