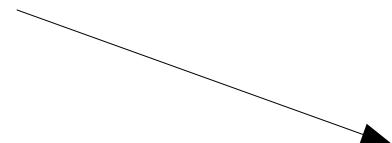
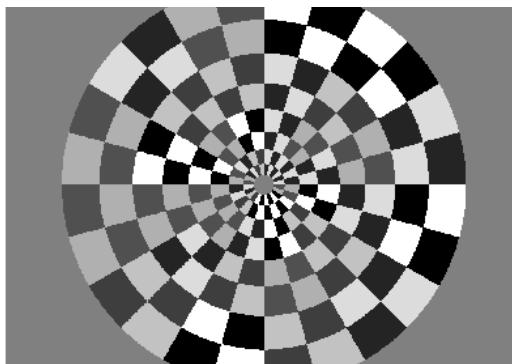
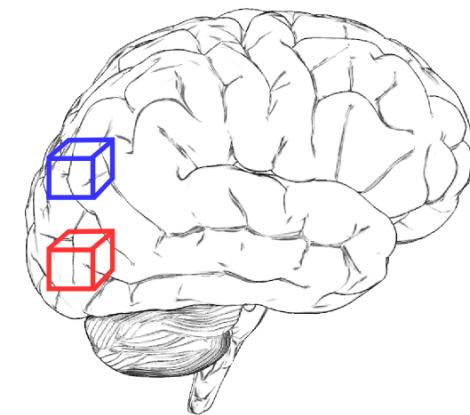
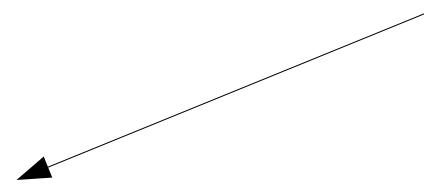
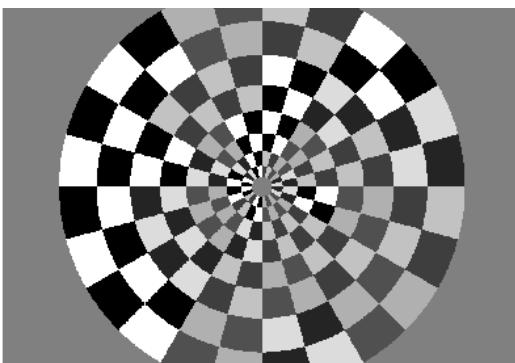


Visual Reconstruction

Show Stimuli

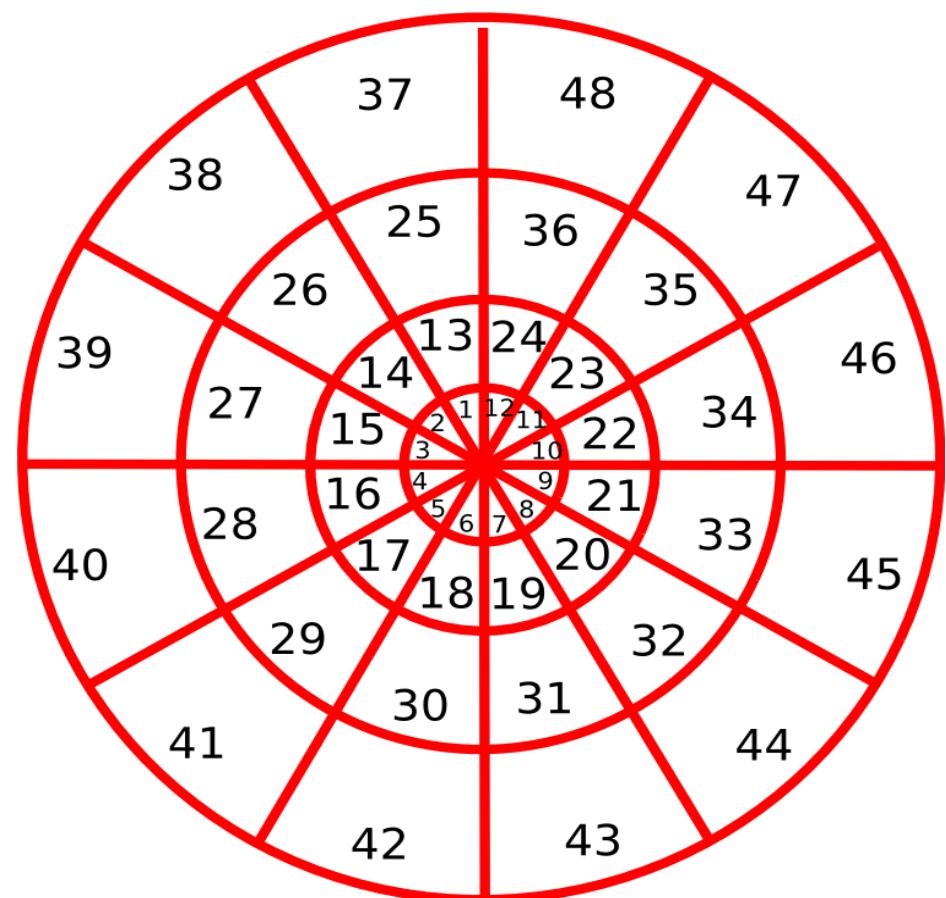
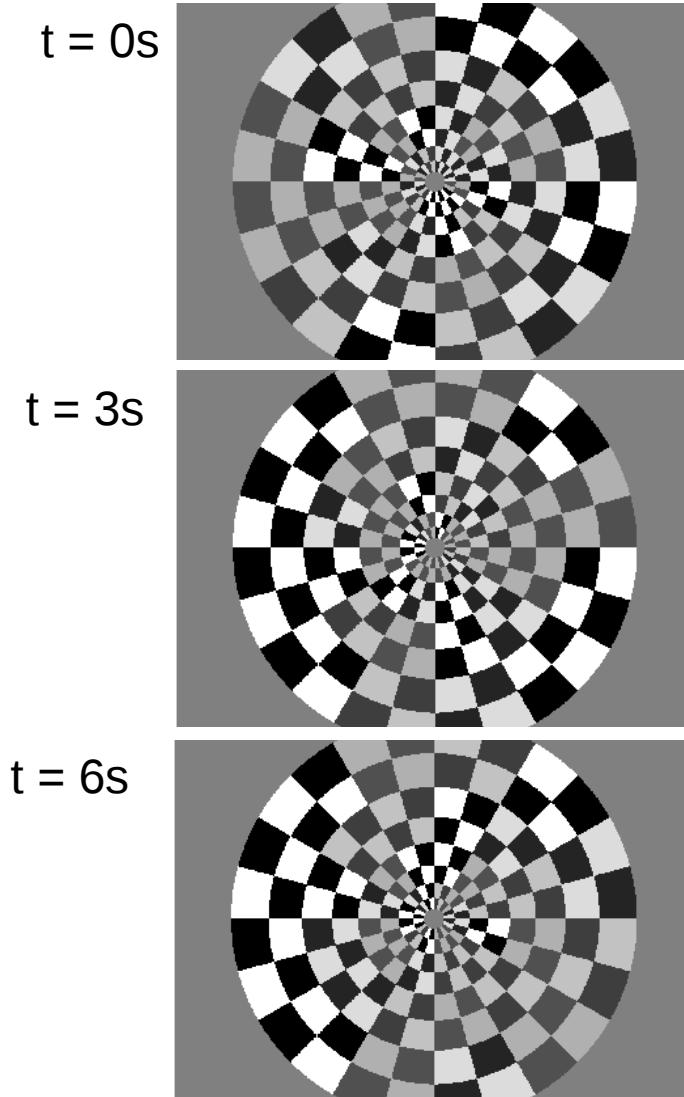


