

SI Appendix for “Dysfunction in Sensorimotor and Default Mode Networks: Elucidating the Neural Correlates of Major Depressive Disorder”: Supplemental Figures, and Tables

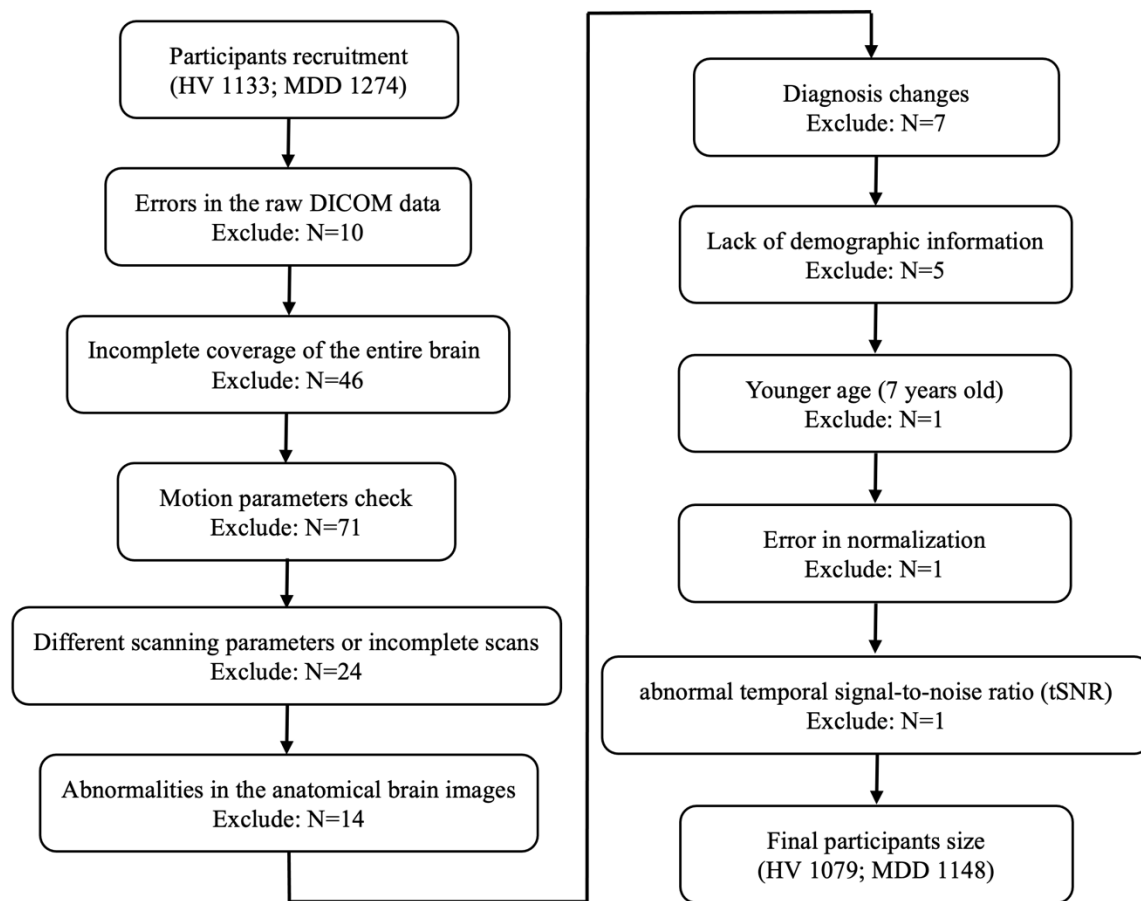


Figure S1. Flowchart for subject exclusion. In total, 2,407 participants (1,274 patients with MDD and 1,133 HVs) were recruited. 180 participants were excluded: duplicate data in the data transfer or errors in the raw DICOM data (N = 10), incomplete coverage of the entire brain (N = 46), excessive head motion (exceeding 3 mm of translational movement, 3° of rotational movement or 0.5 mm of mean framewise displacement, N = 71), different scanning parameters or incomplete scans (N = 24), abnormalities in the anatomical brain images (N = 14), diagnosis changes during follow-up interviews (N = 7), a lack of demographic information (N = 5), younger age (7 years old, N = 1), error in normalization (N = 1), and an abnormal temporal signal-to-noise ratio (N = 1). The final sample included 2,234 participants (1,148 patients with MDD and 1,079 HVs).

