***Supplemental Materials***

**Functional and structural brain abnormalities in bipolar disorder: a** **multimodal meta-analysis of neuroimaging studies**

**Figure S1** Meta-analyses results regarding a) functional difference and b) VBM difference between BD and HCs after FWER correction. Areas with decreased value are displayed in blue, and areas with increased value are displayed in red. The color bar indicates the maximum and minimum SDM-Z values. Abbreviations: BD, bipolar disorder; HCs, healthy controls; SDM, signed differential mapping; VBM, voxel-based morphometry; FWE, family wise error

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**Figure S2** Meta-analyses results regarding functional difference a) between depressed BD and HCs, and b) between unmedicated BD and HCs. Areas with decreased value are displayed in blue, and areas with increased value are displayed in red. The color bar indicates the maximum and minimum SDM-Z values. Abbreviations: BD, bipolar disorder; HCs, healthy controls; SDM, signed differential mapping.



**Figure S3** Meta-analyses results regarding a) Reho difference and b) ALFF didfference between BD and HCs. Areas with decreased value are displayed in blue, and areas with increased value are displayed in red. The color bar indicates the maximum and minimum SDM-Z values. Abbreviations: BD, bipolar disorder; HCs, healthy controls; SDM, signed differential mapping; ReHo, Regional Homogeneity; ALFF, amplitude of low-frequency fluctuation



**Table S1 Quality assessment checklist (score 0/0.5/1 per item; total score out of 10)\***

|  |
| --- |
| Category 1: Participants |
| 1. Patients were evaluated prospectively, specific diagnostic criteria were applied, and demographic data were reported. |
| 2. Healthy comparison participants were evaluated prospectively, psychiatric and medical illnesses were excluded. |
| 3. Important variables (e.g., age, sex, illness duration, onset, medication status, comorbidity, severity of illness) were checked either by stratification or statistically. |
| 4. Sample size per group > 10. |
| Category 2: Methods for image acquisition and analysis |
| 5. Whole brain analysis was automated with no a priori regional selection. |
| 6. Coordinates reported in a standard space. |
| 7. The imaging technique used was clearly described so that it could be reproduced. |
| 8. Measurements were clearly described so that they could be reproduced. |
| Category 3: Results and conclusions |
| 9. Statistical parameters for significant and important nonsignificant differences were provided. |
| 10. Conclusions were consistent with the results obtained and the limitations were discussed. |
| \*When criteria were partially met, 0.5 points were awarded. |

**Table S2** Demographic, clinical and imaging characteristics of the included studies of resting-state functional activity

