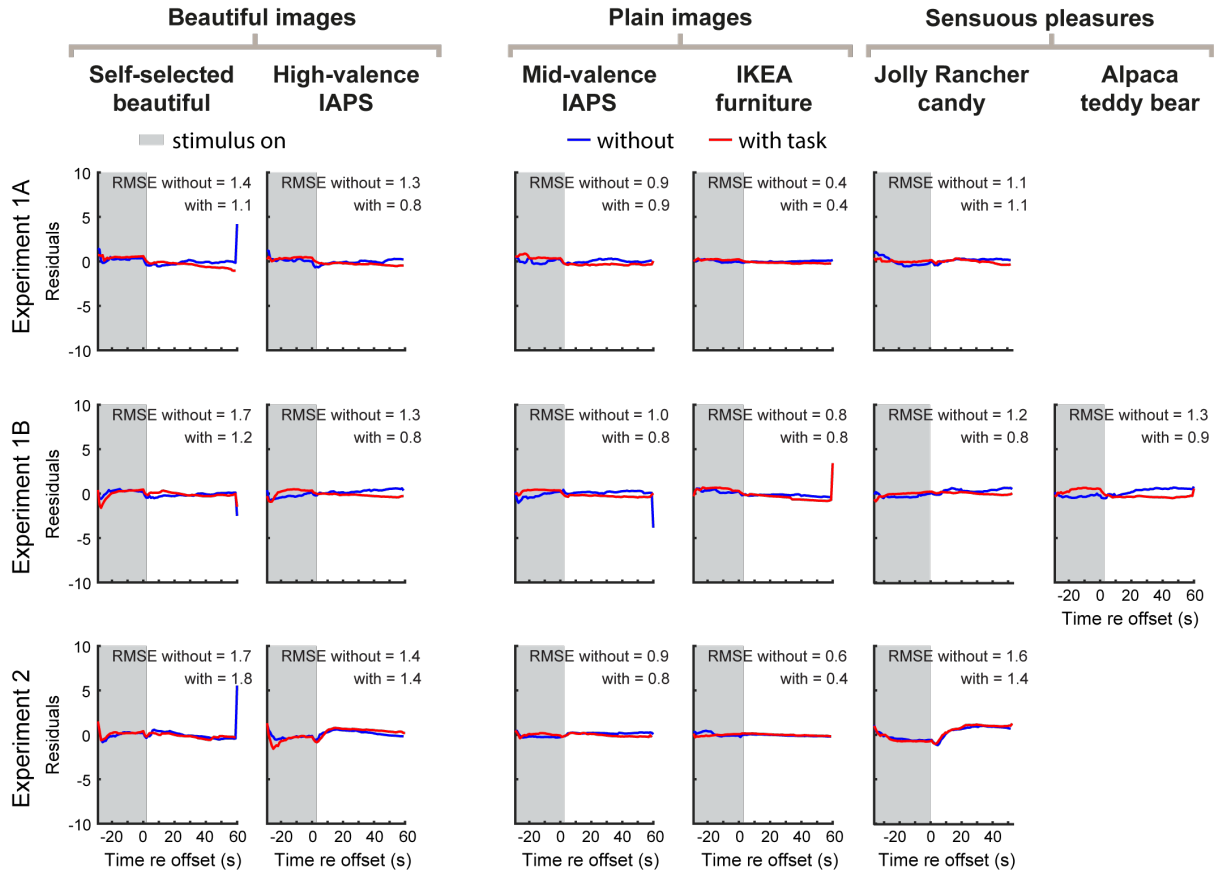## Supplemental Figures

Figure S1. Pleasure residuals of model fits for each stimulus type and experiment. Average pleasure residuals are shown separately for each experiment (rows) and each stimulus type (columns) for model fits of trials without (blue) and with (red) added task. Residuals were calculated using model predictions for each trial based on their individual r_{steady} values. The grey shaded area indicates the stimulus duration. RMSE = root mean square error. See Figure 1 for model fits.