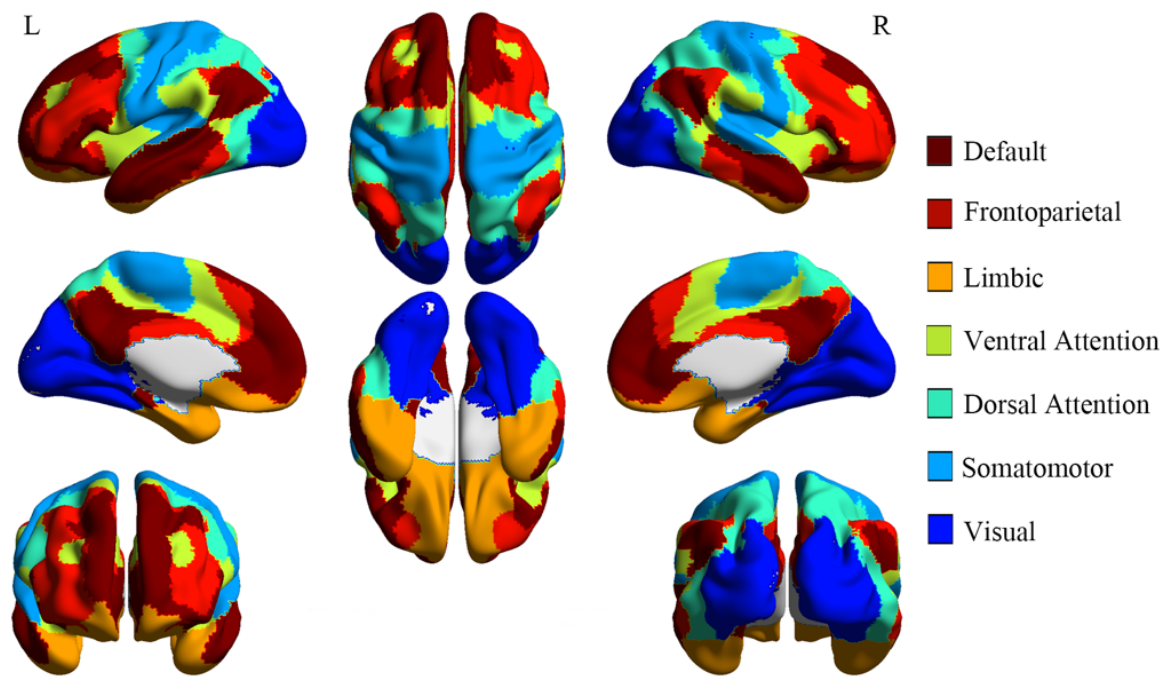


Figure S2. Parcellation of Seven Functional Networks. The atlas of seven functional networks parcellated by Yeo et al.

