

Results

Validation: Reproducibility

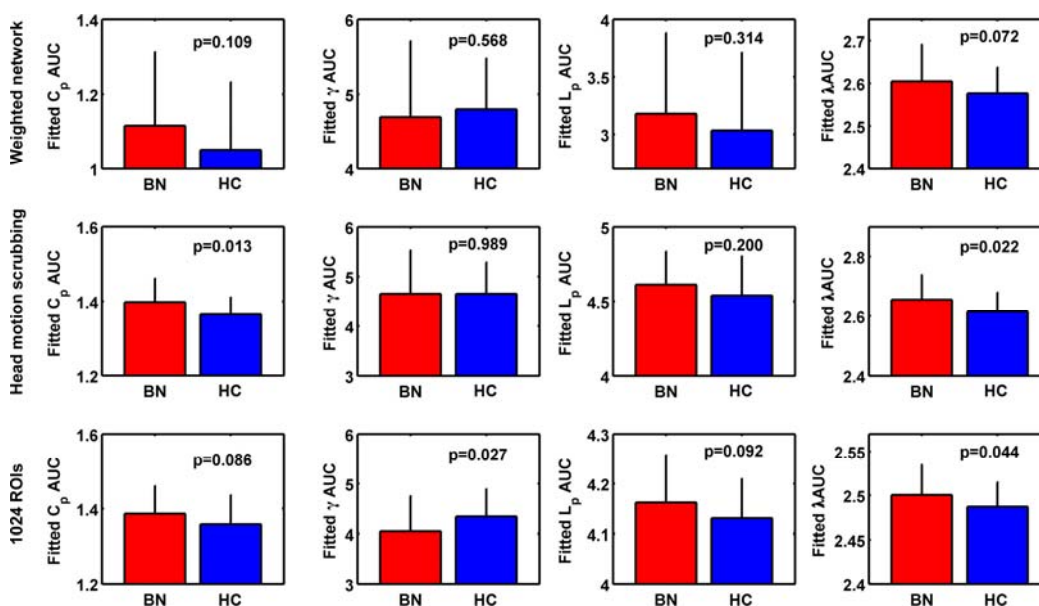


Figure S1. Reproducibility of the results of small-world parameters. Differences in topological properties of functional brain networks between bulimia nervosa (BN) patients and healthy control (HC) subjects, which were obtained after ‘head motion scrubbing’, use of 1024-nodes parcellation, and weighted networks. These results were obtained by comparing the area under curve (AUC) for each topological parameter between groups across the density range of 10%~34%. Error bars denote standard deviations. C_p , clustering coefficient; γ , normalized clustering coefficient; L_p , shortest path length; λ , normalized shortest path length; ROI, region of interest.

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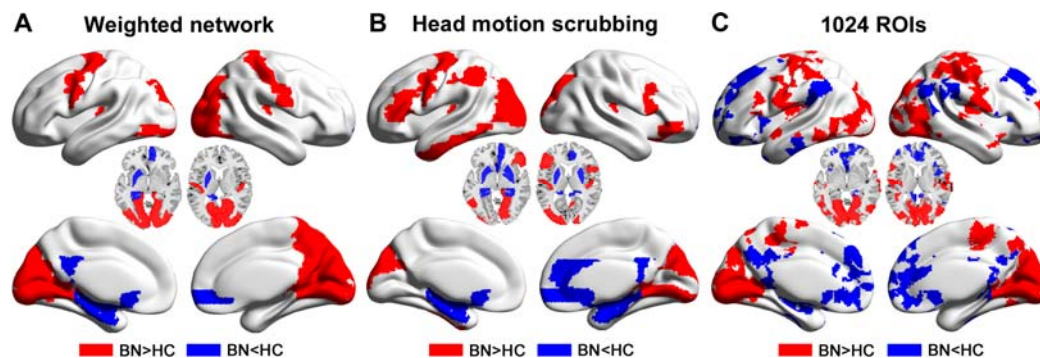


Figure S2. Reproducibility of the results of nodal strength measures. The major results of nodal strength (nodal degree or efficiency) were reproducible with weighted networks (A), head-motion scrubbing (B), and 1024-nodes atlas (C). The results were obtained by comparing the area under curve (AUC) for each topological parameter between groups across the density range of 10%~34%. BN, bulimia nervosa; HC, healthy control; ROI, region of interest.

