

Supplementary materials

Supplementary figures

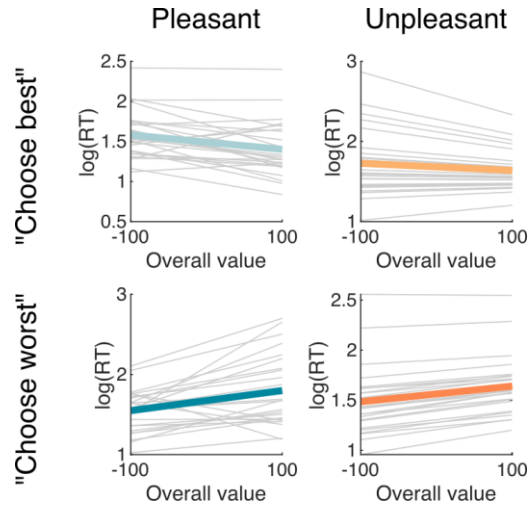


Figure S1. Overall value effects on reaction time depend on task goal. Generalized mixed-effects models were applied to predict RT from the summed value of presented options. Colored lines represent fixed effects while grey lines represent random effects (one line per subject). Overall value was only significantly associated with RT when participants were asked to choose the worst from two pleasant options ($\beta=0.03\pm0.01$, $t_{(1573)}=2.02$, $p=0.044$) or from two unpleasant options ($\beta=0.02\pm0.01$, $t_{(1606)}=2.17$, $p=0.03$). However, aggregating "choose best" and "choose worst" data revealed a significant interaction between overall value and task goal for both pleasant ($\beta=-0.05\pm0.01$, $t_{(3176)}=-3.38$, $p=7.10^{-04}$) and unpleasant ($\beta=-0.03\pm0.01$, $t_{(3187)}=-2.03$, $p=0.042$) conditions.