Reconstruct Stimuli



Observe Response

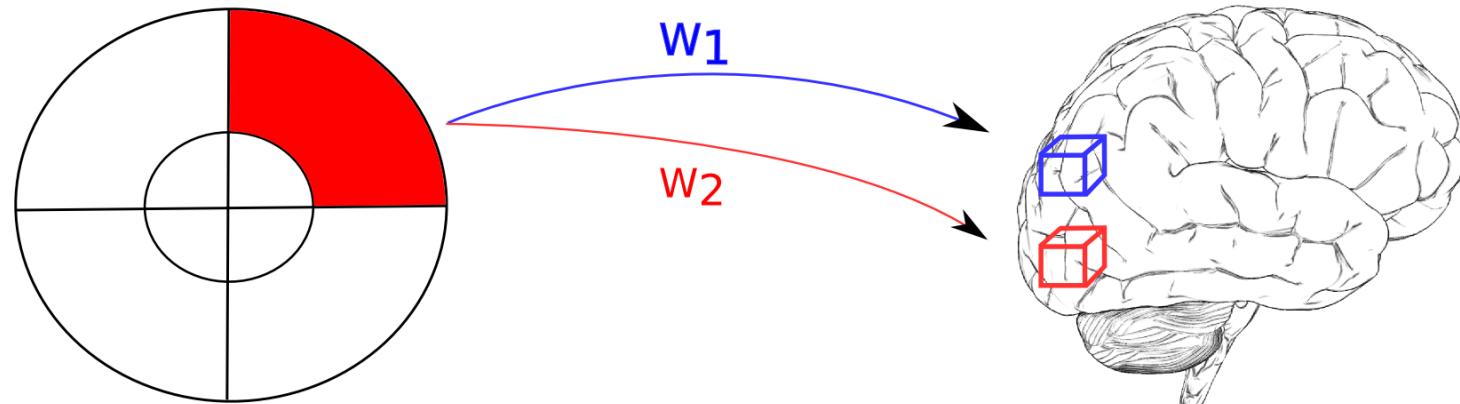
Experimental Setup



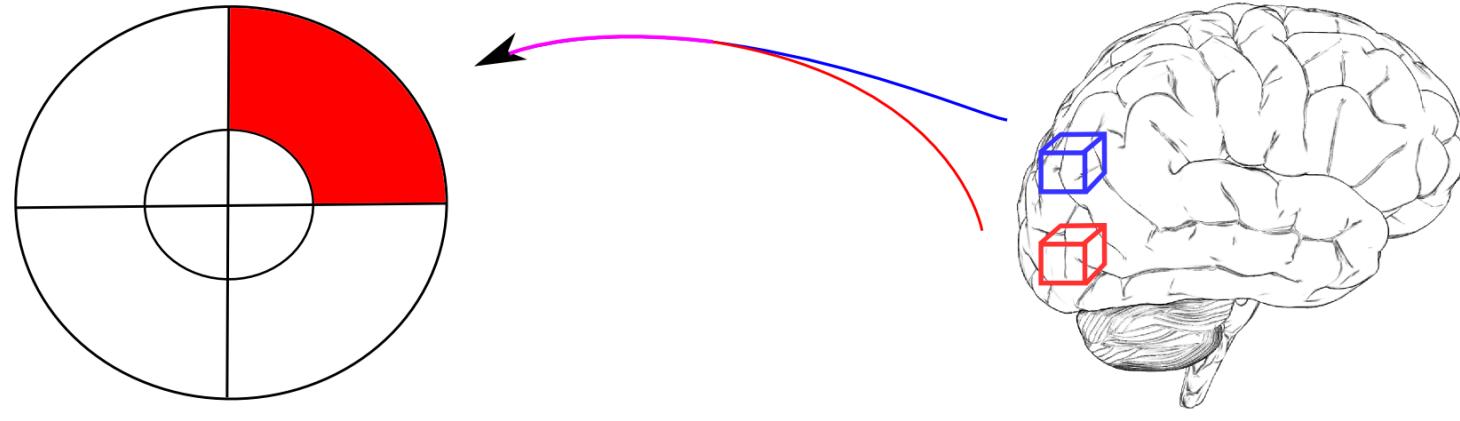
800 checkerboards were shown

Inverse Encoding Models

Encoding



Inverse Encoding



Stimulus Space

Voxel Space

Encoding (Training)

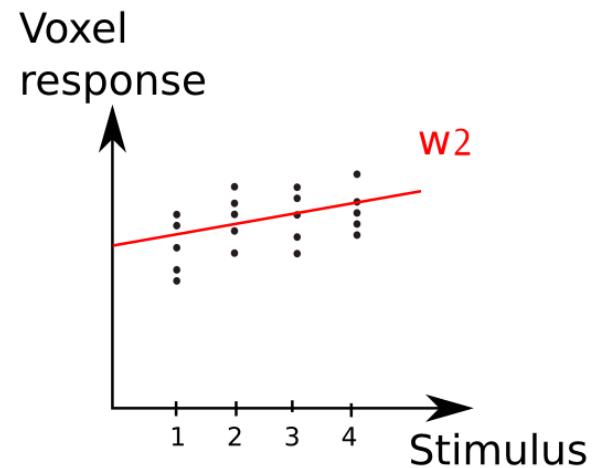
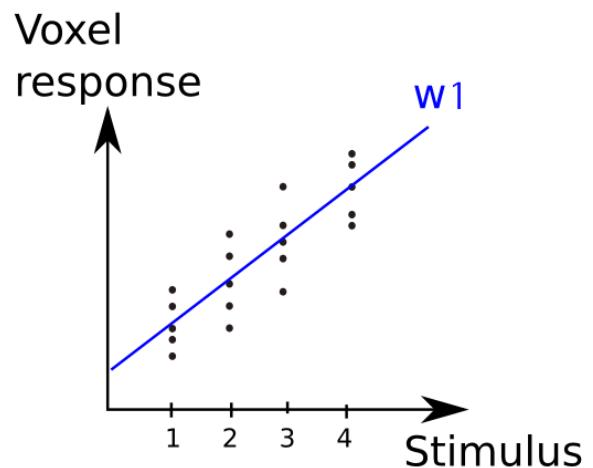
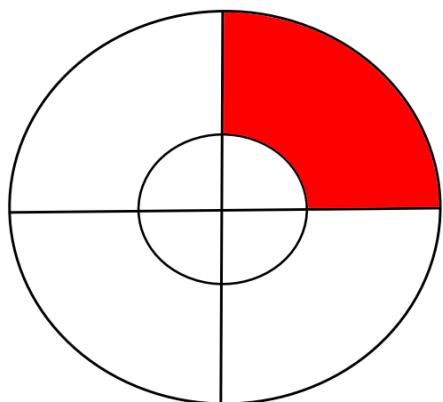
How does each voxel respond to a stimulus?

Voxel response = Stimulus * w

Univariate: each Voxel separately



Estimated by
least-squares regression



Inverse Encoding (Prediction)

