Frequency specific contribution of intrinsic connectivity networks to the integration in brain networks

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Supplementary Table S1

Supplementary Figure S1-S5

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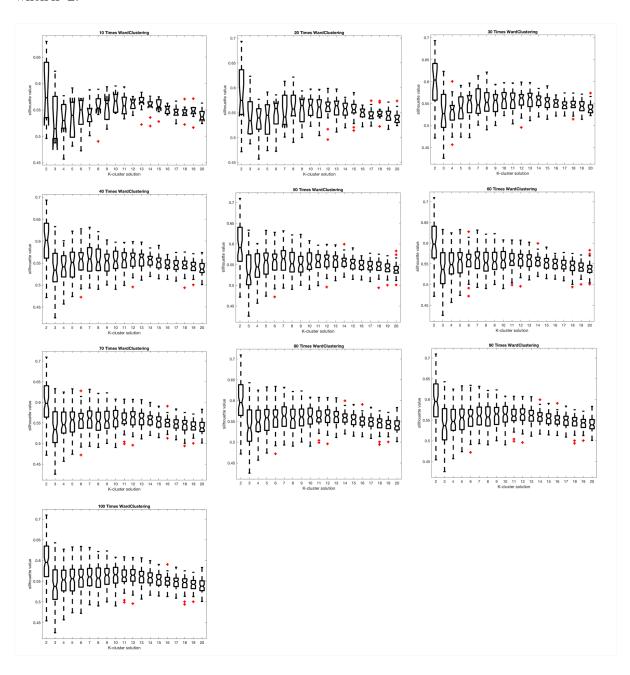
Supplementary Table S1. The difference of silhouette values between k=2 and other k-cluster solution about the number of clustering iteration.

The table shows the difference of silhouette values between k=2 (the highest silhouette value, Fig 1C) and other k-cluster solution for the number of clustering iterations. The significance level of p-value is 0.0002 (Bonferroni correction). The silhouette value of k=2 significantly differs from other k-cluster solutions after clustering 30 times.

K-cluster	K-cluster	P-value at						
solution	solution	10 Times	20 Times	30 Times	40 Times	50 Times	80 Times	100 Times
2	3	0.0023	p < 2e-4					
2	4	0.0010	p < 2e-4					
2	5	0.0040	p < 2e-4					
2	6	0.0120	0.0029	p < 2e-4				
2	7	0.0441	0.0115	p < 2e-4				
2	8	0.5190	0.2611	p < 2e-4				
2	9	0.3570	0.0505	p < 2e-4				
2	10	0.9533	0.3782	p < 2e-4				
2	11	0.7850	0.2402	p < 2e-4				
2	12	0.8543	0.2296	p < 2e-4				
2	13	0.9105	0.1306	p < 2e-4				
2	14	0.5196	0.0495	p < 2e-4				
2	15	0.6501	0.0443	p < 2e-4				
2	16	0.2425	0.0029	p < 2e-4				
2	17	0.0808	0.0004	p < 2e-4				
2	18	0.0873	0.0030	p < 2e-4				
2	19	0.1191	0.0003	p < 2e-4				
2	20	0.0172	p < 2e-4					

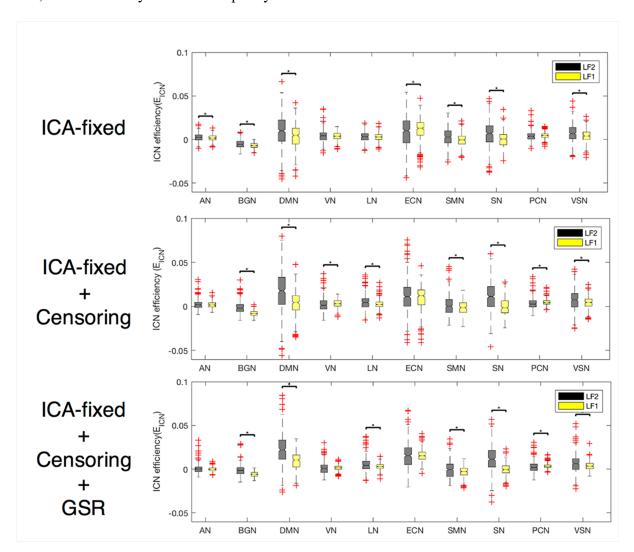
Supplementary Figure S1. The results of silhouette value according to the number of clustering iterations.