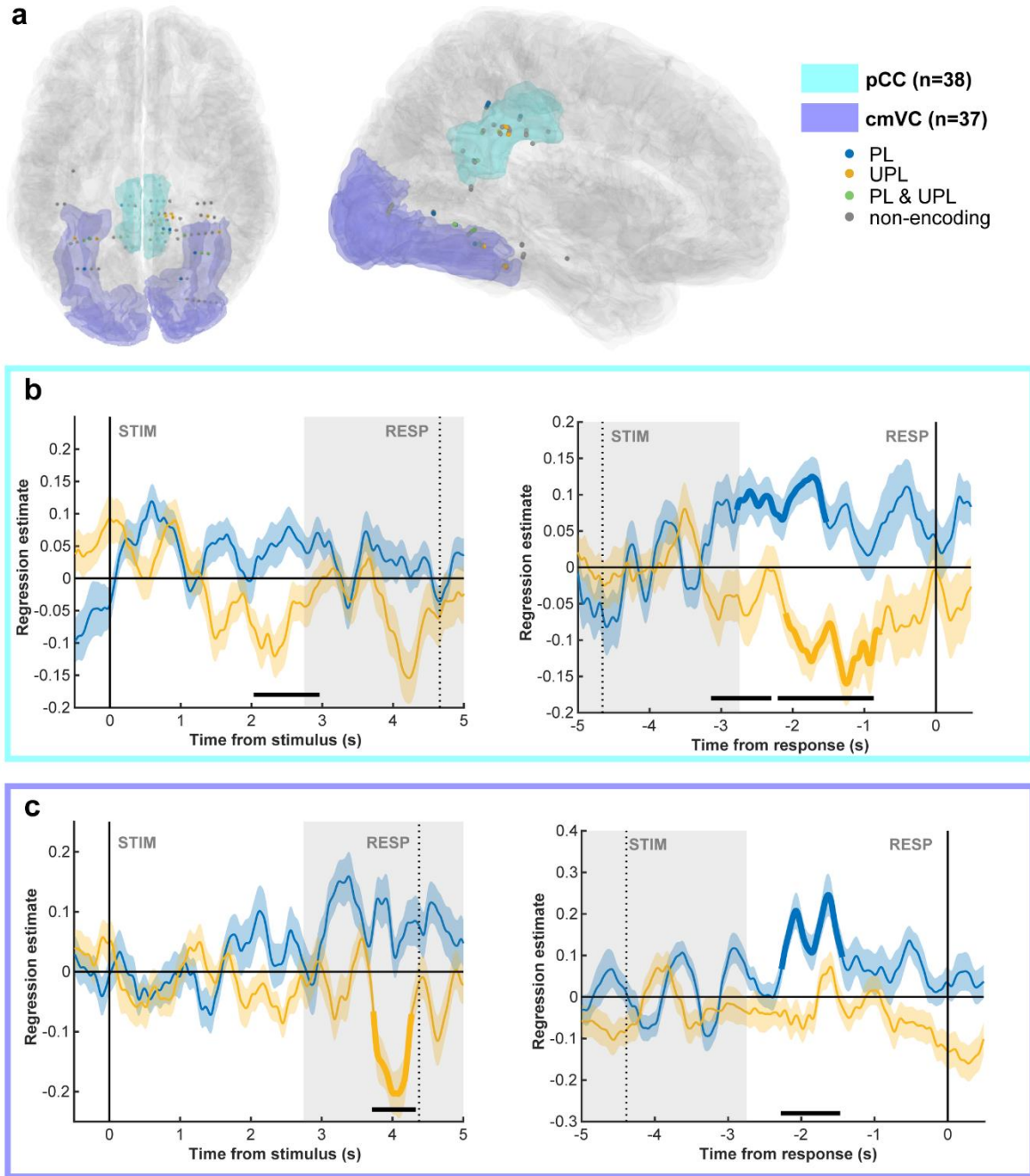


Figure S2. Delayed positive relationship between BGA and pleasant value in the posterior cingulate and caudo-medial visual cortex. (a) Anatomical locations of all pCC and cmVC recording sites projected onto the MNI template brain. Each site is shown as a dot, color-coded by its value-encoding profile (pCC: 38 sites; 4 PL, 4 UPL, 4 PL&UPL; cmVC: 37 sites; 4 PL, 4 UPL, 4 PL&UPL). (b–c) Group-level, time-resolved regression results across all sites for the pCC (b) and cmVC (c). Lines show regression estimates relating trial-wise BGA to item value, averaged across sites and plotted separately for pleasant and unpleasant items. Data are time-locked to stimulus onset (left panels) or response onset (right panels). Bold lines indicate significant clusters ($p_{\text{corr}} < 0.05$), shaded areas represent $\pm$ SEM across sites, and horizontal bars mark significant clusters ($p_{\text{corr}} < 0.05$). Compared with the vmPFC (main Fig. 3), these regions showed later-onset value signals in the stimulus-locked analysis (> 5 s; panels b–c), greater variability across sites, and fewer significant PL sites (panel a; $n = 4$ PL per region). Additionally, the cmVC exhibited a transient negative correlation with unpleasant value in the response-locked analysis (right panel of c).

