# Characterising the cortical gradients of laminar thickness similarity

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## INTRODUCTION

- Cortical sheet consists of six distinct layers
- Layers have unique microstructural and functional properties
- Superficial (supragranular) layers (L I-III) ➔ Ascending (feed-forward) inter-areal connections: Low-level prediction errors
- Deep (infragranular) layers (L V-VI) ➔ Descending (feed-back) interareal connections: High-level predictions
- Cortical types: regions with comparable laminar structure
- "The Structural Model": Cortical type ~ connections, plasticity and development[1].
- Spatial variation of laminar differentiation across cerebral cortex along "sensory-fugal" axis ➔ ↓ laminar differentiation
- Our aim: Using a data-driven dimensionality reduction approach on the BigBrain map of cortical layers to probe along which organisational axes laminar structure covaries in the cortex

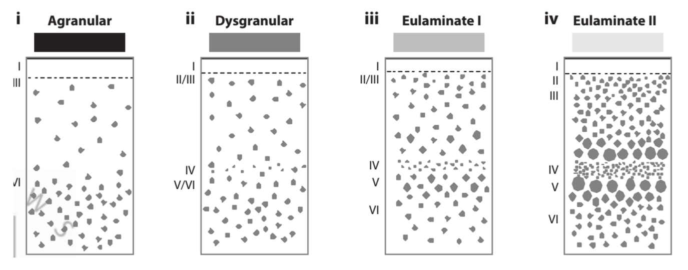


Figure 1. Cortical types.

## METHODS

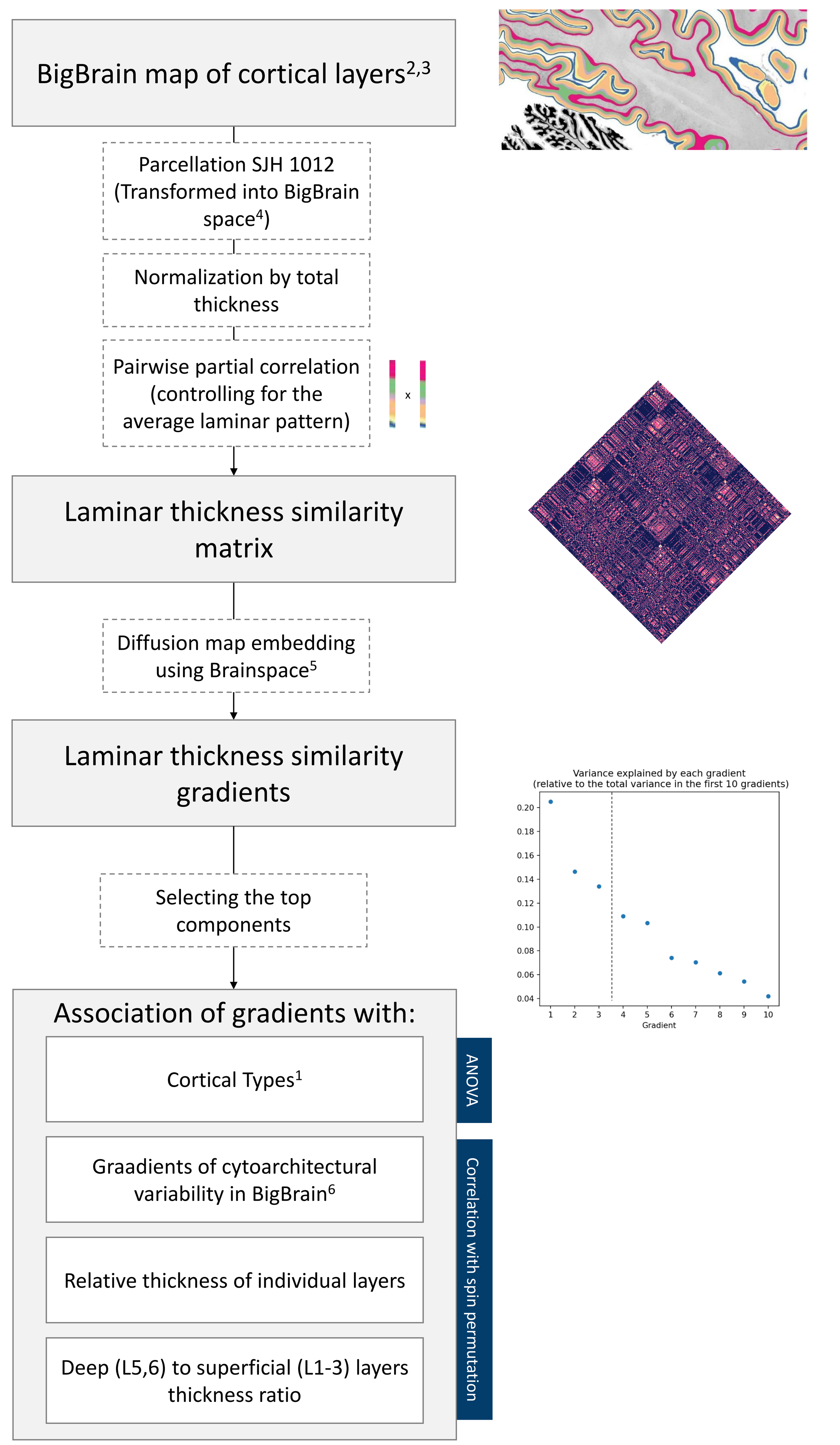


Figure 2. Workflow overview.

