

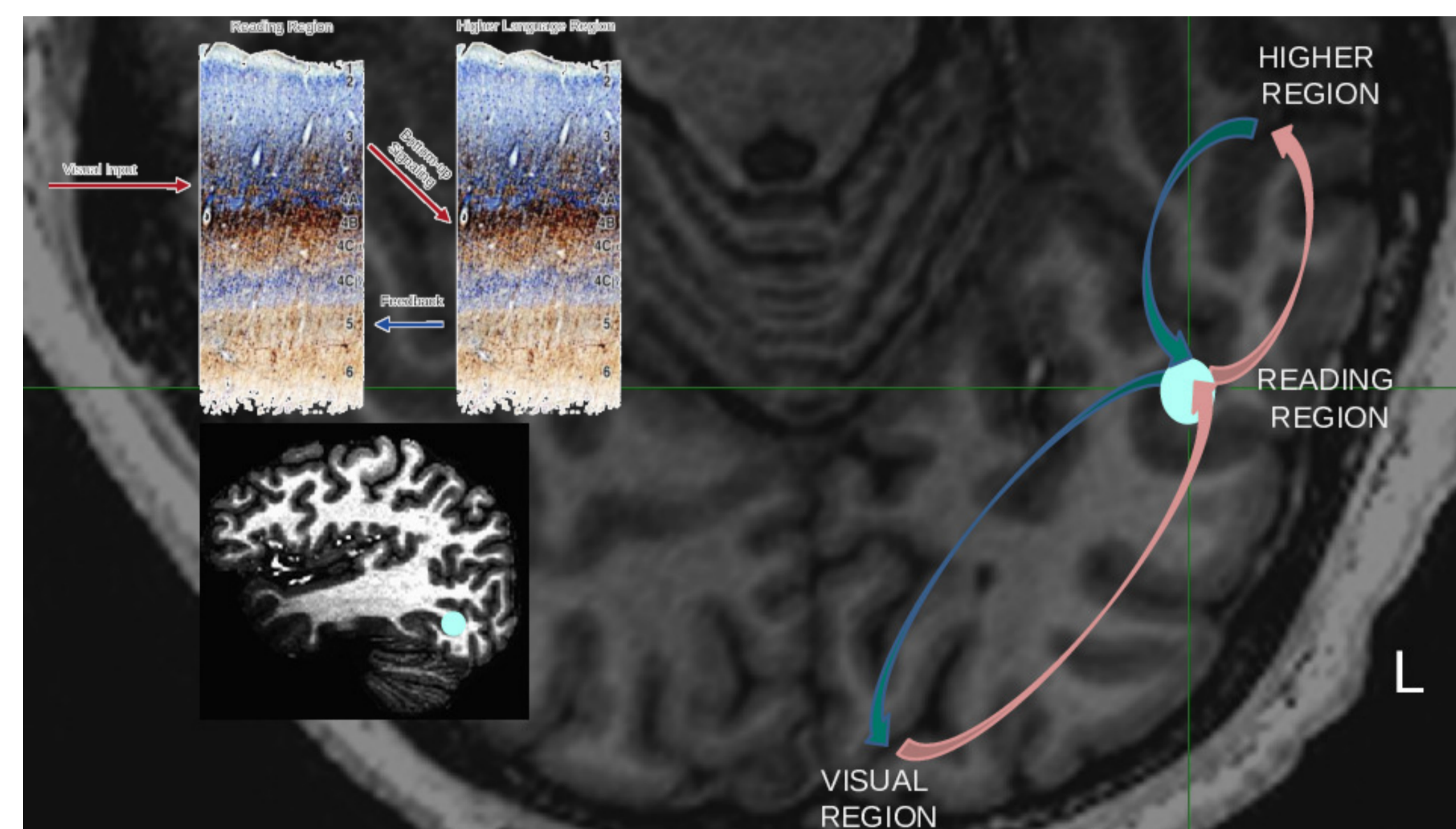
Depth-Dependent BOLD as a Measure of Directed Connectivity During Language Processing