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **study** | **Demographic characteristics** | | | | **Clinical characteristics (BD patients)** | | | | | | **Imaging characteristics** | | | | **Quality**  **score** |
| **Participants(male),n**  **(male),n** | | **Mean age±SD, yr** | | **BD state** | **Illness Duration**  **(months)** | **HAMD 17** | **YMRS** | **Subtype** | **Antidepressants (%)** | **Scanner** | **Software** | **FWHM(mm)** | **Threshold** |
| **BD** | **HC** | **BD** | **HC** |
| ([Altamura et al., 2017](#_ENREF_5)) | 17(4) | 27(14) | 38.7±8.2 | 49.4±11.5 | NA | 11.4 | NA | NA | BDI | 100 | PET 3.0T | SPM12 | 6mm | P < 0.05 (pFWE and cFDR) | 10 |
| 10(9) | 27(14) | 35.7±13.2 | 49.4±11.5 | NA | 12.1 | NA | NA | BDI | 100 | PET 3.0T | SPM12 | 6mm | P < 0.05  (pFWE and cFDR) | 10 |
| ([Bøen et al., 2019](#_ENREF_9)) | 22(5) | 21(7) | 32.6±6.0 | 29.3±5.6 | NA | NA | NA | 3.6±2.9 | BDII | 86.4 | PET/CT | SPM8 | 8mm | P < 0.05  (FWE) | 9 |
| ([Brooks et al., 2009b](#_ENREF_13)) | 15(7) | 19(12) | 36.1±10.4 | 34.0±13.3 | depressed | 33.2 | 22.1±7.7 | NA | 6BDI  9BDII | 0 | PET | SPM5 | 12mm | P< 0.05  (uncorrected) | 9 |
| ([Brooks et al., 2009a](#_ENREF_12)) | 16(14) | 11(10) | 58.7±7.5 | 58.3±5.2 | euthymic | 22.4 | NA | 14.0±2.2 | 10BDI  6BDII | 100 | PET | SPM5 | 7mm | P< 0.05  (uncorrected) | 9.5 |
| ([Brooks et al., 2010](#_ENREF_11)) | 8(7) | 8(7) | 52.8 | 55.9 | mania | NA | NA | 34.1 | BDI | 100 | PET | SPM5 | 7mm | P< 0.05  (uncorrected) | 9 |
| ([Marotta and Delvecchio, 2019](#_ENREF_70)) | 40(20) | 27(14) | 44.4±12.4 | 49.4±11.5 | NA | 141.5 | NA | NA | NA | 100 | PET/CT | SPM12 | 10mm | P < 0.01  (cFWE ) | 10 |
| 50(27) | 27(14) | 37.0±10.6 | 49.4±11.5 | NA | 121.9 | NA | NA | NA | 100 | PET/CT | SPM12 | 10mm | P < 0.01  (cFWE ) | 9.5 |
| ([Zeng et al., 2021](#_ENREF_118)) | 61(25) | 48(23) | 43.0±10.90 | 35.1±12.4 | NA | 24.7 | NA | 11.2±8.9 | NA | 21.3 | 3.0T ASL | SPM12  FSL | 8mm | P<0.001  (AlphaSim corrected) | 9 |
| ([Chang, 2017](#_ENREF_19)) | 100(48) | 183(73) | 25.7±7.9 | 26.6±8.0 | NA | 41.5 | 11.7±9.5 | 8.1±10.1 | NA | 65.0 | 3.0T ALFF | DPARSF | 6mm | P < 0.05  (AlphaSim corrected) | 9.5 |
| ([Cui et al., 2016](#_ENREF_25)) | 40(24) | 40(23) | 28.1±6.9 | 28.3±10.0 | NA | NA | 9.9±8.4 | 9.9±10.7 | NA | 100 | 3.0T ALFF | DPARSF | 6mm | P < 0.05  corrected | 9.5 |
| ([Fei et al., 2018](#_ENREF_31)) | 17(17) | 18 | 17-37 | 17-37 | euthymic | NA | NA | NA | NA | 100 | 3.0T ALFF | REST | 6mm | P < 0.05  (GRF corrected) | 10 |
| ([He, 2017](#_ENREF_39)) | 22(14) | 22(13) | 37.5±11.8 | 35.1±8.4 | depressed | NA | 27.0±6.5 | NA | NA | NA | 3.0T ALFF | DPARSF | 4mm | P < 0.05  (AlphaSim corrected) | 9.5 |
| ([Jiang, 2014](#_ENREF_43)) | 8(5) | 25(12) | 32.5±11.3 | 30.5±10.3 | manic | NA | 21.00±11.06 | NA | NA | 0 | 3.0T ALFF | DPARSF | 6mm | P < 0.05 | 9 |
| ([Jiang et al., 2017](#_ENREF_44)) | 46(19) | 80(29) | 22.28±4.80 | 22.40±4.29 | 10manic;1hypomanic;  1mixed;15depressed;19euthymic | 27.9 | 10.8±8.7 | 10.1±11.5 | 40BDI  6BDII | 56.5 | 3.0T ALFF | DPARSF | 6mm | P < 0.05 and P < 0.01  corrected | 9 |
| ([Li, 2017](#_ENREF_55)) | 14(6) | 20(10) | 31.0±7.6 | 31.7±11.4 | depressed | 108.0 | NA | NA | NA | 100 | 3.0T ALFF | REST | 6mm | P < 0.001  (AlphaSim corrected) | 10 |
| ([Liu et al., 2012a](#_ENREF_61)) | 26(9) | 26(10) | 32.3±11.3 | 31.9±12.2 | depressed | 50.4 | 19.6±2.5 | NA | NA | 100 | 3.0T ALFF | REST | 4mm | P < 0.01 | 9 |
| ([Lui et al., 2015](#_ENREF_66)) | 57(18) | 59(26) | 34.0±13.0 | 38.0±17.0 | NA | 16.9 | NA | 5.6±5.7 | NA | 100 | 3.0T ALFF | REST | 8mm | P < 0.05  (AlphaSim corrected) | 9.5 |
| ([Wei, 2016](#_ENREF_109)) | 12 | 11 | 25.7±7.1 | 29.7±8.0 | NA | NA | 22.7±5.6 | NA | NA | NA | 3.0T ALFF | DPARSF | 4mm | P < 0.05  (AlphaSim corrected) | 9.5 |
| ([Xu et al., 2014](#_ENREF_111)) | 29(18) | 29(13) | 30.5±8.8 | 31.4±8.1 | 5 depressed;6 manic/mixed or hypomanic;18 euthymic | NA | 9.7±10.1 | 6.5±9.3 | NA | 82.8 | 3.0T ALFF | REST | 6mm | P < 0.05  (AlphaSim corrected) | 9.5 |
| ([Xue et al., 2020](#_ENREF_113)) | 19(11) | 22(15) | 32.9±10.7 | 31.8±10.9 | manic | NA | NA | NA | BDI | 100 | 1.5T ALFF | RESTplus | 6mm | P < 0.05  (GRF corrected) | 10 |
| ([Yao, 2018](#_ENREF_115)) | 20(5) | 63(23) | 25.4±7.8 | 26.0±5.8 | NA | 40.4 | 15.6±9.2 | NA | NA | 70.0 | 3.0T ALFF | DPABI | 6mm | P < 0.05  (AlphaSim corrected) | 10 |
| ([Zhang et al., 2018b](#_ENREF_122)) | 21(7) | 21(7) | 25.8±10.9 | 25.5±8.6 | depressed | NA | 24.0±5.4 | NA | BDII | 0 | 3.0T ALFF | DPARSF | 4mm | P < 0.05  (GRF corrected) | 10 |
| ([Zhang et al., 2021](#_ENREF_123)) | 56(35) | 71(34) | 29.5±10.9 | 30.6±10.9 | NA | NA | 8.4±8.0 | NA | NA | 100 | 3.0T  ALFF | DPABI | 4mm | P < 0.001  (FWE corrected) | 9.5 |
| ([Zhong et al., 2019](#_ENREF_124)) | 90(48) | 100(45) | 26.7±8.7 | 28.3±9.0 | depressed | 48.0 | 27.1±5.7 (24-HAMD) | 2.7±2.2 | BDII | 0 | 3.0T ALFF | DPABI | 4mm | P < 0.05  (GRF corrected) | 10 |
| ([Zhou](#_ENREF_125)) | 40(24) | 40(23) | 28.0±6.9 | 28.3±10.0 | NA | 61.6 | 9.9±8.4 | 9.9±10.7 | NA | 82.5 | 3.0T ALFF | REST | 6mm | P < 0.05  (AlphaSim corrected) | 9.5 |
| ([Zou et al., 2015](#_ENREF_128)) | 30(17) | 30(17) | 23.3±4.7 | 23.6±4.3 | 23manic;3depressed;  2mixed;2euthymic | 12.2 | 6.0±6.3 | NA | BDI | 100 | 3.0T ALFF | REST | 6mm | P < 0.05  (AlphaSim corrected) | 10 |
