

Figure 1 Non-fatigue brain connectivity map of subject No. 7 (a) in non-fatigue state 0~20 minutes (b) in fatigue state 41~60 minutes

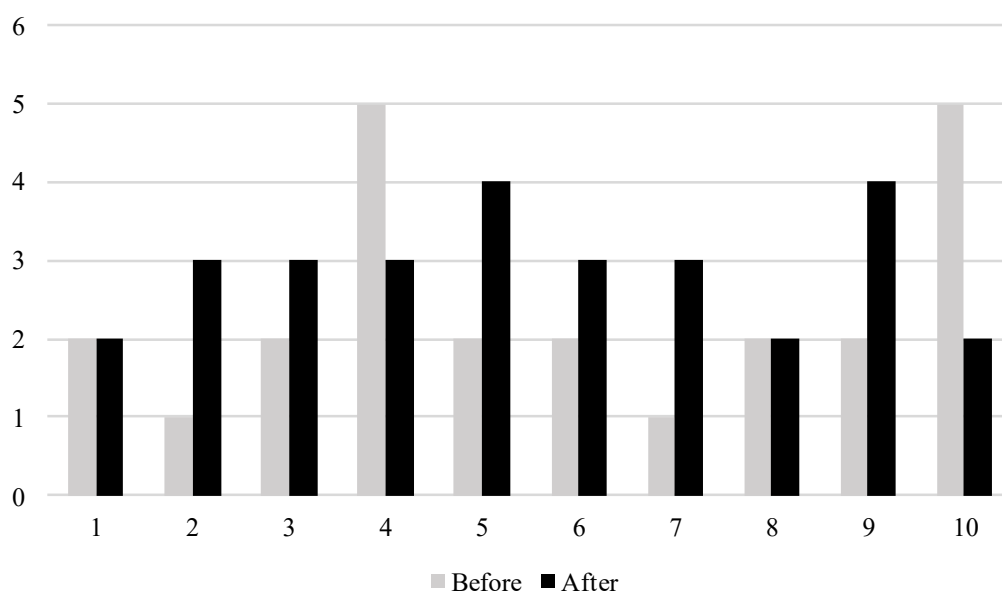


Figure 2 FAS questionnaire results for subject No. 7

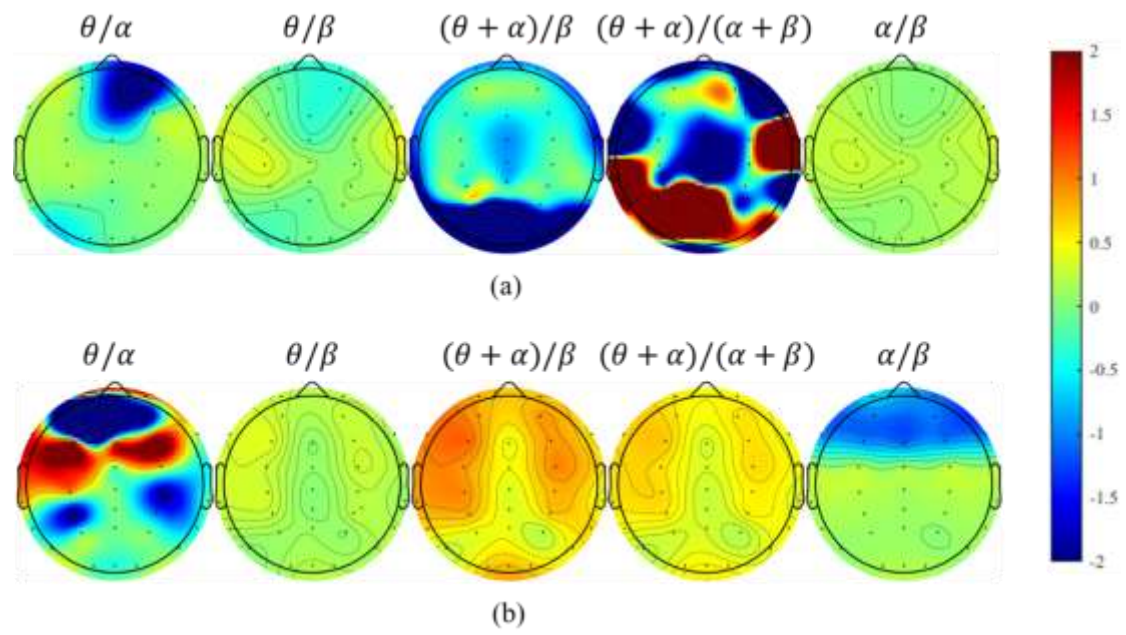


Figure 3 Subject No. 7 frequency band power characteristics (a) non-fatigue characteristics 0 to 20 minutes (b) fatigue characteristics 41 to 60 minutes

Table 1 Top 10 ranking of wPLI for subject No. 7

	1	2	3	4	5	6
1	"FC3-CPz"	"FP1-AF3"	"C3-CP3"	"F7-F3"	"F7-FC3"	"F7-FC3"
2	"FC3-C3"	"FP1-FP2"	"F7-Pz"	"F7-P4"	"FT7-FC3"	"FT7-FC3"
3	"FC3-CP3"	"FP1-CP4"	"F7-F3"	"F3-FC4"	"Fz-FC3"	"FC3-C3"
4	"FC3-CP4"	"FP1-AF4"	"F3-FC3"	"F7-CP3"	"FC3-FCz"	"F8-FC3"
5	"FP1-F3"	"Fz-Pz"	"F3-Fz"	"F7-CPz"	"FC3-C4"	"Fz-FC3"
6	"FC3-Cz"	"F7-Fz"	"F7-P3"	"F7-Cz"	"FC3-C3"	"FP1-P3"
7	"FC3-Pz"	"FP1-TP8"	"F3-T8"	"F7-Pz"	"FC3-Cz"	"FP1-AF4"
8	"F8-CPz"	"Fz-P3"	"F3-TP8"	"F7-CP4"	"FC3-CPz"	"FP1-CP4"
9	"FC3-FCz"	"Fz-CPz"	"FP1-AF4"	"F7-FCz"	"FC3-FC4"	"F7-F3"