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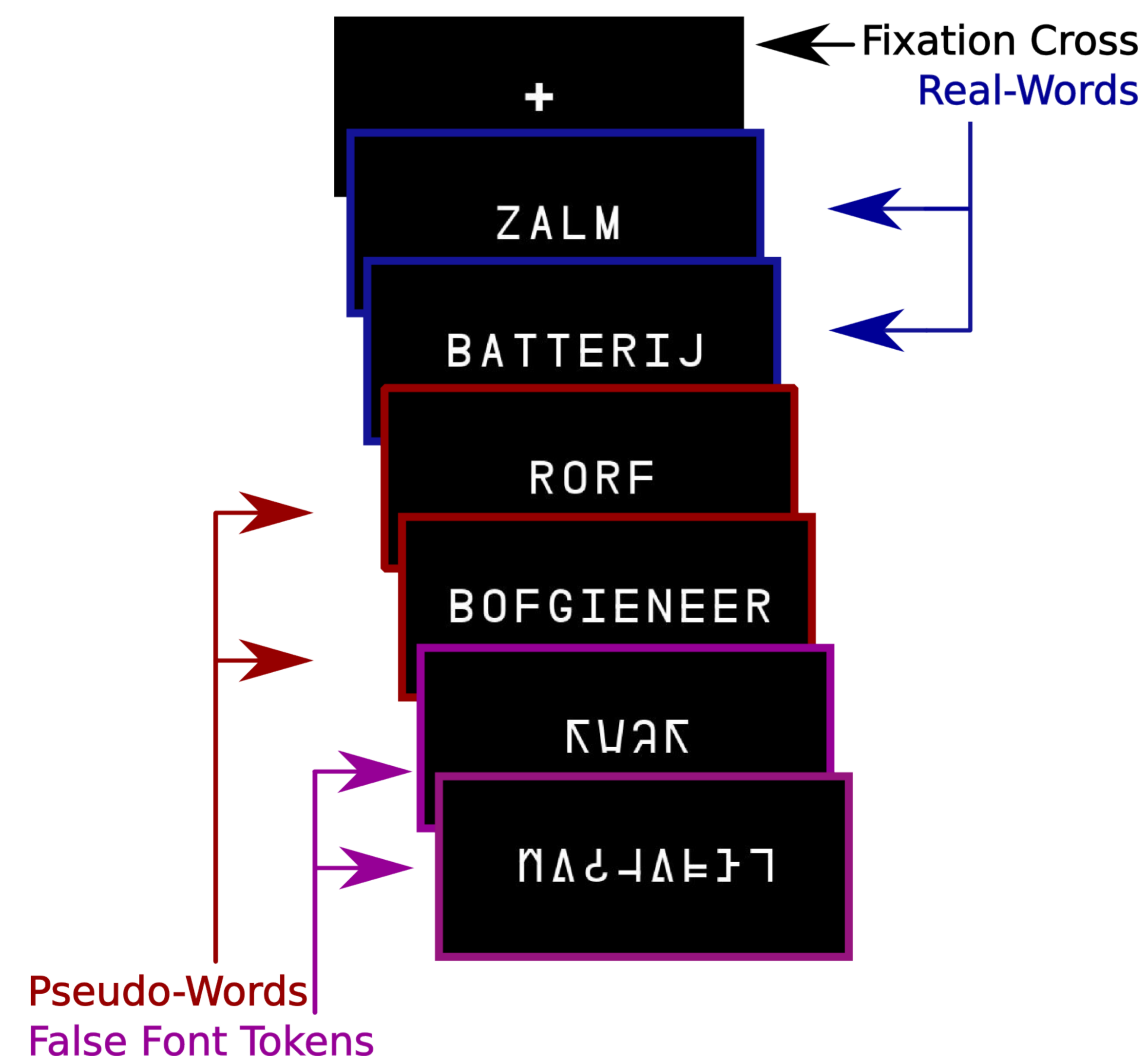
Introduction

- The input/output topology of neocortical circuits is known to be organized with respect to cortical laminae,⁴ and blood supply has been shown to be regulated at this level^{1,8}
- A growing body of evidence suggests high-field MRI is capable of resolving laminar specific BOLD responses^{5,6,8,9}
- This work demonstrates whole brain, laminar connectivity during a reading task.
- Noninvasively disentangles directed information streams through the brain during reading, on the basis of cortical depth dependent BOLD in the ventral occipital sulcus (vOT)



Forward and back propagating information through vOT. Inset shows depth-dependent model of information flow.

