MRI Structural analysis of cortical thickness in developmental prosopagnosia

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Introduction

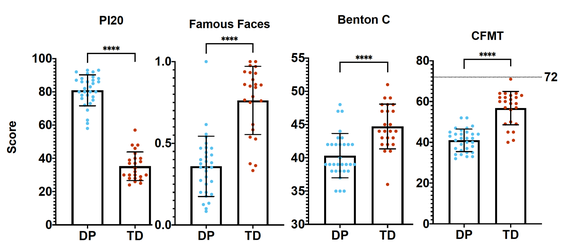
- **Developmental Prosopagnosics (DPs)** is a neurological condition that is characterized by the impairment of face recognition
- Voxel-based morphometry (VBM) study[1] on individuals with DPs have shown a reduction in face-selective brain volume region within the **fusiform face area (FFA), particularly the right middle fusiform (mFus)**
- However, structural MRI studies have yet to investigate cortical thickness in the FFA between DPs and controls

Objective

1. **Whole brain analysis of** difference in cortical thinness between DPs and healthy control
2. **Functionally Define FFA** based on fMRI and compared the ROI cortical thinness in DPs and healthy control

DP (n=31)
Age: 37±15 years

Healthy (n=24)
Age: 34±16 years

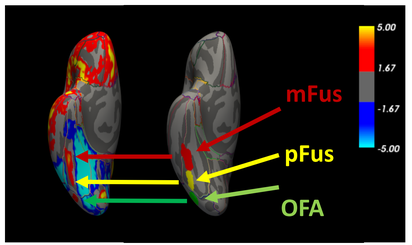


Face Recognition Scores

Methods

(1) Whole brain: T1w → Freesurfer Processing Pipeline → Cortical Thickness → GLM analysis → Permutation ROI Simulation

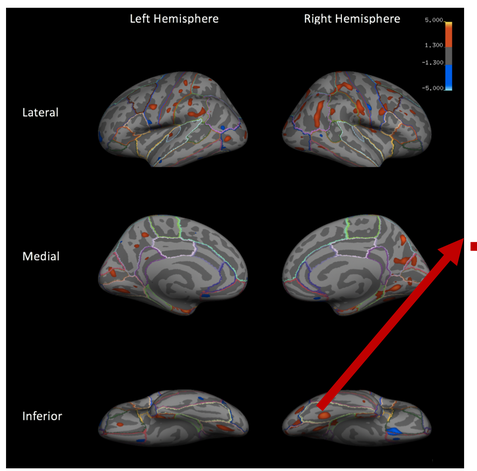
(2) Functionally define: fMRI (Task: face vs. scene) → FSFAST Processing Pipeline → Significant Map → **Functionally Define Region → Extract cortical thickness from regions

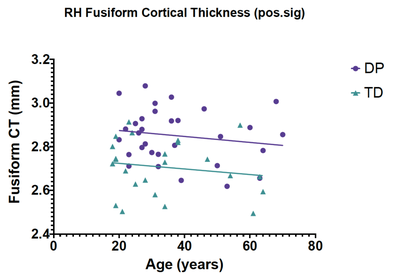


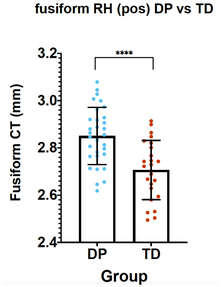
** fMRI regions extracted from average activation label

Results

(1) Whole brain







Cortical Thickenss Significant Map of DP vs. Healthy

(2) Functionally define

- **No significant** thickness different in functionally define regions

Average Cortical Thickness (mm)

	mFus (FG4)	pFus (FG2)	OFA
DP	2.70±.0.28	2.63±.0.30	2.61±.0.39
Healthy	2.88±.0.36	2.74±.0.43	2.660±.0.39

Conclusion

- Mapwise analysis revealed a non-face-selective right FFA region that was significantly thicker in DPs than controls, corresponding to FG1/FG3[2]
- No cortical thickness differences within the mFus (FG4), pFus (FG2), and OFA[3]

References

[1] Garrido et al. 2009, *Brain* | [2] Natu et al. 2015, *PNAS.* | [3] Gomez et al. 2017, *Science* |