

WORD AND OBJECT RECOGNITION

an fMRI data analysis



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MOTIVATION

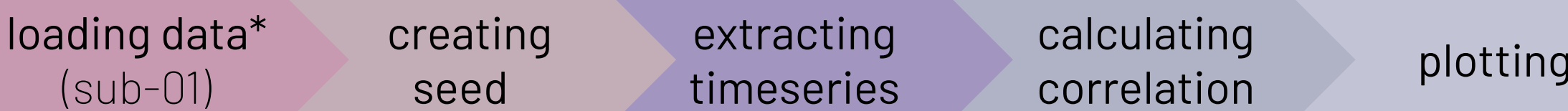
The goal of this analysis was to investigate brain areas that are active during reading and object recognition (step 1). Occipito-temporal cortex is the main area of activation, yet the exact areas for both of these activities may differ from one another within this region. Furthermore, this analysis examined how well brain activity from the subject one corresponds to the mean activation areas derived from 49 subjects (Duncan *et. al* 2009) for reading and object recognition (step 2).

METHODS

GLM analysis – step 1



Seed-to-voxel analysis - step 2



* data was preprocessed using fMRIPrep

CONCLUSIONS

GLM analysis

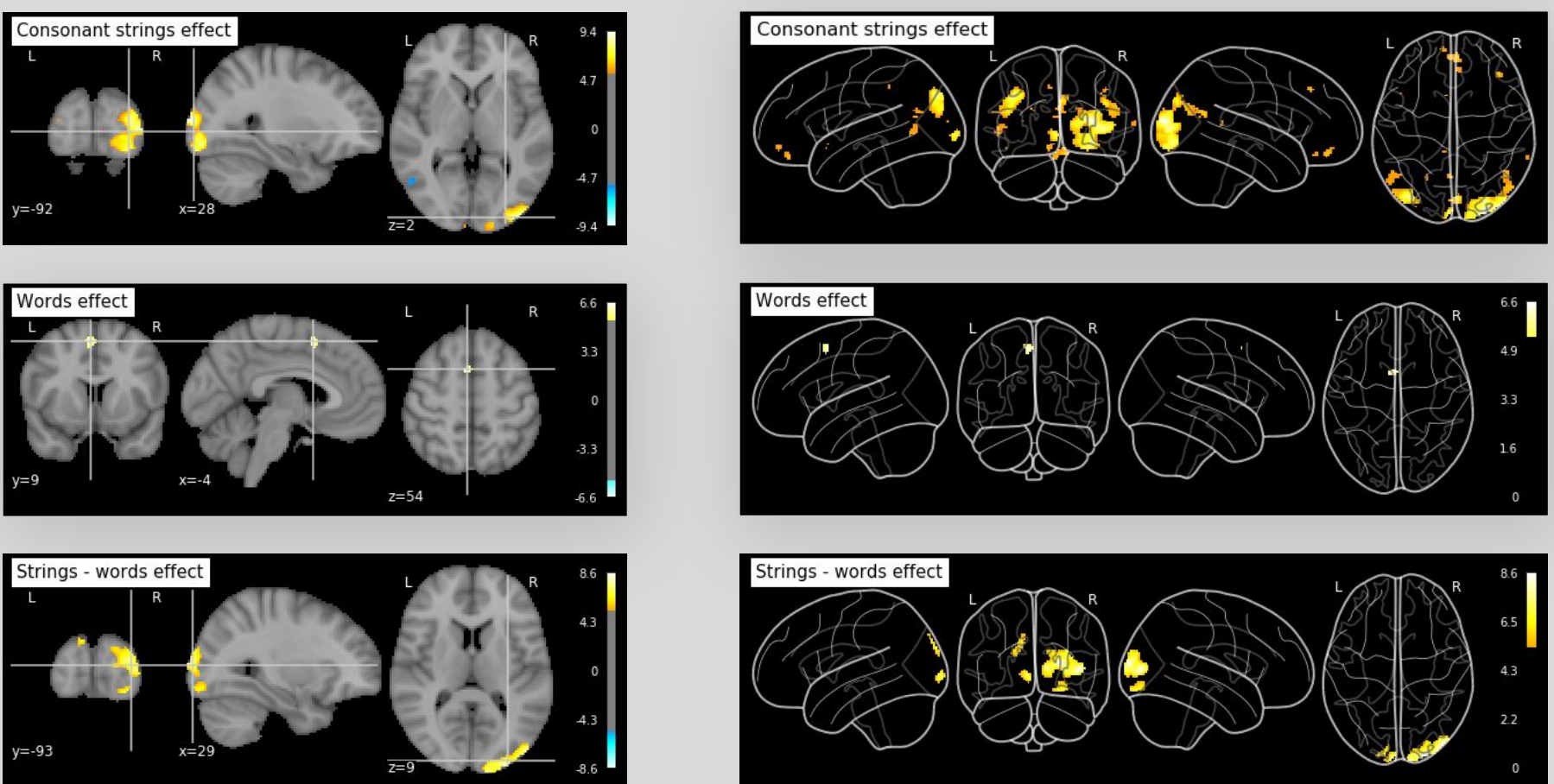
Analysis of the data derived from subject one shows that the occipito-temporal cortex in the **right hemisphere** is the most active brain region during word and object recognition. Two important areas can be distinguished in particular: **ventral occipito-temporal cortex** (word recognition) and **lateral occipito-temporal cortex** (object recognition).