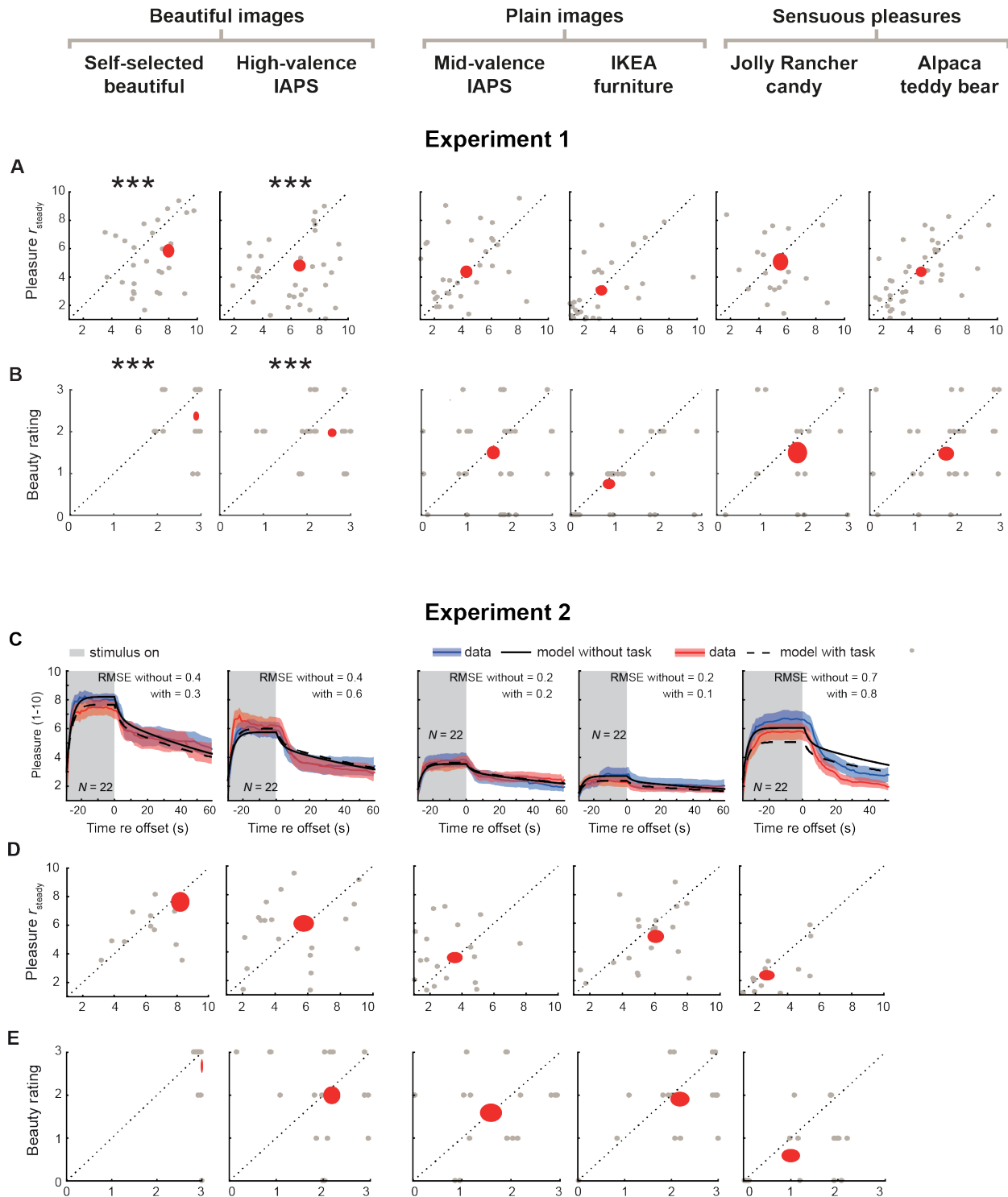
Figure S2. Top half: Scatterplots illustrating the main results of Experiment 1, which had a 2-back task. Scatter plot of pleasure (a) and beauty (b) for each type of stimulus. a & b, The horizontal (and vertical) scales indicate the value without (and with) added task. Grey dots represent data for each trial (horizontally jittered to avoid occlusion). Red ellipses indicate mean ± SE across all trials. The dotted line represents equality. Asterisks mark significant deviation from equality according to post-hoc pairwise comparisons following a significant interaction of task and stimulus type in a repeated-measures ANOVA; ***p < 0.001. Scatter plot of r_{steady} pleasure and final beauty judgments for each type of stimulus. Beauty judgements are 0 = "definitely not"; 1 = "perhaps not"; 2 = "perhaps yes"; 3 = "definitely yes". See Figure 1 for averages. (c) Experiment 2, which had a digit-span task. a, Time course of the

pleasure rating (colored) and model fit (black) in experiment 2 for each condition (stimulus type with or without added task). A schematic of the model (Eqs. 1-3) used to fit pleasure ratings is shown in