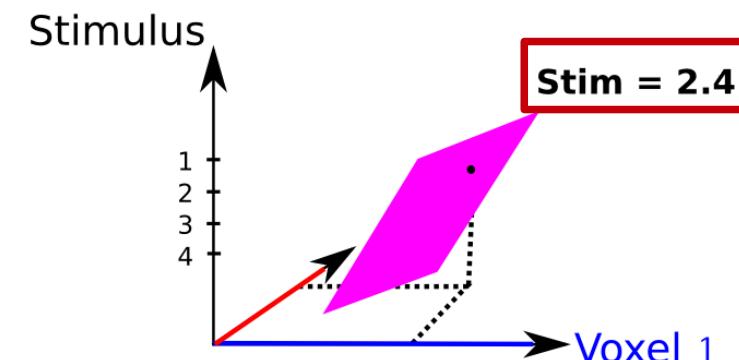
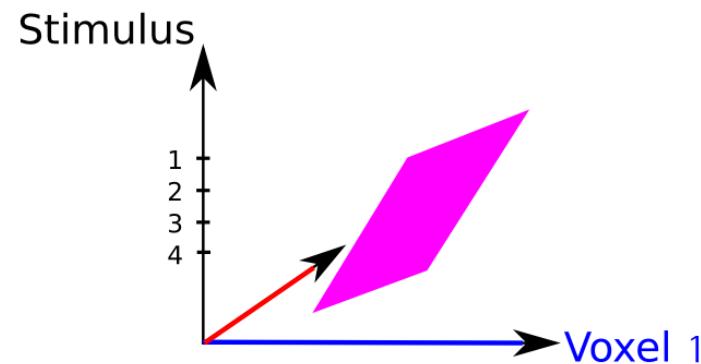
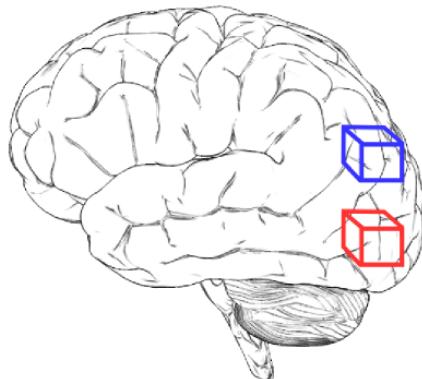
Given voxel responses, what was the most likely stimulus?

$$\text{Voxel response} = \text{Stimulus} * w$$

$$\text{Stimulus} = \text{Voxel response} * w^+$$

Univariate: each Voxel separately

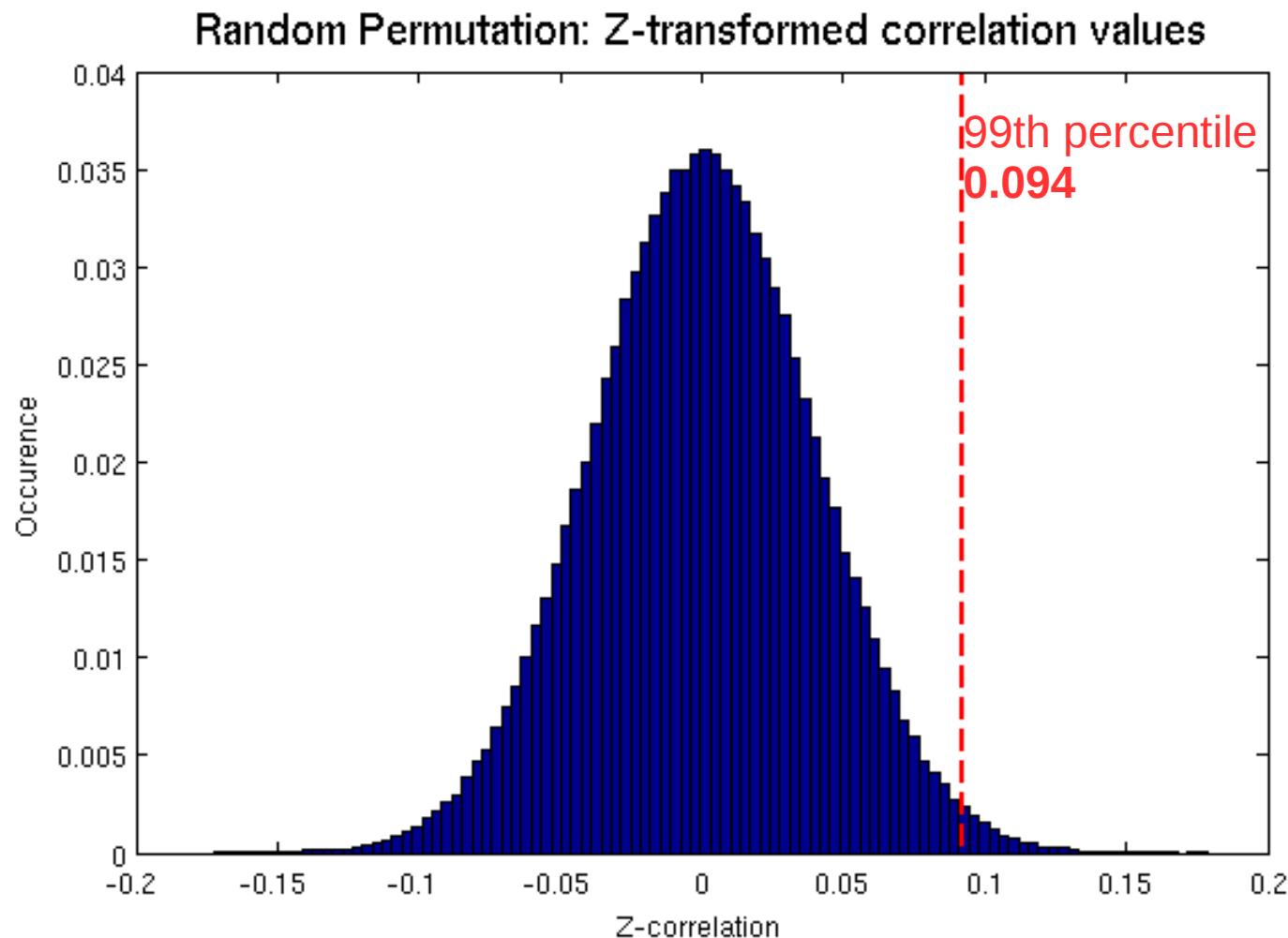
Multivariate: all Voxels contribute



Groups of voxels were used for Inverse Encoding (→ Searchlight)

Permutation analysis

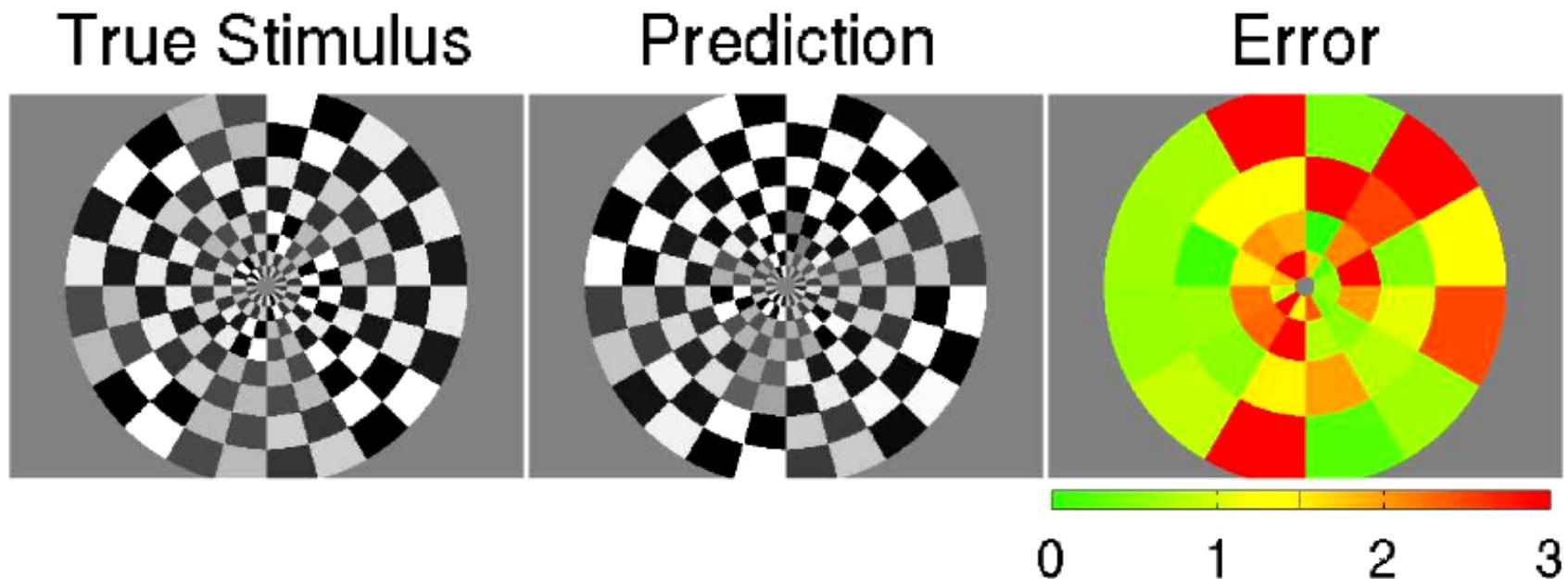
Determining significance:
What results do meaningless data produce?



