Supplementary Materials for

Using the β/α ratio to enhance odor-induced EEG emotion recognition

Jiayi Fang *et al.*

*Guangyong Zhu. E-mail: gyz@sit.edu.cn

*Fengping Yi. Email: yifengping@sit.edu.cn

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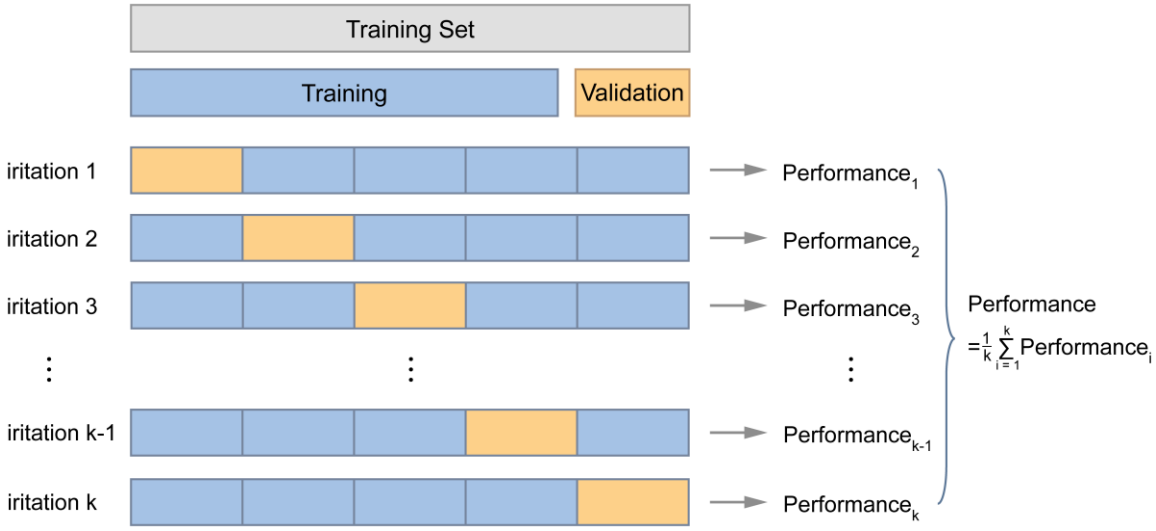


Figure S1.

Cross-validation diagram. We perform k-fold cross-validation on the training set, $k = 5$. The training set is divided equally into 5 parts, each iteration will take four portions of the data as the training set, while the remaining four portions will serve as the validation set (with non-repetitive data in each iteration). Eventually, the performance of the model on the five validation sets will be averaged to obtain the performance of this 5-fold cross-validation model. This metric will be used to determine the optimal hyper-parameters.

Table S1.

Rating of participants inhaling SEO or BEO in valence dimension.

Subject No.	SEO	BEO
1	4	8
2	7	9
3	7	5
4	3	9
5	6	3
6	8	8
7	5	5
8	6	8
9	8	1
10	7	8
11	6	3
12	7	7
13	6	5
14	7	3
15	4	8
16	5	6
17	5	8
18	9	9
19	4	3
20	7	8
21	6	8
22	5	7
23	5	5
24	6	1
25	6	9
26	4	6
27	7	4
28	5	4
29	7	4
30	7	5
31	6	8
32	7	5
33	6	5
34	7	7
35	5	9
36	3	5
37	5	6
38	6	3
39	4	8
40	8	8
41	6	7
42	7	6
43	4	7
44	8	8
45	7	7
46	3	7
47	5	8
48	6	6
49	5	7
50	8	7

Note: SEO: sandalwood essential oil. BEO: bergamot essential oil. The *p* value calculated by paired t test is 0.3924.

Table S2.

***P* values and *t*-values of paired t-test between RS and inhaling SEO in topography analysis.**

Electrodes	Alpha1		Alpha2		β/α	
	p	***t***	***p***	***t***	***p***	***t***
Fp1	0.018*	-2.158	0.015*	-2.241	0.008**	2.486
Fpz	0.018*	-2.160	0.010*	-2.389	0.005**	2.651
Fp2	0.018*	-2.158	0.010*	-2.400	0.010*	2.419
F7	0.021*	-2.090	0.019*	-2.126	0.008**	2.477
F3	0.018*	-2.146	0.019*	-2.133	0.004**	2.791
Fz	0.020*	-2.105	0.011*	-2.373	0.004**	2.734
F4	0.017*	-2.180	0.023*	-2.044	0.009**	2.452
F8	0.016*	-2.214	0.012*	-2.335	0.034*	1.865
FC5	0.029*	-1.944	0.041*	-1.771	0.004**	2.764
FC1	0.016*	-2.202	0.021*	-2.093	0.007**	2.530
FC2	0.011*	-2.368	0.021*	-2.085	0.008**	2.472
FC6	0.015*	-2.222	0.073	-1.475	0.011*	2.377
T7	0.056	-1.615	0.111	-1.237	0.044*	1.741
C3	0.055	-1.631	0.185	-0.906	0.015*	2.246
Cz	0.007**	-2.532	0.020*	-2.112	0.015*	2.232
C4	0.005**	-2.674	0.269	-0.619	0.009**	2.448
T8	0.014*	-2.253	0.384	-0.296	0.014*	2.250
CP5	0.076	-1.456	0.209	-0.817	0.023*	2.050
CP1	0.029*	-1.935	0.289	-0.559	0.017*	2.188
CP2	0.005**	-2.715	0.250	-0.678	0.010*	2.393
CP6	0.006**	-2.597	0.144	-1.074	0.004**	2.810
P7	0.043*	-1.752	0.399	-0.257	0.053	1.650
P3	0.094	-1.336	0.173	-0.950	0.009**	2.451
Pz	0.008**	-2.488	0.086	-1.386	0.005**	2.666
P4	0.081	-1.417	0.056	-1.621	0.003**	2.893
P8	0.019*	-2.142	0.007**	-2.540	***	3.533
POz	0.142	-1.084	0.033*	-1.877	0.002**	3.095
O1	0.032*	-1.900	0.007**	-2.544	0.009**	2.470
Oz	0.053	-1.642	0.006**	-2.596	0.001**	3.150
O2	0.056	-1.620	0.019*	-2.130	0.001**	3.131

