Supplementary Material

1 EEG data acquisition of healthy controls

Eyes-closed resting-state EEG data were acquired from a 64-channel electrode cap (NeuSen W64, Neuracle, China, http://www.neuracle.cn/productinfo/148706.html), with 59 scalp electrodes (Ag/AgCl) placed according to 10-10 international system. EEG data were recorded with a Neuracle amplifier with 24-bit resolution, a sampling rate of 1000 Hz, and lowpass filtered with cutoff frequency (−3 dB) at 250 Hz for between approximately 3 to 5 minutes. The reference electrode was located at electrode CPz and the ground electrode was located at AFz. During recording, the impedance was kept below 10 kΩ for all scalp electrodes. EEG data were recorded in a specific, dimly lit, and sound-attenuated room.

2 Supplementary Tables

Supplementary Table 1. Demographics of healthy controls.

ID	Gender	Age (years)	Handedness
1	Male	58	Right
2	Male	41	Right
3	Female	60	Left
4	Male	53	Right
5	Male	40	Right
6	Male	32	Right
7	Male	50	Right
8	Male	48	Right

Supplementary Table 2. Statistics of EEG preprocessing metrics for patients and controls.

Parameters	Patients_T0	Patients_T1	Controls
Removed channels (n)	0.4 ± 0.5 0–1	0.4 ± 0.5 0–1	0.6 ± 1.0 0–3
Rejected components (n)	22.8 ± 5.1 12–30	25.1 ± 5.0 17–32	11.1 ± 4.2 4–16
Length of EEG retained (seconds)	591.8 ± 27.6 566.3–658.6	1130.1 ± 71.7 989.0–1194.2	238.5 ± 52.7 179.1–301.4

Mean ± standard deviation and range for each parameter are provided in the table.

Supplementary Table 3. The definitions of the microstate features.

Microstate feature	Definition
GEV	The percentage of topographic variance explained by each microstate class.
Mean duration	The average of the continuous length of time during which the EEG time series is determined to be a certain microstate class.
Occurrence	The average number of occurrences per second of each microstate class.
Coverage	The percentage of total analysis time occupied by each microstate class.
Mean interval	The average time across all the intervals from the end of a particular microstate class to the start of the next same microstate class.
Mean GFP	The average amplitude of GFP during each microstate class dominance.
Spatial correlation metric	The mean absolute correlation values of each microstate template with the maps of a given microstate class.
Transition probability	The probability (observed transition probability minus expected transition probability) from each microstate class to another.

Supplementary Table 4. Group average statistics (±*SD*) of the Patients at T0, Patients at T1, and Healthy Controls for the computed relative power, pdBSI, and rBSI in five frequency bands.

	Group	δ	θ	α	β	γ
Relative power	Patients_T0	0.519 ± 0.264	0.211 ± 0.112	0.127 ± 0.086	0.103 ± 0.100	0.039 ± 0.045
	Patients_T1	0.615 ± 0.256	0.139 ± 0.081	0.099 ± 0.078	0.123 ± 0.143	0.023 ± 0.015
	Controls	0.282 ± 0.136	0.123 ± 0.054	0.378 ± 0.201	0.185 ± 0.061	0.031 ± 0.014
pdBSI	Patients_T0	0.169 ± 0.052	0.198 ± 0.085	0.186 ± 0.075	0.179 ± 0.060	0.184 ± 0.039
	Patients_T1	0.134 ± 0.067	0.166 ± 0.098	0.175 ± 0.110	0.179 ± 0.082	0.186 ± 0.077
	Controls	0.155 ± 0.049	0.134 ± 0.043	0.114 ± 0.015	0.122 ± 0.035	0.145 ± 0.056
rBSI	Patients_T0	0.127 ± 0.113	0.134 ± 0.098	0.105 ± 0.074	0.096 ± 0.119	0.106 ± 0.085
	Patients_T1	0.095 ± 0.093	0.126 ± 0.110	0.127 ± 0.140	0.137 ± 0.110	0.100 ± 0.088
	Controls	0.053 ± 0.032	0.062 ± 0.048	0.056 ± 0.021	0.053 ± 0.030	0.059 ± 0.041

Mean ± standard deviation for each parameter is provided in the table.

Supplementary Table 5. Results of analysis of the difference in relative power.

	N_{all}	δ	θ	α	β	Low β	Middle β	High β	γ
Patients_T1 vs. Patients_T0	256	0.082	**−0.004**	−0.518	0.409	0.603	0.346	0.922	−0.377
Subgroup_I_T1 vs. Subgroup_I_T0	16	0.176	−0.059	−0.059	−0.765	−0.529	−0.765	0.765	−0.647
Subgroup_N_T1 vs. Subgroup_N_T0	16	0.294	−0.059	0.412	0.176	0.176	0.059	−0.882	−0.765
Subgroup_I_T0 vs. Subgroup_N_T0	70	0.718	−0.521	0.859	−0.887	−0.803	−0.746	0.915	−0.803
Subgroup_I_T1 vs. Subgroup_N_T1	70	0.352	−0.127	−0.239	−0.437	−0.408	−0.465	0.972	0.859
Subgroup_I vs. Subgroup_N (Δ)	70	0.380	−0.634	**−0.014**	−0.380	−0.127	−0.352	0.887	0.803
Patients_T0 vs. Controls	12870	**0.047**	0.051	**−0.005**	−0.068	−0.154	**−0.022**	−0.235	0.736
Subgroup_I_T0 vs. Controls	495	**0.040**	0.127	**−0.048**	−0.083	−0.190	**−0.026**	−0.313	0.766
Subgroup_N_T0 vs. Controls	495	0.141	0.050	**−0.036**	−0.171	−0.373	−0.095	−0.302	0.724
Patients_T1 vs. Controls	12870	**0.008**	0.654	**−0.001**	−0.283	−0.406	−0.335	−0.287	−0.284
Subgroup_I_T1 vs. Controls	495	**0.006**	−0.393	**−0.014**	−0.111	−0.081	**−0.038**	−0.472	−0.417
Subgroup_N_T1 vs. Controls	495	0.073	0.234	**−0.046**	−0.651	−0.972	−0.831	−0.226	−0.335

N_{all} is the number of all possible permutations.
The results of the statistical analysis are reported as *p*-values in the table.
For X vs. Y, a negative sign before a *p*-value indicates X < Y.
Bolded *p*-values indicate significant differences.
p-value with underline indicates the minimum obtainable *p*-value is achieved.

Supplementary Table 6. Results of analysis of the difference in pdBSI.

	N_{all}	δ	θ	α	β	Low β	Middle β	High β	γ
Patients_T1 vs. Patients_T0	256	−0.058	−0.198	−0.642	0.992	−0.961	0.735	−0.860	0.930
Subgroup_I_T1 vs. Subgroup_I_T0	16	−0.176	−0.176	−0.412	0.647	−0.882	0.529	0.647	0.882
Subgroup_N_T1 vs. Subgroup_N_T0	16	−0.412	−0.647	0.882	−0.647	0.765	−0.765	−0.294	−0.647
Subgroup_I_T0 vs. Subgroup_N_T0	70	0.211	0.127	0.127	0.437	0.268	0.408	0.521	0.239
Subgroup_I_T1 vs. Subgroup_N_T1	70	0.465	0.324	0.465	0.437	0.465	0.380	0.521	0.127
Subgroup_I vs. Subgroup_N (Δ)	70	−0.634	−0.352	−0.634	0.549	−0.887	0.606	0.437	0.408
Patients_T0 vs. Controls	12870	0.588	0.081	**0.017**	**0.029**	**0.014**	0.064	**0.036**	0.125
Subgroup_I_T0 vs. Controls	495	0.228	**0.014**	**0.002**	**0.022**	**0.010**	**0.032**	**0.046**	0.103
Subgroup_N_T0 vs. Controls	495	−0.706	0.599	0.222	0.131	0.103	0.254	0.149	0.512
Patients_T1 vs. Controls	12870	−0.475	0.410	0.173	0.083	**0.040**	0.089	0.126	0.261
Subgroup_I_T1 vs. Controls	495	−0.958	0.212	**0.042**	**0.036**	**0.010**	**0.026**	0.069	0.087
Subgroup_N_T1 vs. Controls	495	−0.220	0.925	0.554	0.308	0.216	0.349	0.373	0.901

N_{all} is the number of all possible permutations.
The results of the statistical analysis are reported as *p*-values in the table.
For X vs. Y, a negative sign before a *p*-value indicates X < Y.
Bolded *p*-values indicate significant differences.
p-value with underline indicates the minimum obtainable *p*-value is achieved.

Supplementary Table 7. Results of analysis of the difference in rBSI.