| ([Lv et al., 2019](#_ENREF_67)) | 26(9) | 26(15) | 22.8±6.1 | 26.3±7.4 | NA | 22.9 | 22.5±3.5 | 2.1±1.5 | NA | 0 | 3.0T fALFF | DPABI | 4mm | P < 0.005  (TFCE corrected) | 9.5 |
| ([Qiu et al., 2018b](#_ENREF_85)) | 28(14) | 27(17) | 31.8±12.8 | 33.7±9.8 | depressed | 109.8 | 31.0±7.9 | NA | NA | 82.1 | 3.0T fALFF | DPARSF | 8mm | P < 0.001  (uncorrected) | 10 |
| ([Shen et al., 2018](#_ENREF_95)) | 26(14) | 26(16) | 32.3±13.1 | 33.0±9.8 | depressed | NA | 31.0±7.9 | NA | NA | 88.5 | 3.0T fALFF | DPARSF | 8mm | P < 0.01  (Alphasim corrected) | 9 |
| ([Wang et al., 2019](#_ENREF_107)) | 30(15) | 31(18) | 36.3±11.0 | 33.6±8.1 | depressed | NA | 23.6±5.6 | NA | NA | 0 | 3.0T fALFF | DPABI | 8mm | P < 0.05  (GRF corrected) | 10 |
| ([Zhang et al., 2017](#_ENREF_121)) | 14(6) | 14(6) | 33.8±11.1 | 34.2±10.7 | depressed | 14.1 | 18.5±5.2 | NA | NA | 0 | 3.0T fALFF | Connectome Computation System | 6mm | P < 0.05  (corrected) | 9.5 |
| ([Zou et al., 2019](#_ENREF_127)) | 45(22) | 50(25) | 25.2±3.1 | 23.4±4.9 | NA | 4.0 | 2.2±2.3 | 10.0±5.9 | NA | 0 | 3.0T fALFF | DPARSF | 4mm | P < 0.05  (FDR corrected) | 10 |
| ([Fu, 2017](#_ENREF_33)) | 20(10) | 30(15) | 25.7±9.1 | 26.5±10.8 | manic | NA | 21.4±9.8 | 0.9±1.9 | NA | 45.0 | 3.0T ReHo | DPARSF | 6mm | P < 0.01  (AlphaSim corrected) | 10 |
| ([He, 2017](#_ENREF_39)) | 22(14) | 22(13) | 37.5±11.8 | 35.1±8.4 | manic | NA | 27.0±6.5 | NA | BD II | NA | 3.0T ReHo | REST | 4mm | P < 0.01  (AlphaSim corrected) | 9 |
| ([Jiang et al., 2016](#_ENREF_46)) | 24(11) | 28(12) | 26.9±9.4 | 26.5±8.5 | depressed | NA | 15.4±9.2 | 5.2±9.0 | BD I | 62.5 | 3.0T ReHo | DPARSF | 6mm | P < 0.05  (AlphaSim corrected) | 10 |
| ([Jiang et al., 2020](#_ENREF_45)) | 24(12) | 30(15) | 28.1±9.6 | 26.5±10.8 | 21depressed  3remission | 11.2 | 22.0±9.5 | 0.8±1.8 | NA | 37.5 | 3.0T ReHo | DPARSF | 6mm | P < 0.005  (GRF corrected) | 9.5 |
| ([Li et al., 2018](#_ENREF_54)) | 19(10) | 25(15) | 38.8±12.0 | 33.4±8.2 | euthymic | 3.9 | 4.2±1.7 | 2.6±1.5 | NA | 100 | 3.0T ReHo | DPABI | 6mm | P < 0.01  (GRF corrected) | 9.5 |
| ([Li et al., 2020](#_ENREF_56)) | 36(18) | 36(22) | 23.1±5.2 | 22.8±2.4 | 4depressed;4manic;36remission | 33.8 | 2.9±3.8 | 3.8±7.1 | BDI | 100 | 3.0T ReHo | DPABI | 6mm | P < 0.05  (GRF corrected) | 9 |
| ([Liang et al., 2013](#_ENREF_60)) | 17(9) | 16(8) | 34.5±9.8 | 35.1±7.9 | depressed | 3.9 | 24.5±4.9 | NA | NA | 0 | 1.5T ReHo | REST | 8mm | P < 0.05 | 9 |
| ([Liu et al., 2012b](#_ENREF_62)) | 26(9) | 26(10) | 32.3±11.3 | 31.9±12.2 | depressed | 4.2 | 19.6±2.5 | NA | NA | 100 | 3.0T  ReHo | REST | 4mm | P < 0.01  (corrected) | 9.5 |
| ([Liu et al., 2013](#_ENREF_63)) | 21(8) | 26(11) | 31.0±8.5 | 33.2±11.9 | depressed | 3.6 | 22.1±3.2 | NA | NA | 100 | 3.0T ReHo | REST | 4mm | P < 0.005 | 10 |
| ([Liu and Li, 2020](#_ENREF_64)) | 40(20) | 54(26) | 32.8±7.4 | 32.6±9.0 | NA | NA | 25.6±5.0 | 2.2±0.8 | NA | NA | 3.0T ReHo | DPABI | 6mm | P < 0.05  (AlphaSim corrected) | 8.5 |
| ([Qiu et al., 2019](#_ENREF_86)) | 100(55) | 100(45) | 26.4±8.9 | 28.3±9.0 | depressed | 40.8 | 26.9±5.9 | 2.8±2.6 | BDII | 0 | 3.0T ReHo | DPABI | 4mm | P < 0.05  (TFCE corrected) | 10 |
| ([Russo et al., 2020](#_ENREF_90)) | 36(14) | 112(43) | 47.2±10.7 | 36.7±12.5 | mania | 17.2 | 7.4±6.0 | 18.6±5.4 | NA | 97.2 | 3.0T ReHo | AFNI | 6mm | P < 0.05  (FWE corrected) | 9.5 |
| 43(20) | NA | 45.5±10.1 | NA | depressed | 16.3 | 21.4±4.0 | 4.0±3.0 | NA | 100 | 3.0T ReHo | AFNI | 6mm | P < 0.05  (FWE corrected) | 9 |
| ([Shan et al., 2020](#_ENREF_94)) | 37(12) | 37(17) | 21.0±3.1 | 20.8±3.1 | NA | NA | 22.2±6.9 | 8.1±5.5 | BDII | 0 | 3.0T ReHo | REST | 4mm | P<0.05 | 8.5 |
| ([Sun, 2018](#_ENREF_101)) | 51(21) | 54(29) | 27.7±8.6 | 27.6±10.3 | depressed | NA | 19.8±8.63 | 3.1±5.5 | 25BDI  51BDII | 52.9 | 3.0T ReHo | REST | NA | P < 0.01  (AlphaSim corrected) | 9.5 |
| 25(10) | 54(29) | 25.0±9.6 | NA | manic | NA | 8.0±6.5 | 19.4±10.1 | NA | 84.0 | 3.0T ReHo | REST | NA | P < 0.01  (AlphaSim corrected) | 9.5 |
| ([Wang, 2014](#_ENREF_106)) | 43(16) | 61(34) | 31.7±10.1 | 31.2±10.7 | depressed; euthymic; manic; mixed | NA | 7.6±8.0 | 6.7±9.0 | BD I | 83.7 | 3.0T ReHo | REST | 6mm | P < 0.05  (Monte Carlo corrected) | 9.5 |
| ([Wei et al., 2018](#_ENREF_110)) | 97(45) | 188(74) | 26.2±7.7 | 26.6±8.1 | NA | 42.2 | 11.8±9.4 | 7.9±10.0 | NA | 67.0 | 3.0T ReHo | DPARSF | 4mm | P < 0.05  (AlphaSim corrected) | 9.5 |
| ([Xue, 2019](#_ENREF_112)) | 19(11) | 22(15) | 32.9±10.7 | 31.8±10.9 | manic | 148.5 | NA | NA | BD I | 100 | 1.5T ReHo | RESTplus | 6mm | Voxel p =0.001  Cluster size = 0.01 (GRF) | 9.5 |
| ([Yao et al., 2018](#_ENREF_116)) | 55(22) | 113(32) | 27.0±7.7 | 29.0±9.8 | depressed | 45.4 | 20.2±8.7 | NA | 19BDI  36BDII | 43.6 | 3.0T ReHo | DPARSF | 4mm | P < 0.005  (AlphaSim corrected) | 9 |
| ([Yao, 2018](#_ENREF_115)) | 20 | NA | 25.4±7.8 | 26.0±5.8 | depressed | 40.4 | 15.6±9.2 | NA | NA | 70.0 | 3.0T ReHo | DPABI | 6mm | P < 0.05  (AlphaSim corrected) | 9 |
| ([Zhang, 2018](#_ENREF_120)) | 12(5) | 15(6) | 23.5±7.6 | 21.1±4.8 | depressed | 6.0 | 21.6±4.5 | 22.8±5.4 | BD II | 0 | 3.0T ReHo | DPABI | 6mm | P < 0.05  (AlphaSim corrected) | 10 |
| **total** | 1842(875) | 2190(999) | 31.2±8.0 | 30.4±8.7 |  | 39.5 | 17.7±6.6 | 8.4±5.9 |  |  |  |  |  |  |  |

