**Supplementary online materials**

**（PSM-D-17-01299）**

**eMethods.**

**Statistical analysis**

**Confounding variables:** Previous studies have showed the influence of age and head motion on brain functional connectivity (Biswal et al., 2010; Yan et al., 2013), the potential effects of age and mean FD was regressed by linear regression.

**Generation of anatomical mask:**

We extract whole brain grey matter mask except the cerebellum based on the AAL templates, made by DPABI (Yan et al., 2013), which as an explicit mask to conducted the group difference in cerebellar-cerebral connectivity.

**eResults.**

**Cerebellar-cerebral functional connectivity pattern in OCD group**

Similar to HC group, the OCD group also showed significant cerebellar-cerebral functional connectivity in different networks. 1) for executive network, we found the significant functional connectivity between the cerebellar with the medial superior frontal gyrus, inferior parietal cortex, precuneus, angular gyrus and caudate; 2) for default-mode network, there are significant functional connectivity between the cerebellar with the orbitofrontal cortex, medial superior frontal gyrus, angular gyrus, precuneus, temporal cortex, and thalamus; 3) for affective-limbic network, there are significant functional connectivity between the cerebellar with the middle frontal gyrus, occipital cortex, inferior parietal cortex, middle cingulate gyrus, and caudate; 4) for motor network, the significant functional connectivity between the cerebellar with the superior frontal gyrus and supplementary motor area was found.

**Potential confounds of age and head motion**

Given the trend group differences in age and head motion, of which association with brain function has been documented (Biswal et al., 2010; Yan et al., 2013), we further compared the group difference in cerebellar-cerebral functional connectivity after controlling the age and mean FD, and the main results remain significant. In addition, we also found decreased cerebellar functional connectivity with cingulate and thalamus, and for the default-mode network, patients with OCD had reduced cerebellar functional connectivity with temporal gyrus (eTable2).

**eReferences**

Biswal BB, Mennes M, Zuo X-N (2010). Toward discovery science of human brain function. Proceediing of the National Academy of Sciences of the United States of America, 107, 4734–4739.

Yan CG, Cheung B, Kelly C (2013). A comprehensive assessment of regional variation in the impact of head micromovements on functional connectomics. Neuroimage, 76, 183–201.

**eTable1. Comparison of demographic variables and clinical features between the drug-naïve and medication-free patients.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| VariablesMean (SD) | Drug-naïve (n=14) | Medication-free (n=13) | t/χ2 | *P* values |
| Age, years | 29.00(7.07) | 29.46(9.38) | -0.145 | 0.886 |
| Sex (M/F) | 8/6 | 8/5 | -0.534 | 0.598 |
| Education, years | 14.29(2.49) | 12.92(2.99) | 1.291 | 0.209 |
| Mean FD | 0.09(0.03) | 0.12(0.07) | -1.567 | 0.130 |
| BDI-II scores | 23.14(10.33) | 24.54(13.29) | -0.306 | 0.762 |
| BAI scores | 15.00(7.69) | 20.15(11.25) | -1.399 | 0.174 |
| Y-BOCS |
| Total score | 28.50(4.22) | 28.62(4.54) | -0.068 | 0.946 |
| Obsession subscale score | 14.64(2.27) | 14.77(2.32) | -0.143 | 0.887 |
| Compulsion subscale score | 13.86(2.38) | 13.85(2.76) | 0.011 | 0.182 |
| Age of onset  | 22.86(4.37) | 20.08(6.20) | 1.356 | 0.187 |
| Duration of illness, years | 8.15(6.55) | 9.88(6.77) | -1.112 | 0.277 |

**Note:** FD= frame-wise displacement; Y-BOCS= Yale-Brown Obsessive-Compulsive Scale; BDI-II= Beck Depression Inventory-second edition; BAI= Beck Anxiety Inventory.

**eTable2. After controlling age and mean FD, the extra decreased cerebellar-cerebral functional connectivity in OCD group relative to the HC group.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Seeds | Brain regions | side | Voxels | MNI(x, y, z) | T values | Cohen’s d |
| Executive network |  |
| R Crus IExec1 | Middle Cingulate Gyrus | R | 114 | 9, -9, 42 | -3.8506 | 0.64 |
| Affective-limbic network |  |
| R Lobule VIAff | Middle Cingulate Gyrus | L | 98 | -3, -42, 54 | -4.2864 | 0.83 |
| L Lobule VIAff | Thalamus | L | 315 | -9, -24, 0 | -5.4513 | 0.90 |
| Default-mode network |  |
| L Crus IDMN | Superior Temporal Gyrus | R | 213 | 54, -42, 15 | -4.7093 | 0.73 |
| R Crus IDMN | Middle Temporal Gyrus | R | 264 | 54, -48, 0 | -5.5511 | 0.47 |