	N_{all}	δ	θ	α	β	Low β	Middle β	High β	γ
Patients_T1 vs. Patients_T0	256	−0.152	−0.821	0.510	0.058	0.136	0.058	0.082	−0.735
Subgroup_I_T1 vs. Subgroup_I_T0	16	−0.294	−0.647	0.647	0.176	0.059	0.176	0.176	0.412
Subgroup_N_T1 vs. Subgroup_N_T0	16	−0.294	0.529	0.882	0.294	0.529	0.294	0.294	−0.176
Subgroup_I_T0 vs. Subgroup_N_T0	70	0.099	**0.042**	0.634	0.408	0.662	0.211	0.352	0.549
Subgroup_I_T1 vs. Subgroup_N_T1	70	**0.127**	0.408	0.521	0.296	0.437	0.296	0.324	**0.014**
Subgroup_I vs. Subgroup_N (Δ)	70	−0.606	−0.408	0.662	0.944	0.718	−0.972	−0.915	0.127
Patients_T0 vs. Controls	12870	**0.048**	0.085	0.089	0.460	0.080	0.629	0.623	0.170
Subgroup_I_T0 vs. Controls	495	**0.004**	**0.006**	0.058	0.131	0.050	0.115	0.188	0.091
Subgroup_N_T0 vs. Controls	495	0.548	0.919	0.179	−0.980	0.169	−0.571	−0.712	0.433
Patients_T1 vs. Controls	12870	0.271	0.137	0.237	**0.028**	**0.006**	0.082	**0.038**	0.272
Subgroup_I_T1 vs. Controls	495	**0.042**	**0.044**	0.079	**0.004**	**0.002**	**0.010**	**0.012**	**0.014**
Subgroup_N_T1 vs. Controls	495	−0.776	0.482	0.397	0.258	0.069	0.536	0.242	−0.502

N_{all} is the number of all possible permutations.
The results of the statistical analysis are reported as *p*-values in the table.
For X vs. Y, a negative sign before a *p*-value indicates X < Y.
Bolded *p*-values indicate significant differences.
p-value with underline indicates the minimum obtainable *p*-value is achieved.

Supplementary Table 8. Results of analysis of the difference in functional connectivity.

	N	δ		θ		α		β		γ	
		DEC	**INC**	**DEC**	**INC**	**DEC**	**INC**	**DEC**	**INC**	**DEC**	**INC**
Patients_T1 vs. Patients_T0	256	1.000	0.156	0.202	1.000	0.070	1.000	1.000	0.358	1.000	1.000
Subgroup_I_T0 vs. Subgroup_N_T0	70	1.000	1.000	1.000	0.479	1.000	0.169	0.761	1.000	0.817	1.000
Subgroup_I_T1 vs. Subgroup_N_T1	70	1.000	0.648	1.000	0.056	0.732	1.000	0.820	1.000	1.000	0.282
Patients_T0 vs. Controls	2000	0.881	0.200	1.000	0.091	0.078	0.898	0.130	0.679	1.000	0.077
Patients_T1 vs. Controls	2000	0.964	0.099	0.878	0.186	**0.018**	1.000	0.381	0.314	1.000	0.119

N is the number of permutations.
The results of the statistical analysis are reported as *p*-values in the table. Only the smallest *p*-value among the connected components is provided.
Bolded *p*-values indicate significant differences.
DEC: decrease; INC: increase.
For subgroups comparisons, the univariate comparisons were used permutation tests.

Supplementary Table 9. Group average statistics (±*SD*) of the Patients at T0, Patients at T1, and Healthy controls for all the computed microstates parameters and classes.

Parameters	**Microstate**	**Patients_T0**	**Patients_T1**	**Controls**
GEV (%)	Class A	15.263 ± 3.668	14.459 ± 3.385	7.516 ± 2.967
	Class B	15.716 ± 5.032	18.225 ± 5.505	5.975 ± 2.239
	Class C	17.975 ± 3.144	19.238 ± 9.080	31.150 ± 9.178
	Class D	7.583 ± 3.565	7.036 ± 3.613	5.206 ± 1.963
Mean Duration (ms)	Class A	73.800 ± 9.082	84.338 ± 22.970	56.663 ± 4.907
	Class B	76.900 ± 14.834	92.050 ± 19.215	56.075 ± 4.385
	Class C	80.663 ±14.331	97.538 ± 40.746	101.025 ± 21.061
	Class D	68.875 ± 19.698	79.138 ± 26.138	55.488 ± 4.336
Occurrence (Hz)	Class A	3.456 ± 0.819	2.925 ± 0.774	3.095 ± 0.430
	Class B	3.459 ± 0.739	3.331 ± 1.149	2.881 ± 0.559
	Class C	3.765 ± 0.726	3.280 ± 0.938	4.856 ± 0.332
	Class D	2.771 ± 0.421	2.411 ± 0.528	3.076 ± 0.569
Coverage (%)	Class A	24.975 ± 4.172	23.213 ± 2.451	17.725 ± 4.014
	Class B	26.300 ± 6.089	28.950 ± 5.979	16.338 ± 4.268
	Class C	29.750 ± 4.165	29.463 ± 6.193	48.762 ± 8.778
	Class D	18.975 ±5.176	18.375 ± 5.494	17.200 ± 4.219
Mean Interval (ms)	Class A	233.500 ± 78.438	281.000 ± 80.644	272.125 ± 45.961
	Class B	194.000 ± 43.204	230.625 ± 64.334	303.750 ± 75.115
	Class C	300.375 ± 64.933	359.625 ± 117.090	106.475 ± 19.045
	Class D	228.875 ± 39.851	269.750 ± 78.964	279.375 ± 60.910
Mean GFP (a.u.)	Class A	0.944 ± 0.027	0.934 ± 0.030	0.890 ± 0.044
	Class B	0.937 ± 0.026	0.939 ± 0.045	0.861 ± 0.060
	Class C	0.951 ± 0.014	0.946 ± 0.049	0.994 ± 0.004
	Class D	0.859 ± 0.042	0.828 ± 0.073	0.846 ± 0.068

Mean ± standard deviation for each parameter is provided in the table.

Supplementary Table 10. Results of analysis of the difference in microstate features.

MS parameters	Microstate	Patients_T1 vs. Patients_T0 (N_{all} = 256)	Subgroup_I_T1 vs. Subgroup_I_T0 (N_{all} = 16)	Subgroup_N_T1 vs. Subgroup_N_T0 (N_{all} = 16)	Subgroup_I_T0 vs. Subgroup_N_T0 (N_{all} = 70)	Subgroup_I_T1 vs. Subgroup_N_T1 (N_{all} = 70)
GEV	Class A	−0.572	0.882	−0.412	−0.690	0.831
	Class B	0.377	0.765	0.412	0.324	0.521
	Class C	0.907	−0.059	0.294	−0.380	−0.099
	Class D	−0.696	0.529	−0.176	−0.634	0.239
Mean Duration	Class A	0.167	0.176	0.882	0.887	0.408
	Class B	**0.004**	0.059	0.059	0.437	0.211
	Class C	0.113	0.176	0.765	−0.803	−0.915
	Class D	0.253	0.059	−0.294	−0.606	0.268
Occurrence	Class A	**−0.012**	−0.059	−0.176	−0.775	−0.408
	Class B	−0.735	−0.176	0.529	0.437	−0.380
	Class C	−0.058	−0.059	−0.529	−0.634	−0.183
	Class D	−0.097	−0.294	−0.294	−0.549	−0.775
Coverage	Class A	−0.339	−0.765	−0.412	−0.718	0.465
	Class B	0.455	−0.882	0.294	0.183	0.887
	Class C	−0.860	−0.176	0.647	−0.380	−0.127
	Class D	−0.782	0.412	−0.176	−0.606	0.211
Mean Interval	Class A	**0.004**	0.059	0.059	0.887	0.690
	Class B	0.611	0.176	−0.529	−0.183	0.662
	Class C	0.066	0.059	0.647	0.521	**0.042**
	Class D	0.222	0.765	0.176	0.634	−0.887
Mean GFP	Class A	−0.300	−0.647	−0.059	−0.972	0.775
	Class B	0.922	0.529	−0.765	0.296	0.268
	Class C	−0.798	−0.176	0.176	0.352	−0.127
	Class D	−0.315	−0.529	−0.294	−0.493	0.577