Abbreviations: BD, bipolar disorder; HC, healthy control; SD, standard deviation; HAMD, Hamilton Depression Scale; YMRS, Young Manic Rating Scale; FWHM, full width at half maximum; NA, not available; PET, positron emission tomography; SPM, statistical parametric mapping; FEW, family wise error; FDR, false discovery rate; CT, computed tomography; FSL, FMRIB’s Software Library, the University of Oxford; ALFF, amplitude of low-frequency fluctuation; DPARSF, data processing assistant for resting-State fMRI software; GRF, Gaussian random field; DPABI, Data Processing & Analysis of Brain Imaging; fALFF, the fractional ALFF; TFCE, the Threshold-Free Cluster Enhancement; ASL, Arterial Spin Labeling; ReHo, Regional Homogeneity; AFNI, Analysis of Functional NeuroImages.

**Table S3** Demographic, clinical and imaging characteristics of the included studies of VBM

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **study** | **Demographic characteristics** | | | | **Clinical characteristics (BD patients)** | | | | | **Imaging characteristics** | | | | | | | | | **Quality**  **score** | | |
| **Participants**  **(male),n** | | **Mean age±SD, yr** | | **BD state** | **Illness Duration**  **(months)** | **HAMD 17** | **YMRS** | **Antidepressants (%)** | **Scanner** | **Software** | **FWHM(mm)** | | | **Threshold** | | | |
| **BD** | **HC** | **BD** | **HC** |
| ([Adler et al., 2005](#_ENREF_2)) | 32(19) | 27(12) | 31.2±9.4 | 30.5±9.7 | 5manic; 2depressed | NA | NA | NA | 71.9 | 3.0T | SPM99 | 12mm | | | NA | | | | 9 | | |
| ([Adler et al., 2007](#_ENREF_1)) | 33(15) | 33(19) | 19.9±7.9 | 21.5±4.3 | 18manic; 13mixed | NA | NA | NA | 81.8 | 3.0T | SPM2 | 12mm | | | NA | | | | 9 | | |
| ([Almeida et al., 2009](#_ENREF_3)) | 27(10) | 28(13) | 31.9±7.3 | 30.8±10.6 | 17euthymic; 10depressed | 11.1 | NA | NA | 88.9 | NA | SPM5 | NA | | | P < 0.05  (small volume corrected) | | | | 9.5 | | |
| ([Alonso-Lana et al., 2016](#_ENREF_4)) | 28 | 33(18) | 44.0±6.0 | 44.1±6.6 | euthymic | 201.1 | 2.5±2.0 | 1.2±1.81 | 100 | 1.5T | SPM12 | 4mm | | | P < 0.05  (FWE corrected) | | | | 10 | | |
| ([Altamura et al., 2018](#_ENREF_6)) | 46(23) | 56(29) | 33.7±11.7 | 25.3±7.4 | hypomanic or manic/depressed | NA | NA | NA | 100 | 3.0T | SPM12 | 6mm | | | P < 0.001 | | | | 9.5 | | |
|  | 62(27) | 62 |  | 27.3±8.7 | hypomanic or manic/depressed | NA | NA | NA | 100 | 3.0T | SPM12 | 6mm | | | P < 0.001 | | | | 9.5 | | |
| ([Amann et al., 2016](#_ENREF_7)) | 45(26) | 45(26) | 42.9±9.2 | 43.3±9.9 | 15manic; 15depressed; 15euthymic | 17.6 | NA | 8.5±10.9 | 100 | 1.5T | FSL | 4mm | | | P < 0.01  (FWE corrected) | | | | 9 | | |
| ([Ambrosi et al., 2013](#_ENREF_8)) | 20(5) | 21(6) | 41.9±13.1 | 34.6±10.8 | NA | 151.2 | NA | NA | 95 | 1.5T | SPM8 | 8mm | | | P < 0.05  corrected | | | | 9.5 | | |
| ([Berk et al., 2017](#_ENREF_10)) | 39(30) | 30(12) | 21.5±2.1 | 21.4±2.5 | manic | NA | NA | 2.4±2.2 | 100 | 3.0T | SPM8 | NA | | | P < 0.01  uncorrected | | | | 9 | | |
| ([Brown et al., 2011](#_ENREF_14)) | 15(7) | 21(10) | 45.0±10.2 | 46.2±10.6 | NA | 226.8 | 20.9±11.9 | NA | 100 | 1.5T | SPM5 | 8mm | | | P < 0.05  corrected | | | | 9.5 | | |
| ([Bruno et al., 2004](#_ENREF_15)) | 39(13) | 35(10) | 39.1 | 34.8 | NA | 158.4 | NA | NA | 79 | 1.5T | SPM2 | 12mm | | | P < 0.05  uncorrected | | | | 9 | | |
| ([Cai et al., 2015](#_ENREF_16)) | 23(16) | 23(10) | 25.6±6.6 | 28.2±3.8 | NA | 73.1 | 28.5±9.3 | NA | 100 | 3.0T | SPM8 | 8mm | | | P < 0.005  uncorrected | | | | 9 | | |
| ([Castro-Fornieles et al., 2018](#_ENREF_18)) | 15(9) | 70(48) | 16.5±0.7 | 15.3±1.5 | NA | NA | NA | NA | 100 | NA | SPM8 | NA | | | P < 0.05  (FWE corrected) | | | | 8.5 | | |
| ([Cao et al., 2018](#_ENREF_17)) | 22(8) | 25(10) | 26.3±5.2 | 27.1±6.8 | NA | NA | NA | NA | NA | 3.0T | SPM8 | 12mm | | | P < 0.01  uncorrected | | | | 9 | | |
| ([Chang, 2017](#_ENREF_19)) | 86(35) | 156(63) | 22.0±4.7 | 22.2±4.3 | NA | 20.6 | 8.3±8.5 | 9.7±10.5 | 100 | NA | SPM8 | 8mm | | | P < 0.05  (FDR corrected) | | | | 10 | | |
| ([Chen et al., 2007](#_ENREF_21)) | 24(6) | 25 | 38.2±11.0 | NA | NA | 170.0 | NA | NA | 50 | 1.5T | SPM12 | 12mm | | | P < 0.001  uncorrected | | | | 9.5 | | |
| ([Chen et al., 2012](#_ENREF_22)) | 18(18) | 27(27) | 32.0±7.6 | 31.3±6.8 | manic | 50.4 | 3.2±1.1 | 24.8±6.8 | 100 | 3.0T | SPM5 | 8mm | | | P < 0.001 | | | | 9.5 | | |
| ([Chen et al., 2020](#_ENREF_20)) | 22(4) | 22(4) | 28.1±12.0 | 27.4±10.2 | manic | 3.6 | NA | 5.4±6.7 | 100 | 3.0T | SPM12 | 8mm | | | P < 0.001  uncorrected | | | | 9.5 | | |
| ([Cui et al., 2010](#_ENREF_23)) | 20(11) | 20(10) | 30.9±7.4 | 28.1±7.6 | manic | 69.3 | NA | 27.0±5.9 | 100 | 1.5T | SPM99 | 8mm | | | P <0.002 | | | | 9 | | |
| ([Cui et al., 2011](#_ENREF_24)) | 24(15) | 36(21) | 28.4±6.6 | 26.6±6.7 | manic | 73.4 | NA | 25.9±6.9 | 100 | 3.0T | SPM5 | 6mm | | | P < 0.001 | | | | 9.5 | | |
| ([Duarte et al., 2016](#_ENREF_27)) | 20(6) | 20(9) | 40.3±10.2 | 37.4±10.2 | NA | 181.2 | NA | NA | 100 | 1.5T | SPM8 | 8mm | | | P < 0.05  (FWE corrected) | | | | 10 | | |
| ([Eker et al., 2014](#_ENREF_28)) | 28(16) | 30(10) | 36.4±7.8 | 34.7±8.4 | NA | 195.0 | 2.3±3.4 | 1.0±1.8 | 60.7 | 3.0T | SPM8 | 8mm | | | P < 0.05  (FWE corrected) | | | | 10 | | |
| ([Ekman et al., 2017](#_ENREF_29)) | 85(30) | 102(56) | 37.0±13.0 | 39.0±15.0 | manic/depressed | 16.0 | NA | NA | 100 | 1.5T | SPM12 | 8mm | | | P < 0.05  (FWE corrected) | | | | 9.5 | | |
| 82(40) | 102(56) | 40.0±13.0 | 39.0±15.0 | manic/depressed | NA | NA | NA | 100 | 1.5T | SPM12 | 8mm | | | P < 0.05  (FWE corrected) | | | | 9.5 | | |
| ([Fan et al., 2016](#_ENREF_30)) | 26 | 26 | 26.1±3.9 | 24.4±4.3 | NA | NA | NA | NA | NA | NA | SPM8 | 8mm | | | P < 0.001  uncorrected | | | | 9 | | |
| 24 | 25 | 26.0±3.5 | 24.0±4.4 | NA | NA | NA | NA | NA | NA | SPM8 | 8mm | | | P < 0.001  uncorrected | | | | 9 | | |
| ([Frangou, 2011](#_ENREF_32)) | 47(21) | 71(36) | 46.2±11.5 | 39.8±15.3 | NA | 20.0 | 3.0±3.9 | 1.3±2.9 | 100 | 1.5T | SPM5 | 12mm | | | P < 0.001 | | | | 9.5 | | |