## RESULTS

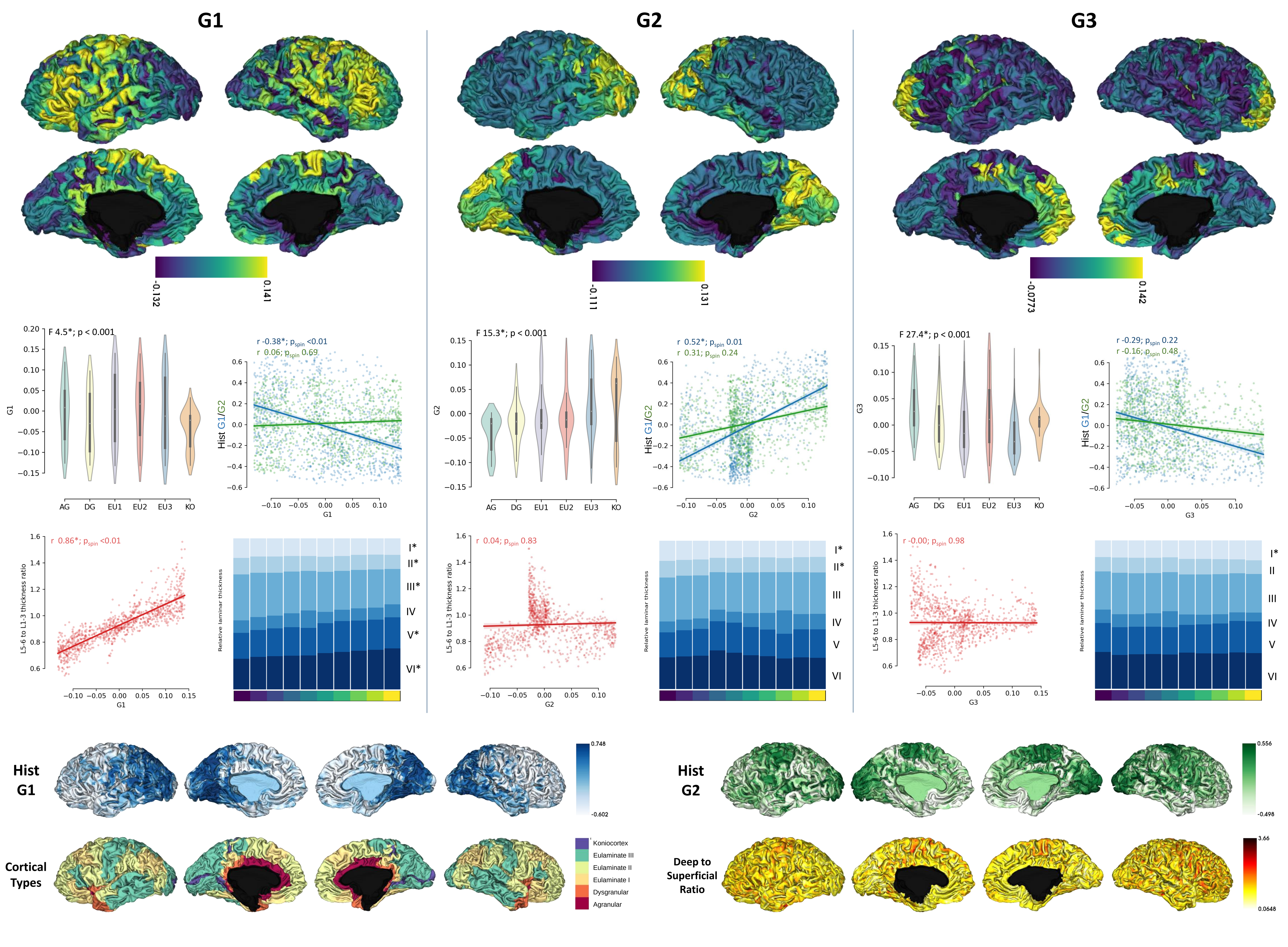


Figure 3. Principal gradient components of variability in laminar thickness similarity and their associations with the cortical types, histological gradients, and relative laminar thicknesses.
* significant correlation with the gradients of laminar thickness similarity

## DISCUSSION

- Multiple gradient axes of laminar thickness variability across cortex:
  - G1: gradual increase in the relative thickness of deeper layers from the occipital, medial frontal and anterior temporal regions towards somatomotor cortices and lateral frontal areas.
  - G2: ordered along the sensory-fugal axis from koniocortex and eulaminate III regions to a-/dysgranular regions
  - G3: dissociates the frontal pole and medial frontal regions from the rest of the brain.
- Primary axes of laminar thickness pattern variability are similar to the main gradient of cytoarchitectural variability in the BigBrain.

### References

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### Acknowledgments

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