Example Decoding

...using the 5 best searchlights determined by nested cross-validation

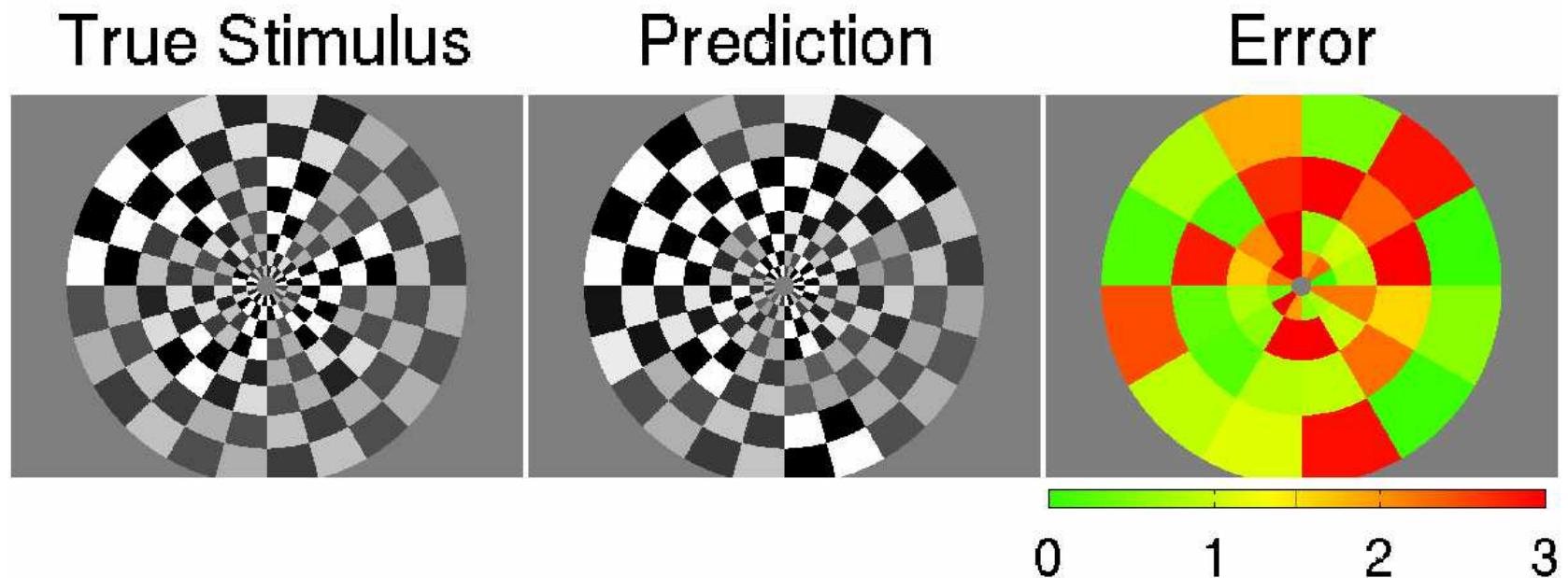
Trained on 700 Stimulus examples



Example Decoding

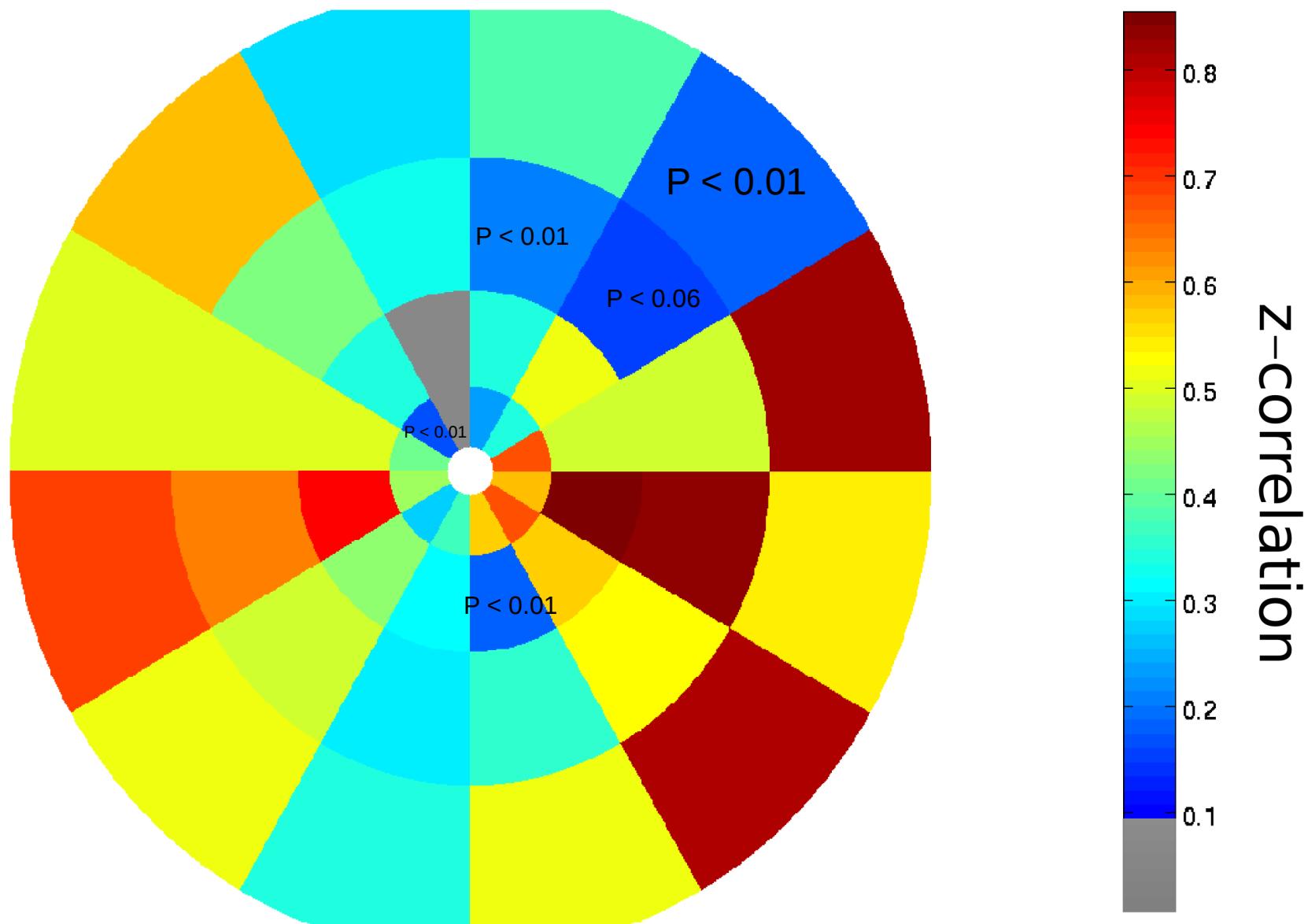
...using the 5 best searchlights determined by nested cross-validation