| ([Goikolea et al., 2019](#_ENREF_34)) | 31(16) | 31(16) | 30.5±9.0 | 31.1±8.8 | manic | 40.0 | NA | 18.0±8.1 | 100 | 1.5T | SPM8 | 8mm | | | P < 0.05  (FWE corrected) | | | | 9.5 | | |
| ([Ha et al., 2009](#_ENREF_35)) | 23(8) | 23(8) | 35.2±10.0 | 36.0±9.4 | 7depressed; 16remission | 10.5 | 13.1±8.3 | NA | 100 | 1.5T | SPM2 | 8mm | | | P < 0.05  (FDR corrected) | | | | 10 | | |
|  | 23(8) | 23(8) | 35.6±11.1 | 36.0±9.4 | 4depressed; 19remission | 10.4 | 8.8±6.8 | NA | 100 | 1.5T | SPM2 | 8mm | | | P < 0.05  (FDR corrected) | | | | 10 | | |
| ([Hajek et al., 2012](#_ENREF_37)) | 12(6) | 11(8) | 45.6±8.9 | 46.0±8.6 | NA | NA | 2.6±2.9 | 1.1±1.4 | 100 | 1.5T | FSL | 3mm | | | P < 0.05  corrected | | | | 9 | | |
| ([Hajek et al., 2014](#_ENREF_36)) | 33(16) | 11(4) | 51.6±12.3 | 43.1±10.4 | NA | 334.8 | NA | NA | 100 | 1.5T | FSL | NA | | | P < 0.05  (TFCE corrected) | | | | 10 | | |
| ([Haldane et al., 2008](#_ENREF_38)) | 44(20) | 44(20) | 42.7±11.0 | 43.1±11.2 | NA | 195.6 | 5.0±13.0 | NA | 100 | 1.5T | SPM99 | 5mm | | | P < 0.01  corrected | | | | 9.5 | | |
| ([Hu et al., 2016](#_ENREF_40)) | 19(7) | 28(10) | 25.2±5.9 | 25.0±5.8 | depressed | 47.8 | 22.0±4.8 | 1.7±1.7 | NA | 3.0T | SPM8 | 8mm | | | P < 0.001  uncorrected | | | | 9 | | |
| ([Ishida et al., 2017](#_ENREF_41)) | 29(17) | 33(20) | 42.7±13.3 | 37.6±9.8 | mania; depression | 141.6 | 4.7±5.9 | 2.1±3.1 | 100 | 3.0T | SPM8 | 8mm | | | P < 0.05  (TFCE corrected) | | | | 10 | | |
| ([Song et al., 2015](#_ENREF_98)) | 44(19) | 35(11) | 34.8±14.1 | 33.9±14.5 | manic | 88.8 | NA | 23.9±12.2 | 100 | 3.0T | SPM8 | 8mm | | | P < 0.05  (FWE corrected) | | | | 9 | | |
| ([Ji et al., 2018](#_ENREF_42)) | 35(13) | 30(15) | 28.9±7.3 | 31.5±8.2 | NA | NA | NA | NA | 100 | 3.0T | FSL | 7mm | | | P < 0.05  (TFCE corrected) | | | | 9.5 | | |
| ([Kempton et al., 2009](#_ENREF_48)) | 30(15) | 52(27) | 39.4±9.8 | 35.2±13.0 | manic | 16.6 | NA | NA | 100 | 1.5T | SPM5 | 12mm | | | P < 0.001  uncorrected | | | | 9 | | |
| ([Keramatian et al., 2021](#_ENREF_49)) | 61(27) | 43(21) | 22.8±4.4 | 23.8±5.1 | manic | NA | 7.1±8.8 | 3.3±5.6 | 100 | 3.0T | FSL | 3mm | | | P < 0.05  (FWE corrected) | | | | 9 | | |
| ([Oertel-Knöchel et al., 2014](#_ENREF_81)) | 21(12) | 20(12) | 35.7±10.7 | 36.9±11.1 | euthymic | 91.4 | NA | NA | 100 | 3.0T | SPM8 | 8mm | | | P < 0.05  (FDR corrected) | | | | 9.5 | | |
| ([Kozicky et al., 2013](#_ENREF_50)) | 41(24) | 30(12) | 22.8±4.6 | 22.9±4.7 | manic | NA | 3.8±4.2 | 0.9±2.0 | 100 | 3.0T | SPM8 | 8mm | | | P < 0.05  (FWE corrected) | | | | 10 | | |
| ([Kozicky et al., 2016](#_ENREF_51)) | 21 | 25 | 22.9±4.0 | 22.0±4.0 | 10depressed; 4manic; 7both | NA | 4.6 | 2.5±5.9 | 100 | 3.0T | SPM8 | 8mm | | | P < 0.05  (FWE corrected) | | | | 10 | | |
| ([Lee et al., 2017](#_ENREF_53)) | 21(7) | 21(7) | 37.0±11.7 | 37.0±10.4 | 18euthymic; 3mildly depressed | 92.1 | 4.8±4.0 (HAMD-21) | 2.3±2.8 | 100 | 3.0T | SPM12 | 8mm | | | P < 0.05  (FWE corrected) | | | | 10 | | |
| ([Lee et al., 2020](#_ENREF_52)) | 65(29) | 65(28) | 35.1±9.2 | 34.5±8.9 | NA | 13.8 | NA | NA | 100 | 3.0T | SPM8 | 8mm | | | P < 0.017  (FWE corrected) | | | | 9 | | |
| ([Li et al., 2011](#_ENREF_57)) | 24(15) | 36(21) | 28.4±6.6 | 25.6±6.7 | 17manic; 7depressed | 72.0 | 20.0±4.3 | 25.9±4.5 | 100 | 3.0T | SPM2 | 8mm | | | P < 0.05  corrected | | | | 9.5 | | |
| ([Li, 2014](#_ENREF_58)) | 34 | 36 | 31.1±7.7 | 31.3±7.3 | 13depressed; 13remitted; 8manic | NA | depressed 21.21±2.61；manic 5.08±1.66；remitted 3.53±1.92 | depressed 1.79±1.53；manic 23.62±4.00；remitted 2.27±2.09 | 100 | NA | SPM8 | 8mm | | | P < 0.05  (FWE corrected) | | | | 10 | | |
| ([Li, 2017](#_ENREF_55)) | 13(6) | 20(10) | 31.0±7.6 | 31.7±11.4 | depressed | 108.0 | NA | NA | 100 | NA | SPM8 | 8mm | | | P < 0.05  (FDR corrected) | | | | 10 | | |
| ([Li, 2018](#_ENREF_59)) | 30(15) | 31(18) | 36.3±11.0 | 33.6±8.1 | depressed | NA | 23.6±5.6 | NA | 0 | NA | SPM8 | 8mm | | | P < 0.05  (GRF corrected) | | | | 9.5 | | |
| ([Li et al., 2020](#_ENREF_56)) | 44(18) | 36(22) | 23.1±5.1 | 22.8±2.4 | 4depressed; 4manic | 33.8 | 2.9±3.8 | 3.8±7.1 | 100 | 3.0T | SPM12 | 8mm | | | P < 0.05  (GRF corrected) | | | | 9.5 | | |
| ([Lochhead et al., 2004](#_ENREF_65)) | 31(16) | 11(6) | 38.2±10.8 | 24.3±9.2 | NA | NA | NA | NA | 3.2 | 1.5T | SPM99 | 12mm | | | P < 0.001 corrected | | | | 9.5 | | |
| ([Lyoo et al., 2004](#_ENREF_68)) | 39(16) | 43(19) | 38.3±11.6 | 35.7±10.1 | 22depressed; 17manic/hypomanic/mixed | 217.2 | 17.4±6.7 | 14.2±6.7 | 61.5 | 1.5T | SPM99 | 8mm | | | NA | | | | 9 | | |
| ([Maggioni et al., 2017](#_ENREF_69)) | 176(69) | 383(195) | 44.7±12.1 | 30.4±9.2 | 22euthymic; 1hypomanic 1; 49depressed; 12manic | NA | 14.5±10.7 | NA | NA | 3.0T | SPM12 | 6mm | | | P < 0.05  (cFWE corrected) | | | | 10 | | |
| ([Matsubara et al., 2016](#_ENREF_71)) | 10(3) | 27(10) | 46.9±12.3 | 48.3±13.0 | depressed | 74.1 | 21.3±6.7 | 0.0±0.0 | 100 | 1.5T | SPM8 | NA | | | P < 0.05  (FWE corrected) | | | | 10 | | |
| ([McIntosh et al., 2004](#_ENREF_73)) | 19(7) | 49(23) | 39.7±9.2 | 35.3±11.1 | NA | NA | NA | NA | NA | 1.5T | SPM99 | 8mm | | | P < 0.01  uncorrected | | | | 8.5 | | |
| ([Minuzzi et al., 2018](#_ENREF_74)) | 32(0) | 36(0) | 29.0±8.1 | 32.8±8.3 | NA | NA | 5.7±3.9 | 1.5±1.4 | 100 | 3.0T | SPM12 | 8mm | | | P < 0.05  (FDR corrected) | | | | 10 | | |
| ([Molina et al., 2011](#_ENREF_75)) | 19(12) | 24(16) | 38.3±8.3 | 34.6±8.6 | euthymic | 9.8 | NA | NA | 100 | 1.5T | SPM8 | 8mm | | | P < 0.001 | | | | 9.5 | | |
| ([Narita et al., 2011](#_ENREF_76)) | 14(8) | 84(48) | 40.2±10.9 | 41.1±11.4 | 2euthymic; 2 elevated; 10depressed | 103.2 | NA | NA | 100 | 1.5T | SPM5 | 12mm | | | P < 0.05  (FDR corrected) | | | | 10 | | |
|  | 17(9) | 84(48) | 41.40±11.90 | 41.10±11.40 | 6euthymic; 2elevated; 9depressed | 74.4 | NA | NA | 100 | 1.5T | SPM5 | 12mm | | | P < 0.05  (FDR corrected) | | | | 10 | | |
| ([Nenadic et al., 2015](#_ENREF_77)) | 17(8) | 34(16) | 37.7±11.1 | 34.3±10.6 | NA | 118.8 | 2.7±2.3 | 2.7±2.2 | NA | NA | NA | NA | | | NA | | | | 9 | | |
