Supplementary Table 1. Patient demographic and clinical information. M/F male, female: 1 L/R left, right

Patient ID	Sex	Age (years)	Aetiology	Lesion location
02	F	30-39	Hippocampal sclerosis plus focal dysplasia	Right hippocampal sclerosis plus porencephalic cyst over the parieto-occipital junction
04	F	18-29	Focal cortical dysplasia + gliosis	Extensive lesion over the left frontal region involving dorsolateral and orbitofrontal cortex and anterior border of the cingulum
05	M	18-29	Periventricular heterotopia plus focal cortical dysplasia	Bilateral occipital horn heterotopia plus focal dysplasia over the left occipital cortex
06	M	40-49	Hippocampal sclerosis	Left hippocampus
13	F	40-49	Focal cortical dysplasia	Right basal temporal cortex
15	F	30-39	Focal cortical dysplasia	Left temporal pole
16	M	30-39	Reactive gliosis, diffuse microglia activation and small vessel vasculopathy	Medial wall of the left parietal region (precuneus and posterior cingulum)
21	F	30-39	Periventricular heterotopia	Left occipital horn heterotopia
25	M	18-29	Focal cortical dysplasia	Right posterior temporobasal region
27	M	18-29	Focal cortical dysplasia	Left temporal pole
32	M	50-59	Encephalocele + gliosis	Bilateral temporal pole
33	F	18-29	Inflammatory lesion	Right parietal cortex
34	M	18-29	Postraumatic	Left temporopolar and temporolateral
36	F	18-29	Gliosis (posthemorraghe)	Right temporo-occipital region
37	F	18-29	Possible focal cortical dysplasia	Left posterior temporobasal region
38	M	18-29	Pathology (Blumcke): Temporal neocortex with glial scar	Right temporal lateral region
Z1	F	50-59	Hippocampal sclerosis	Left hippocampus
Z2	M	30-39	Focal cortical dysplasia	Right frontal cortex
Z5	M	30-39	Dysembryoplastic neuroepithelia tumor	Left anterior hippocampus
Z6	F	18-29	Unclear etiology	Unclear
Z8	F	18-29	Non-lesional	
Z10	M	50-59	Hippocampal sclerosis	Right hippocampus
Z12	F	18-29	Non-lesional	

Supplementary Table 2. Number of analyzed trials following exclusions based on both time- and frequency-domain artifact rejection over the total number per patient and conditions given as (trials after artefact rejection)/ (total number of trials of that condition). r, right electrode; l, left electrode. In the case of bilateral electrodes only recordings from the non-pathological side were included in all analyses. **(a)** N=14 patients with electrodes implanted in both the amygdala and the ipsilateral hippocampus. **(b)** N=6 patients with electrodes implanted only in the amygdala. Patients z1, z10, and 37 are highlighted in yellow because their data were included only in the computation of the main effects but excluded from the interaction analysis due to having fewer than four trials (<4) in at least one condition.