10	"F8-Pz"	"Fz-P7"	"FC4-CPz"	"F7-P3"	"FC3-CP3"	"F4-F8"
	7	8	9	10	11	12
1	"F7-FC3"	"FP1-FP2"	"F7-Fz"	"AF4-T8"	"FP1-F3"	"FP1-FP2"
2	"Fz-FC3"	"FC3-FT8"	"FP1-FP2"	"FC3-FT8"	"F3-T8"	"AF4-TP7"
3	"FT7-FC3"	"F4-F8"	"Fz-T8"	"AF4-F4"	"FC3-FT8"	"AF4-TP8"
4	"FC3-FC4"	"Fz-P7"	"F7-P4"	"F3-FT8"	"T7-CP4"	"F3-Fz"
5	"F7-F3"	"AF4-TP8"	"FC3-FC4"	"F3-T8"	"T7-CPz"	"Fz-P7"
6	"Fz-F4"	"F7-Fz"	"F7-T8"	"AF4-P7"	"T7-Pz"	"F8-TP7"
7	"F3-Fz"	"F8-TP7"	"FC4-FT8"	"AF4-TP8"	"AF4-CP4"	"FP1-AF4"
8	"F4-F8"	"FC3-T8"	"Fz-P7"	"AF4-T8"	"FC4-P4"	"FC3-FT8"
9	"Fz-T8"	"F8-TP8"	"F7-F4"	"Fz-P7"	"F7-CP3"	"C3-TP7"
10	"Fz-FT8"	"F7-FC4"	"F7-TP7"	"TP8-T8"	"T7-Cz"	"Fz-F4"
	13	14	15	16	17	18
1	"F3-TP8"	"F3-T7"	"AF3-F3"	"F8-FC4"	"F7-P7"	"FT8-O2"
2	"F3-T8"	"FP1-FP2"	"F3-T8"	"FC4-CP4"	"F8-Pz"	"FP1-O2"
3	"FP1-FP2"	"AF4-P4"	"F3-FT7"	"P7-P4"	"FT7-T7"	"AF3-F3"
4	"AF3-F3"	"AF3-AF4"	"FT8-CP4"	"F4-FC4"	"T7-TP7"	"F7-T8"
5	"FP2-O1"	"FP1-AF4"	"F3-TP8"	"FC4-CPz"	"T7-P7"	"AF3-O2"
6	"FP2-Oz"	"AF4-Pz"	"FP1-F3"	"FP1-P7"	"F4-P7"	"F7-P4"
7	"FP2-C3"	"FP2-AF3"	"AF4-F3"	"AF3-P7"	"F4-T8"	"FC3-O2"