Continued

MS parameters	Microstate	Subgroup_I vs. Subgroup_N（Δ） (N_{all} = 70)	Patients_T0 vs. Controls (N_{all} = 12870)	Subgroup_I_T0 vs. Controls (N_{all} = 495)	Subgroup_N_T0 vs. Controls (N_{all} = 495)	Patients_T1 vs. Controls (N_{all} = 12870)
GEV	Class A	0.521	**0.001**	**0.004**	**0.006**	**0.001**
	Class B	−0.803	**0.001**	**0.002**	**0.010**	**0.000**
	Class C	**−0.042**	**−0.003**	**−0.016**	**−0.038**	**−0.024**
	Class D	0.239	0.129	0.353	0.058	0.239
Mean Duration	Class A	0.324	**2.33e−4**	**0.004**	**0.002**	**0.001**
	Class B	0.408	**0.001**	**0.002**	**0.014**	**7.77e−5**
	Class C	−0.887	**−0.040**	−0.087	−0.149	−0.850
	Class D	**0.014**	0.061	0.113	**0.014**	**0.032**
Occurrence	Class A	−0.408	0.281	0.427	0.272	−0.591
	Class B	−0.099	0.101	0.067	0.347	0.331
	Class C	−0.155	**−0.002**	**−0.004**	**−0.016**	**−0.001**
	Class D	0.859	−0.248	−0.250	−0.532	**−0.026**
Coverage	Class A	0.493	**0.005**	**0.026**	**0.014**	**0.008**
	Class B	−0.493	**0.003**	**0.004**	**0.044**	**0.001**
	Class C	−0.268	**7.77e−5**	**−0.004**	**−0.004**	**−0.001**
	Class D	0.099	0.462	0.808	0.290	0.642
Mean Interval	Class A	0.380	−0.241	−0.240	−0.353	0.787
	Class B	0.324	**−0.047**	**−0.044**	−0.246	−0.238
	Class C	**0.042**	**2.33e−4**	**0.002**	**0.002**	**7.77e−5**
	Class D	−0.465	0.533	0.401	0.935	0.078
Mean GFP	Class A	0.803	**0.013**	0.056	0.052	**0.038**
	Class B	0.634	**0.008**	**0.028**	0.081	**0.013**
	Class C	**−0.042**	**7.77e−5**	**−0.002**	**-0.002**	**-0.013**
	Class D	0.549	0.641	0.883	0.571	−0.611

Continued

MS parameters	Microstate	Subgroup_I_T1 vs. Controls (N_{all} = 495)	Subgroup_N_T1 vs. Controls (N_{all} = 495)
GEV	Class A	**0.004**	**0.010**
	Class B	**0.002**	**0.002**
	Class C	**−0.010**	**−0.236**
	Class D	0.063	0.899
Mean Duration	Class A	**0.002**	**0.012**
	Class B	**0.002**	**0.002**
	Class C	−0.692	−0.942
	Class D	**0.010**	0.139
Occurrence	Class A	−0.226	0.867
	Class B	0.927	0.141
	Class C	**−0.002**	**−0.008**
	Class D	**−0.030**	−0.171
Coverage	Class A	**0.032**	0.073
	Class B	**0.004**	**0.004**
	Class C	**−0.002**	**−0.014**
	Class D	0.224	−0.500
Mean Interval	Class A	0.506	−0.944
	Class B	−0.442	−0.234
	Class C	**0.002**	**0.002**
	Class D	0.111	0.137
Mean GFP	Class A	0.071	0.163
	Class B	**0.020**	0.125
	Class C	**−0.002**	−0.288
	Class D	−0.960	−0.433

N_{all} is the number of all possible permutations.
The results of the statistical analysis are reported as *p*-values in the table.
For X vs. Y, a negative sign before a *p*-value indicates X < Y.
Bolded *p*-values indicate significant differences.
p-value with underline indicates the minimum obtainable *p*-value is achieved.

Supplementary Table 11. Classification performance of the linear kernel SVM models.

Model	Accuracy	Sensitivity/Recall	Specificity
With PCA (the first two principal components)	1.000 (16/16)	1.000 (8/8)	1.000 (8/8)
Without PCA	0.875 (14/16)	1.000 (8/8)	0.750 (6/8)

Samples after zolpidem administration are labeled as positive.

Supplementary Table 12. Results of correlation analysis between spectral feature and CRS-R score at T_{end}.

N_{all} = 40320		**δ**	**θ**	**α**	**β**	**Low β**	**Middle β**	**High β**	**γ**
Relative power at T0–CRS-R	*p*	0.669	0.605	0.804	0.711	0.502	0.502	0.781	0.941
	r	0.169	−0.205	0.096	−0.145	−0.265	−0.265	−0.108	−0.024
Relative power at T1–CRS-R	*p*	0.140	0.184	0.448	**0.015**	0.203	**0.028**	**0.011**	0.285
	r	0.566	−0.518	−0.301	**−0.819**	−0.494	**−0.771**	**−0.843**	−0.422
pdBSI at T0–CRS-R	*p*	0.426	0.230	0.140	0.464	0.502	0.342	0.669	0.758
	r	0.313	0.470	0.566	0.289	0.265	0.374	0.169	0.120
pdBSI at T1–CRS-R	*p*	0.711	0.758	0.242	0.314	0.393	0.242	0.541	0.052
	r	0.145	0.120	0.458	0.398	0.337	0.458	0.241	0.711
rBSI at T0–CRS-R	*p*	**0.011**	**0.040**	0.150	0.242	0.106	0.064	0.374	0.804
	r	**0.843**	**0.735**	0.554	0.458	0.615	0.687	0.349	0.096
rBSI at T1–CRS-R	*p*	0.314	0.203	0.170	0.068	**0.028**	0.106	0.242	0.150
	r	0.398	0.494	0.530	0.675	**0.771**	0.615	0.458	0.554

N_{all} is the number of all possible permutations.
Bolded *p*-values and correlation coefficient indicate significant correlations.

Supplementary Table 13. Results of correlation analysis between microstate feature and CRS-R score at T_{end}.

MS parameters	**Microstate**	N_{all}	**Feature_T0–CRS-R**		**Feature_T1–CRS-R**	
			p	***r***	***p***	***r***
GEV	Class A	40320	0.693	−0.157	0.150	0.558
	Class B	40320	0.605	0.205	0.485	0.277
	Class C	40320	0.132	−0.578	0.170	−0.530
	Class D	40320	0.485	−0.277	0.242	0.458
Mean Duration	Class A	40320	0.693	0.157	0.150	0.554
	Class B	40320	0.605	0.205	0.140	0.566
	Class C	40320	0.669	−0.169	0.541	0.241
	Class D	40320	0.892	0.048	0.230	0.470
Occurrence	Class A	40320	0.522	−0.253	0.541	−0.241
	Class B	40320	0.541	0.241	0.325	−0.386
	Class C	40320	0.565	−0.229	0.170	−0.530
	Class D	40320	0.889	−0.055	0.162	−0.542
Coverage	Class A	40320	0.711	−0.145	**0.036**	**0.747**
	Class B	40320	0.285	0.422	0.821	−0.091
	Class C	40320	0.068	−0.675	0.112	−0.606
	Class D	40320	0.846	−0.072	0.249	0.455
Mean Interval	Class A	40320	0.565	0.229	0.541	0.241
	Class B	40320	0.184	−0.518	0.311	0.400
	Class C	40320	0.314	0.398	**0.008**	**0.855**
	Class D	40320	0.892	−0.048	0.411	0.325
Mean GFP	Class A	40320	0.804	0.096	0.586	0.220
	Class B	40320	0.314	0.398	0.464	0.289
	Class C	40320	0.902	0.049	0.058	−0.699
	Class D	40320	0.565	−0.229	0.892	−0.048

N_{all} is the number of all possible permutations.
Bolded *p*-values and correlation coefficient indicate significant correlations.

Supplementary Table 14. Results of correlation analysis between functional connectivity and CRS-R score at T_{end}.

	N	*δ*		*θ*		*α*		*β*		*γ*	
		NEG	**POS**	**NEG**	**POS**	**NEG**	**POS**	**NEG**	**POS**	**NEG**	**POS**
FC_T0–CRS-R	2000	0.931	1.000	1.000	1.000	1.000	0.174	1.000	1.000	1.000	1.000
MFCSCC_T0–CRS-R	40320						**2.48e-5**				
FC_T1–CRS-R	2000	1.000	0.359	1.000	0.311	1.000	1.000	0.547	1.000	1.000	0.452
MFCSCC_T1–CRS-R	40320				**0.002**						

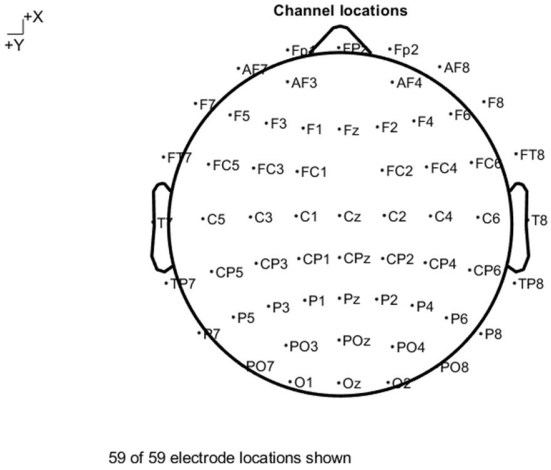
N is the number of permutations.
The results of the correlation analysis are reported as *p*-values in the table. Bolded *p*-values indicate significant correlations.
NEG: negative correlation; POS: positive correlation.
FC: functional connectivity; MFCSCC: mean functional connectivity strength of the connected component with the smallest *p*-value.

Supplementary Table 15. Prediction performance of the linear kernel SVR models.

