# **Supplementary Table 1 The number of participants by facility**

|  |  |  |  |
| --- | --- | --- | --- |
| **Facilities** | **HC** | **AN-R** | **AN-BP** |
| Chiba University Hospital | 34 | 9 | 14 |
| Hosipital of the UOEH | 26 | 9 | 1 |
| Tohoku University Hospital | 21 | 20 | 15 |
| Kyushu University Hospital | 4 | 3 | 0 |
| Kyoto University Hosipital | 50 | 20 | 23 |
|  |  |  |  |
| HC healty control, AN-R anorexia nervosa restricting type, | | |  |
| AN-BP Anorexia nervosa binge-purging type. | | | |
| UOEH: University of occupational and environmental health. | | | |

# **Supplementary Table 2 MRI scanners and imaging parameters in each sites**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **MRI site** | **Chiba University Hosp.** | **Hosp. of the UOEH** | **Tohoku University Hosp.** | **Kyushu University Hosp.** | **Kyoto University Hosp.** |
| MRI scanners |  |  |  |  |  |
| Vender and model | GE Discovery MR750 3.0T | GE Discovery MR750 3.0T | Philips Achieva 3.0T | Philips Achieva 3.0T | Siemens MAGNETOM TrioTim |
| Magnetic field strength (T) | 3 | 3 | 3 | 3 | 3 |
| Number of channels of head coils | 32 | 32 | 8 | 8 | 32 |
| Imaging parameters : T1-weighted images |  |  |  |  |  |
| Pulse sequence | 3D IR SPGR | 3D IR SPGR | MPRAGE | MPRAGE | MPRAGE |
| Imaging direction | Sagittal | Sagittal | Sagittal | Sagittal | Axial |
| Matrix | 256x256 | 256x256 | 256x256 | 256x256 | 256x240 |
| Number of slices | 196 | 196 | 200 | 200 | 208 |
| FOV (mm) | 256x256 | 256x256 | 256x256 | 256x256 | 240x225 |
| Resolution (mm) | 1x1 | 1x1 | 1x1 | 1x1 | 0.9375x0.9375 |
| TR (ms) | 7.36 | 7.7 | 7.28 | 7.43 | 2000 |
| TE (ms) | 3.05 | 3.11 | 3.38 | 3.41 | 3.4 |
| TI (ms) (prepulse delay) | 400 | 400 | 963 | 900 | 990 |
| Slice thickness (mm) | 1 | 1 | 1 | 1 | 1 |
| Flip angle (degree) | 11 | 11 | 9 | 9 | 8 |
| Band width (Hz/pixel) | 244.141 | 244.141 | 217 | 217 | 130 |
| Parallel Imaging | ASSET 2x | ASSET 2x | SENSE 2x | SENSE 2x | No |
| Total scan time | 4:54 | 5:01 | 5:51 | 5:52 | 8:02 |
| Imaging parameters : Resting-state fMRI |  |  |  |  |  |
| Imaging direction | Axial | Axial | Axial | Axial | Axial |
| Matrix | 64x64 | 64x64 | 64x63 | 64x63 | 64x64 |
| Number of slices | 45 | 44-50 (mainly 45) | 45 | 45 | 40 |
| FOV (mm) | 212x212 | 212x212 | 212x208 | 169.6x167.0 | 212x212 |
| Resolution | 3.3125x3.3125 | 3.3125x3.3125 | 3.3125x3.3125 | 2.65x2.65 | 3.3125x3.3125 |
| TR (ms) | 3000 | 3000 | 3000 | 3000 | 2500 |
| TE (ms) | 30 | 30 | 30 | 30 | 30 |
| Slice thickness (mm) | 3.3 | 3.3 | 3.3 | 3.3 | 3.2 |
| gap (mm) | 0 | 0 | 0 | 0 | 0.8 |
| Flip angle | 80 | 80 | 80 | 80 | 80 |
| Band width (Hz/pixel) | 1937.5 | 1937.5 | 3080 | 3921 | 2003 |
| Number of volumes | 140 | 140 | 140 | 140 | 242 |
| Phase encoding direction | PA | PA | AP | AP | PA |
| Parallel Imaging | ASSET 2x | ASSET 2x | NA | NA | No |
| Slice order | Ascending, interleaved | Ascending, interleaved | Ascending | Ascending | Ascending, Interleaved |
| Eye close/open | Open | Open | Close | Open | Open |
| Total scan time | 7:00 | 7:00 | 7:00 | 7:00 | 10:10 |
