

CORTICAL THICKNESS ABNORMALITIES AND IMPAIRED COGNITIVE CONTROL ABILITY IN ADOLESCENTS WITH INTERNET ADDICTION DISORDER

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Target audience

The subjects with internet addiction disorder (IAD) and the psychiatrist and the clinical doctors interested in IAD.

Purpose

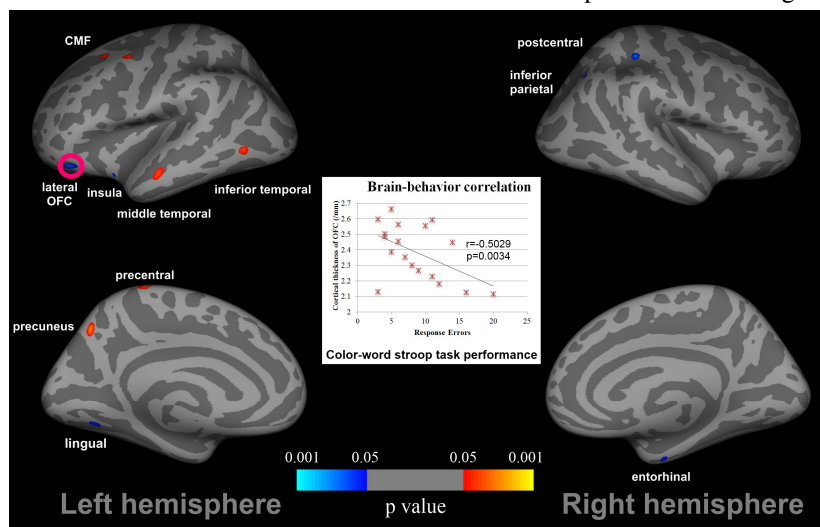
As one of the common mental health problems amongst Chinese adolescents, IAD had attracted attention from the whole world (1, 2). Emerging neuroimaging studies had detected brain abnormalities in individuals with IAD (3), however, the structural effects of IAD on cortical thickness of brain in adolescents and its association with the impaired cognitive control ability are not well known.

Methods

Eighteen adolescents with IAD and age-, education- and gender- matched controls (n=18) participated in our study. The cortical thickness measurement method was employed to investigate alterations of cortical thickness in individuals with IAD. The color-word Stroop task was employed to investigate the functional implications of the cortical thickness abnormalities.

Results

The IAD group committed more errors than the control group during the incongruent condition (8.56 ± 4.77 vs 4.56 ± 2.93 ; $p < 0.05$). Our imaging results revealed decreased cortical thickness of the left lateral orbitofrontal cortex (OFC), insula cortex, lingual gyrus, the right postcentral gyrus, entorhinal cortex, and inferior parietal cortex in adolescents with IAD; however, the cortical thicknesses of the left precentral gyrus, precuneus, middle frontal cortex, inferior temporal and middle temporal cortices were increased. Correlation analysis demonstrated that the cortical thicknesses of the left precentral cortex and precuneus correlated with duration of IAD and the cortical thickness of the OFC correlated with the task performance during the color-word Stroop task in adolescents with IAD.



Discussion

Previous studies had proved that the OFC were associated with impulse control and decision-making (4). Akin to a deficit in impulsive control in substance addicts, adolescents with IAD constantly exhibit compulsive Internet-seeking behavior despite of negative outcomes (5-7). The significant correlation between the cortical thickness of the OFC and the task performance during the color-word Stroop test was found in our current study. Previous addiction studies had revealed the association between Stroop interference and relative glucose metabolism in the OFC among cocaine-addicted subjects (8). This brain-behavior relationship demonstrated that the abnormal structure of the OFC was associated with impaired executive function among adolescents with IAD. Our results provided more evidence for the structural changes in the OFC in adolescents with IAD.

Conclusion

The findings in the current study suggested that the cortical thickness abnormalities of these regions may be implicated in the underlying pathophysiology of IAD.

Reference

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