Note: RS: resting state, SEO: sandalwood essential oil. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$, $n = 50$, degrees of freedom = 49, one-tailed.

Table S3.

***P* values and *t*-values of paired t-test between RS and inhaling BEO in topography analysis.**

Electrodes	Alpha1		Alpha2		β/α	
	p	***t***	***p***	***t***	***p***	***t***
Fp1	0.022*	-2.075	0.015*	-2.238	0.288	-0.564
Fpz	0.022*	-2.068	0.011*	-2.361	0.278	-0.594
Fp2	0.027*	-1.974	0.014*	-2.270	0.251	-0.676
F7	0.046*	-1.717	0.030*	-1.932	0.344	-0.405
F3	0.049*	-1.683	0.037*	-1.820	0.242	-0.704
Fz	0.068	-1.519	0.033*	-1.884	0.174	-0.947
F4	0.060	-1.580	0.023*	-2.050	0.117	-1.204
F8	0.077	-1.446	0.006**	-2.597	0.160	-1.006
FC5	0.091	-1.351	0.121	-1.183	0.293	-0.549
FC1	0.047*	-1.706	0.020*	-2.100	0.165	-0.983
FC2	0.071	-1.489	0.025*	-2.004	0.149	-1.052
FC6	0.127	-1.155	0.038*	-1.812	0.074	-1.468
T7	0.041*	-1.774	0.143	-1.079	0.111	-1.239
C3	0.076	-1.453	0.145	-1.071	0.101	-1.296
Cz	0.057	-1.606	0.030*	-1.919	0.201	-0.847
C4	0.111	-1.235	0.256	-0.660	0.203	-0.838
T8	0.149	-1.054	0.380	-0.306	0.017*	-2.193
CP5	0.287	-0.565	0.365	-0.348	0.087	-1.376
CP1	0.048*	-1.700	0.218	-0.784	0.127	-1.153
CP2	0.048*	-1.693	0.146	-1.065	0.222	-0.771
CP6	0.175	-0.945	0.259	-0.650	0.279	-0.591
P7	0.180	-0.923	0.292	-0.550	0.281	-0.585
P3	0.232	-0.739	0.145	-1.070	0.198	-0.858
Pz	0.038*	-1.816	0.035*	-1.846	0.281	-0.584
P4	0.061	-1.570	0.042*	-1.767	0.362	-0.356
P8	0.112	-1.232	0.035*	-1.853	0.619	0.303
POz	0.166	-0.978	0.083	-1.408	0.421	-0.201
O1	0.220	-0.780	0.040*	-1.784	0.430	-0.177
Oz	0.328	-0.447	0.066	-1.532	0.629	0.330
O2	0.414	-0.220	0.070	-1.497	0.574	0.187

Note: RS: resting state, BEO: bergamot essential oil. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$, $n = 50$, degrees of freedom = 49, one-tailed.

Table S4.

***T*-values of paired t-test between RS and inhaling SEO in spectrogram analysis.**

Frequency	F-ROI	T-ROI	C-ROI	P-ROI	O-ROI
Alpha1	-2.192	-1.916	-2.436	-1.820	-1.766
Alpha2	-2.213	-0.898	-1.087	-1.908	-2.604

Notes: RS: resting state; SEO: sandalwood essential oil; F-ROI: frontal ROI; T-ROI: temporal ROI; C-ROI: central ROI; P-ROI: parietal ROI; O-ROI: occipital ROI. $N = 50$, degrees of freedom = 49, one-tailed.

Table S5.

***T*-values of paired t-test between RS and inhaling BEO in spectrogram analysis.**

Frequency	F-ROI	T-ROI	C-ROI	P-ROI	O-ROI
Alpha1	-1.700	-1.482	-1.593	-1.385	-0.502
Alpha2	-2.151	-0.732	-1.075	-1.671	-1.646

Notes: RS: resting state; BEO: bergamot essential oil; F-ROI: frontal ROI; T-ROI: temporal ROI; C-ROI: central ROI; P-ROI: parietal ROI; O-ROI: occipital ROI. $N = 50$, degrees of freedom = 49, one-tailed.