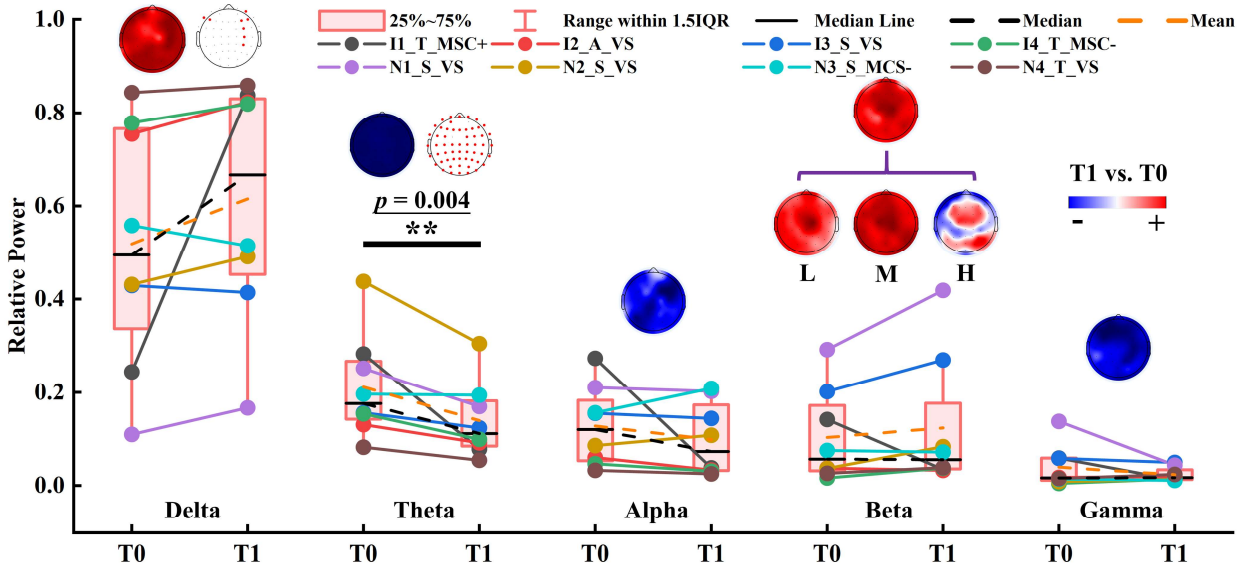
Model	**1**	**2**	**3**	
Feature used	***α*-MFCSCC at T0**	***θ*-MFCSCC at T1**	**PC1 of *α*-MFCSCC at T0 and *θ*-MFCSCC at T1**	
	Predicted score	**Predicted score**	**Predicted score**	**CRS-R score at T_{end}**
Score of each patient	12.151	10.283	11.212	22
	11.378	14.052	12.507	12
	8.096	7.733	7.741	8
	12.705	10.942	11.841	12
	5.592	6.047	6.126	6
	7.300	6.152	6.757	6
	9.068	9.543	9.128	10
	7.399	7.448	7.357	7
#Permutation	40320	40320	40320	
p	0.001	0.002	0.002	
r	0.952	0.916	0.916	
RMSE with outlier	3.549	4.230	3.844	
RMSE without outlier	0.735	0.913	0.511	

RMESE: root-mean-square error; PC1: the first principal component; MFCSCC: mean functional connectivity strength of the connected component with the smallest *p*-value.

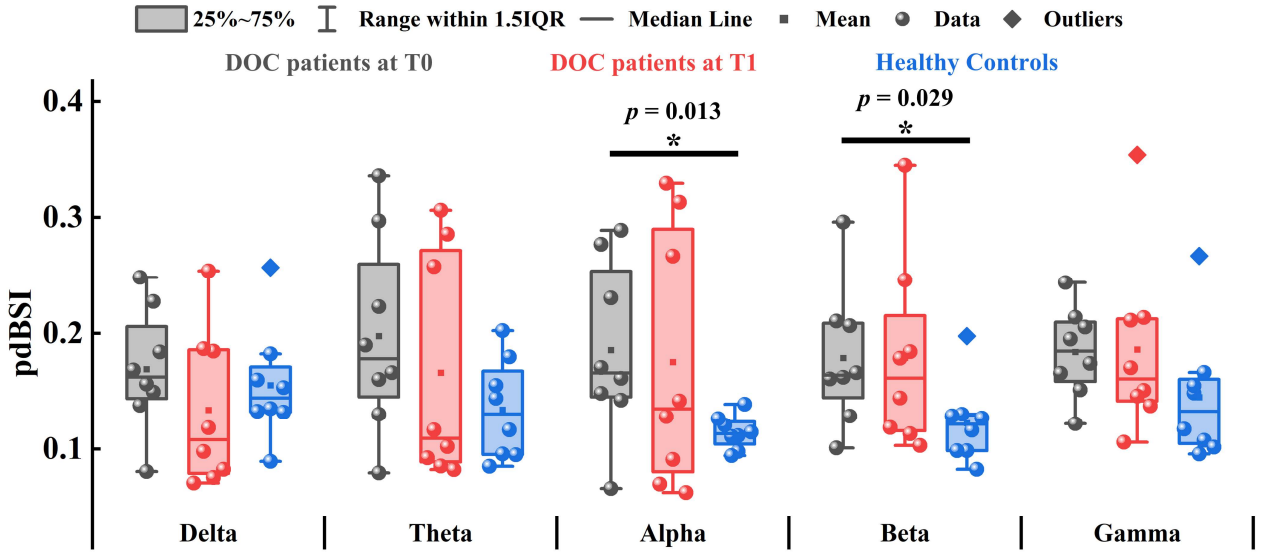
3 Supplementary Figures



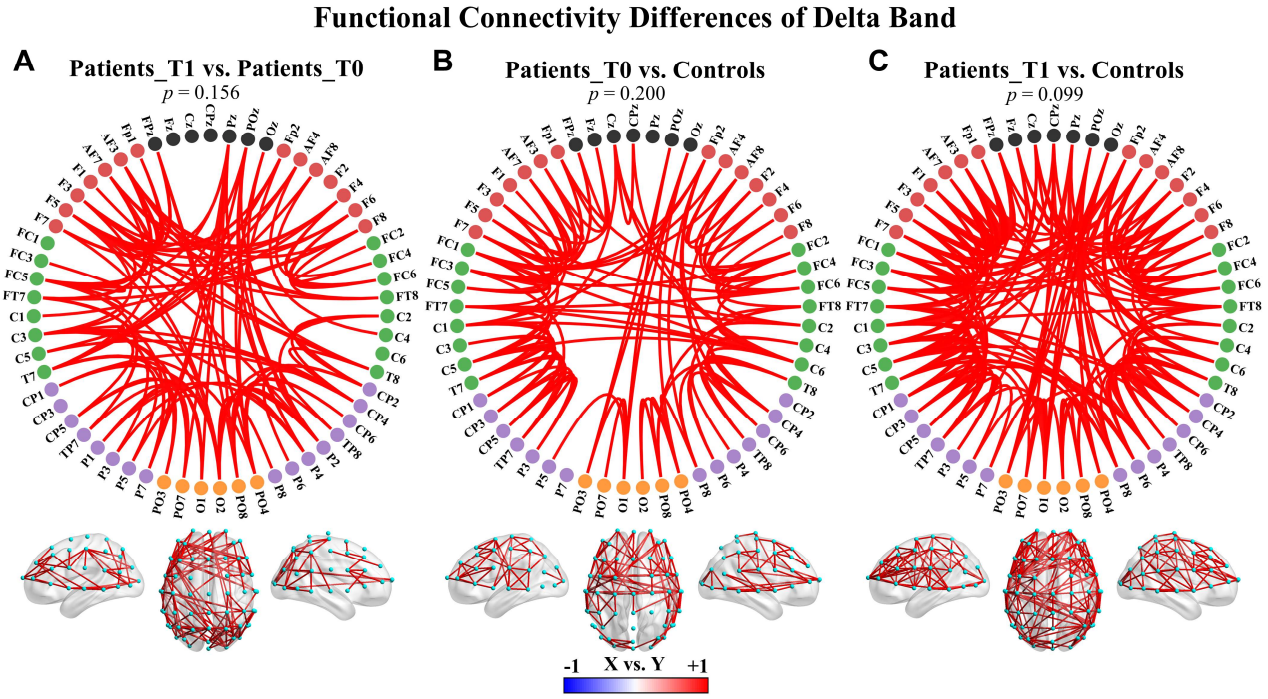
Supplementary Figure 1. The electrode placements of the EEG data of patients.