| ([Nery et al., 2015](#_ENREF_78)) | 25(8) | 27(11) | 35.7±8.9 | 31.2±9.5 | NA | 163.2 | 2.9±2.6 | 1.2±2.1 | 100 | 3.0T | SPM8 | 8mm | | | P < 0.05  (FWE corrected) | | | | 10 | | |
| ([Neves Mde et al., 2015](#_ENREF_79)) | 21(10) | 21(10) | 39.0±13.5 | 37.9±8.2 | NA | 139.2 | 2.0±2.5 | 3.0±2.5 | 100 | 1.5T | SPM8 | 8mm | | | P < 0.05  (FWE corrected) | | | | 10 | | |
| ([Kandilarova et al., 2019](#_ENREF_47)) | 11(3) | 42(13) | 43.6 ± 10.5 | 42.6 ± 13.7 | NA | 185.5 | NA | NA | 100 | 3.0T | SPM12 | 8mm | | | P < 0.05  (FDR corrected) | | | | 9.5 | | |
| ([Matsuo et al., 2012](#_ENREF_72)) | 35(8) | 40(16) | 40.8±9.2 | 41.6±9.1 | manic/depressed/euthymic | NA | NA | NA | 100 | 3.0T | SPM8 | 8mm | | | P < 0.01  (FWE corrected) | | | | 9 | | |
| ([Nugent et al., 2006](#_ENREF_80)) | 20(5) | 65(19) | 41.0±8.3 | 38.0±11.8 | NA | 276.0 | NA | NA | 100 | 3.0T | SPM2 | 12mm | | | NA | | | | 9 | | |
|  | 16(5) | 65(19) | 37.0±7.5 | 38.0±11.8 | NA | 204.0 | NA | NA | 100 | 3.0T | SPM2 | 12mm | | | NA | | | | 9 | | |
| ([Ota et al., 2016](#_ENREF_82)) | 43(22) | 229(61) | 38.3±8.9 | 45.5±15.7 | 29depressed; 14euthymic | 11.4 | 12.5±7.7 | 2.1±3.7 | 100 | 1.5T | SPM | 12mm | | | P < 0.05  (FWE corrected) | | | | 9 | | |
| ([de Azevedo-Marques Périco et al., 2011](#_ENREF_26)) | 26(10) | 94(53) | 27.1±8.5 | 30.2±8.4 | manic | 3.8 | 7.6±10.1 | 7.4±10.4 | 100 | 1.5T | SPM2 | 8mm | | | P < 0.05  (FWE corrected) | | | | 10 | | |
| ([Poletti et al., 2016](#_ENREF_83)) | 206(72) | 136(68) | 46.2±13.0 | 33.3±13.0 | manic/depressed | 185.5 | 19.6±4.8 | NA | 100 | 3.0T | SPM8 | 8mm | | | P < 0.05  (FWE corrected) | | | | 10 | | |
| ([Qiu et al., 2018a](#_ENREF_84)) | 28(14) | 28(18) | 31.8±12.8 | 33.5±9.9 | depressed | NA | 31.0±7.9 | NA | NA | NA | SPM8 | 8mm | | | P < 0.01  (FWE corrected) | | | | 10 | | |
| ([Redlich et al., 2014](#_ENREF_87)) | 58(21) | 58(21) | 37.5±11.0 | 37.7±9.7 | manic/depressed | 170.7 | 21.0±6.0 | 3.0±2.7 | 100 | 3.0T | SPM8 | 8mm | | | P < 0.001 | | | | 9 | | |
| ([Rocha-Rego et al., 2014](#_ENREF_88)) | 26(12) | 26(12) | 41.5±11.3 | 41.3±11.6 | NA | NA | NA | 1.8±4.1 | 100 | 1.5T | SPM5 | 8mm | | | P < 0.001  uncorrected | | | | 9 | | |
| 14(6) | 14(6) | 37.6±12.0 | 37.4±11.0 | NA | NA | NA | 1.7±3.1 | 100 | 1.5T | SPM5 | 8mm | | | P < 0.001  uncorrected | | | | 9 | | |
| ([Rossi et al., 2013](#_ENREF_89)) | 14(5) | 40(21) | 43.0±8.0 | 40.0±11.0 | euthymic | 204.0 | 18.0±11.0 | NA | 100 | 1.5T | SPM5 | 8mm | | | P < 0.001 | | | | 9 | | |
| ([Sani et al., 2016](#_ENREF_91)) | 78(38) | 78(38) | 44.6±13.3 | 44.4±13.3 | 41depressed; 29euthymia; 5mania; 3mixed | 207.4 | 11.6±8.6 | 5.0±6.4 | 100 | NA | SPM8 | 8mm | | | P < 0.05  (FWE corrected) | | | | 10 | | |
| ([Sarıçiçek et al., 2015](#_ENREF_92)) | 28(8) | 29(13) | 36.3±9.5 | 33.6±9.3 | NA | 127.2 | 1.3±1.4 | 0.6±0.9 | 100 | 1.5T | SPM8 | 12mm | | | P < 0.05  (FWE corrected) | | | | 10 | | |
| ([Scherk et al., 2008](#_ENREF_93)) | | 35(17) | 32(20) | 43.3±12.5 | 33.7±11.8 | NA | 172.6 | NA | 2.5±2.8 | 100 | 1.5T | SPM2 | 8mm | | | P<0.05 | | | | 9 | |
| ([Shepherd et al., 2015](#_ENREF_96)) | | 30(12) | 34(16) | 39.1±12.8 | 32.6±10.6 | NA | NA | NA | 6.7±8.4 | 100 | 3.0T | SPM8 | 8mm | | | P < 0.05  (FWE corrected) | | | | 10 | |
| ([Song et al., 2020](#_ENREF_97)) | 36(16) | 29(10) | 30.6±8.3 | 29.3±5.3 | NA | 94.8 | NA | NA | 100 | 3.0T | SPM12 | 8mm | | | P < 0.01  (FDR corrected) | | | | 9.5 | | |
| ([Stanfield et al., 2009](#_ENREF_99)) | 66(30) | 66(31) | 36.4±11.1 | 39.0±10.9 | NA | 15.4 | 1.0±6.0 | 3.0±10.0 | 100 | 1.5T | SPM99 | 12mm | | | P < 0.05  (uncorrected) | | | | 9 | | |
| ([Sun et al., 2020](#_ENREF_100)) | 30(15) | 31(20) | 36.3±11.0 | 33.6±8.1 | depressed | NA | 23.6±5.6 | NA | 0 | 3.0T | SPM8 | 8mm | | | P < 0.05  (GRF corrected) | | | | 10 | | |
| ([Tang et al., 2014](#_ENREF_102)) | 27(10) | 27(11) | 32.0±11.2 | 32.6±11.8 | depressed | 50.3 | 19.6±72.4 | 1.0±0.9 | 100 | 3.0T | SPM8 | 8mm | | | P < 0.05  (FWE corrected) | | | | 10 | | |
| ([Tost et al., 2010](#_ENREF_103)) | 42(19) | 42(19) | 42.4±13.1 | 42.2±13.6 | NA | 190.8 | NA | 11.4±15.4 | 100 | 1.5T | SPM2 | 12mm | | | P < 0.05  (FWE corrected) | | | | 10 | | |
| ([Vai et al., 2020](#_ENREF_104)) | 74(55) | 74(39) | 47.3±9.4 | 36.4±12.5 | NA | 208.2 | NA | NA | 100 | 3.0T | SPM12 | 8mm | | | P < 0.05  (FWE corrected) | | | | 9.5 | | |
| ([Wang, 2013](#_ENREF_105)) | 19(6) | 30(15) | 26.5±4.7 | 25.6±6.6 | depressed | 49.8 | 23.2±4.8 | 2.0±1.7 | 100 | NA | SPM8 | 8mm | | | P < 0.005  uncorrected | | | | 9 | | |
| ([Wang et al., 2019](#_ENREF_107)) | 30(15) | 31(18) | 36.3±11.0 | 33.6±8.1 | depressed | NA | 23.6±5.6 | NA | 0 | 3.0 T | SPM8 | 8mm | | | P < 0.05  (GRF corrected) | | | | 9.5 | | |
| ([Watson et al., 2012](#_ENREF_108)) | 24(8) | 24(8) | 36.0±10.0 | 35.6±9.7 | depressed | NA | NA | NA | 87.5 | 1.5T | SPM5 | 4mm | | | P < 0.001  uncorrected | | | | 9 | | |
| ([Yatham et al., 2007](#_ENREF_117)) | 15(6) | 15(6) | 36.0±13.0 | 36.0±13.0 | manic | 46.8 | NA | 27.0±5.9 | 46.7 | 1.5T | SPM99 | 8 mm | | | P < 0.002 | | | | 9 | | |
| ([Yüksel et al., 2012](#_ENREF_114)) | 27(10) | 58(20) | 32.9±11.9 | 36.4±10.5 | manic/depressed/euthymic | NA | NA | 22.8±10.3 | 100 | 3.0T | FSL | 12mm | | | P < 0.05  (FWE corrected) | | | | 9.5 | | |
| ([Zhang et al., 2018a](#_ENREF_119)) | 28(13) | 46(22) | 27.2±7.2 | 25.5±9.7 | NA | NA | 9.4±9.6 | 6.4±9.2 | 100 | NA | SPM8 | 8mm | | | P < 0.001  (GRF corrected) | | | | 9.5 | | |
|  | 40(14) | 46(22) | 27.7±8.0 | 25.5±9.7 | NA | NA | 11.4±8.6 | 8.2±11.9 | 100 | NA | SPM8 | 8mm | | | P < 0.001  (GRF corrected) | | | | 9.5 | | |
| ([Zou et al., 2014](#_ENREF_126)) | 17(8) | 17(8) | 23.6±5.4 | 24.9±2.6 | remission | 13.5 | NA | NA | NA | 3.0T | SPM8 | NA | | | P < 0.001  uncorrected | | | | 9 | | |
| **total** | 2790(1358) 3690 (1763) 35.00±9.3 | | | 33.1±9.1 |  | 120.9 | 12.5±7.5 | 7.5±5.3 | |  |  |  |  |  | | |  |  | | |  |