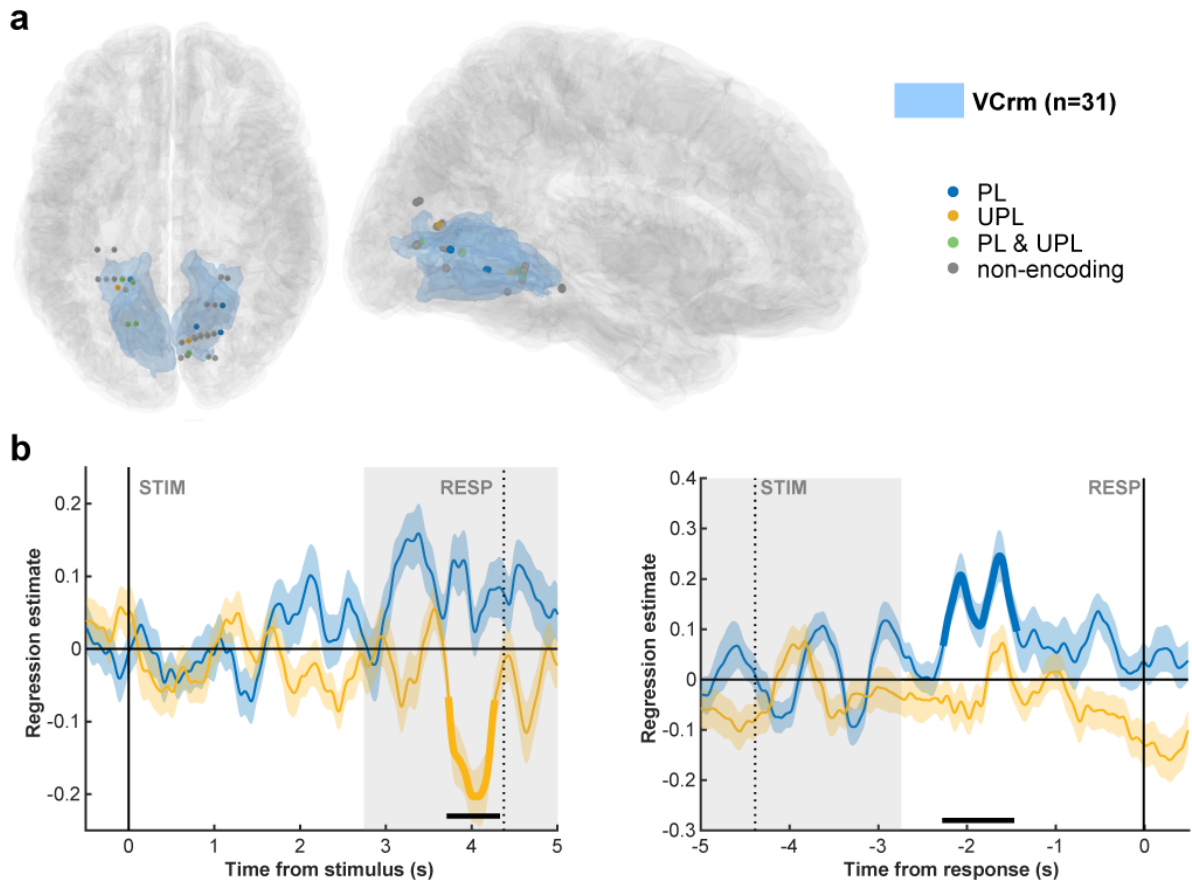


Figure S3. Delayed and inconsistent relationship between rmVC BGA and unpleasant value. (a) Anatomical location of all rmVC recording sites projected onto the MNI template brain. Each site is shown as a dot and color-coded by its value-encoding profile (31 sites; 4 PL, 4 UPL, 6 PL&UPL). (b) Group-level results across all sites. We plotted the time-resolved regression estimates of the relationship between trial-wise BGA and item value, averaged across sites and shown separately for pleasant and unpleasant items. Data are locked either to stimulus onset (left panels) or to response onset (right panels). Bold lines indicate significant clusters ($p_{\text{corr}} < 0.05$). Shaded areas denote $\pm$ SEM across sites, horizontal bars mark significant clusters ($p_{\text{corr}} < 0.05$). Compared with the aINS (main Fig. 4), this region showed a later-onset cluster in the stimulus-locked analysis, only a few significant UPL sites ($n = 4$ in panel a), and a transient positive value signal in the response-locked analysis (right panel of b), indicating a weaker and less consistent encoding of unpleasant value.