Figure 1b. Colored lines with shaded areas represent mean ± 1 SE across participants. Lines for measured and fitted pleasure are shown without (blue and solid-black) and with (red and dashed-black) the added task. The grey shaded area indicates the stimulus duration. RMSE = root mean square error across the entire 90 s trial duration; N = number of trials (and participants) per curve. b & c, Scatter plot of pleasure (d) and beauty (e) for each type of stimulus. The horizontal (and vertical) scales indicate the value without (and with) added task. Beauty judgements are 0 = "definitely not"; 1 = "perhaps not"; 2 = "perhaps yes"; 3 = "definitely yes". Data points were jittered horizontally to avoid occlusion. Grey dots are for each trial. Red ellipses are means ± SE across all trials. The dotted line represents equality. There were no significant interactions of task and stimulus in Experiment 2. See Figure 3 for averages.
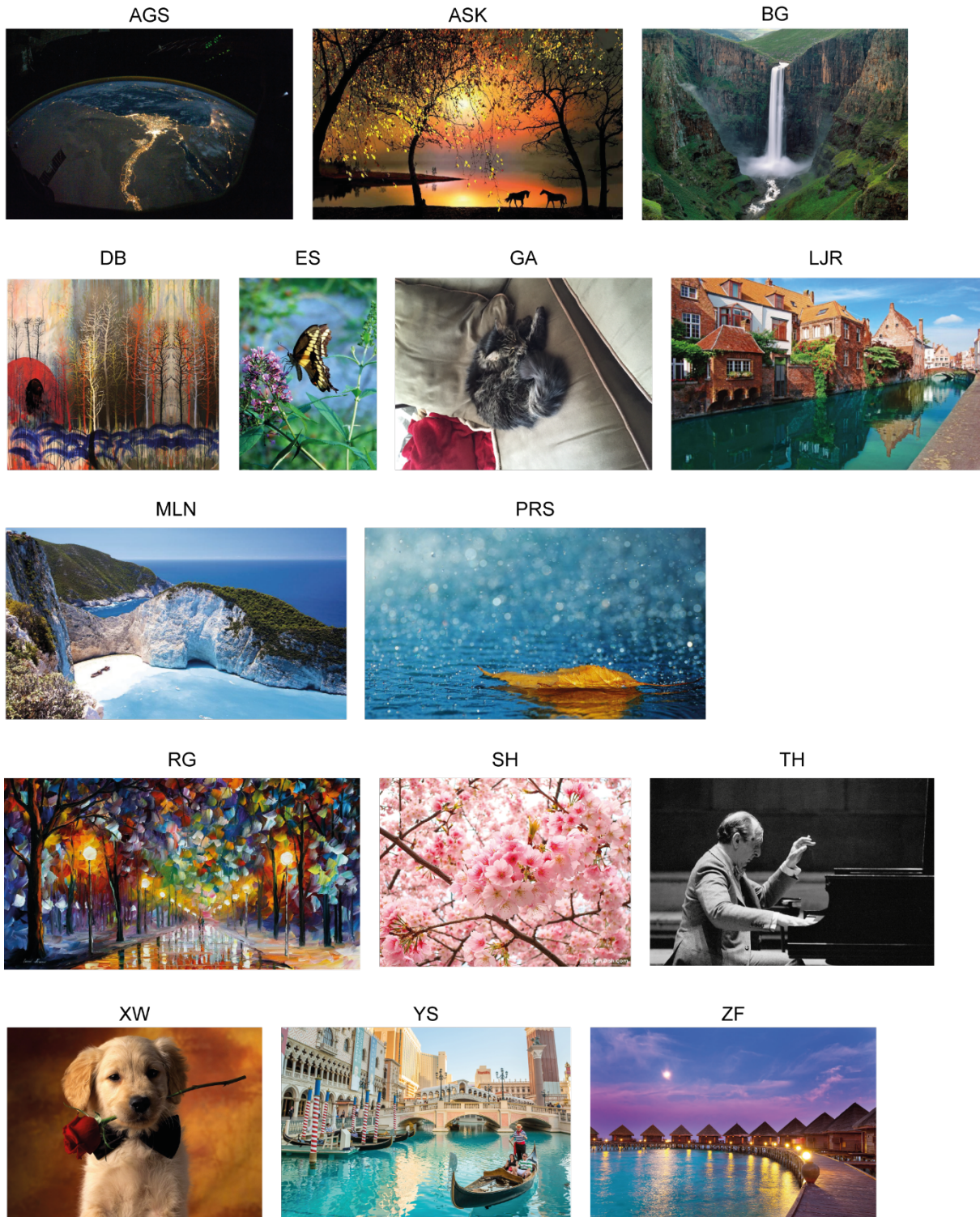
Figure S3. Examples of participants' self-selected beautiful images. Example images were randomly drawn from a list of all participants across experiments. See Figure 1 for examples for all stimulus types.
