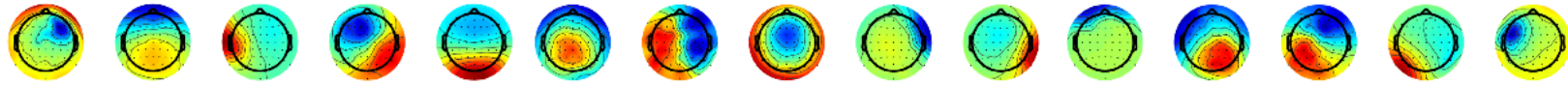


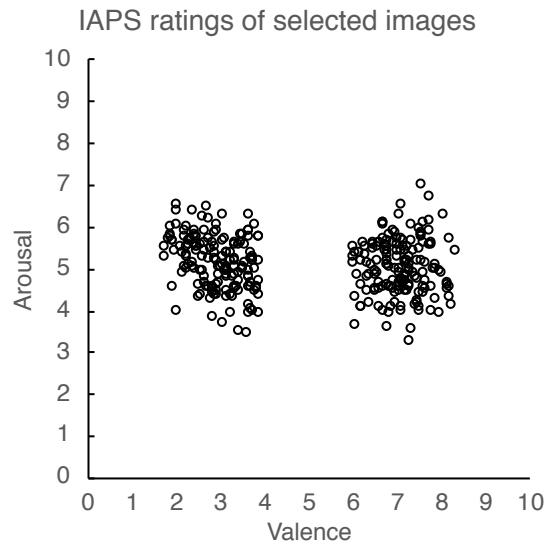
## Supplementary Table



	Cls. 1	Cls. 2	Cls. 3	Cls. 4	Cls. 5	Cls. 6	Cls. 7	Cls. 8	Cls. 9	Cls. 10	Cls. 11	Cls. 12	Cls. 13	Cls. 14	Cls. 15	
# participants	26 (93%)	28 (100%)	24 (86%)	25 (89%)	28 (100%)	26 (93%)	24 (86%)	23 (82%)	25 (89%)	25 (89%)	22 (79%)	28 (100%)	25 (89%)	26 (93%)	24 (86%)	
# total ICs	43	66	59	75	117	62	52	79	51	44	41	66	78	66	50	
<b>Valence (pleasant v.s. unpleasant)</b>																
$\theta$	<b>2.08 (.11)</b>	0.99 (.55)	-0.88 (.54)	0.32 (.83)	<u>1.77 (.23)</u>	<b>2.63 (.02)</b>	<b>1.99 (.06)</b>	0.70 (.48)	-1.01 (.31)	-0.01 (.99)	<b>2.56 (.03)</b>	0.73 (.69)	0.65 (.77)	-1.34 (.26)	0.77 (.44)	
$\alpha$	<u>1.70 (.13)</u>	0.90 (.55)	-1.17 (.54)	-1.07 (.83)	-0.07 (.94)	-0.09 (.92)	0.97 (.33)	0.70 (.48)	<u>-1.69 (.17)</u>	0.15 (.99)	1.15 (.37)	0.83 (.69)	-0.28 (.78)	-0.16 (.87)	0.89 (.44)	
$\beta$	0.75 (.45)	0.23 (.81)	0.60 (.54)	-0.21 (.83)	0.96 (.50)	1.57 (.17)	<b>2.36 (.05)</b>	1.46 (.43)	-1.57 (.17)	1.21 (.67)	0.58 (.56)	-0.34 (.73)	<u>1.71 (.26)</u>	1.36 (.26)	-1.12 (.44)	
<b>Arousal (high v.s. low)</b>																
$\theta$	0.31 (.75)	<u>1.70 (.13)</u>	0.88 (.56)	1.40 (.16)	<b>3.48 (.00)</b>	-1.24 (.31)	1.57 (.17)	<b>2.14 (.03)</b>	0.97 (.32)	1.04 (.37)	-0.64 (.53)	<b>-2.05 (.11)</b>	-0.64 (.78)	<b>3.03 (.00)</b>	0.00 (.99)	
$\alpha$	0.34 (.75)	<b>3.64 (.00)</b>	<b>2.63 (.02)</b>	<b>3.60 (.00)</b>	<b>5.69 (.00)</b>	1.55 (.31)	<b>3.72 (.00)</b>	<b>3.84 (.00)</b>	2.46 (.04)	<u>1.74 (.24)</u>	0.62 (.53)	0.71 (.71)	1.32 (.55)	<b>3.91 (.00)</b>	0.77 (.99)	
$\beta$	0.52 (.75)	0.66 (.50)	-0.34 (.73)	<u>1.74 (.12)</u>	<b>2.08 (.03)</b>	0.44 (.66)	0.96 (.33)	<b>2.50 (.01)</b>	1.37 (.25)	-0.89 (.37)	1.52 (.38)	-0.21 (.83)	0.06 (.95)	0.76 (.44)	0.28 (.99)	
<b>Expectation (predicting pleasant v.s. predicting unpleasant)</b>																
$\theta$	0.94 (.34)	-1.63 (.31)	-0.57 (.84)	-0.58 (.60)	-1.03 (.30)	-0.39 (.81)	0.44 (.81)	0.08 (.93)	-0.87 (.43)	<b>-2.42 (.04)</b>	-0.46 (.96)	0.05 (.96)	1.11 (.49)	0.69 (.73)	-0.20 (.84)	
$\alpha$	1.26 (.31)	-0.92 (.53)	-0.60 (.84)	-0.52 (.60)	-1.28 (.30)	-1.00 (.81)	0.95 (.81)	-0.67 (.75)	0.79 (.43)	-1.26 (.26)	-0.03 (.97)	-1.40 (.24)	-0.98 (.49)	0.18 (.86)	<u>1.77 (.22)</u>	
$\beta$	1.41 (.31)	0.21 (.83)	-0.04 (.96)	-0.99 (.60)	<b>-1.92 (.16)</b>	-0.23 (.81)	0.23 (.81)	0.80 (.75)	<b>1.99 (.14)</b>	1.12 (.26)	0.72 (.96)	<b>-2.15 (.09)</b>	0.08 (.93)	0.78 (.73)	-0.25 (.84)	