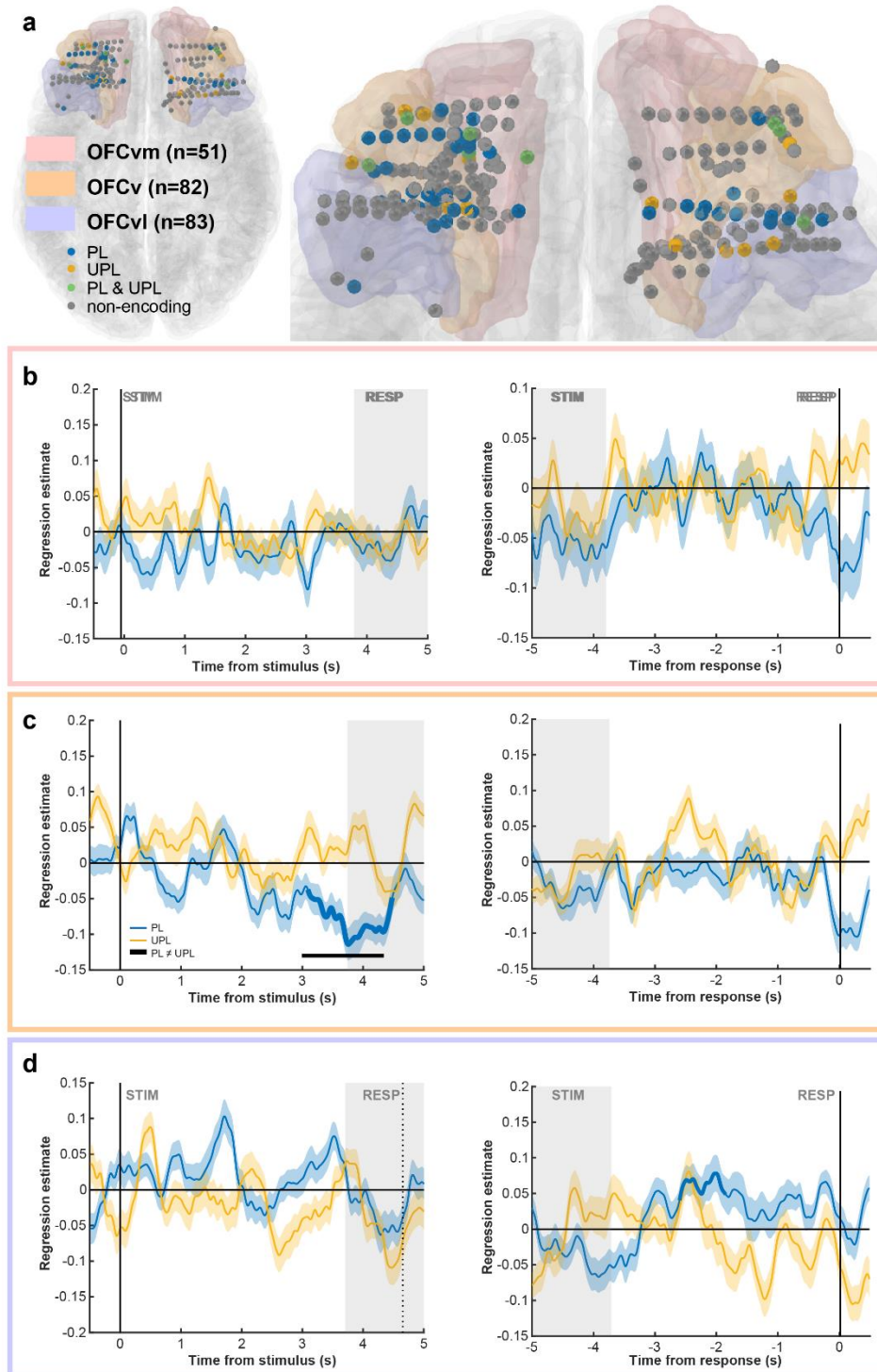


Figure S4. Orbitofrontal subregions adjacent to the vmPFC do not correlate positively with pleasant value. (a) Anatomical location of all OFC recording sites projected onto the MNI template brain. Each site is shown as a dot and color-coded by its value-encoding profile. (b-d) Group-level results across all sites. We plotted the time-resolved regression estimates of the relationship between trial-wise BGA and item value, averaged across sites and shown separately for pleasant and unpleasant items. Data are locked either to stimulus onset (left panels) or to response onset (right panels). Bold lines indicate significant clusters ($p_{\text{corr}} < 0.05$). Shaded areas denote $\pm$ SEM across sites, horizontal bars mark significant clusters ($p_{\text{corr}} < 0.05$).