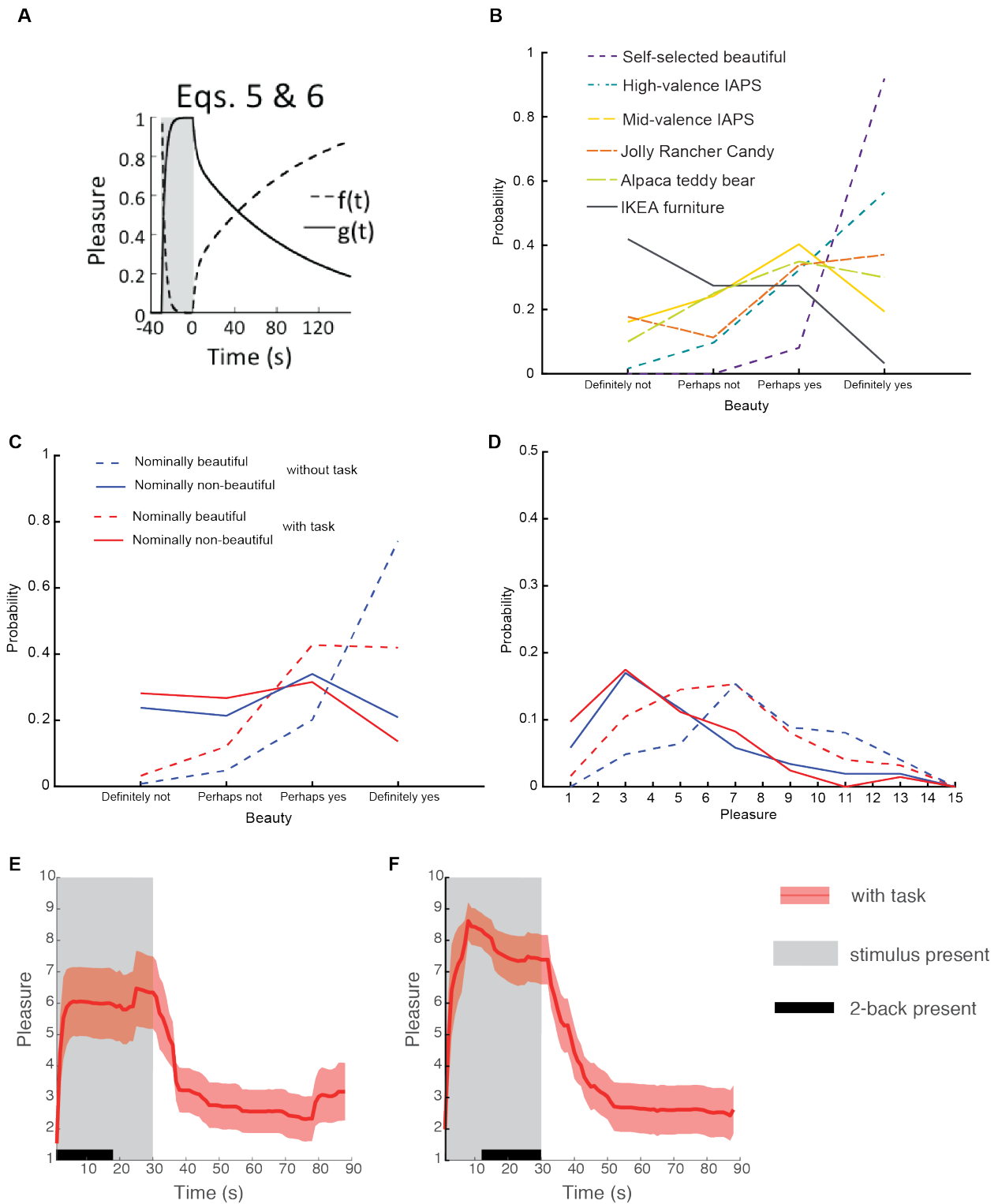
Figure S4. (a) Plot of Eqs. 5 &6 from Experimental Procedures. The estimator of asymptotic pleasure r_{steady} is a linear function (Eq. 4 in Methods) of the pleasure response function. The weighting function $g(t)$ and the offset function $f(t)$ are defined in Eqs. 5 and 6. They are plotted here using the fixed model parameters determined in the initial fit. See Figure 1 for a schematic of Eq. 1. (b) Distribution of beauty judgements in trials without added task for each kind of stimulus. Nominally beautiful stimuli (dashed) and candy (solid orange) peak at 3 (definitely felt beauty). Neutral IKEA furniture peaks at 0 (definitely not felt beauty). The rest (mid-valence IAPS, teddy bear, all

solid lines) peak at 2 (perhaps felt beauty). Participants who rated the candy to be beautiful in trials without added task showed no indication of generally heightened beauty responses. Sorting participants into those who judged candy beautiful (definitely yes (3)) or not, reveals no significant difference in their ratings of mid-value IAPS: 1.75 vs. 1.56 with task and 1.35 vs. 1.64 without. We do, however, find that those 7 participants of experiment 2 who did find the candy beautiful (3) without task, on average rate the teddy to be more beautiful M=2.43, than the other 13 participants, M=1.54, p < .04. For trials with task, this difference was non-significant. Thus, the reports of beauty from candy do not result from a general response tendency, though some participants may have a slightly higher tendency to call sensuous pleasures beautiful. (c) Probability of one particular beauty judgment