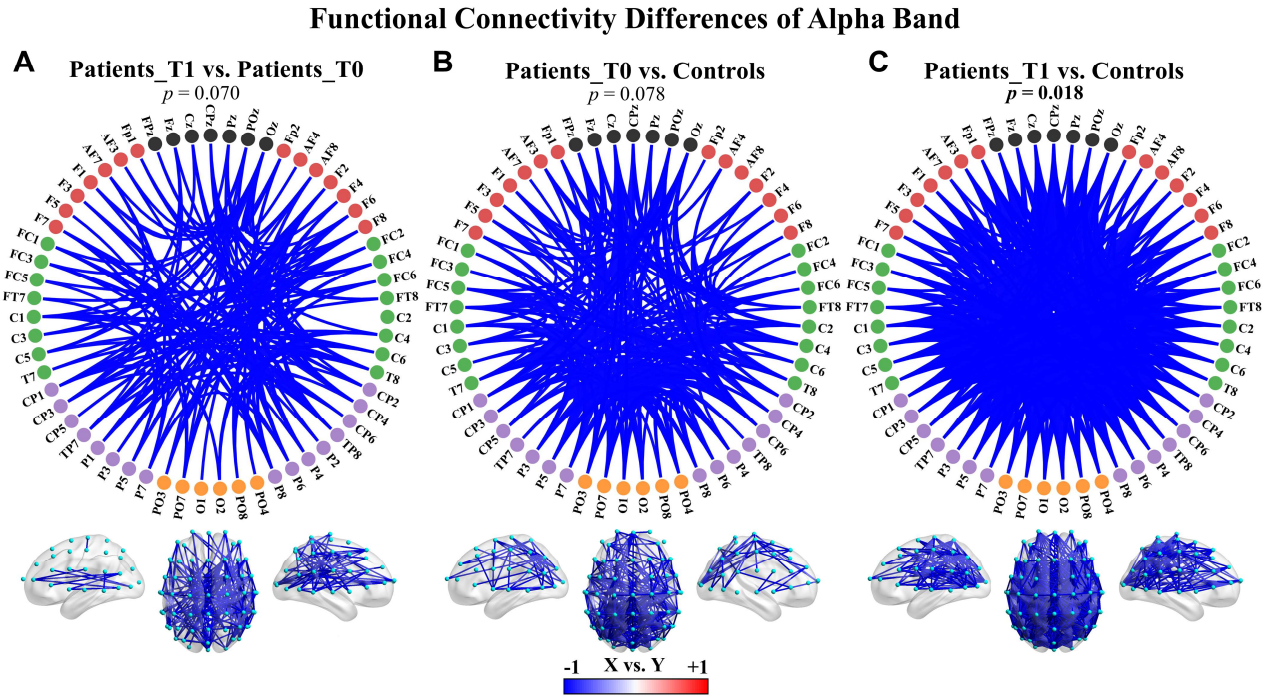
Supplementary Figure 2. Differences between T0 and T1 in relative power. The box line plot demonstrates the change in the average relative power of the whole brain. The topographic map above the box plot shows the change in relative power at the electrode level before and after zolpidem administration, and if there is a significant difference, it is marked with a red dot in the other topographic map. Red and blue colors indicate higher, lower relative power for patients at T1 versus patients at T0, respectively. L, M, and H denote the low β-band, middle β-band, and high β-band, respectively. $^{**}p < 0.01$; p-value with underline indicates the minimum obtainable p-value is achieved.



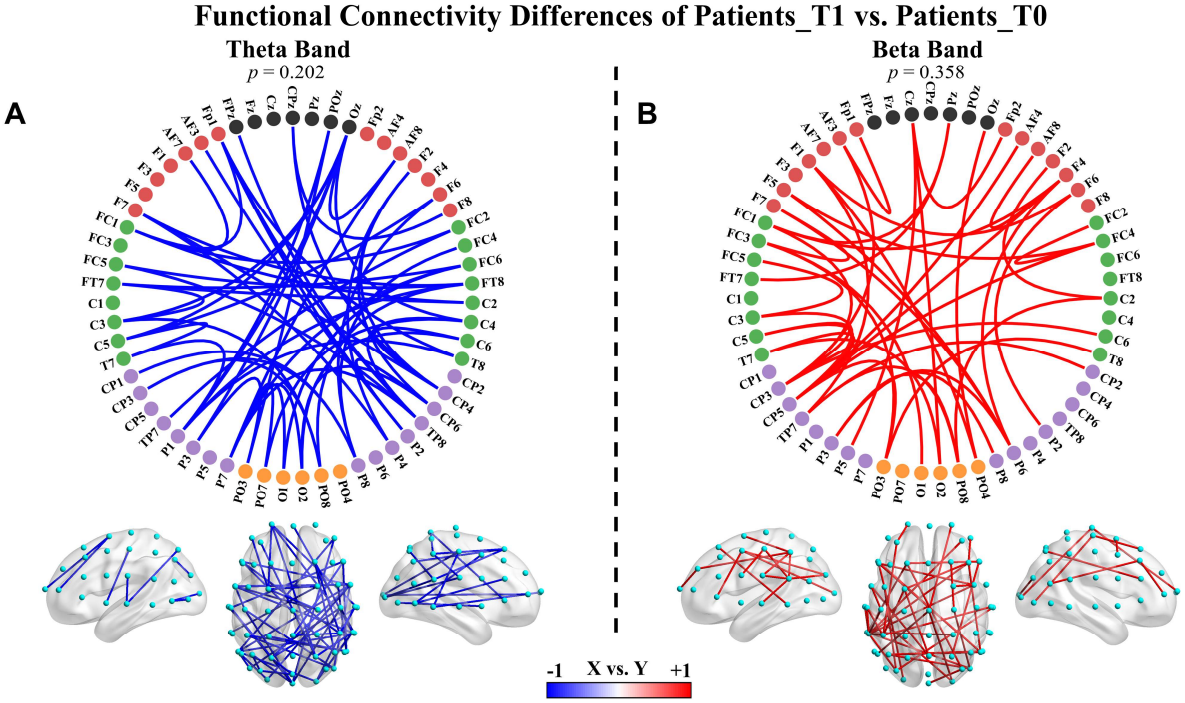
Supplementary Figure 3. pdBSI of DOC patients and healthy controls. *$p < 0.05$.



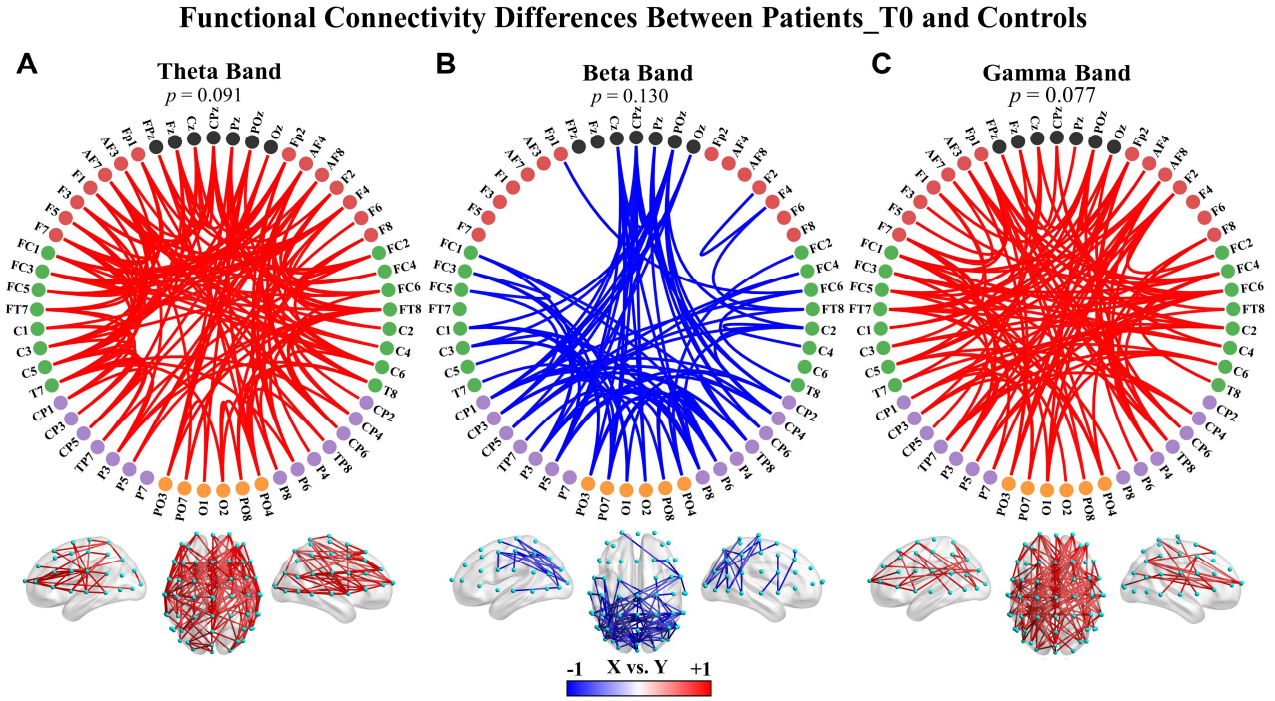
Supplementary Figure 4. Group differences in functional connectivity of the delta band. (**A**) Patients at T1 vs. Patients at T0. (**B**) Patients at T0 vs. Controls. (**C**) Patients at T1 vs. Controls. The depth of color indicates the size of the connectivity difference. Only the connected component with the smallest *p*-value is displayed.