Abbreviations: VBM, Whole-brain morphometric; BD, bipolar disorder; HC, healthy control; SD, standard deviation; HAMD, Hamilton Depression Scale; YMRS, Young Manic Rating Scale; FWHM, full width at half maximum; NA, not available; SPM, statistical parametric mapping; FWE, family wise error; FDR, false discovery rate; FSL, FMRIB’s Software Library, the University of Oxford; GRF, Gaussian random field; TFCE, the Threshold-Free Cluster Enhancement.

**Table S4** Meta-analyses results regarding functional difference between BD and HCs after FWER correction.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Local Maximum** |  |  |  |  | **Cluster** |  | ***I*2** | **Egger’s test**  **(*p* value)** |
| **Region** | **Peak MNI coordinate**  **(x, y, z)** | **SDM-Z value** | ***p* value** |  | **No. of voxels** | **Breakdown (No. of voxels)** |
| **BD > HCs** |  |  |  |  |  |  |  |  |
| Left middle frontal gyrus, orbital part, BA 11 | -26, 46, -16 | 5.437 | 9.999e-3 |  | 186 | Left middle frontal gyrus, orbital part, BAs 11, 47 (117)  Left inferior frontal gyrus, orbital part, BAs 11, 47 (34) | 28.470 | 0.803 |
| **BD < HCs** |  |  |  |  |  |  |  |  |
| Left middle temporal gyrus, BA 22 | -58, -16, 0 | -6.211 | 1.999e-3 |  | 1099 | Left superior temporal gyrus, BAs 22,42, 48 (524)  Left postcentral gyrus, BA 48 (89)  Left suparmarginal gyrus, BAs 42, 48 (99)  Left middle temporal gyrus, BAs 21, 22 (81)  Left heschl gyrus, BA 48 (15) | 25.162 | 0.649 |

Abbreviations: BD, bipolar disorder; HC, healthy control; FWE, family wise error; MNI, Montreal Neurological Institute; SDM, signed differential mapping; BA, Brodmann area.