to be given for nominally beautiful (dashed lines) and non-beautiful (solid lines) stimuli separated for trials without (blue) and with (red) added task (see also **Table 1** for raw number of trials). (d) Probability of pleasure ratings for nominally beautiful (dashed lines) and non-beautiful (solid lines) stimuli separated for trials without (blue) and with (red) added task. (**e-f**) Effect of asynchronous task onset and offset. In a separate experiment, seven participants continuously rated their pleasure from self-selected beautiful images that were presented for 30 s. To study the effect of a task that is present for only part of the trial, we shortened the duration of the 2-back task to 18 s. In one trial, the 2-back task onset coincided with stimulus onset, and its offset came 12 s before stimulus offset. In the other trial, the 2-back onset was 12 s after stimulus onset. Traces show mean (±SE) pleasure over time. The task duration (18 s) was shorter than the stimulus duration (30 s). In the left graph, the task ended before the stimulus, and there is a sharp sustained rise in pleasure about 6 s after task offset. In the right graph, the task began after the stimulus, and there is a sharp sustained drop in pleasure about 4 s after task onset.

Supplemental Tables
Table S1. Parameter estimates of model (Eq. 3) fits to each participant (see also Figure 1 for average model fits). This table is solely to assess individual differences. The rest of our analyses and figures use the single set of best-fitting parameters (except r_{steady}) for the average curves (across participants) for each condition of all experiments.