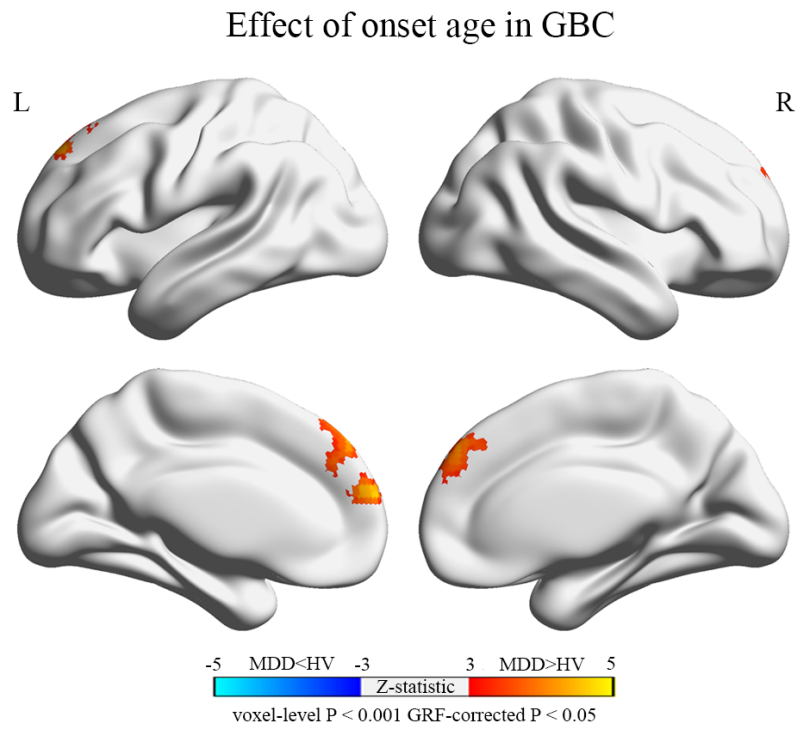


Figure S3. Group differences in GBC between the patients with an onset age ≤ 21 years and those with an onset age > 21 years. The patients with an onset age ≤ 21 showed a significantly increased GBC in bilateral medial superior frontal gyrus compared to the MDD patients with an onset age older than 21 years (GRF correction, voxel $P < 0.001$, cluster $P < 0.05$, two-tailed).

