The left dorsolateral prefrontal cortex volume is reduced in adults reporting childhood trauma independent of depression diagnosis

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Background

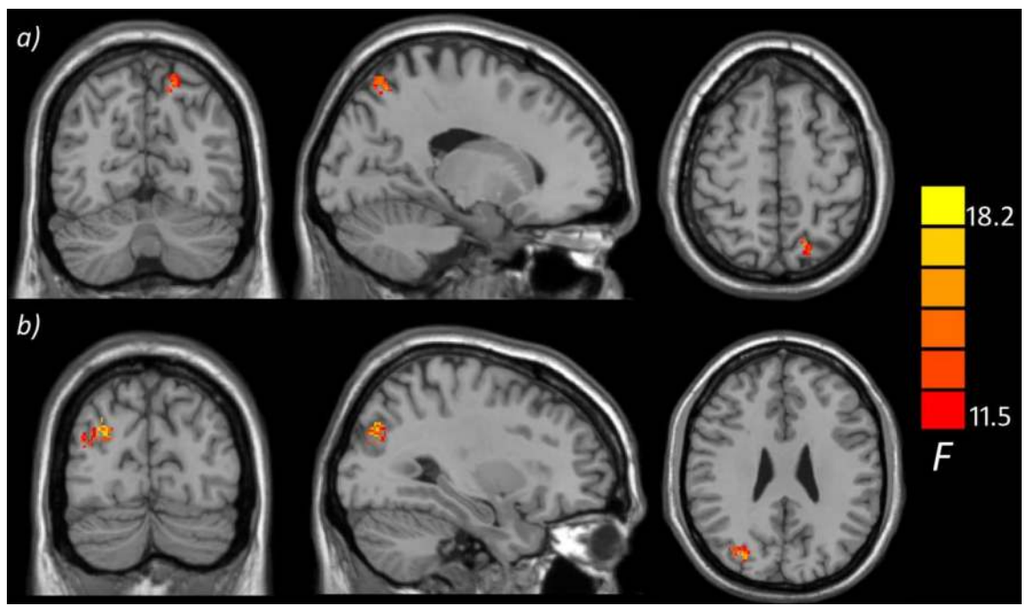
Both major depressive disorder (MDD) and childhood trauma have been linked with brain structural changes. As childhood trauma is more highly prevalent in MDD patients, previous morphometric findings in MDD therefore might have been confounded by childhood trauma. This study aimed to differentiate the impact of childhood trauma from the influence of MDD diagnosis on gray matter volume (GMV).

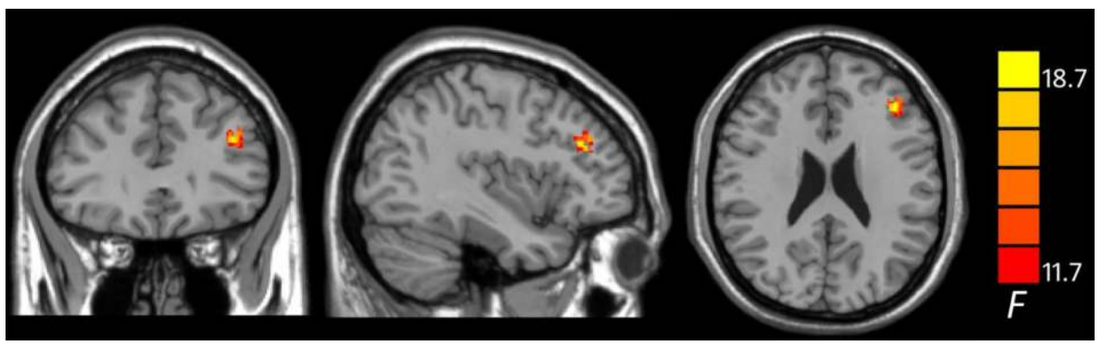
Methods

Seventy-eight subjects were recruited into four study groups (n=16, MDD patients with childhood trauma exposures, CTE/MDD; n=14, MDD patients without CTE, non-CTE/MDD; n=24, healthy controls with CTE, CTE/HC; and n=24, HCs without CTE, non-CTE/HC). All participants underwent high-resolution structural magnetic resonance scans. Voxel-based morphometry was used to investigate GM alterations, and a 2×2 analysis of variance was performed to identify the effects of diagnosis, childhood trauma, and their interactions.

Results

The main effects of diagnosis displayed abnormal GMV located in the left superior parietal lobule (MDD < HC) and right middle occipital gyrus (MDD > HC). While the left dorsolateral prefrontal cortex (DLPFC) volume revealed a significant main effect of childhood trauma, as shown by decreased GMV of the left DLPFC in subjects with CTE, regardless of diagnosis. A negative correlation was also found between the left DLPFC volume and emotional neglect in individuals reporting CTE.





↑ Figure 2. Brain regions showing significant main effect of childhood trauma (*p* < 0.001, *GRF corrected*).

← Figure 1. Brain regions showing significant main effect of diagnosis (*p* < 0.001, *GRF corrected*).

Conclusion

The present findings suggest that decreased GMV of the left DLPFC is a function of childhood trauma rather than MDD, which may represent the biological risk for developing MDD.

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