Seed-to-voxel analysis

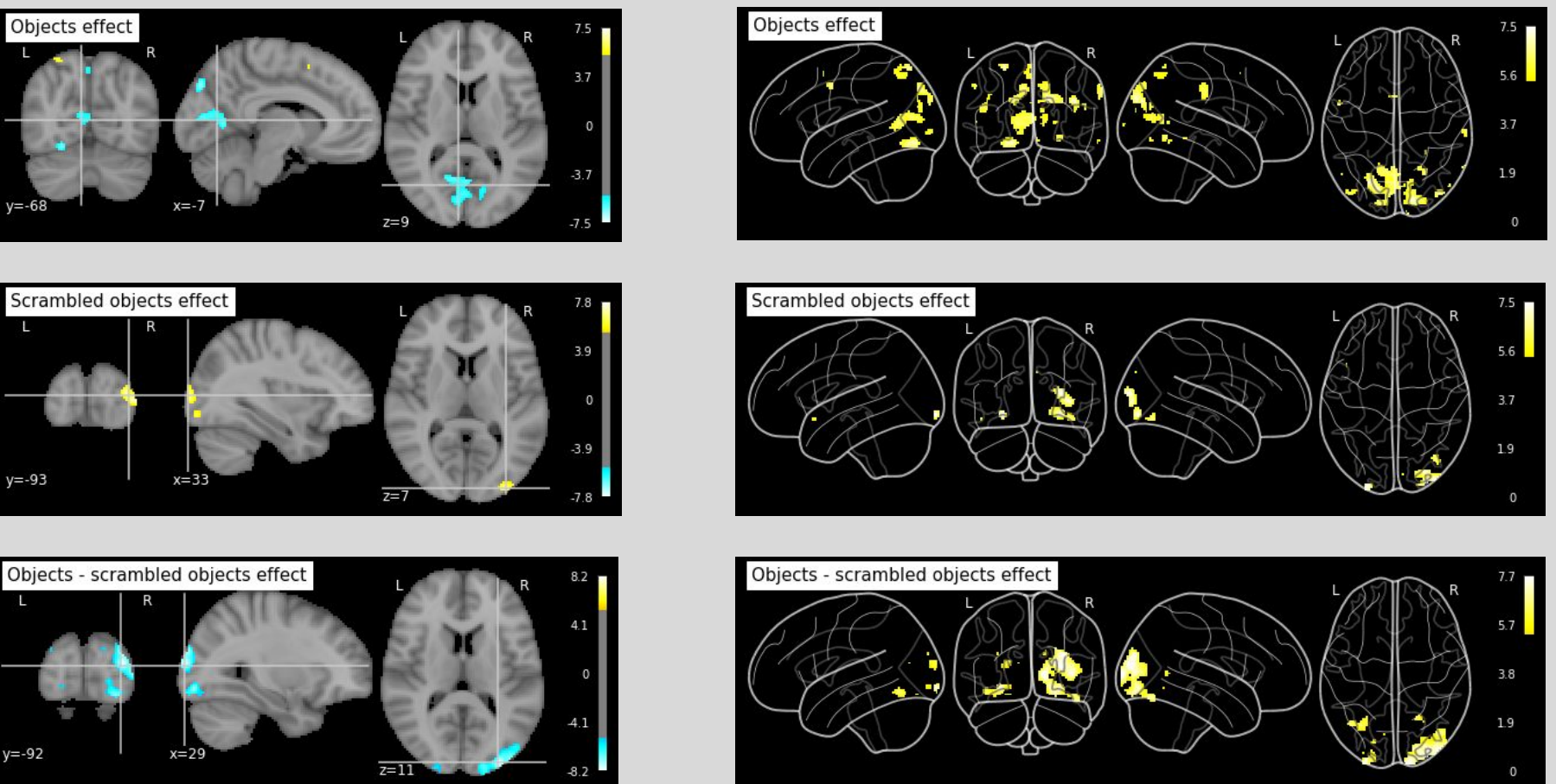
Subject's brain activation region for both word processing and object processing coincides well with the mean activation area, however, the brain activation area for object recognition is bigger compared to the area for word recognition.