Appendix 1 to Wang L, Kong QM, Li K, et al. Altered intrinsic functional brain architecture in female patients with bulimia nervosa. *J Psychiatry Neurosci* 2017.
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Table S1. Regions of interest.

Index	Region	Abbreviation	Index	Region	Abbreviation
1,2	Superior frontal gyrus, dorsolateral	SFGdor	47,48	Middle frontal gyrus, orbital part	ORBmid
3,4	Middle frontal gyrus	MFG	49,50	Inferior frontal gyrus, orbital part	ORBinf
5,6	Inferior frontal gyrus, opercular part	IFGoperc	51,52	Superior frontal gyrus, medial orbital	ORBsupmed
7,8	Inferior frontal gyrus, triangular part	IFGtriang	53,54	Gyrus rectus	REC
9, 10	Rolandic operculum	ROL	55,56	Insula	INS
11,12	Supplementary motor area	SMA	57,58	Anterior cingulate and paracingulate gyri	ACG
13,14	Superior frontal gyrus, medial	SFGmed	59,60	Median cingulate and paracingulate gyri	DCG
15,16	Cuneus	CUN	61,62	Posterior cingulate gyrus	PCG
17,18	Lingual gyrus	LING	63,64	Parahippocampal gyrus	PHG
19,20	Superior occipital gyrus	SOG	65,66	Temporal pole: superior temporal gyrus	TPOsup
21,22	Middle occipital gyrus	MOG	67,68	Temporal pole: middle temporal gyrus	TPOmid
23,24	Inferior occipital gyrus	IOG	69,70	Olfactory cortex	OLF
25,26	Fusiform gyrus	FFG	71,72	Hippocampus	HIP
27,28	Superior parietal gyrus	SPG	73,74	Amygdala	AMYG
29,30	Inferior parietal, but supramarginal and angular gyri	IPL	75,76	Caudate nucleus	CAU
31,32	Supramarginal gyrus	SMG	77,78	Lenticular nucleus, putamen	PUT
33,34	Angular gyrus	ANG	79,80	Lenticular nucleus, pallidum	PAL
35,36	Precuneus	PCUN	81,82	Thalamus	THA
37,38	Paracentral lobule	PCL	83,84	Precentral gyrus	PreCG
39,40	Superior temporal gyrus	STG	85,86	Calcarine fissure and surrounding cortex	CAL
41,42	Middle temporal gyrus	MTG	87,88	Postcentral gyrus	PoCG
43,44	Inferior temporal gyrus	ITG	89,90	Heschl gyrus	HES
45,46	Superior frontal gyrus, orbital part	ORBsup			

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Table S2. Topological properties of brain graphs used in the current study.

Parameters	Characters	Descriptions
Global network properties		
Clustering coefficient	C_p	The capability of local clustering of a network
Characteristic path length	L_p	The average shortest path length between any pairs of nodes in a network
Gamma	γ	The normalization of C_p divided by those of comparable random networks
Lambda	λ	The normalization of L_p divided by those of comparable random networks
Regional nodal properties		
Degree centrality		The number (or sum of weights) of connections connected directly to a node
Nodal efficiency		The efficiency of information transfer over a node's direct neighbors

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Table S3. Regions showing altered nodal strength in the bulimia nervosa patients as compared with healthy controls obtained by two-sample t tests.