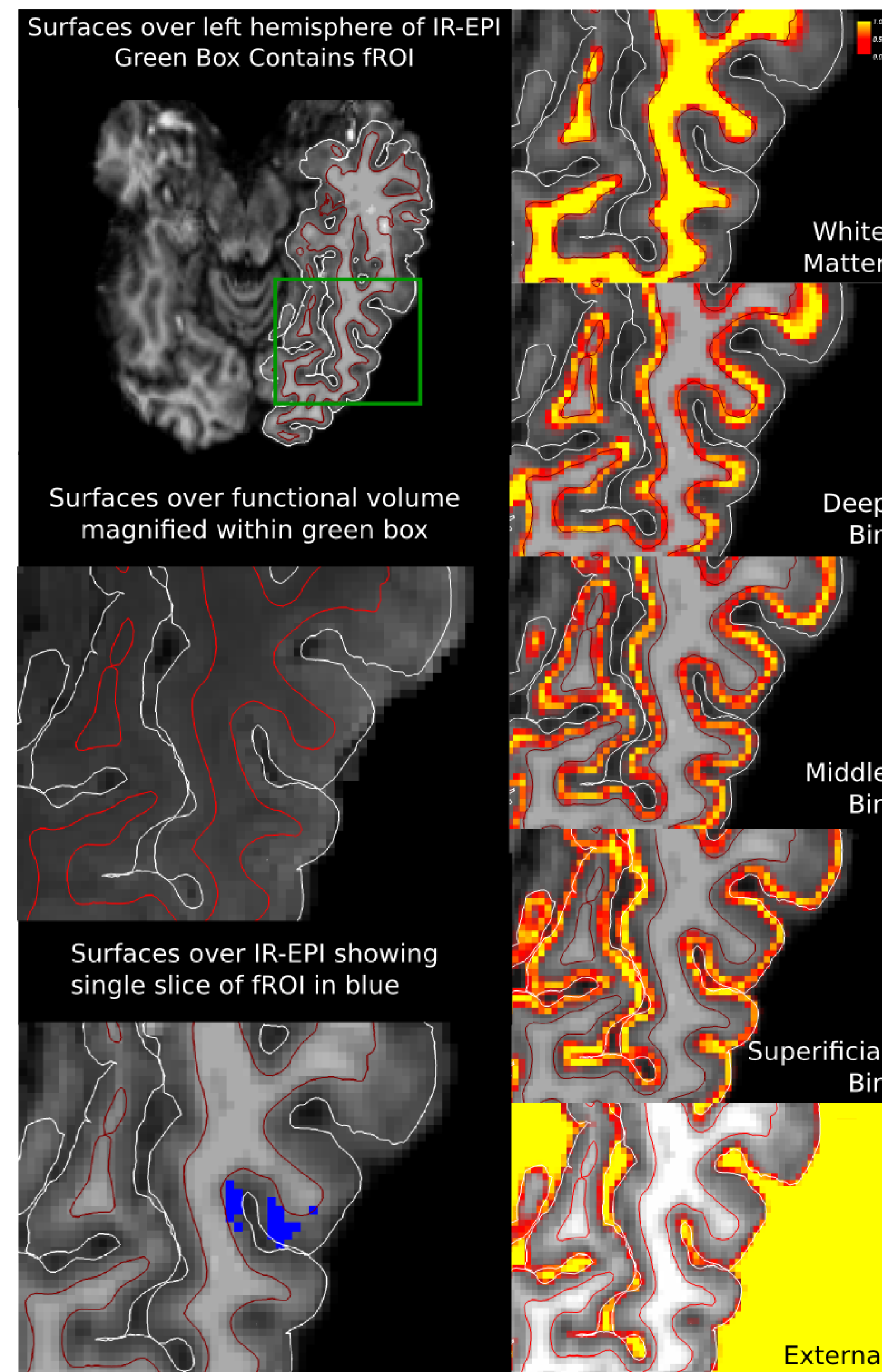
Task Procedure



Pseudo-Words
False Font Tokens



Acquisition and Analysis Procedure