Trained on 700 Stimulus examples



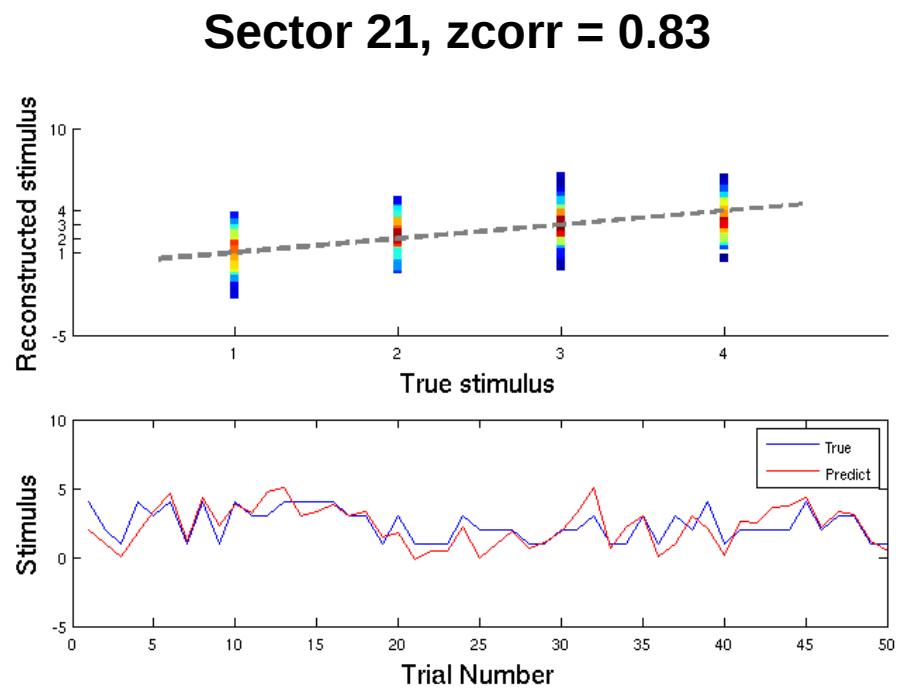
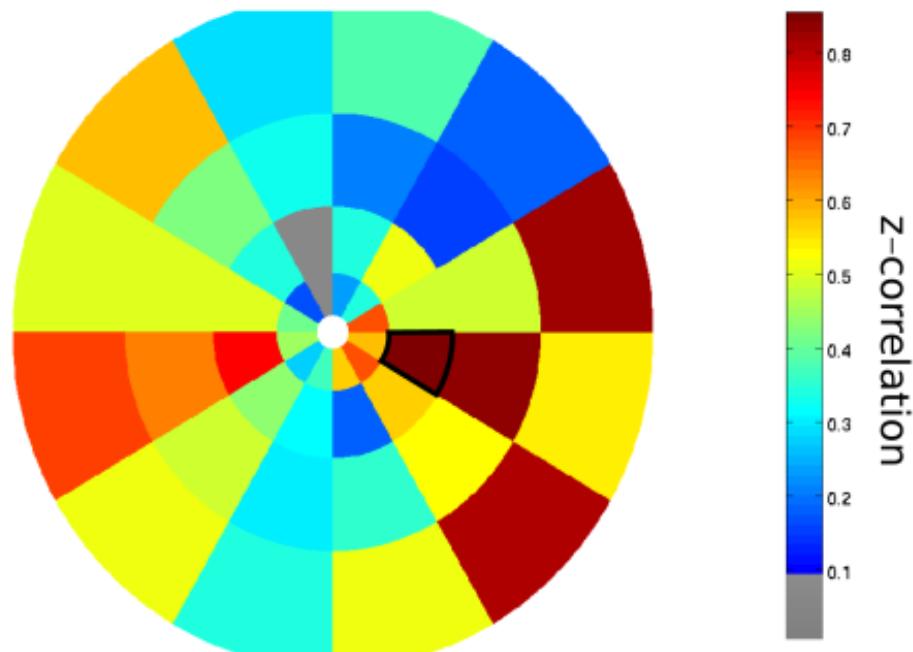
Reconstruction performance

using the 5 best searchlights determined by nested cross-validation



Reconstruction performance

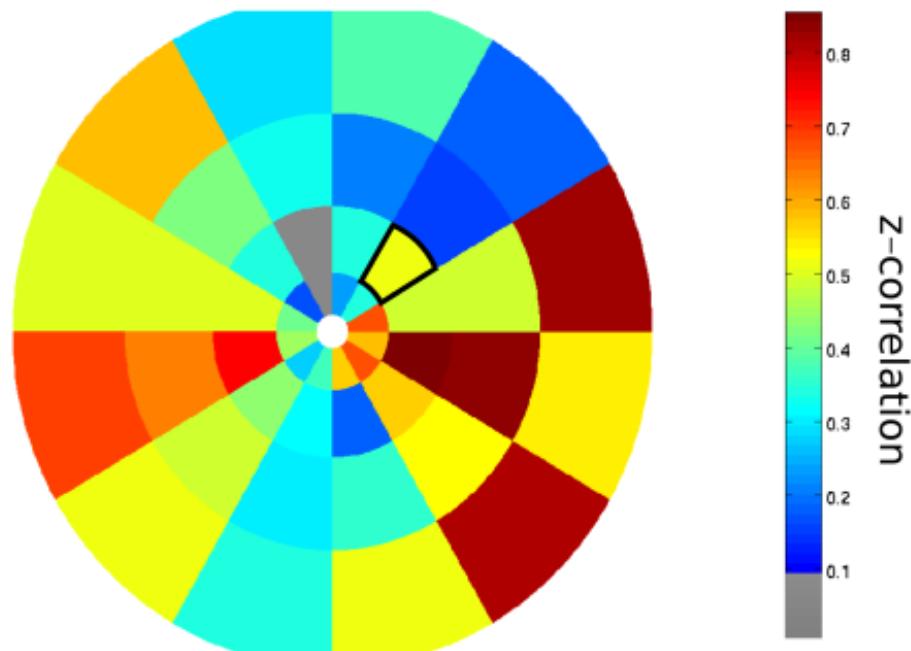
using the 5 best searchlights determined by nested cross-validation



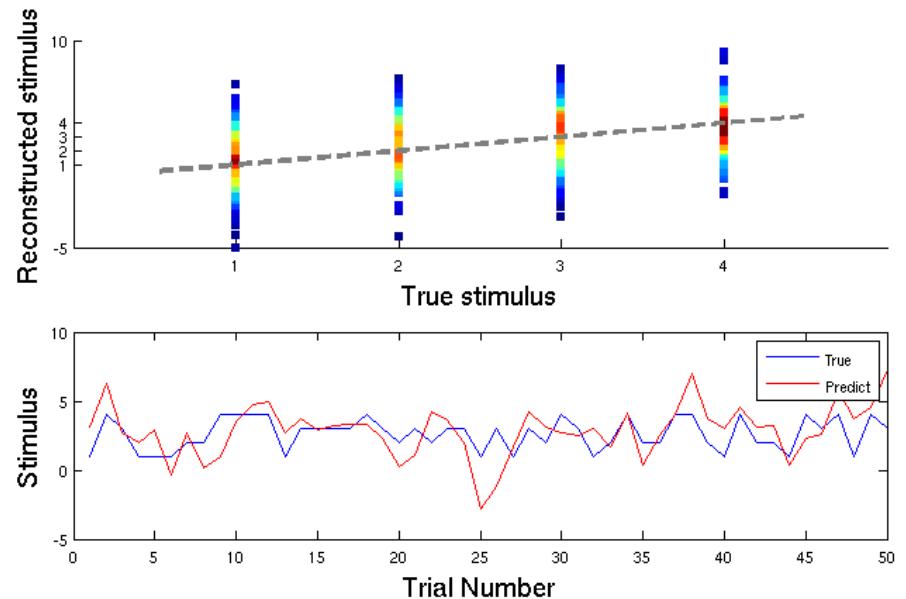
Some sectors can be reconstructed **well**, ...