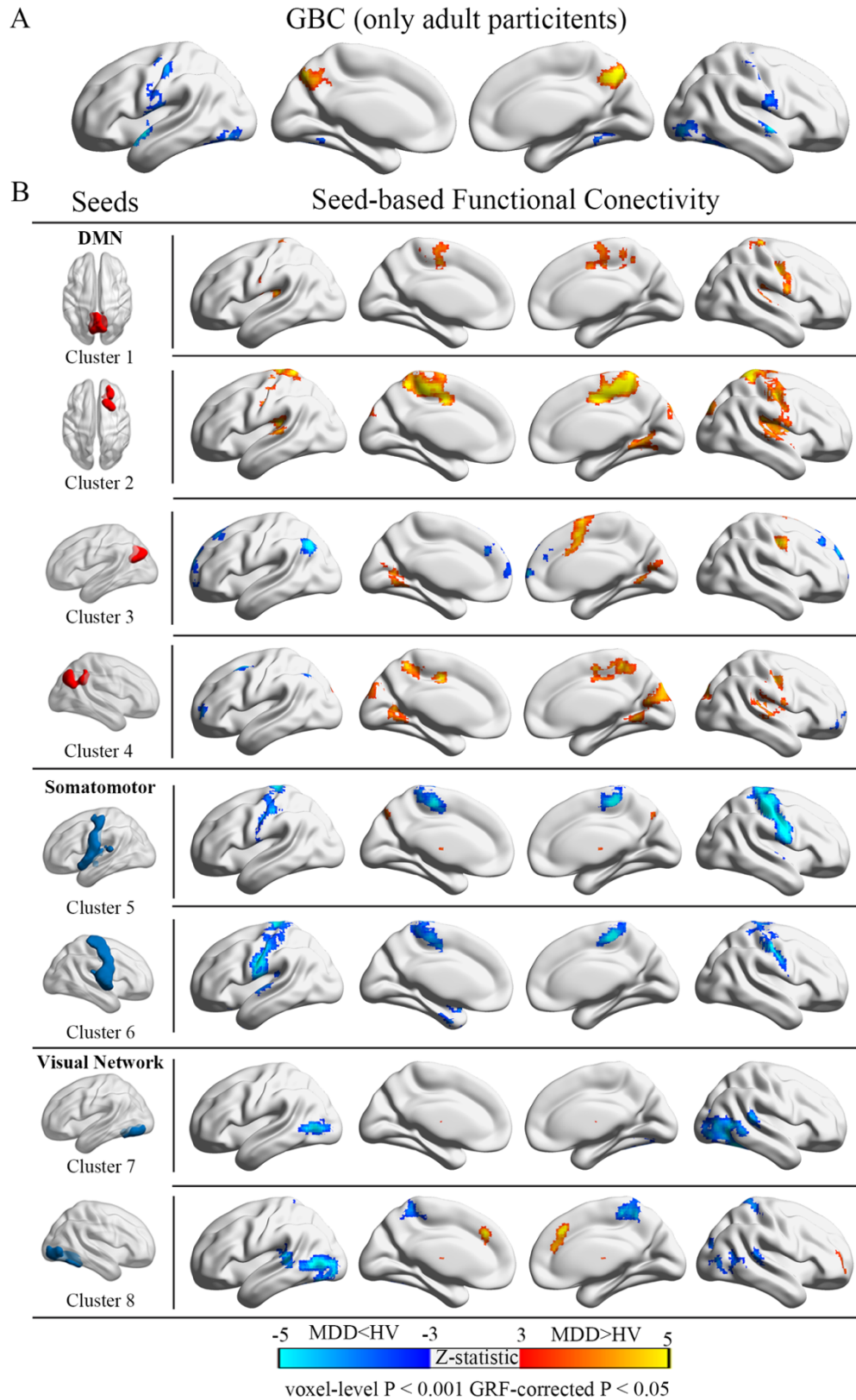


Figure S4. The repeated statistical analysis of adult participants. The repeated statistical analysis of adult participants in GBC and seed-based FC analysis showed highly similar to the main findings (GRF correction, voxel $P < 0.001$, cluster $P < 0.05$, two-tailed).