Brain regions	p values	
	Nodal degree	Nodal efficiency
Bulimia nervosa > Healthy control		
Left precentral gyrus	0.0231	0.0003
Right postcentral gyrus	0.0114	0.3178
Left superior occipital gyrus	0.7428	0.0002
Right superior occipital gyrus	0.2826	0.0015
Left middle occipital gyrus	0.5689	0.0053
Right middle occipital gyrus	0.3178	0.0212
Left cuneus	0.6391	0.0001
Left lingual gyrus	0.8347	0.0343
Right lingual gyrus	0.6646	0.0060
Right inferior temporal gyrus	0.3742	0.0199
Left heschl gyrus	0.0358	0.2119
Right precuneus	0.0095	0.7470
Bulimia nervosa < Healthy control		
Right middle frontal gyrus, orbital	0.0083	0.8875
Left olfactory cortex	0.0242	0.2486
Left hippocampus	0.0161	0.3589
Left parahippocampal gyrus	0.0216	0.0871
Right parahippocampal gyrus	0.0396	0.8470
Left insula	0.2840	0.0202
Left amygdala	0.0204	0.2617
Left putamen	0.0054	0.5861
Left thalamus	0.0253	0.8096

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Note: Regions were considered abnormal in the bulimia nervosa patients if they exhibited significant

between-group differences ($p < 0.05$, uncorrected) in at least one nodal metric (node degree and efficiency) (shown

in bold font).

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Table S4. Regions showing altered nodal strength in the bulimia nervosa patients as compared with healthy controls obtained by nonparametric permutation tests.

Brain regions	p values	
	Nodal degree	Nodal efficiency
Left precentral gyrus	0.0261	0.0005
Right postcentral gyrus	0.0124	0.3258
Left superior occipital gyrus	0.7463	0.0001
Right superior occipital gyrus	0.2764	0.0017
Left middle occipital gyrus	0.5729	0.0052
Right middle occipital gyrus	0.3265	0.0175
Left cuneus	0.6463	0.0001
Left lingual gyrus	0.8434	0.0347
Right lingual gyrus	0.6676	0.0048
Right inferior temporal gyrus	0.3744	0.0211
Left heschl gyrus	0.0359	0.2192
Right precuneus	0.0096	0.7682
Bulimia nervosa < Healthy control		
Right middle frontal gyrus, orbital	0.0082	0.8905
Left olfactory cortex	0.0239	0.2459
Left hippocampus	0.0165	0.3704
Left parahippocampal gyrus	0.0206	0.0847
Right parahippocampal gyrus	0.039	0.8468
Left insula	0.2926	0.0156
Left amygdala	0.0217	0.2643
Left putamen	0.0058	0.6
Left thalamus	0.0281	0.8041

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Table S5. The specific pairs of intrinsic functional connectivity showing significant differences between the bulimia nervosa patients and healthy controls.

Bulimia nervosa > Healthy control	Bulimia nervosa < Healthy control
Within primary sensorymotor system	Primary sensorymotor - Subcortical system
Right precentral gyrus-right calcarine fissure	Left precentral gyrus-left caudate
Left calcarine fissure-leftpostcentral gyrus	Left postcentral gyrus-left caudate
Right calcarine fissure- left postcentral gyrus	Right postcentral gyrus-left caudate
Left calcarine fissure-right postcentral gyrus	Left precentral gyrus-right caudate
Right calcarine fissure-right postcentral gyrus	Left postcentral gyrus-right caudate
Right calcarine fissure-left heschl gyrus	Left postcentral gyrus- leftputamen
Primary sensorymotor - Unimodal association	Right postcentral gyrus-left putamen
Left calcarine fissure-right rolandic operculum	Left precentral gyrus-left thalamus
Right calcarine fissure-right rolandic operculum	Left calcarine fissure-left thalamus
Left calcarine fissure-left cuneus	Left postcentral gyrus-left thalamus
Right calcarine fissure-left cuneus	Left precentral gyrus-right thalamus
Left calcarine fissure-rightcuneus	Left postcentral gyrus-right thalamus
Right calcarine fissure-right cuneus	Unimodal association - Subcortical system
Left calcarine fissure-left superior occipital gyrus	Left cuneus-left putamen
Right calcarine fissur-left superior occipital gyrus	Left superior occipital gyrus-left putamen
Right calcarine fissure-right superior occipital gyrus	Left inferior occipital gyrus-left putamen,
Left calcarine fissure-right middle occipital gyrus	Right inferior occipital gyrus -left putamen,
Right calcarine fissure-right middle occipital gyrus	Left fusiform gyrus -left putamen,
Right calcarine fissure-right fusiform gyrus	Left superior occipital gyrus-right putamen
Left postcentral gyrus-right lingual gyrus	Left superior occipital gyrus-left lenticular nucleus, pallidum
Right postcentral gyrus-left cuneus	Left lingual gyrus-left thalamus
Right postcentral gyrus-left lingual gyrus	Right lingual gyrus-left thalamus
Right postcentral gyrus-right lingual gyrus	Left superior occipital gyrus-left thalamus
Left heschl gyrus-right lingual gyrus	Left inferior occipital gyrus-left thalamus
Left heschl gyrus-left paracentral lobule	Right inferior occipital gyrus-left thalamus