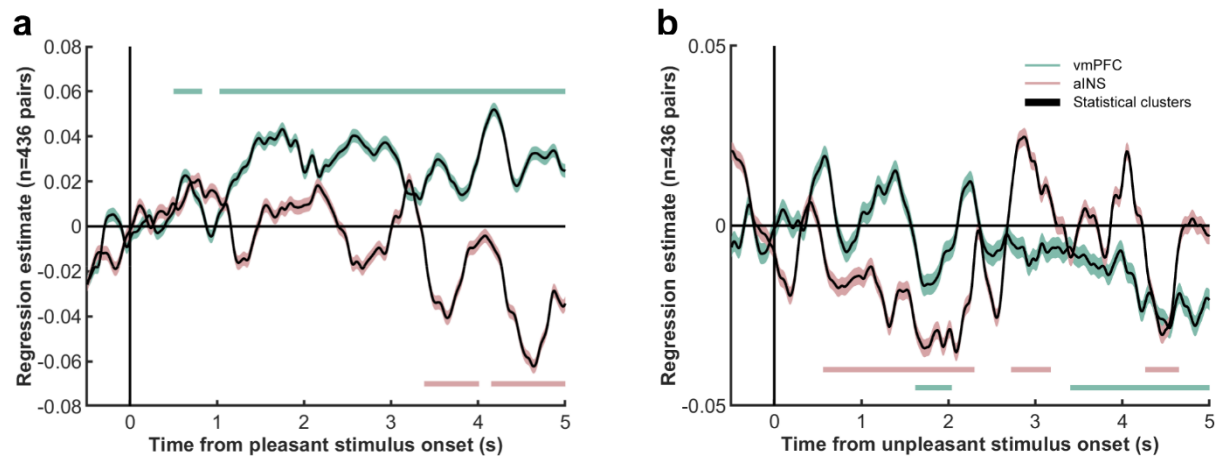


Figure S5. Non-redundant value signals in the vmPFC and aINS during the rating task. Time courses of regression estimates for vmPFC and aINS BGA, included together in a single GLM predicting value and estimated separately for pleasant (a) and unpleasant (b) items. Lines show the mean across all recording sites, and shaded areas indicate $\pm$ SEM. Horizontal bars mark significant clusters ($p_{\text{corr}} < 0.05$), highlighting periods when each region contributed non-redundant information about value. By including both regions simultaneously in the model, this analysis demonstrates that the vmPFC and aINS encode value for pleasant and unpleasant items respectively, beyond known effects of their anti-correlation at rest.

Supplementary tables

ID	Diagnosis age	Suspected epileptic focus
G1	35	Left medial temporal/amygdala/hippocampus
G2	13	Right insulo-opercular
G3	16	Undefined
G4	13	Right insulo-opercular
G5	16	Left antero-medial temporal
G6	20	Right parieto-occipital
G7	30	Left Broca's area (frontal opercular)
G8	47	Left antero-medial temporal
G9	38	Right temporo-insulo-opercular
G10	22	Right parieto-central
G11	35	Bilateral temporo-insular
G12	36	Bilateral temporal
G13	16	Left frontal mesial premotor
L1	11	NA
P1	24	Right temporal - pole and superior temporal gyrus
P2	13	Bilateral frontal
P3	2	Right frontal medial
R1	5	NA
R2	14	NA
R3	12	NA
T1	NA	Right temporo-mesial
T2	17	Left olfactory gyrus
T3	9	NA
T4	NA	Left hippocampus
T5	37	Right antero-lateral temporal
T6	34	Right medial temporal
T7	10	NA

Table S1. Demographic and clinical details. Diagnosis age refers to the age at which the patient was diagnosed with epilepsy.