Reconstruction performance

using the 5 best searchlights determined by nested cross-validation



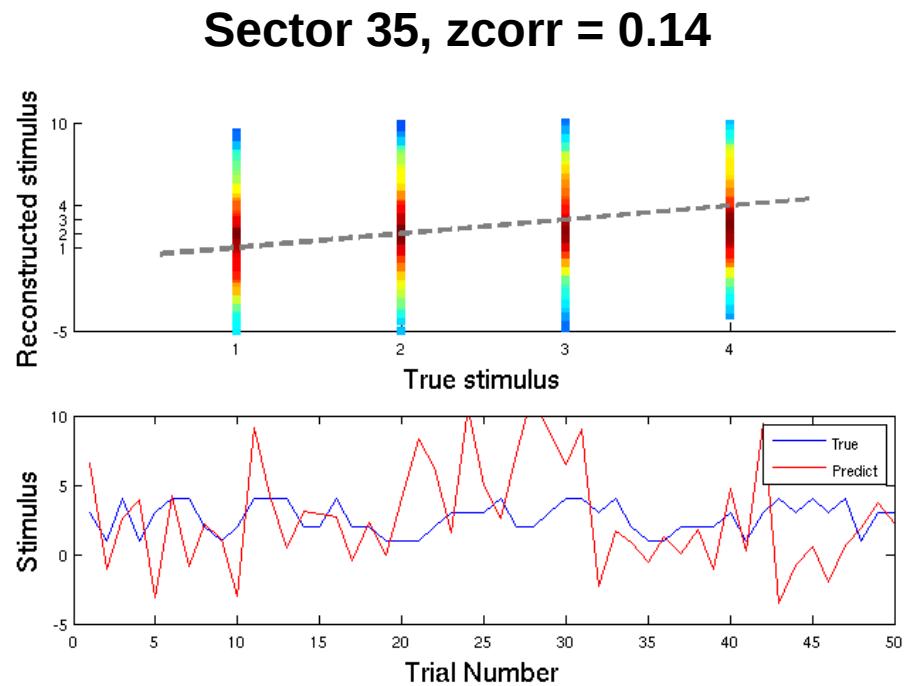
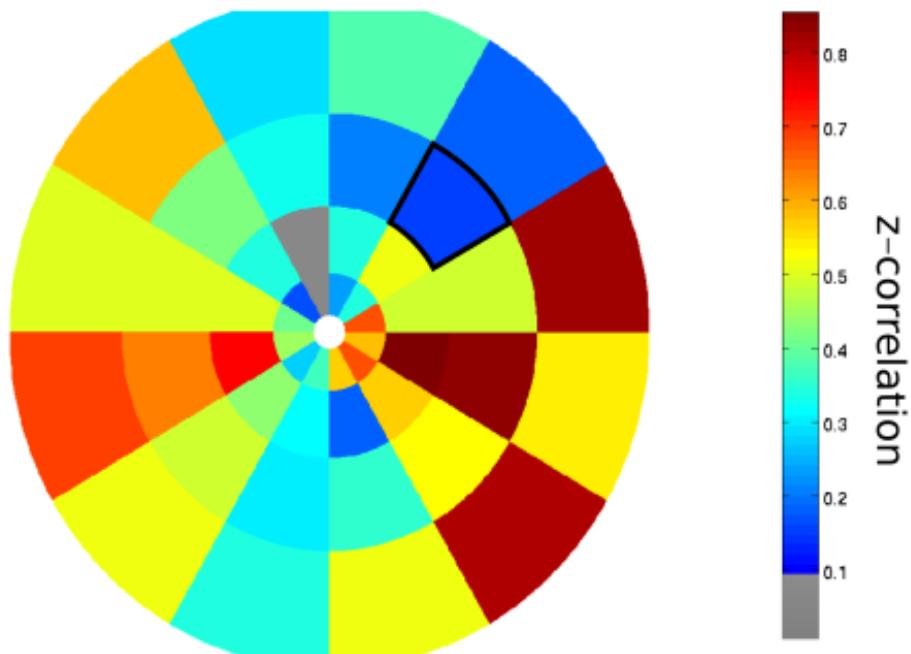
Sector 23, zcorr = 0.55



...some sectors just **medium** ...

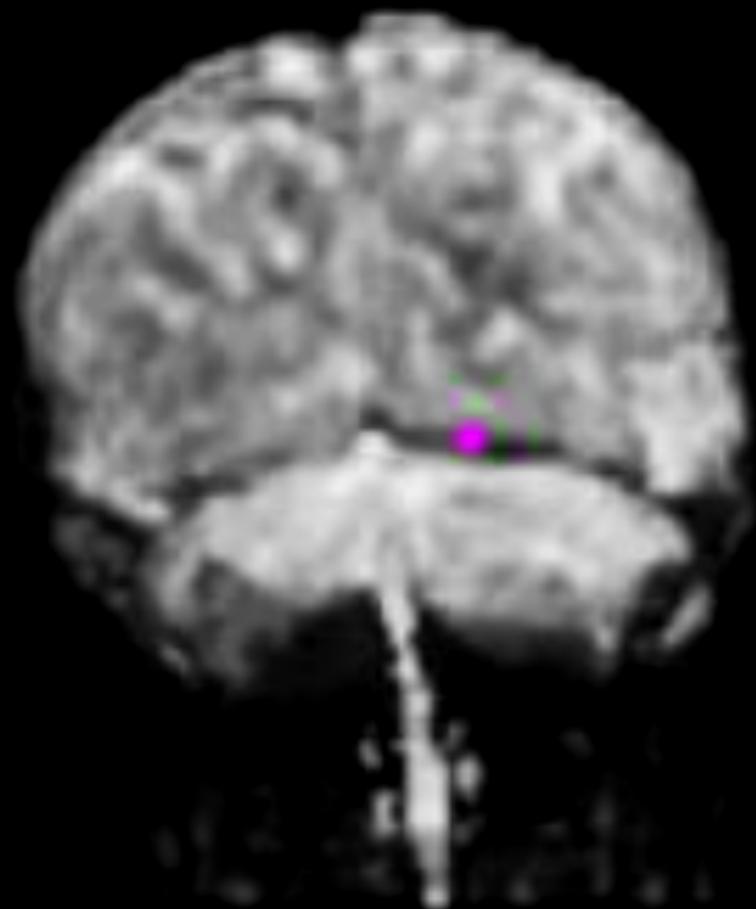
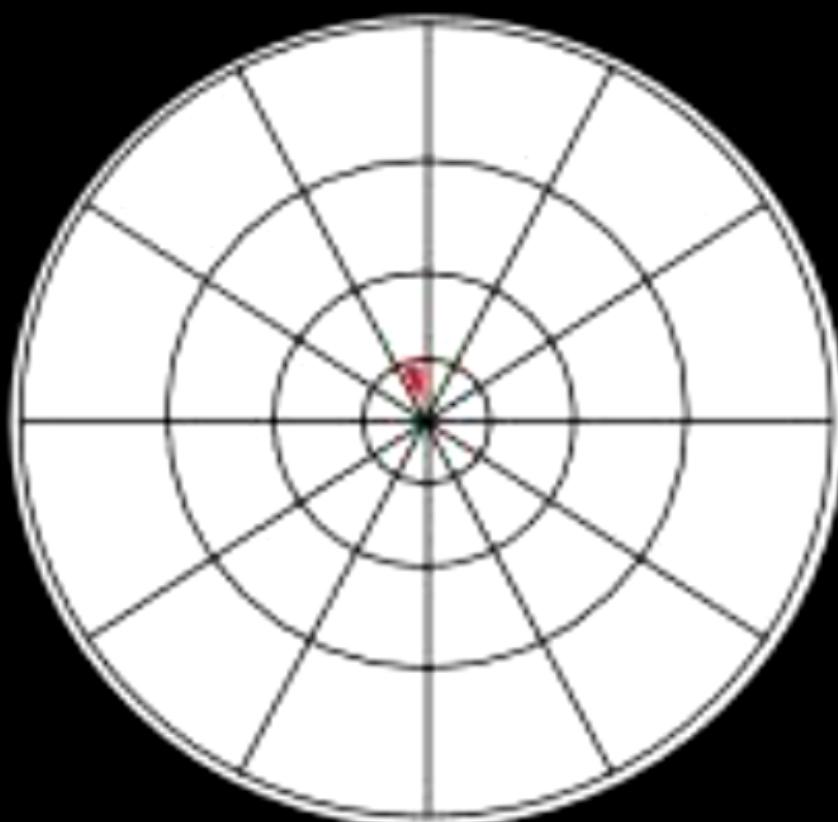
Reconstruction performance