Summary of clustered ICs. Number of participants and percentage of participants among all who held an IC clustered into each IC cluster (“Cls. 1” to “Cls. 15”). All statistical results ( $Z$ -scores and FDR corrected  $p$ -values in parentheses) of Wilcoxon signed rank test on each frequency range for all comparisons of interest. **Red texts** represent robustly significant frequency at  $p_{\text{FDR-corrected}} < .05$ ; **bold texts** represent significant frequency at  $p_{\text{uncorrected}} < .05$ ; and **underlined texts** represent marginally significant frequency at  $p_{\text{uncorrected}} < .10$ . As was obvious, different IC and frequency ranges reflected different aspects of psychological axis, valence, arousal, and expectation. However, some ICs appeared to overlap among different axes (i.e.,  $\theta$  of IC Cluster 5 for valence and arousal, and  $\beta$  of that for arousal and expectation). In addition, three IC clusters out of fifteen appeared to be shared by all (100%) participants, suggesting such IC may be applicable for anyone; however, some IC clusters was not shared by all (i.e. IC cluster 11 for valence and IC cluster 10 were shared by only 79% and 89%, respectively).

### Supplementary Figure 1

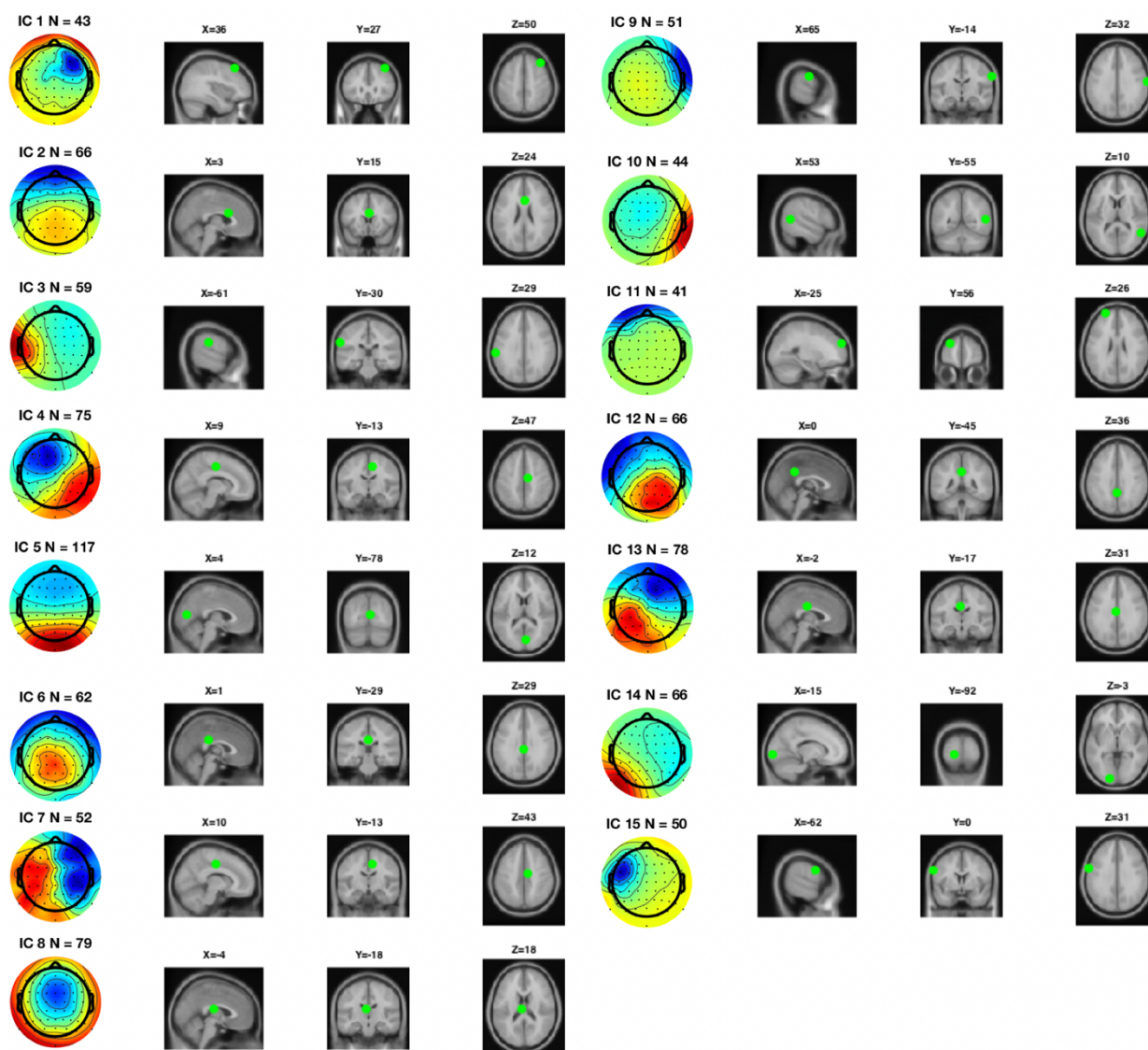


A scatter plot of subjective ratings (as reported in the Lang, Bradley, & Cuthbert, 2008) selected in this study for valence (along the X-axis) and arousal (along the Y-axis). Pictures with intermediate valence (with valence rating between 4–6) were not used in this study. As is apparent in the figure below, we selected pictures so that the valence cue would be congruent to its assignment: one for pleasant (valence value above 6) and the other for unpleasant (valence value below 4). As for *arousal*, we did not set such a border, yet simply applied a median split for high and low arousal pictures. See Supplementary Table 2 below for the details (mean  $\pm$  *SD*) of valence and arousal ratings for selected sets of pictures.

Supplementary Table 2

		Set 1	Set 2
Valence	Pleasant	7.17 $\pm$ 0.53	6.99 $\pm$ 0.57
	Unpleasant	3.06 $\pm$ 0.61	2.91 $\pm$ 0.55
Arousal	High	5.31 $\pm$ 0.45	5.77 $\pm$ 0.28