Chosen			Unchosen		
ROI	T-statistic	P-value	ROI	T-statistic	P-value
SPCm	3,40	0,0018	pINS	-2,68	0,0082
SPC	2,89	0,0055	PCC	-3,12	0,0036
PFCvm	2,68	0,0090	MTCr	-3,38	0,0009
pINS	2,20	0,0291	IPCv	-3,43	0,0009
			PFcdl	-2,75	0,0091
Pfrdli	-3,35	0,0013			
OFCv	-3,26	0,0016			
Hippocampus	-3,03	0,0032			
OFCvm	-2,34	0,0234			

Table S2. Summary of all regions responding to chosen and unchosen option values when asked to choose the best of two pleasant stimuli. BGA in the [-3 0 s] before response was regressed against value across trials for each site within each ROI and significance was tested across beta estimates across all contacts of each ROI.

Chosen			Unchosen		
ROI	T-statistic	P-value	ROI	T-statistic	P-value
PFCvm	3,32	0,0014	PFCvm	5,29	0,0000
Hippocampus	2,81	0,0060	MTCc	5,23	0,0000
OFCvl	2,58	0,0115	PFcdl	4,54	0,0001
Pfrdls	2,56	0,0128	PMrv	4,34	0,0000
MTCr	2,03	0,0440	MTCr	3,91	0,0001
			PCC	3,80	0,0005
VCI	-2,72	0,0076	PMdl	2,61	0,0127
			ITCr	2,52	0,0135
			OFCv	2,32	0,0229

Table S3. Summary of all regions responding to chosen and unchosen option values when asked to choose the worst of two pleasant stimuli. BGA in the [-3 0 s] before response was regressed against value across trials for each site within each ROI and significance was tested across beta estimates across all contacts of each ROI.

Chosen			Unchosen		
ROI	T-statistic	P-value	ROI	T-statistic	P-value
Sv	5,20	0,0000	aINS	-4,35	2.10 ⁻⁰⁵
PMdl	3,15	0,0031	Sv	-3,14	0,0025
ITCr	2,78	0,0066	STCc	-3,11	0,0027
VCI	2,73	0,0074	pINS	-2,80	0,0057
aINS	2,71	0,0075	OFCvl	-2,68	0,0088
MTCc	2,45	0,0155	PFRvl	-2,66	0,0096
PFRvl	2,01	0,0484			
Hippocampus	-3,60	0,0005			
PFCvm	-2,50	0,0146			
Pfrdls	-2,14	0,0363			

Table S4. Summary of all regions responding to chosen and unchosen option values when asked to choose the best of two unpleasant stimuli. BGA in the [-3 0 s] before response was regressed against value across trials for each site within each ROI and significance was tested across beta estimates across all contacts of each ROI.

Chosen			Unchosen		
ROI	T-statistic	P-value	ROI	T-statistic	P-value
pINS	-4,57	0,0000	VCcm	3,74	0,0006
aINS	-3,69	0,00029	IPCv	3,32	0,0013
VCcm	-3,55	0,0011			
STCc	-3,11	0,0027	Hippocampus	-5,20	0,0000
Sv	-2,94	0,0045	PMrv	-5,19	0,0000
ITCm	-2,40	0,0194	MTCr	-3,97	0,0001
ITCr	-2,10	0,0389	Mdl	-3,48	0,0009

Table S5. Summary of all regions responding to chosen and unchosen option values when asked to choose the worst of two unpleasant stimuli. BGA in the [-3 0 s] before response was regressed against value across trials for each site within each ROI and significance was tested across beta estimates across all contacts of each ROI.