| All the magnetic field strength were 3T. Hosp. Hospital, UOEH University of Occupational and Environmental Health, FOV field-of-vies, TR repetition time, TE echo time, TI inversion time. | | | | | |

# **Supplementary Table 3 Correlation coefficients between rsFCs showed group differences and self-administered psychological scales**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Seed | Region | Correlation coefficient | |  |  |  |  |  |  |
|  |  | EDE-Q (R) | EDE-Q (E) | EDE-Q (S) | EDE-Q (W) | EDE-Q (G) | BDI-II | STAI State | STAI Trait |
| **rsFCs HC < AN** |  |  |  |  |  |  |  |  |  |
| SN, right rostral prefrontal cortex | Right anterior superior temporal gyrus | -.043 | .033 | .012 | -.014 | -.000 | -.040 | .012 | -.022 |
|  | Right posterior superior temporal gyrus | -.142 | .087 | -.010 | -.011 | -.008 | .112 | .074 | .049 |
|  | Right hippocampus | -.145 | -.101 | -.027 | .003 | -.077 | .192 | .071 | .040 |
|  | Left hippocampus | -.124 | -.107 | -.040 | -.056 | -.093 | .111 | .064 | .101 |
|  | Right amygdala | -.281 | -.201 | -.181 | -.157 | -.219 | -.094 | -.163 | -.082 |
|  | Left amygdala | -.117 | -.056 | .038 | .062 | -.010 | .010 | -.080 | -.075 |
| Left temporal pole | Right frontal operculum cortex | -.102 | -.044 | -.116 | -.063 | -.092 | .160 | -.073 | -.179 |
|  | SN, right rostral prefrontal cortex | -.132 | -.029 | -.054 | -.045 | -.065 | .056 | .031 | -.078 |
|  | SN, left rostral prefrontal cortex | -.132 | -.005 | .014 | .004 | -.020 | .044 | .097 | .055 |
| Right anterior middle tempral gyrus | SN, left rostral prefrontal cortex | .099 | .060 | .043 | .087 | .076 | .033 | .065 | .036 |
|  | Left frontal opeculum cortex | .084 | .052 | .118 | .081 | .071 | .102 | -.025 | -.008 |
| Right amygdala | SN, left rostral prefrontal cortex | -.094 | -.011 | .069 | .102 | .022 | .055 | .017 | .109 |
| AN anorexia nervosa, HC healthy control, rsFCs resting state functional connectivities, EDE-Q eating disorder examination questionnaire (R; restraint, E: eating concern, S: shape concern, W: weight concern), | | | | | | | | | |
| STAI state-trait anxiety inventory, BDI-II beck depression inventory-II, SN salience network | | | | | | | | | |

# **Supplementary Table 4 Correlation coefficients between rsFCs showed group differences and self-administered psychological scales**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Seed | Region | Correlation coefficient | |  |  |  |  |  |  |
|  |  | EDE-Q (R) | EDE-Q (E) | EDE-Q (S) | EDE-Q (W) | EDE-Q (G) | BDI-II | STAI State | STAI Trait |
| **rsFCs AN < HC** |  |  |  |  |  |  |  |  |  |
| Left temporal pole | Left posterior temporal fusiform cortex | .038 | -.002 | -.014 | .001 | .009 | -.054 | .037 | .142 |
|  | Right hippocampus | -.041 | -.037 | .000 | .064 | .013 | -.037 | .035 | .096 |
|  | Left hippocampus | -.075 | -.024 | -.056 | -.052 | -.037 | .064 | .059 | .291 |
|  | Right amygdala | -.109 | -.006 | -.004 | .072 | .000 | .091 | .156 | .233 |
|  | Right anterior parahippocampal gyrus | -.018 | -.055 | -.041 | -.020 | -.049 | -.147 | .073 | .075 |
|  | Left anterior parahippocampal gyrus | .115 | -.014 | -.006 | -.029 | .010 | -.159 | .111 | .121 |