Participant #	$r_{initial}$	r_{final}	τ_{short}	τ_{long}	w_{short}
1	3.92	4.85	4.24	0.00	0.69
2	1.17	1.18	0.39	0.00	0.34
3	1.00	1.39	1.22	0.01	0.44
4	1.46	1.12	0.40	103.42	0.44
5	1.99	1.03	4.56	0.02	5.14
6	1.41	1.89	2.03	44.65	0.35
7	1.47	1.14	0.98	61.75	0.39
8	1.00	1.37	0.44	61.44	1.00
9	1.30	1.31	0.00	36.28	0.74
10	1.54	2.38	2.59	84.63	1.11
11	1.23	1.23	0.40	53.81	0.77
12	1.35	1.40	1.05	73.15	0.33
13	1.43	1.58	1.11	45.65	0.42
14	1.52	1.85	1.63	72.46	0.50
15	1.01	1.20	1.13	63.45	0.47
16	1.17	1.56	0.81	1.09	0.76
17	1.76	2.13	4.46	79.61	0.40
18	1.64	1.55	1.75	49.64	0.39
19	2.22	1.57	0.11	133.73	0.98
20	1.55	2.05	1.12	106.63	-0.22
21	1.51	3.39	0.00	11.42	1.36
22	1.75	1.37	0.00	43.96	0.31
23	1.61	1.06	1.27	95.33	0.55
24	2.24	3.41	2.89	46.10	0.37
25	1.18	1.00	0.00	78.73	0.81
26	1.37	1.76	1.04	73.66	0.09
27	1.58	1.17	3.51	56.69	-0.51
28	1.28	1.18	0.64	58.35	0.39
29	1.24	1.12	0.73	63.65	0.40
30	1.00	1.69	0.15	35.77	0.87
31	2.18	2.34	1.39	18.72	0.55
32	1.57	1.35	0.54	45.46	0.42
33	1.18	1.65	1.36	58.67	1.15
34	2.26	1.81	1.48	18.17	0.87
35	1.09	2.16	2.08	55.66	0.56
36	1.57	1.69	0.79	30.89	0.60
37	1.82	1.62	0.84	143.99	-0.28
38	1.75	1.53	0.63	64.54	0.43
39	1.15	1.04	0.64	75.29	0.59
40	1.03	1.00	0.12	1.69	-0.16
41	1.97	1.57	0.29	48.78	0.71
42	1.16	1.49	1.30	57.14	0.68
43	1.04	1.49	1.12	113.83	0.62
44	1.38	1.00	0.05	184.96	0.48
45	1.35	2.20	1.74	81.25	0.18
46	2.23	3.22	4.05	205.21	-0.39
47	1.12	1.35	1.20	64.71	0.46
48	1.88	1.00	0.00	0.53	0.90
49	2.09	2.21	0.98	43.93	0.14

50	1.33	1.18	0.69	88.38	0.76
51	1.64	1.07	0.00	52.72	0.84
52	1.00	1.00	0.61	77.42	0.67
53	1.94	1.19	0.14	3.61	0.45
54	1.61	2.28	2.77	68.18	0.54
55	1.72	1.53	0.75	45.80	0.35
56	1.04	1.36	1.13	0.07	0.47
57	1.54	1.10	0.46	52.85	0.63
58	1.38	1.73	1.21	47.56	0.44
59	1.42	1.47	0.69	71.56	0.90
60	2.38	1.00	0.04	107.63	0.47
61	1.00	1.00	0.01	49.83	1.36
62	1.50	2.08	3.43	13.01	0.19
M	1.54	1.62	1.18	58.50	0.59
SD	0.48	0.70	1.17	41.94	0.69

Participants 1-20 were in Experiment 1A; participants 21-40 in Experiment 1B; participants 41-62 in Experiment 2.

Table S2. Root mean square errors (RMSE) for a control experiment. Participants in this control experiment tracked the changing distance of two dots on the screen instead of rating their pleasure (see Figure 1) in one trial with and one trial without 2-back task. Data is shown for all 11 participants from experiment 1A who absolved this additional task.

Participant	RMSE with task	RMSE without task
ELW	2.29	1.33
SHV	1.37	5.06
MAM	3.14	1.95
PAR	2.11	4.34
ARB	1.20	1.81
QMN	5.12	2.48
ZF	3.00	5.23
XW	1.61	2.65
NS	2.16	2.55
FFC	1.51	2.97
TH	5.80	3.35
Average	2.67	3.07

Notes. RMSE not different in trials with versus without added task according to 2-tailed t-test, $p = 0.525$.