**Table S5** Meta-analyses results regarding functional difference between depressed BD and HCs.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Local Maximum** |  |  |  |  | **Cluster** |  | ***I*2** | **Egger’s test**  **(*p* value)** |
| **Region** | **Peak MNI coordinate**  **(x, y, z)** | **SDM-Z value** | ***p* value** |  | **No. of voxels** | **Breakdown (No. of voxels)** |
| **BD > HCs** |  |  |  |  |  |  |  |  |
| Left inferior frontal gyrus, triangular part, BA 45 | -48, 36, -2 | 2.798 | 2.569e-3 |  | 13 |  | 70.787 | 0.970 |
| **BD < HCs** |  |  |  |  |  |  |  |  |
| Left postcentral gyrus, BA 48 | -54, -18, 18 | -2.867 | 2.070e-3 |  | 29 |  | 14.008 | 0.993 |

Abbreviations: BD, bipolar disorder; HCs, healthy controls; MNI, Montreal Neurological Institute; SDM, signed differential mapping; BA, Brodmann area.

**Table S6** Meta-analyses results regarding functional difference between unmedicated BD and HCs.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Local Maximum** |  |  |  |  | **Cluster** |  | ***I*2** | **Egger’s test**  **(*p* value)** |
| **Region** | **Peak MNI coordinate**  **(x, y, z)** | **SDM-Z value** | ***p* value** |  | **No. of voxels** | **Breakdown (No. of voxels)** |
| **BD > HCs** |  |  |  |  |  |  |  |  |
| Left superior frontal gyrus, dorsolateral, BA 10 | -22, 58, 14 | 4.562 | 2.503e-6 |  | 261 |  | 1.853 | 0.476 |
| Right superior frontal gyrus, medial, BA 8 | 4, 38, 48 | 3.701 | 1.074e-4 |  | 231 | Left superior frontal gyrus, medial, BAs 8, 9 (146)  Right superior frontal gyrus, medial, BAs 8, 9 (57) | 8.124 | 0.715 |
| Right postcentral gyrus, BA 4 | 26, -32, 60 | 3.861 | 5.639e-5 |  | 120 |  | 12.103 | 0.599 |

Abbreviations: BD, bipolar disorder; HCs, healthy controls; MNI, Montreal Neurological Institute; SDM, signed differential mapping; BA, Brodmann area.

**Table S7** Meta-analyses results regarding Reho difference between BD and HCs.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Local Maximum** |  |  |  |  | **Cluster** |  | ***I*2** | **Egger’s test**  **(*p* value)** |
| **Region** | **Peak MNI coordinate**  **(x, y, z)** | **SDM-Z value** | ***p* value** |  | **No. of voxels** | **Breakdown (No. of voxels)** |
| **BD > HCs** |  |  |  |  |  |  |  |  |
| Left middle frontal gyrus, orbital part, BA 11 | -26, 40, -18 | 4.773 | 8.94e-7 |  | 979 | Left inferior frontal gyrus, orbital part, BAs 11, 47 (417)  Left middle frontal gyrus, orbital part, BAs 11, 46, 47 (306)  Left inferior frontal gyrus, triangular part, BA 45 (30) | 12.645 | 0.936 |
| **BD < HCs** |  |  |  |  |  |  |  |  |
| Left middle temporal gyrus, BA 22 | -58, -16, 0 | -4.597 | 2.146e-6 |  | 1555 | Left superior temporal gyrus, BAs 22, 41, 42, 48 (684)  Left postcentral gyrus, BAs 22, 48 (135)  Left supramarginal gyrus, BA 42 (25)  Left heschl gyurs, BA 48 (23)  Left middle temporal gyrus, BAs 21, 22 (57) | 12.616 | 0.522 |

# Abbreviations: ReHo, regional homogeneity; BD, bipolar disorder; HCs, healthy controls; MNI, Montreal Neurological Institute; SDM, signed differential mapping; BA, Brodmann area.

**Table S8** Meta-analyses results regarding ALFF difference between BD and HCs.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Local Maximum** |  |  |  |  | **Cluster** |  | ***I*2** | **Egger’s test**  **(*p* value)** |
| **Region** | **Peak MNI coordinate**  **(x, y, z)** | **SDM-Z value** | ***p* value** |  | **No. of voxels** | **Breakdown (No. of voxels)** |
| **BD > HCs** |  |  |  |  |  |  |  |  |
| Right insula, BA 47 | 38, 20, -2 | 6.360 | <e-10 |  | 1240 | Right insula, BAs 47, 48 (534)  Right inferior frontal gyrus, opercular part, BAs 45, 48 (167)  Right inferior frontal gyrus, triangular part, BAs 45, 47 (181)  Right inferior frontal gyrus, orbital part, BAs 38, 47 (70)  Right temporal pole, superior temporal gyrus (16)  Right superior temporal gyrus, BA 48 (11) | 3.662 | 0.782 |
| Right striatum | 18, 12, -6 | 6.067 | <e-10 |  | 420 | Right striatum (152)  Right lenticular nucleus, putamen, BA 48 (42)  Right olfactory cortex, BA 48 (28)  Right amygdala, BA 34 (17) | 15.794 | 0.998 |
| Right anterior thalamic projections | 12, 6, 8 | 4.998 | 2.98e-7 |  | 355 | Right anterior thalamic projections (208)  Right caudate nucleus (126) | 8.169 | 0.797 |
| Left striatum | -18, 8, 0 | 4.283 | 9.239e-6 |  | 273 | Left striatum (165)  Left lenticular nucleus, putamen, BAs 25, 48 (36)  Left olfactory cortex, BA 25 (12) | 9.277 | 0.861 |
| Right inferior temporal gyrus, BA 20 | 42, 2, -38 | 4.497 | 3.457e-6 |  | 231 | Right inferior temporal gyrus, BAs 20, 36 (138)  Right fusiform gyrus, BA 20 (21)  Right temporal pole, middle temporal gyrus, BA 36 (11) | 5.762 | 0.660 |
| Left caudate nucleus | -10, 5, 16 | 4.225 | 1.192e-5 |  | 158 |  | 5.510 | 0.866 |
| Left inferior frontal gyrus, orbital part, BA 45 | -46, 40, -4 | 3.374 | 3.705e-4 |  | 31 |  | 0.601 | 0.617 |
| Right striatum | 20, 54, -12 | 3.199 | 6.890e-4 |  | 17 |  | 22.249 | 0.980 |
| **BD < HCs** |  |  |  |  |  |  |  |  |
| Left cerebellum, hemispheric lobule VI, BA 18 | -12, -72, -20 | -5.450 | <e-10 |  | 570 | Left cerebellum, hemispheric lobule VI (250)  Left calcarine fissure / surrounding cortex, BA 17 (54)  Left lingual gyrus, BAs 17, 18 (111)  Left cerebellum, curs I (49)  Right lingual gyrus, BA 17 (10) | 3.486 | 0.551 |

Abbreviations: ALFF, amplitude of low frequency fluctuations; BD, bipolar disorder; HCs, healthy controls; MNI, Montreal Neurological Institute; SDM, signed differential mapping; BA, Brodmann area.

**Table S9** Meta-analyses results regarding VBM difference between BD and HCs after FWER correction.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Local Maximum** |  |  |  |  | **Cluster** |  | ***I*2** | **Egger’s test**  **(*p* value)** |
| **Region** | **Peak MNI coordinate**  **(x, y, z)** | **SDM-Z value** | ***p* value** |  | **No. of voxels** | **Breakdown (No. of voxels)** |
| **BD < HCs** |  |  |  |  |  |  |  |  |
| Left temporal pole, superior temporal gyrus, BA 38 | -38, 10, -22 | -5.504 | 3.600e-2 |  | 17 |  | 31.713 | 0.204 |

Abbreviations: VBM, voxel-based morphometry; BD, bipolar disorder; HC, healthy control; FWE, family wise error; MNI, Montreal Neurological Institute; SDM, signed differential mapping; BA, Brodmann area.

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