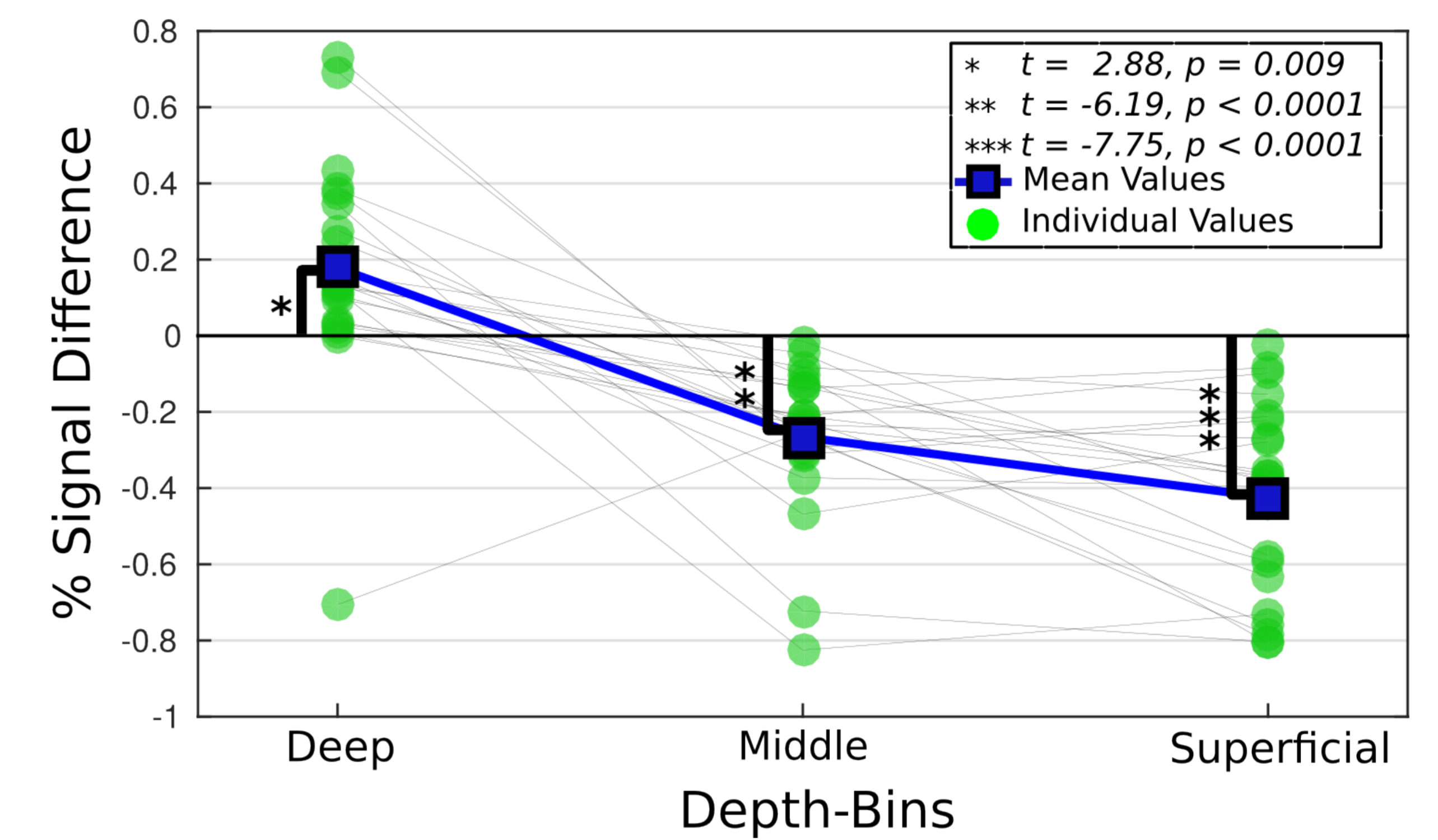


Layering shown over different acquisitions for a single subject.