|  | Left posterior parahippocampal gyrus | -.045 | -.012 | -.013 | .019 | -.018 | -.024 | .096 | .172 |
|  | Subcallosal cortex | .068 | .032 | .047 | .061 | .032 | .064 | -.045 | .008 |
|  | Vermis I,II | -.112 | -.123 | -.107 | -.090 | -.115 | -.031 | .125 | .214 |
|  | Left cerebellum IV,V | -.081 | -.018 | -.101 | -.051 | -.069 | -.173 | .069 | .053 |
| Anterior right middle temporal gyrus | Right hippocampus | .079 | .058 | .047 | .066 | .079 | .045 | .049 | -.012 |
|  | Left hippocampus | .149 | .232 | .154 | .194 | .217 | .188 | .249 | .081 |
|  | Subcallosal cortex | -.095 | -.039 | -.183 | -.145 | -.139 | -.135 | -.185 | -.121 |
| Left cerebelum crus II | Right frontal pole | .012 | -.047 | -.166 | -.129 | -.101 | -.226 | -.126 | -.021 |
|  | Right angular gyrus | -.095 | .023 | -.114 | -.105 | -.064 | -.076 | .139 | .177 |
|  | FPN, right posterior parietal cortex | -.161 | -.071 | -.183 | -.179 | -.158 | -.195 | .002 | .063 |
| SN, left supramarginal gyrus | Vermis VI | -.143 | -.009 | .001 | .001 | -.036 | .081 | .106 | .105 |
|  | Vermis VII | -.286 | -.149 | -.039 | -.020 | -.121 | .038 | .089 | .077 |
| Anterior left superior temporal gyrus | Right hippocampus | .049 | -.022 | -.049 | -.003 | -.002 | -.015 | .131 | .138 |
|  | Left hippocampus | -.048 | .024 | -.029 | -.018 | -.009 | .030 | .116 | .154 |
| Posterior left inferior temporal gyrus | Left posterior temporal fusiform cortex | -.109 | -.188 | -.117 | -.171 | -.150 | -.082 | -.237 | -.080 |
|  | Right anterior parahippocampal gyrus | -.127 | -.177 | -.208 | -.239 | -.204 | -.169 | -.015 | .030 |
| Anterior cingulate gyrus | Right thalamus | .120 | .117 | .104 | .135 | .137 | -.012 | .082 | .155 |
|  | Left thalamus | .203 | .161 | .090 | .123 | .156 | .000 | .080 | .166 |
|  | VN, right lateral | .013 | .101 | -.128 | -.039 | -.021 | -.202 | .068 | .146 |
| Right cerebellum VI | Left frontal operculum cortex | -.140 | -.094 | -.026 | .011 | -.068 | .167 | .047 | .080 |
|  | LN, left posterior superior temporal gyrus | -.013 | .080 | .075 | .108 | .064 | .133 | .067 | -.051 |
| Vermis VII | Left posterior supramarginal gyrus | -.195 | -.030 | -.038 | -.006 | -.059 | .152 | .095 | .054 |
|  | Right cerebellum VIIb | .100 | .110 | .060 | .146 | .119 | .157 | .031 | .118 |
| Left temporal occipital fusiform cortex | VN, right lateral | .077 | .173 | -.045 | .002 | .051 | -.122 | .066 | .138 |
| Right hippocampus | Left hippocampus | .062 | .105 | .098 | .111 | .112 | .139 | .022 | .287 |
| Left hippocampus | Left anterior middle temporal gyrus | .082 | .155 | .043 | .087 | .120 | .047 | .215 | .221 |
| Vermis VI | CN, anterior | .134 | .051 | .039 | .028 | .051 | -.091 | -.134 | .026 |
| AN anorexia nervosa, HC healthy control, rsFCs resting state functional connectivities, EDE-Q eating disorder examination questionnaire (R; restraint, E: eating concern, S: shape concern, W: weight concern), | | | | | | | | | |
| STAI state-trait anxiety inventory, BDI-II beck depression inventory-II, SN salience network, FPN Frontoparietal network, VN visual network, LN language network, CN cerebellar network | | | | | | | | | |