8	"FP2-AF3"	"AF4-CPz"	"F3-T7"	"FC4-O2"	"F7-F3"	"F7-TP8"
9	"FP2-F3"	"AF4-F8"	"F3-Fz"	"FT8-CP4"	"F4-O1"	"Fz-T8"
10	"FC3-O1"	"F3-FT7"	"FP2-F3"	"FC4-Cz"	"AF3-P7"	"AF3-FC3"
	19	20	21	22	23	24
1	"F7-FC3"	"F7-T8"	"TP8-O1"	"FC4-FT8"	"T8-CP3"	"F3-Fz"
2	"F7-O1"	"FC4-T8"	"F7-Fz"	"FC3-FT8"	"T8-Pz"	"FC4-T8"
3	"F8-FC3"	"FC4-TP8"	"AF4-O1"	"FC3-P7"	"T8-CPz"	"Fz-P7"
4	"F4-F8"	"F7-F3"	"F7-FC4"	"FC3-T8"	"F3-Fz"	"FC4-TP8"
5	"F4-FC4"	"F7-FC3"	"F3-Fz"	"FP1-AF4"	"FC4-T8"	"FC4-P7"
6	"FC4-T8"	"C4-TP8"	"T8-O1"	"Fz-P7"	"FP1-T8"	"FP1-CPz"
7	"F3-FC4"	"FT7-FC3"	"F8-TP7"	"F3-O1"	"AF3-T8"	"TP8-P4"
8	"C4-O1"	"Fz-FC3"	"F8-T8"	"AF3-AF4"	"T8-CP4"	"F7-P4"
9	"FC3-C4"	"C3-T8"	"F8-P7"	"AF4-TP8"	"FC4-P7"	"FP1-AF4"
10	"FC3-FC4"	"C3-TP8"	"C4-TP8"	"FP1-C4"	"FC4-TP8"	"FP1-Cz"
	25	26	27	28	29	30
1	"FP1-FP2"	"AF3-AF4"	"FP2-AF4"	"FP1-F3"	"AF4-F3"	"AF4-F3"
2	"F8-TP7"	"FP1-AF4"	"F3-T8"	"AF3-F3"	"AF3-F3"	"AF3-F3"
3	"F8-P4"	"AF3-FT8"	"FP1-P7"	"AF4-F3"	"F3-TP8"	"F3-TP8"
4	"F4-FT8"	"AF3-T8"	"FP1-AF3"	"F3-T7"	"FP2-F3"	"FP1-F3"
5	"FT8-P4"	"C4-T8"	"FP1-T8"	"F3-P4"	"FP1-F3"	"F3-T8"
6	"FP2-AF3"	"C4-CP4"	"FP1-O2"	"F3-TP8"	"FP1-FC3"	"AF4-F4"
7	"FP1-T8"	"FT8-TP8"	"AF3-F3"	"F3-T8"	"AF3-FC3"	"AF4-P7"
8	"F4-F8"	"FP2-AF3"	"CP4-O2"	"AF3-FC3"	"FC3-P7"	"AF3-AF4"
9	"T8-CP4"	"T8-Pz"	"AF3-FC3"	"FP1-FC3"	"FC3-O1"	"F3-CP3"
10	"F8-P7"	"F4-TP7"	"CP3-O2"	"F7-FC3"	"F3-TP7"	"FP2-AF3"
	31	32	33	34	35	36
1	"AF3-F3"	"F8-FC4"	"FT8-P3"	"FT7-T7"	"FC3-C3"	"AF3-F3"
2	"FP1-F3"	"AF3-AF4"	"F8-FT8"	"FC4-Cz"	"FP1-FC3"	"FP1-F3"