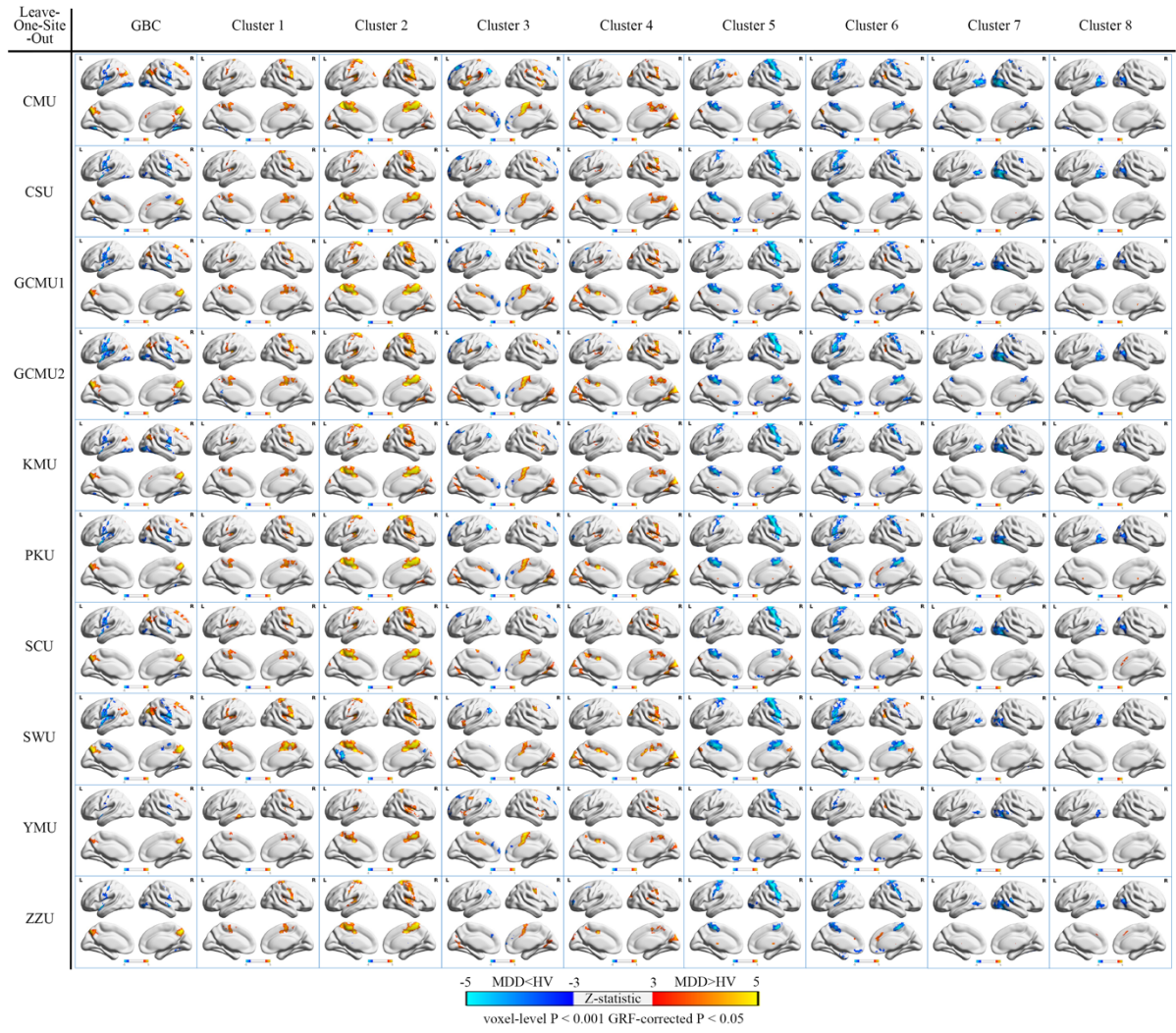


Figure S5. Leave-one-site-out cross-validation on regional alterations in GBC and seed-based analysis. The between-group differences in GBC and the seed-based functional connectivity were largely comparable when excluding data from different centers and were highly similar to the main findings (GRF correction, voxel $P < 0.001$, cluster $P < 0.05$, two-tailed).

Table S1. Between-group differences in the GBC values of the subnetworks in the mean maps

Subnetworks	<i>t</i>-value	Cohen's <i>d</i>	<i>P</i>-value
Visual network	35.738	0.182	$<1.0 \times 10^{-100}$
Sensorimotor network	99.302	0.446	$<1.0 \times 10^{-100}$
Dorsal attention network	-10.501	-0.040	4.17×10^{-25}
Ventral attention network	8.319	0.044	1.94×10^{-16}
Limbic network	44.593	0.194	$<1.0 \times 10^{-100}$
Frontoparietal network	-39.472	-0.136	$<1.0 \times 10^{-100}$
Default mode network	-31.600	-0.092	$<1.0 \times 10^{-100}$
Subcortical network	5.879	0.016	4.54×10^{-09}

Table S2. Clusters with significant between-group differences in FC of DMN seeds.

Seed: ROI1 (DMN)(Precuneus)							
Region		Network	MNI Coordinates (Peak)			t	Cluster size
			x	y	z		
MDD>HV							
1	Right PoCG/PreCG/STG/ROL	SMN	42	-15	39	5.7	753
2	Right PoCG/ROL/STG		-36	-27	21	5.3	299
3	Bilateral PoCG/SMA/PCL, Right PreCG, Bilateral MCC/Precunues	SMN/DMN	24	-30	66	5.9	942
Seed: ROI2(DMN)(SFG_R)							
Region		Network	MNI Coordinates (Peak)			t	Cluster size
			x	y	z		
MDD>HV							
1	Bilateral PreCG/PCL/PoCG/STG/ROL	SMN	3	-30	57	7.5	3969
	Bilateral SMA/Precuneus/SPG	DMN					
2	Left STG/ROL/SMG/PoCG/MTG	SMN	-66	-18	9	6	454
3	Right Lingual/Fusiform/Calcarine	VIS	24	-69	-3	4.4	189
4	Bilateral SOG/Cuneus		18	-84	33	5.9	245
Seed: ROI3(DMN)(Angular_L)							
Region		Network	MNI Coordinates (Peak)			t	Cluster size
			x	y	z		
MDD>HV							
1	Left Insular/Putamen	Subcortical	-33	-3	6	4.3	156
2	Right Insular/Putamen		36	15	-6	4.7	161
3	Bilateral SMA/MCC	V-Att	6	9	48	5.3	484
4	Bilateral Calcarine/cuneus/Lingual	VIS	12	-75	15	4.7	573
5	Bilateral PoCG/STG/ROL	SMN	-63	-9	12	4.7	137
6	Right PreCG/PoCG		45	-9	39	5.4	183
MDD<HV							
7	Bilateral SFGmed/SFG	DMN	-36	15	51	-5.4	1518
8	Left Angular		-45	-72	39	-5.7	200
Seed: ROI4(DMN)(Angular_R)							
Region		Network	MNI Coordinates (Peak)			t	Cluster size
			x	y	z		
MDD>HV							
1	Left STG/PreCG	SMN	-66	-15	9	4.3	192
2	Right STG/PoCG/ROL/SMG/PreCG		48	-30	15	5.7	972
3	Bilateral Cuneus/SOG; Left lingual	VIS	15	-87	33	5.8	773
4	Left Lingual/Calcarine		-12	-54	-6	4.3	143
5	Bilateral MCC/Precuneus/PCL/SMA	V-Att/DMN	-9	-12	42	6	727
MDD<HV							
6	Left MFG	Frontoparietal	-33	6	57	-5.6	301