RESULTS

WORD RECOGNITION

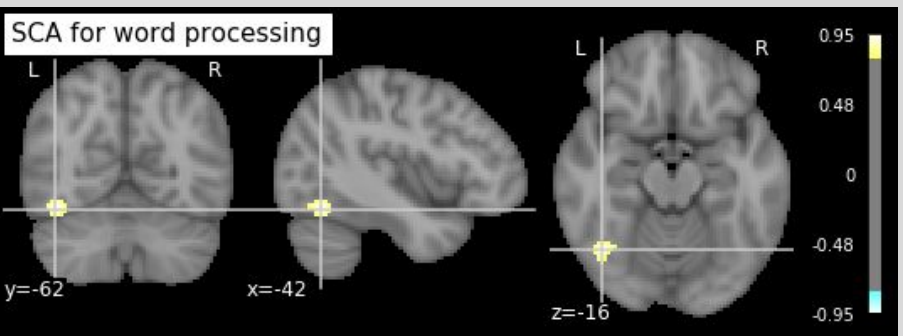


OBJECT RECOGNITION

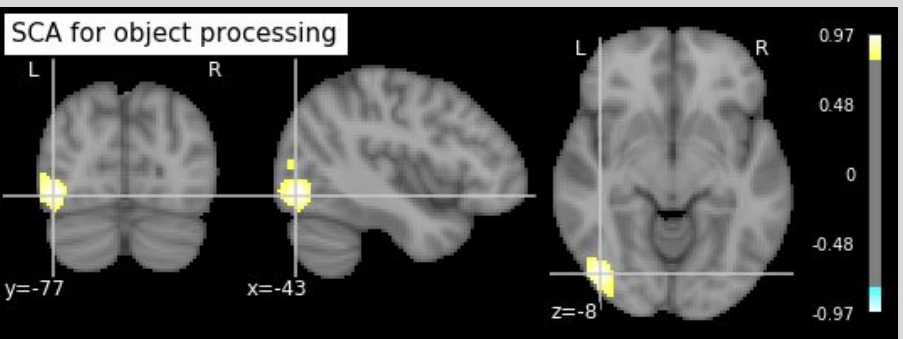


SEED-TO-VOXEL ANALYSIS

Mean MNI coordinates: -42, -62, -16
(ventral occipito-temporal cortex)



Mean MNI coordinates: -43, -77, -8
(lateral occipito-temporal cortex)



GLM parameters:

alpha – .01
threshold – 5.456
smoothing – 8
high pass filtering – .01 Hz

REFERENCES

[1] Duncan, K.J., Pattamadilok, C., Knierim, I., Devlin, J.T. (2009). Consistency and variability in functional localisers. *Neuroimage*, 46(4):1018-26. doi: 10.1016/j.neuroimage.2009.03.014

[2] Dataset: OpenfMRI project (<http://www.openfmri.org>); Accession: ds107

+ special thanks to Karolina Finc for data preprocessing

– Code available at: github.com/igaadamska/fmri-analysis-materials - Word and object processing - fMRI analysis.ipynb –