3	"F3-T8"	"F4-T8"	"TP7-P7"	"AF3-F3"	"FC3-P3"	"FP1-FC3"
4	"AF4-F3"	"F8-T8"	"F8-T8"	"F7-CP3"	"F3-P3"	"AF4-F3"
5	"F3-TP8"	"FP1-AF4"	"F4-T8"	"CP3-O1"	"F3-CP4"	"AF4-O1"
6	"FP2-F3"	"F4-FC4"	"FT8-P4"	"F3-CP3"	"F3-O2"	"F3-T8"
7	"F3-Fz"	"FC3-P7"	"FT8-Pz"	"FCz-FC4"	"FC3-Pz"	"FT8-P3"
8	"FT7-T7"	"FC3-FC4"	"FT8-CP4"	"Pz-O1"	"FP1-F3"	"FT8-O1"
9	"F3-O1"	"FC4-P4"	"F4-P7"	"F3-P4"	"AF3-FC3"	"FC3-O2"
10	"F3-T7"	"F3-F4"	"TP7-T8"	"FP1-O1"	"FC3-P4"	"AF3-FC3"
	37	38	39	40	41	42
1	"FP1-F3"	"F3-FT8"	"AF4-F3"	"FP2-AF3"	"FP1-F3"	"AF4-F8"
2	"AF4-F3"	"AF3-F3"	"AF4-Pz"	"AF3-FC3"	"FP2-F3"	"AF3-F8"
3	"AF3-F3"	"AF4-F3"	"AF4-O2"	"AF3-AF4"	"AF3-F3"	"F4-FT8"
4	"F3-CP3"	"FP2-AF3"	"AF4-P3"	"FC3-T7"	"F4-FC3"	"F3-FT8"
5	"F3-CP4"	"FP1-F3"	"AF4-CPz"	"FP1-FP2"	"FP1-FC3"	"AF4-Pz"
6	"F3-T8"	"F3-Fz"	"FP2-Pz"	"F3-T7"	"FP2-FC3"	"AF4-C3"
7	"F3-Pz"	"FP1-FT8"	"AF4-Oz"	"FP1-AF4"	"F3-TP8"	"F3-TP8"
8	"F3-P4"	"F3-T8"	"FT8-Pz"	"AF4-Oz"	"F3-TP7"	"AF4-P3"
9	"FP1-FC3"	"AF4-F4"	"F3-O1"	"AF3-F3"	"F3-T7"	"AF4-F4"
10	"F3-O2"	"AF3-FT8"	"FP1-Pz"	"FP1-FC3"	"F3-FT7"	"AF4-CP3"
	43	44	45	46	47	48
1	"AF4-O2"	"FP1-AF4"	"AF4-F3"	"AF4-O2"	"AF4-F3"	"F3-T8"
2	"FP1-AF3"	"AF4-O1"	"F3-TP7"	"AF4-P3"	"AF3-F3"	"F3-P7"
3	"AF4-P7"	"AF4-Pz"	"AF3-FC3"	"F7-TP7"	"FP1-F3"	"FC3-P7"
4	"AF4-CP3"	"AF4-P3"	"AF3-F3"	"FP1-FP2"	"F3-F4"	"FC3-C3"
5	"F3-Fz"	"AF4-F4"	"F3-T7"	"FP2-F7"	"FP2-F3"	"FC3-CP3"
6	"Fz-O2"	"AF4-P4"	"FP2-F3"	"FP2-AF3"	"F3-TP8"	"FC3-Pz"
7	"AF3-O2"	"AF4-CP3"	"FP1-FC3"	"F8-FT8"	"FP1-AF4"	"Fz-F8"
8	"AF4-F3"	"AF4-Oz"	"FC3-T7"	"FT8-P3"	"F3-Oz"	"FP1-FT8"
9	"AF4-Pz"	"F3-TP8"	"FC3-CP3"	"FP1-AF4"	"F3-TP7"	"T8-CP4"
10	"FC3-T8"	"AF4-CPz"	"FP1-F3"	"FT8-Pz"	"AF4-Pz"	"FP2-O2"
	49	50	51	52	53	54