When we repeated the clustering from 10 to 100, the silhouette values always have the highest value when k=2.



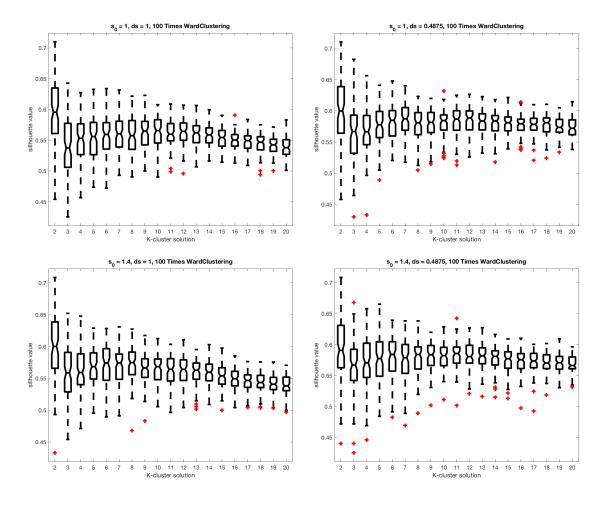
Supplementary Figure S2. Impact of preprocessing pipeline on E_{ICN} by frequency.

Difference of E_{ICN} by frequency according to the preprocessing pipeline. The E_{ICN} results which included the volume censoring step differed from the the E_{ICN} results which included only the ICA-fixed step in statistical significance of AN, VN, LN, ECN and PCN, but the tendency of E_{ICN} to frequency was maintained. The E_{ICN} results which included the GSR and volume censoring step differed from the E_{ICN} results which included the volume censoring step in statistical significance of VN, but the tendency of E_{ICN} to frequency was maintained.



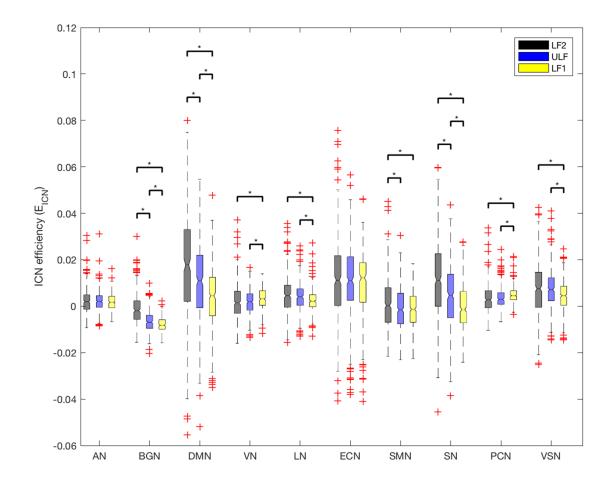
Supplementary Figure S3. Results of cluster solution in several hyperparameter condition.

In the any conditions, cluster solution 2 had the hightest silhouette value, so we used $s_0=1$ and ds=1.



Supplementary Figure S4. The $E_{\rm ICN}$ along the frequency band including uncertain low frequency (ULF)

If the E_{ICN} is considered in an ULF (0.012 ~ 0.03 Hz) between LF1 and LF2, there is an ICN with a statistically significant difference in ULF from LF1 or LF2, but the tendency of E_{ICN} to frequency is maintained. Analysis of variance (ANOVA) was performed for each ICN to determine the difference in E_{ICN} with frequency (p < 0.005 with Bonferroni correction). *Post hoc* two-sample t-tests for differences between the E_{ICN} of each frequency band were also performed (p < 0.01 with Bonferroni correction).



Supplementary Figure S5. The characteristics of the connectivity matrix according to sparsity.

(a) Mean degree of connectivity matrix at the sparsity for each frequency. The threshold is the logarithm of the number of whole brain network nodes. At a sparsity of 5% or more, the mean degree exceeds the threshold and satisfies the small-worldness network. (b) The surviving correlation coefficient at the sparsity for each frequency. The mean of histogram for each subject's surviving correlation coefficients are plotted for each case. There were higher surviving correlation coefficient values at LF2 than at LF1. Sparsity at 5% is satisfied at a correlation coefficient of at least 0.3. The top row indicates results at LF1. The bottom row indicates results at LF2.