- Data acquired on Siemens 7T scanner at Erwin L. Hahn Institute
- Segmentation and depth parcellation performed on IR-EPI
- Depth parcellation follows level-set method of Waehnert et al.^{10,11}
- Single subject laminar signal extracted using spatial GLM on fROIs¹⁰
- Individual fROIs selected by weighted contrast of T-scores for words and pseudowords against false fonts

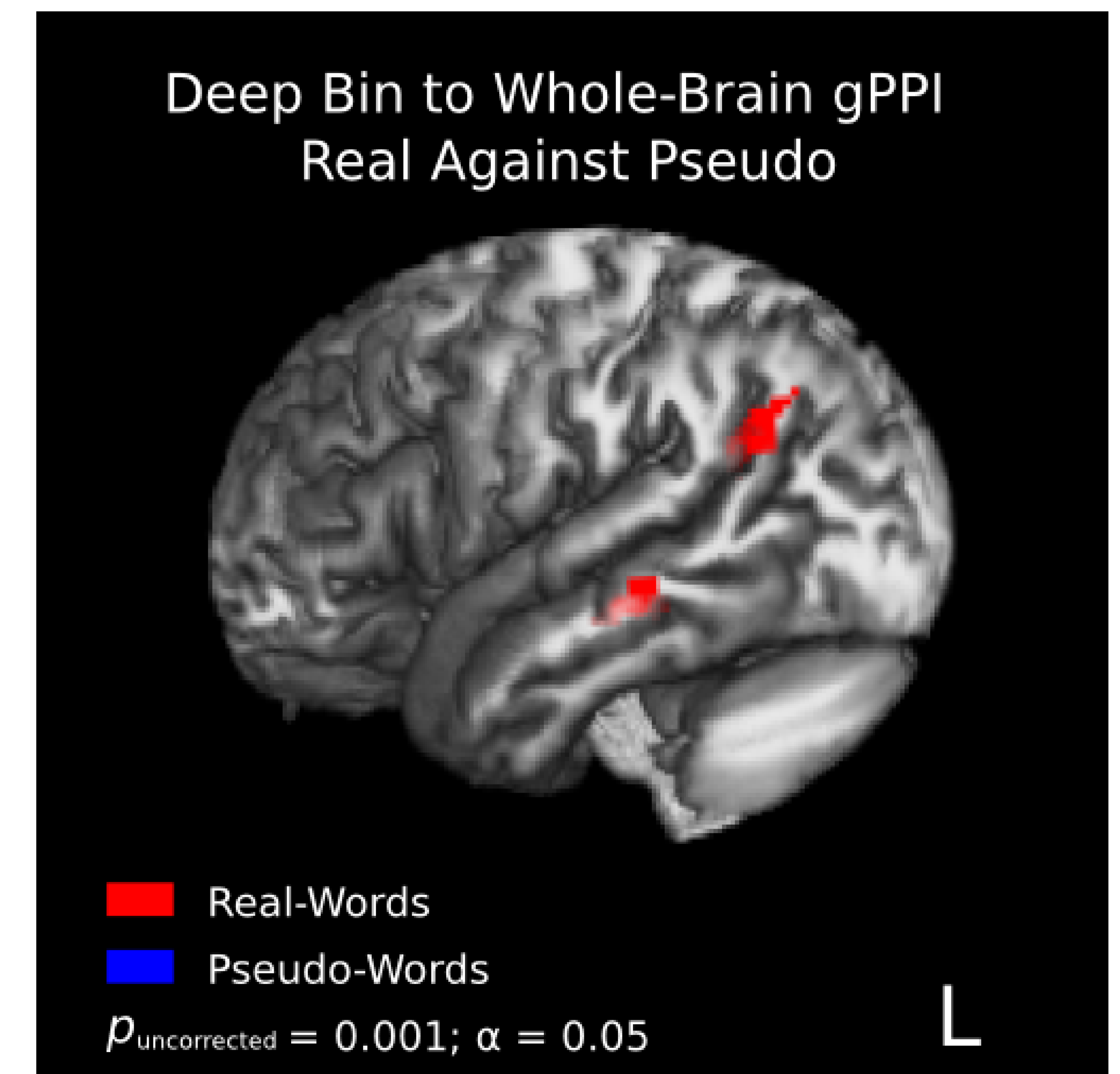


Depth-dependent task responses



Real - Pseudo T-Scores for group shown at each depth-bin

Depth-dependent connectivity during task



Whole brain gPPI connectivity seeding from the deep bin of vOT. No significant finding for the middle bin.

References

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