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Within unimodal association system	Left fusiform gyrus-left thalamus
Left cuneus-left lingual gyrus	Right fusiform gyrus-left thalamus
Left cuneus-left superior occipital gyrus	Right paracentral lobule-left thalamus
Right cuneus-left superior occipital gyrus	Left cuneus-right thalamus
Left lingual gyrus-left superior occipital gyrus	Right cuneus-right thalamus
Left cuneus-right superior occipital gyrus	Left lingual gyrus-right thalamus
Right cuneus-right superior occipital gyrus	Left superior occipital gyrus-right thalamus
Left cuneus-right superior occipital gyrus	Right middle occipital gyrus-right thalamus
Right superior occipital gyrus-right middle occipital gyrus	Left inferior occipital gyrus -right thalamus
Primary sensorymotor - Heteromodal association	Left fusiform gyrus-right thalamus
Right precentral gyrus-left precuneus	Right fusiform gyrus-right thalamus
Right precentral gyrus-right precuneus	Right superior parietal gyrus-right thalamus
Left heschl gyrus-left precuneus	Primary sensorymotor - Limbic system
Left heschl gyrus-right precuneus	Left postcentral gyrus-left hippocampus
Unimodal association-Heteromodal association	Left postcentral gyrus-right hippocampus
Left rolandic operculum-left precuneus	Unimodal association - Paralimbic system
Right rolandic operculum-left precuneus	Left cuneus-left anterior cingulate
Left superior temporal gyrus-left precuneus	Left cuneus-right anterior cingulate
Right superior temporal gyrus-left precuneus	Right cuneus-left anterior cingulate
Within heteromodal association system	Right cuneus-right anterior cingulate
Left supplementary motor area-right precuneus	Unimodal association - Limbic system
	Left cuneus-right amygdala
	Right cuneus-right amygdala
	Left superior occipital gyrus-left amygdala
	Left superior occipital gyrus-right amygdala
	Primary sensorymotor - Paralimbic system
	Right calcarine fissure-left anterior cingulate
	Right calcarine fissure-right anterior cingulate
	Within paralimbic system
	Left middle frontal gyrus, orbital-left parahippocampal gyrus

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Right middle frontal gyrus, orbital-left parahippocampal gyrus

Right gyrus rectus-left parahippocampal gyrus

Right middle frontal gyrus, orbital-right parahippocampal gyrus

Paralimbic - Subcortical system

Left temporal pole: middle temporal gyrus-left thalamus

Right temporal pole: middle temporal gyrus-left thalamus

Left parahippocampal gyrus-left thalamus

Paralimbic - Limbic system

Left parahippocampal gyrus-right olfactory cortex

Right parahippocampal gyrus-left olfactory cortex

Right parahippocampal gyrus-right olfactory cortex

Within unimodal association system

Left cuneus-right angular gyrus

Unimodal association - Heteromodal association

Right superior parietal gyrus-right inferior parietal gyrus