	Low	4.41 $\pm$ 0.27	4.86 $\pm$ 0.52

## Supplementary Figure 2



Scalp topography of each IC cluster with a number of ICs in the cluster and a location of the centroid (green dot) plotted on a template brain for each IC cluster with its spherical coordinates. Centroids for IC6, 5, and 10 (selected for valence, arousal, and expectation) were centered around middle-posterior cingulate cortex, visual cortex in proximity to posterior cingulate and precuneus regions, and right angular gyrus (lateral occipital complex) regions, respectively.

**Appendix: 320 IAPS picture codes acquired from the IAPS database**

1090	2075	2387	4007	5628	7481	9001	9390
1111	2091	2389	4090	5820	7482	9002	9403
1113	2095	2395	4150	5829	7489	9008	9404
1220	2100	2398	4225	5830	7492	9031	9409
1270	2110	2399	4250	5831	7499	9041	9417
1270	2115	2455	4255	5833	7502	9043	9421
1271	2120	2456	4532	5910	7521	9046	9425
1274	2141	2457	4597	5961	7530	9050	9426
1275	2150	2530	4598	5973	7660	9090	9427
1280	2152	2590	4599	5994	8001	9102	9428
1301	2153	2655	4600	6240	8021	9110	9429
1340	2155	2661	4601	6242	8031	9140	9430
1410	2158	2683	4603	6244	8034	9145	9435
1440	2160	2694	4610	6311	8090	9180	9440
1441	2165	2700	4612	6530	8130	9182	9445
1460	2170	2703	4614	6561	8161	9184	9470
1463	2205	2715	4617	6831	8162	9185	9471
1540	2208	2716	4619	6838	8163	9186	9490
1590	2209	2722	4621	7079	8190	9190	9491
1601	2216	2745.2	4622	7135	8193	9220	9495
1620	2217	2750	4623	7200	8208	9230	9530
1630	2222	2753	4624	7240	8210	9265	9560
1659	2224	2795	4626	7250	8230	9270	9561
1710	2274	2799	4628	7260	8231	9280	9571
1720	2276	2800	4640	7279	8330	9290	9592
1721	2278	2900.1	4641	7280	8340	9291	9594
1750	2300	2900.2	4645	7284	8370	9295	9610
1810	2301	3022	4700	7286	8380	9300	9622
1812	2303	3180	5199	7330	8420	9301	9630
1920	2306	3181	5215	7350	8461	9302	9800
2019	2311	3185	5250	7352	8467	9320	9831
2030	2312	3195	5270	7359	8470	9322	9900
2039	2314	3215	5450	7360	8480	9325	9903
2040	2340	3216	5470	7361	8485	9326	9912
2050	2345	3220	5480	7380	8496	9330	9920
2055.1	2345.1	3230	5551	7390	8499	9331	9921
2057	2346	3280	5621	7430	8500	9332	9922
2058	2347	3300	5622	7470	8510	9341	9925
2070	2352.1	3350	5623	7477	8531	9342	9930
2071	2375.1	4006	5626	7480	8540	9373	9941