Table S3. Clusters with significant between-group differences in FC of SMN seeds.

Seed: ROI5 (SMN)(Pre-/Post-central_L)							
Region		Network	MNI Coordinates (Peak)			t	Cluster size
			x	y	z		
MDD>HV							
1	Bilateral Thalamus	Subcortical	-18	-12	12	4.5	192
2	Bilateral Precuneus, Left SPG	DMN	9	-69	42	4.6	212
MDD<HV							
3	Bilateral Rectus/OFCmed;	Limbic	-12	36	-12	-4.9	253
4	Bilateral PoCG/PreCG/PCL/SMA, Right ROL/STG	SMN	42	-24	69	-7	3420

Seed: ROI6 (SMN)(Pre-/Post-central_R)							
Region		Network	MNI Coordinates (Peak)			t	Cluster size
			x	y	z		
MDD>HV							
1	Right ANG/MTG/SMG	DMN	48	-48	24	4.9	164
2	Bilateral Precuneus		15	-63	36	5.6	242
MDD<HV							
3	Left ITG/Parahippocampal gyrus/TPOsup	Limbic	-36	0	-36	-5.1	272
4	Bilateral Rectus/OFCmed		12	24	-12	-4.4	235
5	Bilateral PoCG/PreCG, Left PCL/SMA/ROL/STG	SMN	0	-30	57	-6.4	3128

Table S4. Clusters with significant between-group differences in FC of VIS seeds.

Seed: ROI7 (VIS)(FFG_L)							
Region		Network	MNI Coordinates (Peak)			t	Cluster size
			x	y	z		
MDD>HV							
1	Bilateral Thalamus	Subcortical	3	-6	6	4.9	167
MDD<HV							
2	Right STG	SMN	54	-39	15	-4.4	118
3	Right FFG/SOG/MOG/IOG/STG/MTG/ITG	VIS/DMN	39	-57	-15	-5.5	1057
4	Left SOG/MOG/IOG/MTG		-48	-72	3	-5.3	314

Seed: ROI8 (VIS)(FFG_R)							
Region		Network	MNI Coordinates (Peak)			t	Cluster size
			x	y	z		
MDD>HV							
1	Bilateral Thalamus	Subcortical	6	-6	6	-5.6	221
2	Bilateral SFGmedial,Right ACC/MCC/SFG	DMN	6	30	36	-5.2	212
MDD<HV							
3	Left IOG/SOG/FFG/MTG	VIS/DMN	-48	-72	3	5.7	352
4	Right SOG/MOG/MTG		48	-69	-6	4.9	304
5	Left STG/MTG/ROL	SMN/DMN	-57	-36	12	5.1	289
6	Bilateral PoCG/PreCG/PCL/SPG/Precuneus		6	-33	57	5	684