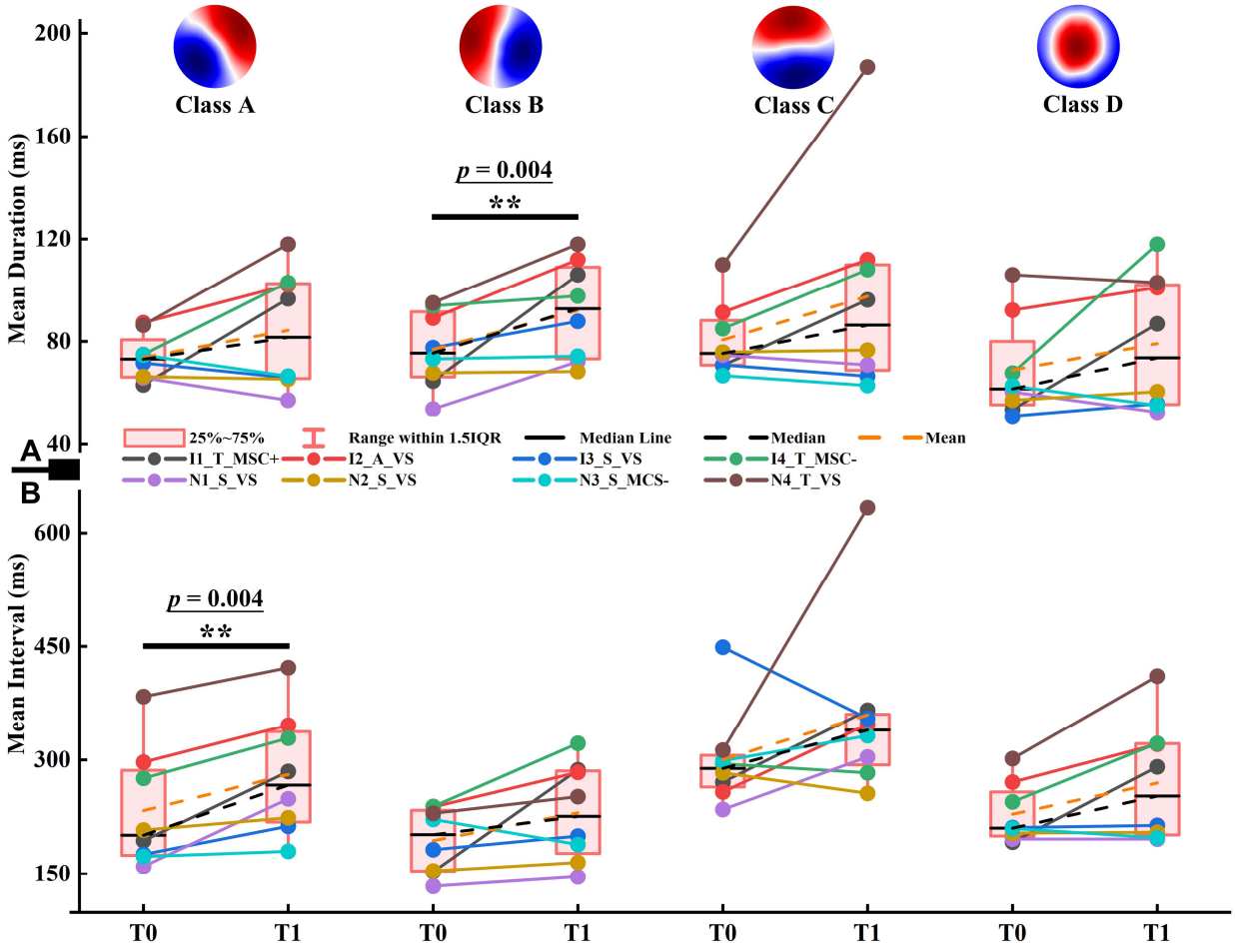
Supplementary Figure 5. Group differences in functional connectivity of the alpha band. (**A**) Patients at T1 vs. Patients at T0. (**B**) Patients at T0 vs. Controls. (**C**) Patients at T1 vs. Controls. The depth of color indicates the size of the connectivity difference. For X vs. Y, the blue color indicates X < Y; the red color indicates X > Y. Only the connected component with the smallest *p*-value is displayed. Bolded *p*-values indicate significant differences.



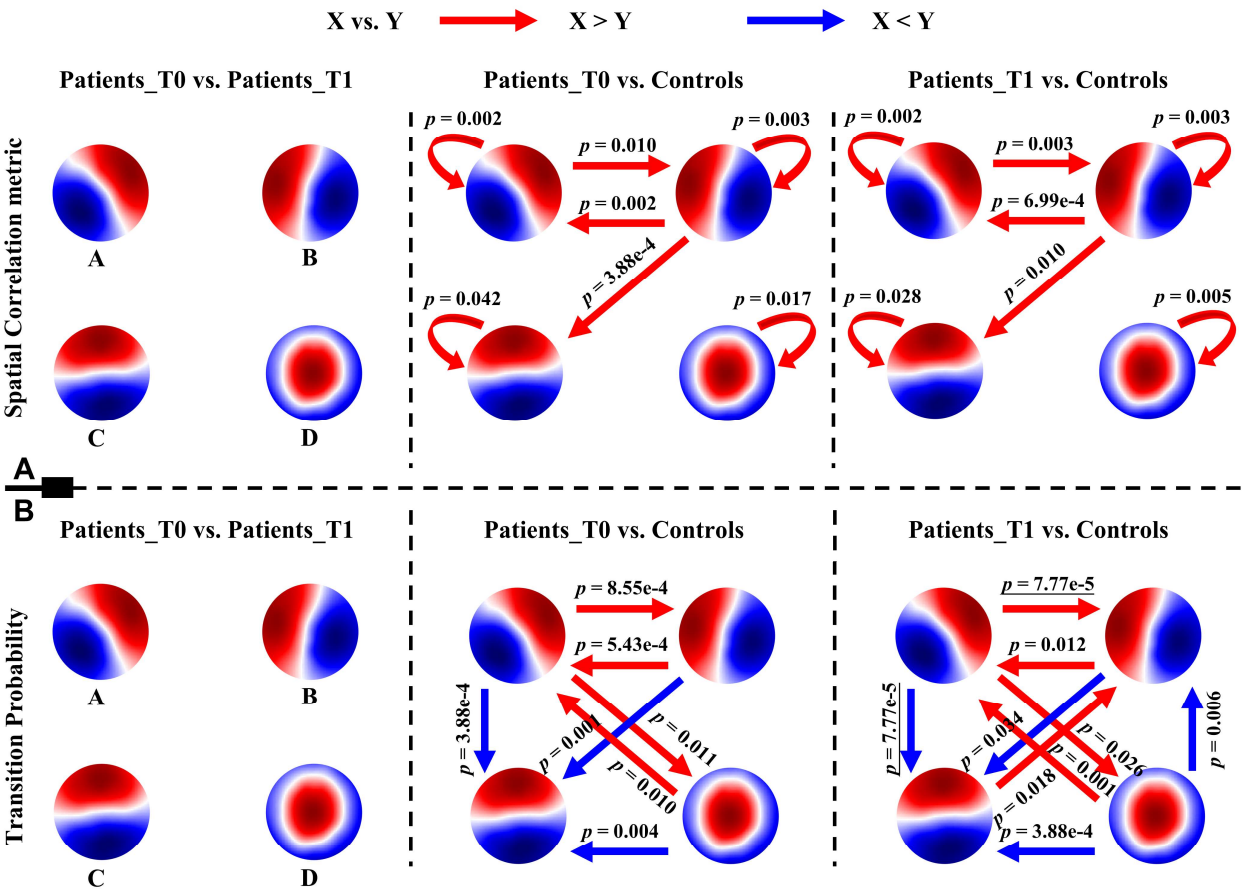
Supplementary Figure 6. Group differences in functional connectivity between patients at T0 and patients at T1. (**A**) Theta band. (**B**) Beta band. The depth of color indicates the size of the connectivity difference. For X vs. Y, the blue color indicates X < Y; the red color indicates X > Y. Only the connected component with the smallest *p*-value is displayed.