1	"F7-FC3"	"AF4-O1"	"AF3- AF4"	"AF4-F3"	"AF4-F3"	"AF3-FC3"
2	"F3-T7"	"AF4-Pz"	"FP2-AF3"	"AF4-F7"	"AF4-F7"	"FC3-O2"
3	"AF4-Pz"	"AF4-F4"	"FP1-F3"	"FP2-F7"	"FP1-AF4"	"FP1-F3"
4	"F7-Fz"	"AF3-O1"	"AF4-Pz"	"F3-T8"	"AF3-F3"	"FP2-F3"
5	"FC3-T8"	"FP1-FP2"	"AF4-F7"	"F7-TP7"	"FP2-F7"	"AF4-F3"
6	"FC3-T8"	"AF4-CPz"	"AF3-F3"	"F3-T8"	"FP2-F3"	"F3-O2"
7	"AF4-Oz"	"AF4-CP3"	"AF4-Oz"	"F3-T7"	"F3-T8"	"FP1-FC3"
8	"FC3-T7"	"CPz-P3"	"FP1-F7"	"F3-Oz"	"FP1-FP2"	"AF4-F7"
9	"F3-T8"	"FP1-FT8"	"AF3-F7"	"F3-O2"	"FP2-AF3"	"FP2-FC3"
10	"FC3-C3"	"Fz-O1"	"FC3-O1"	"F7-T7"	"AF3- AF4"	"AF4-Pz"
	55	56	57	58	59	60
1	"FP1-FP2"	"AF4-Oz"	"FP2-Pz"	"FP1-FP2"	"AF3-F3"	"AF4-F3"
2	"AF4-O1"	"FP2-Oz"	"AF4-Pz"	"FP1-AF4"	"FP1-FC3"	"F4-FC3"
3	"AF4-F3"	"FC3-Oz"	"AF3-F3"	"FT8-T8"	"AF4-F3"	"AF3-F3"
4	"FP2-Oz"	"AF4-FC3"	"F3-T7"	"FT8-O1"	"F3-TP8"	"FP1-F3"
5	"FC3-T7"	"AF4-F3"	"AF4-F3"	"Fz-P7"	"AF3-FC3"	"F3-TP8"
6	"FP2-F3"	"FP1-FC3"	"FC3-T7"	"F3-FT8"	"AF4-F4"	"F3-T8"
7	"AF4-Oz"	"AF3-FC3"	"FP2-F3"	"FT8-O2"	"FP1-F3"	"Fz-CPz"
8	"FP2-O1"	"FP2-FC3"	"AF4-FC3"	"FP2-AF3"	"FP2-F3"	"FC3-T7"
9	"AF4-P3"	"FC3-P3"	"F3-FT7"	"F7-FT8"	"FP2-F4"	"F3-FT7"
10	"FP2-P3"	"AF3-F7"	"FT7-T7"	"FT8-P7"	"FP2-FC3"	"F3-Fz"