using the 5 best searchlights determined by nested cross-validation

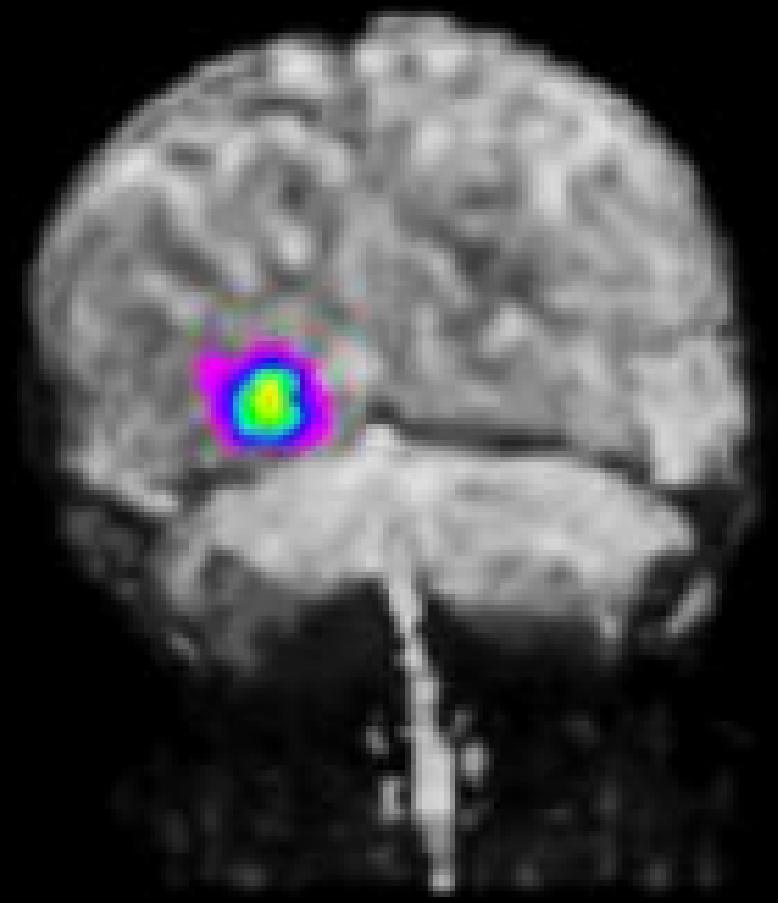
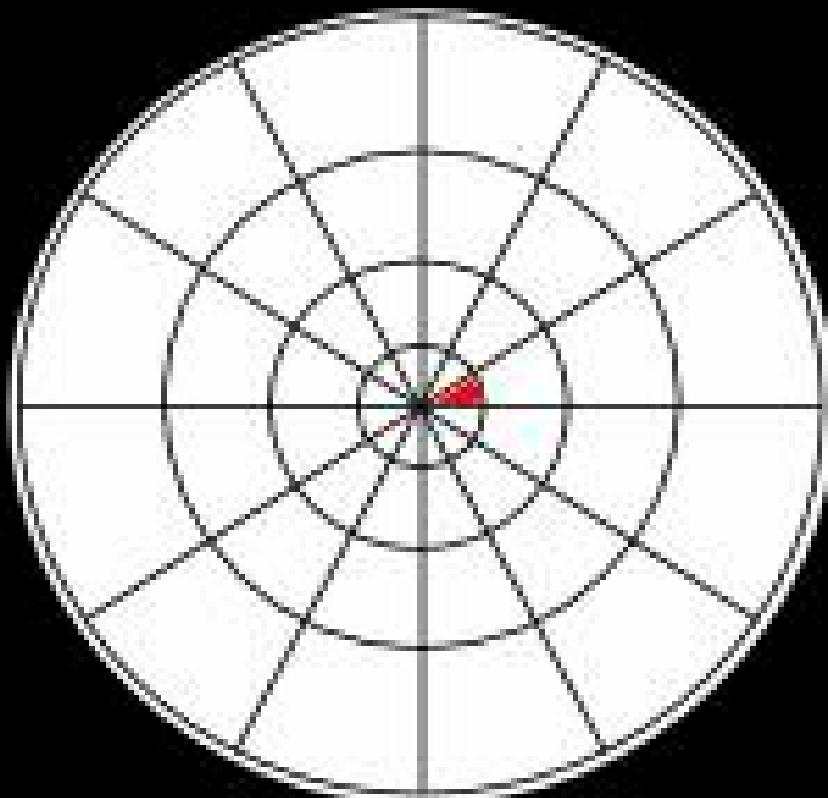


... and some are **barely** reconstructed.

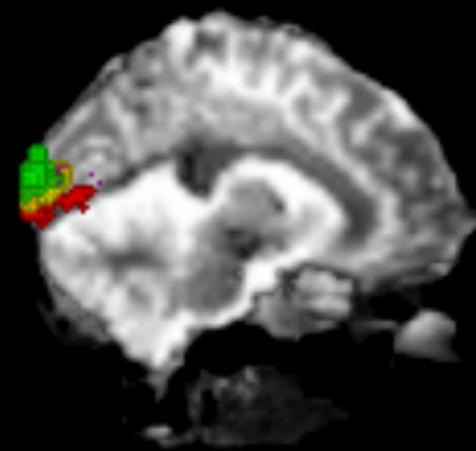
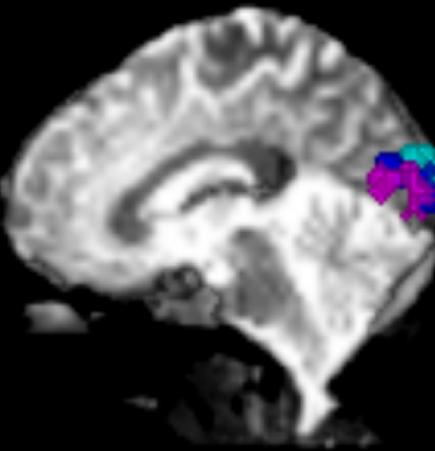
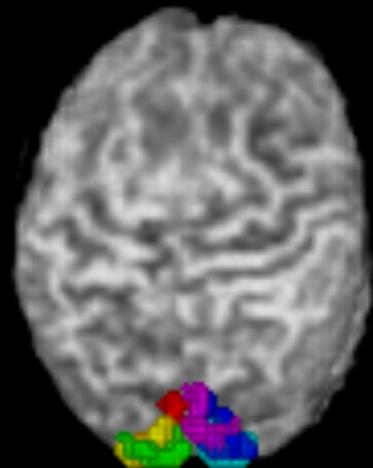
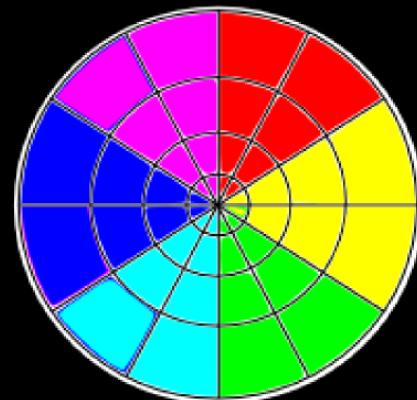
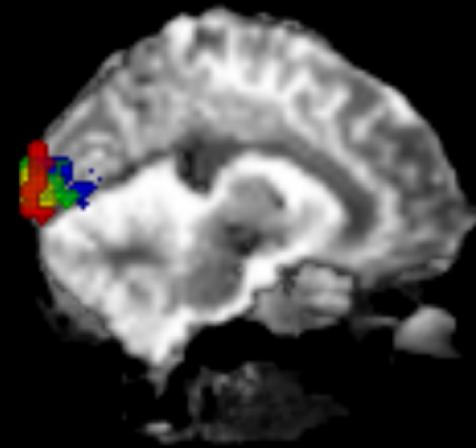
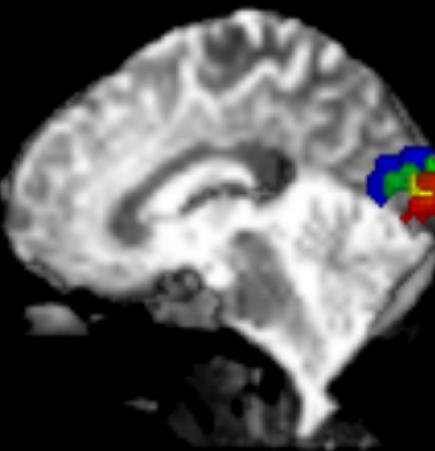
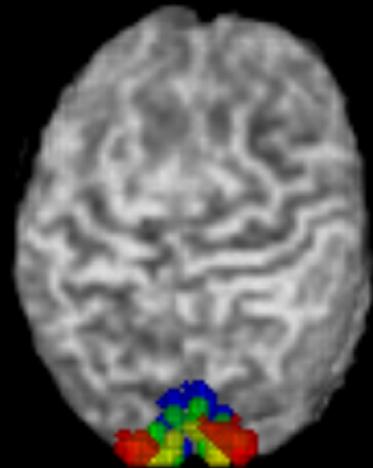
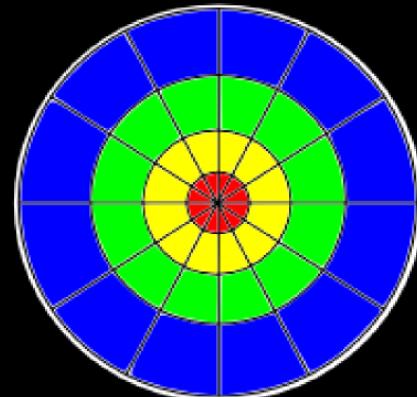
Which voxels are used for decoding?