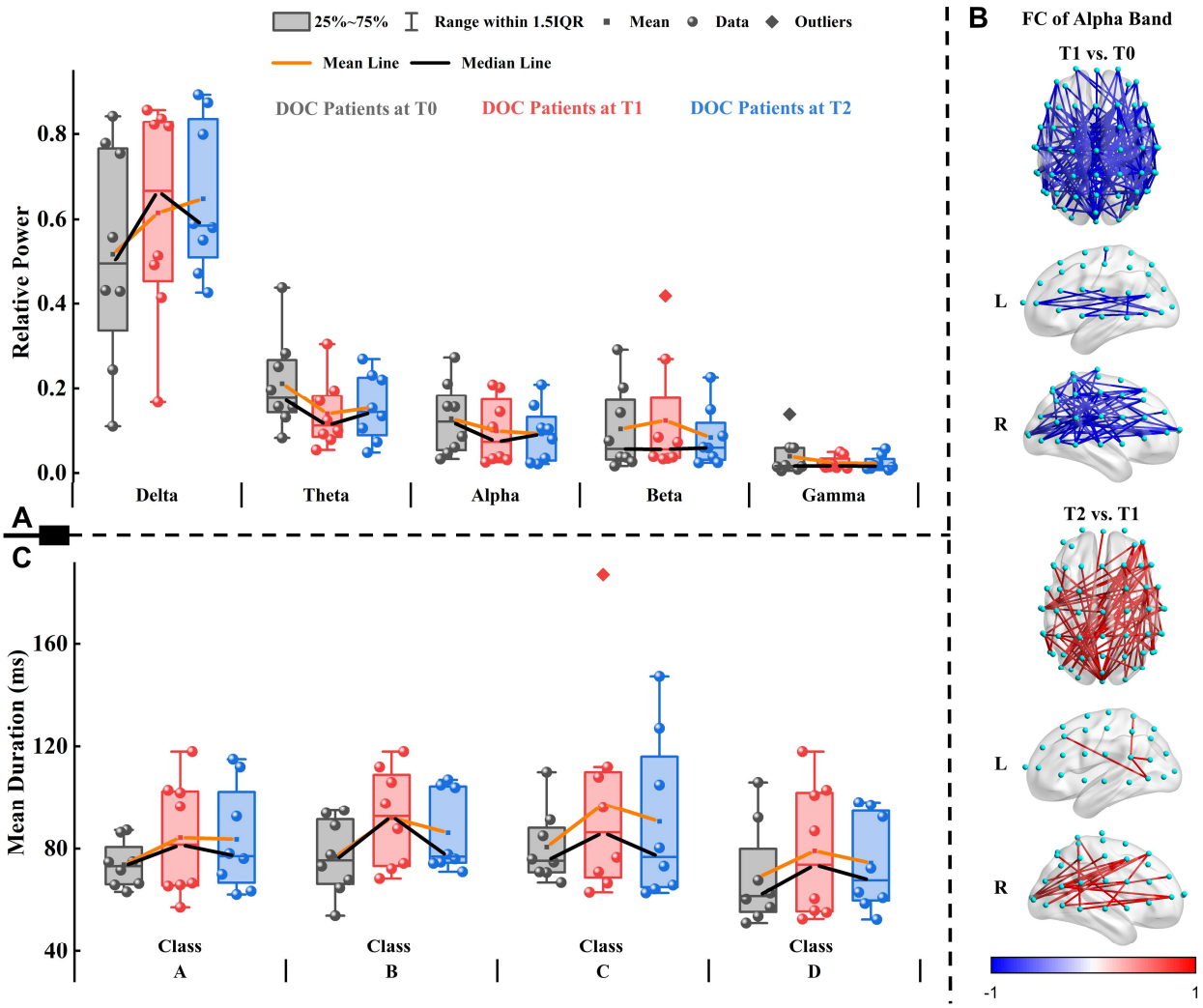
Supplementary Figure 7. Group differences between patients at T0 and healthy controls in functional connectivity. (**A**) Theta band. (**B**) Beta band. (**C**) Gamma band. The depth of color indicates the size of the connectivity difference. For X vs. Y, the blue color indicates X < Y; the red color indicates X > Y. Only the connected component with the smallest *p*-value is displayed.



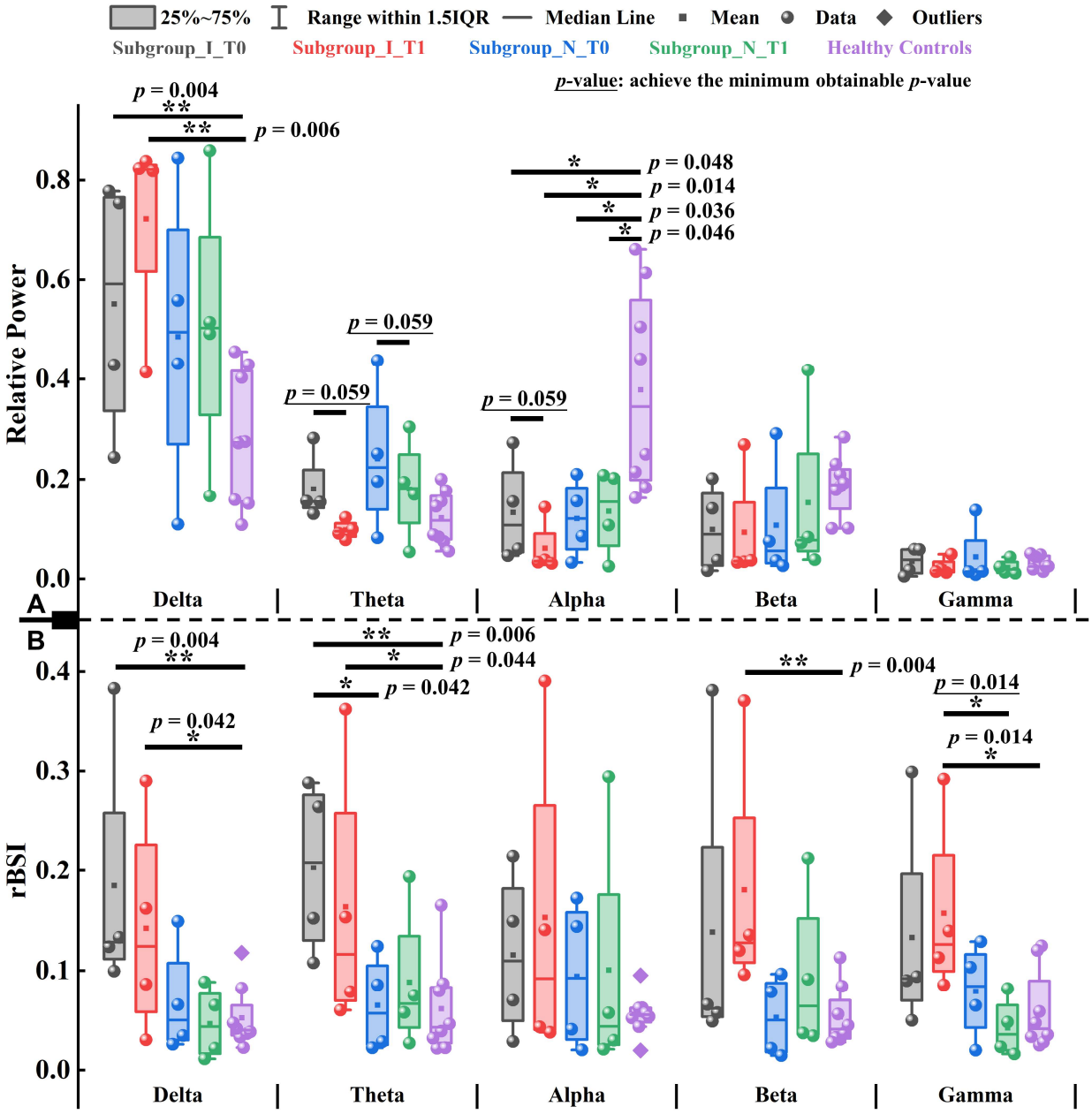
Supplementary Figure 8. Microstate templates and differences between patients at T0 and T1 in microstate features. (**A**) Mean duration. (**B**) Mean interval. The box line plot depicts the change in microstate features from T0 to T1. Four microstate templates of DOC patients are shown at the top of the figure. $^{**}p < 0.01$; *p*-value with underline indicates the minimum obtainable *p*-value is achieved.



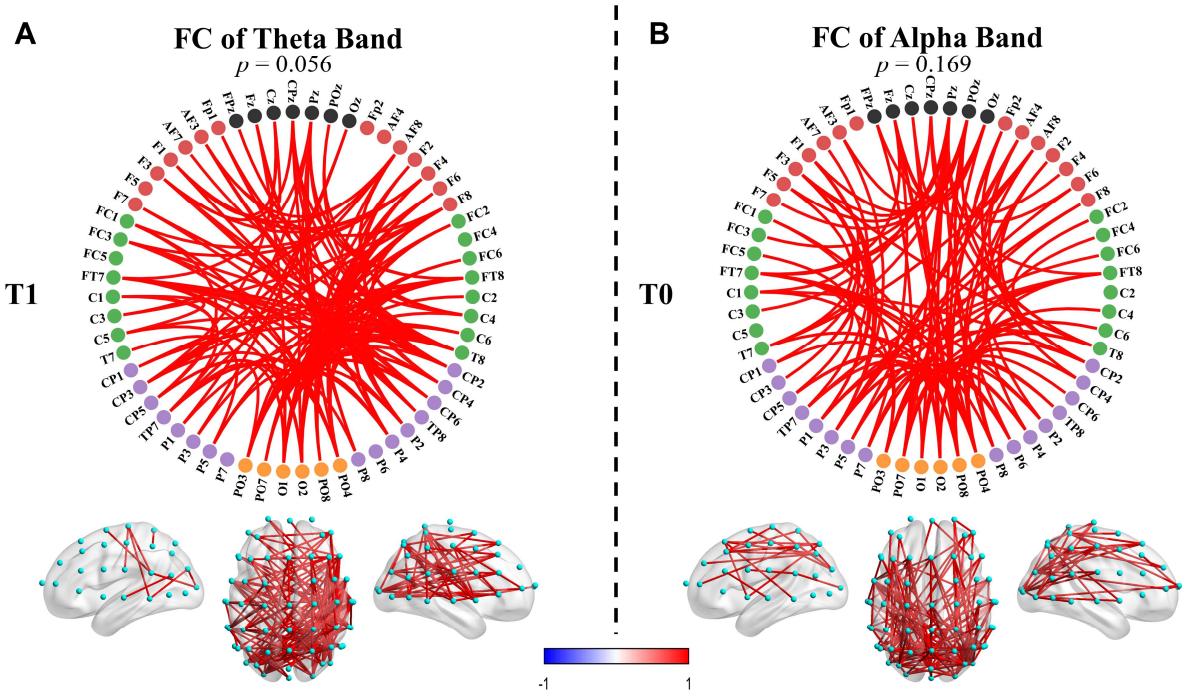
Supplementary Figure 9. Results of comparisons in spatial correlation and transition probability features. (**A**) Spatial correlation metric. (**B**) Transition probability. *p*-value with underline indicates the minimum obtainable *p*-value is achieved.



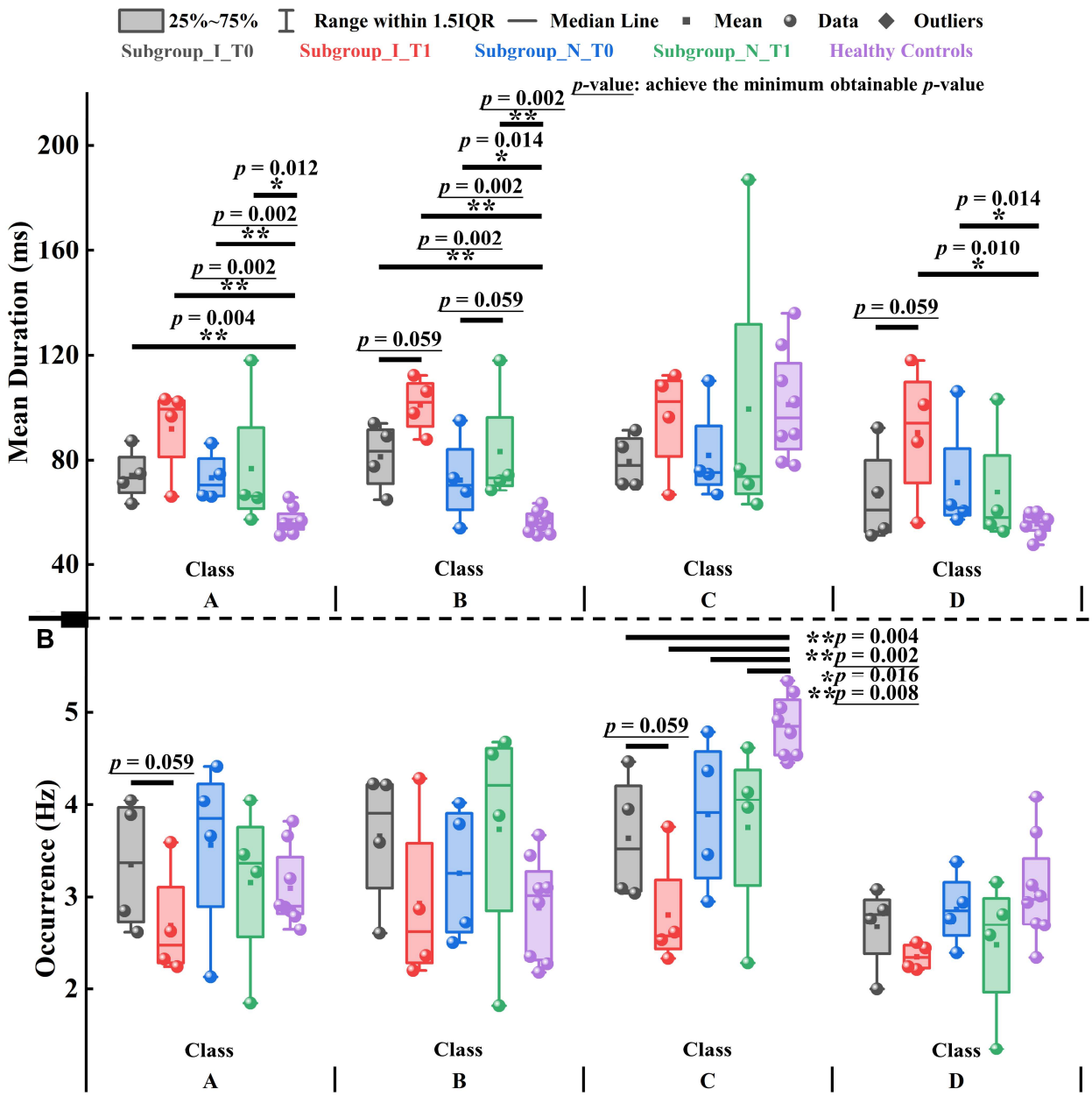
Supplementary Figure 10. Dynamic changes of EEG features from T0 to T2. (**A**) pdBSI. (**B**) Mean duration. (**C**) Functional connectivity of alpha band. FC: functional connectivity. For X vs. Y, the blue color indicates X < Y; the red color indicates X > Y.



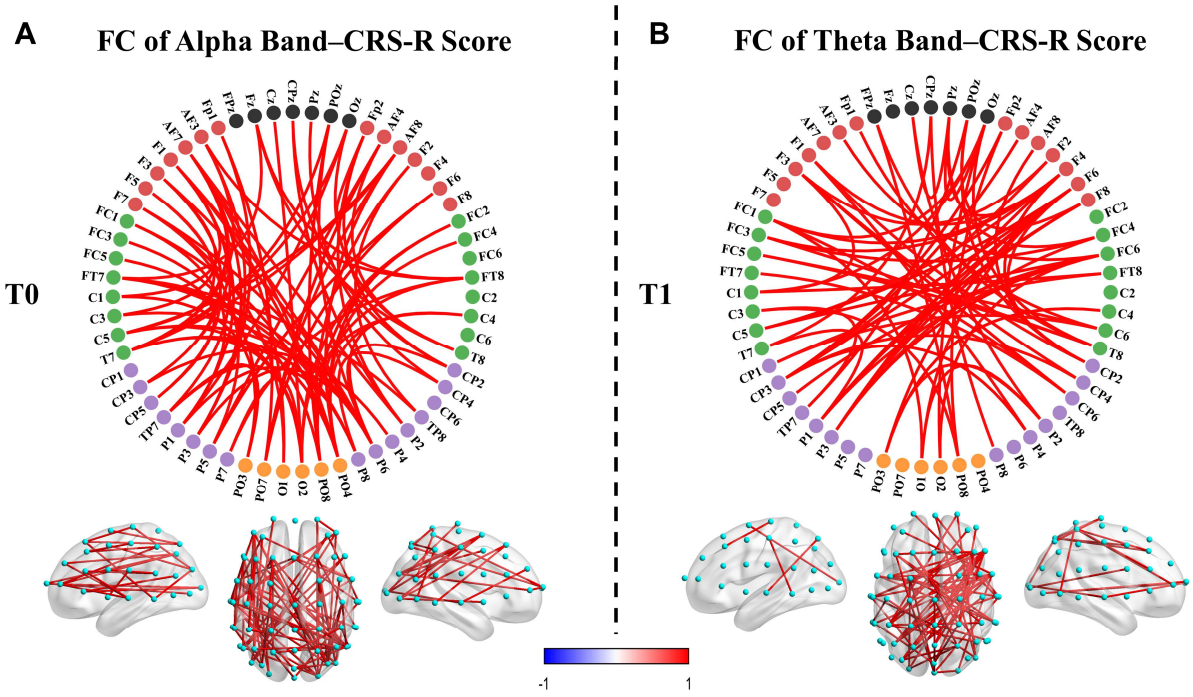
Supplementary Figure 11. Comparisons between subgroups with improvement (Subgroup_I) and with non-improvement (Subgroup_N) in spectral features. (**A**) Relative power. (**B**) rBSI. *$p < 0.05$; **$p < 0.01$; p-value with underline indicates the minimum obtainable p-value is achieved.



Supplementary Figure 12. Group differences in functional connectivity for Subgroup_I vs. Subgroup_N. (**A**) Subgroup_I vs. Subgroup_N at T1 of the theta band. (**B**) Subgroup_I vs. Subgroup_N at T1 of the alpha band. The depth of color indicates the size of the connectivity difference. For X vs. Y, the blue color indicates X < Y; the red color indicates X > Y. Only the connected component with the smallest *p*-value is displayed.



Supplementary Figure 13. Comparisons between Subgroup_I and Subgroup_N in microstate features. (**A**) Mean duration. (**B**) Occurrence. *$p < 0.05$; **$p < 0.01$; p-value with underline indicates the minimum obtainable p-value is achieved.



Supplementary Figure 14. Correlation between functional connectivity and CRS-R score at T_{end}. (**A**) Correlation between alpha-band functional connectivity at T0 and CRS-R score at T_{end}. (**B**) Correlation between theta-band functional connectivity at T1 and CRS-R score at T_{end}. The depth of the color indicates the degree of correlation. The red color indicates positive correlations. Only the connected component with the smallest *p*-value is displayed. FC: functional connectivity.