Which voxels are used for decoding?

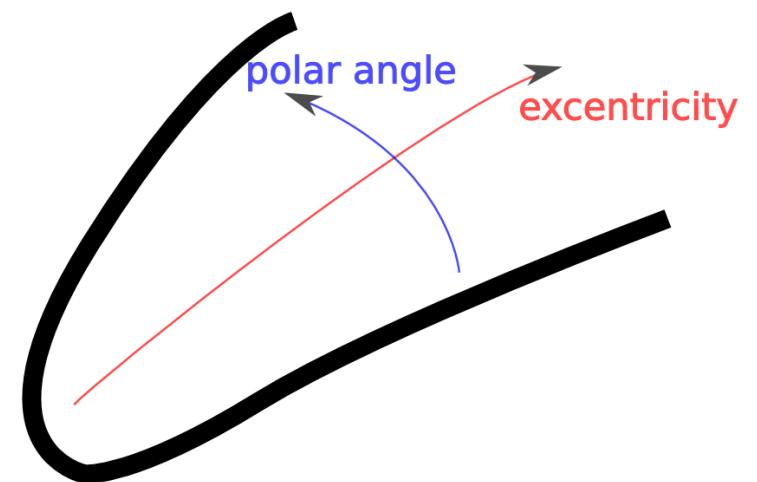
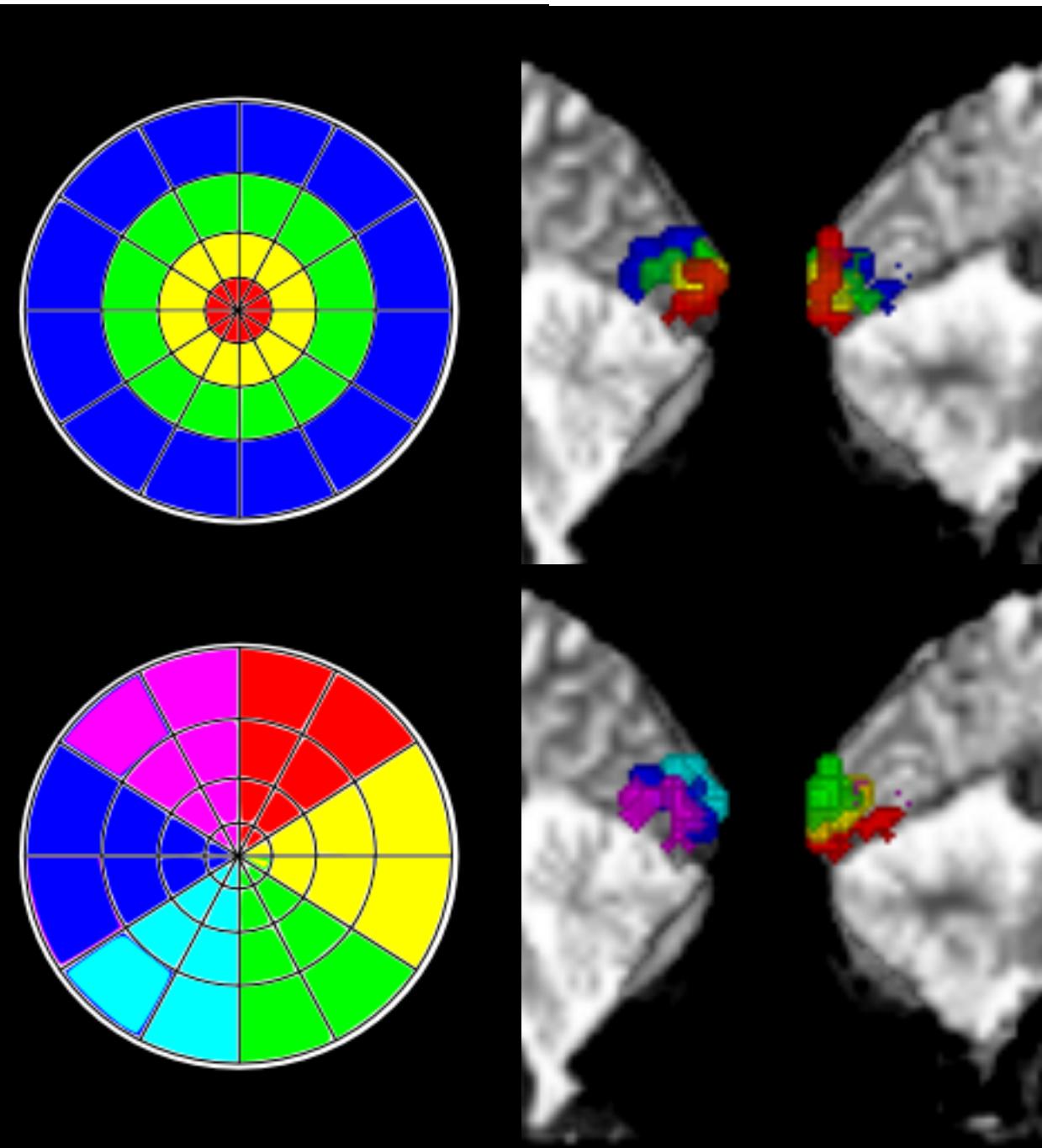


Retinotopic mapping



Colored: top-5 voxels of each segment

Retinotopic mapping



Trained on 700 Stimulus examples

Das Ding vl einfach weg? ^^