a

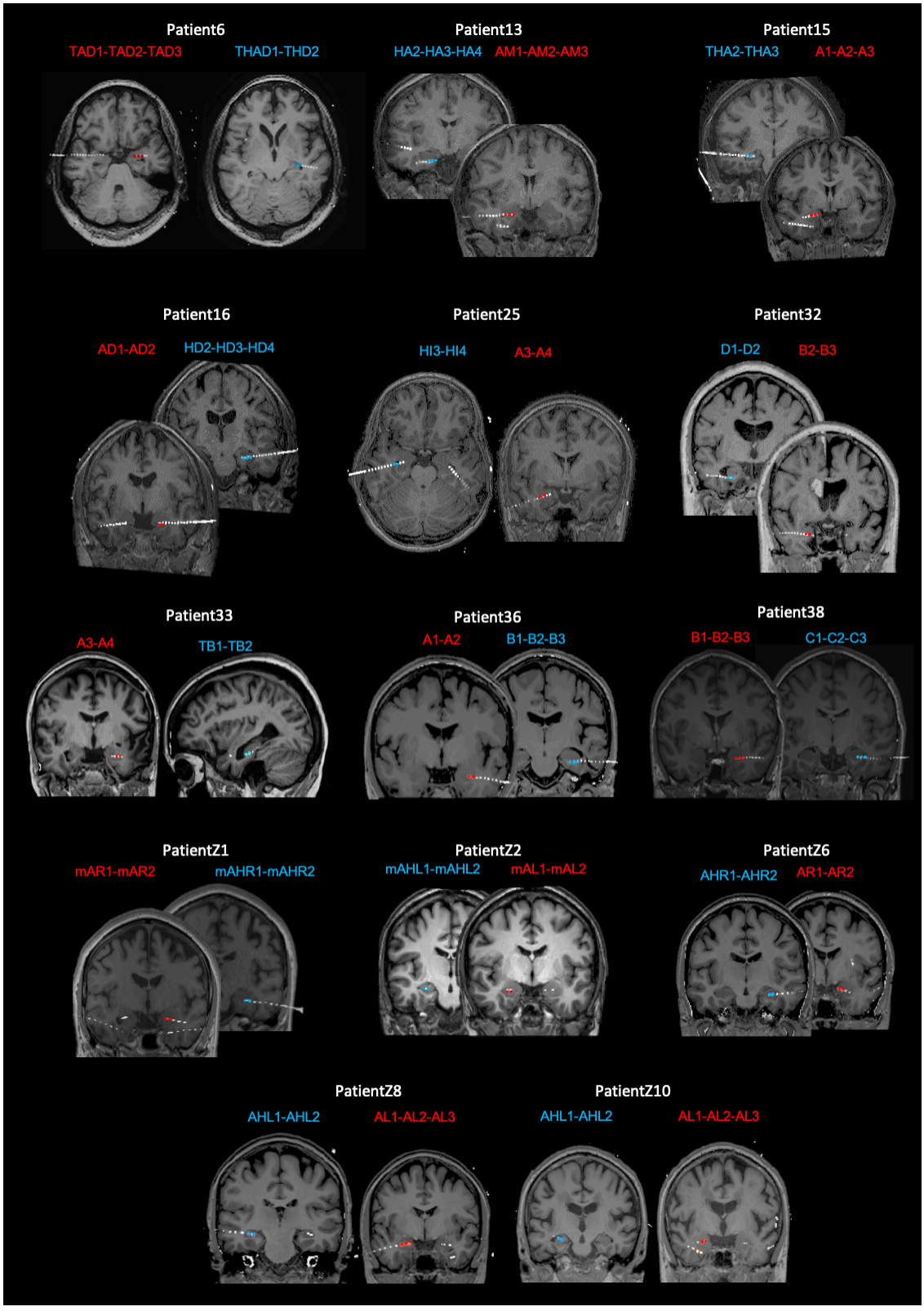
Patient	eR aversive remember	eKF aversive know/forgotten	nR neutral remember	nKF neutral know/forgotten
06r	8/10	27/30	11/11	65/68
13	12/19	16/21	10/19	41/60
15	19/19	18/21	23/23	57/57
16r	13/24	11/16	35/48	22/30
25	9/17	10/23	18/32	27/48
32	9/12	24/28	31/39	35/41
33	15/21	7/17	10/20	39/59
36	10/10	30/30	15/15	61/65
38	18/22	12/18	23/29	39/51
Z1r	16/21	8/17	2/4	50/72
Z2	4/4	34/36	9/9	67/70
Z6	12/12	25/28	33/33	40/46
Z8	4/4	36/36	12/12	63/63
Z10	7/9	16/27	3/3	58/74

b

Patient	eR aversive remember	eKF aversive know/forgotten	nR neutral remember	nKF neutral know/forgotten
2	6/7	24/33	6/10	55/70
4	10/20	4/11	21/40	12/33
21r	11/16	12/23	16/25	34/55
27	21/25	6/13	27/38	29/37
34	22/24	12/16	15/22	45/58
37	2/4	13/36	4/16	22/64

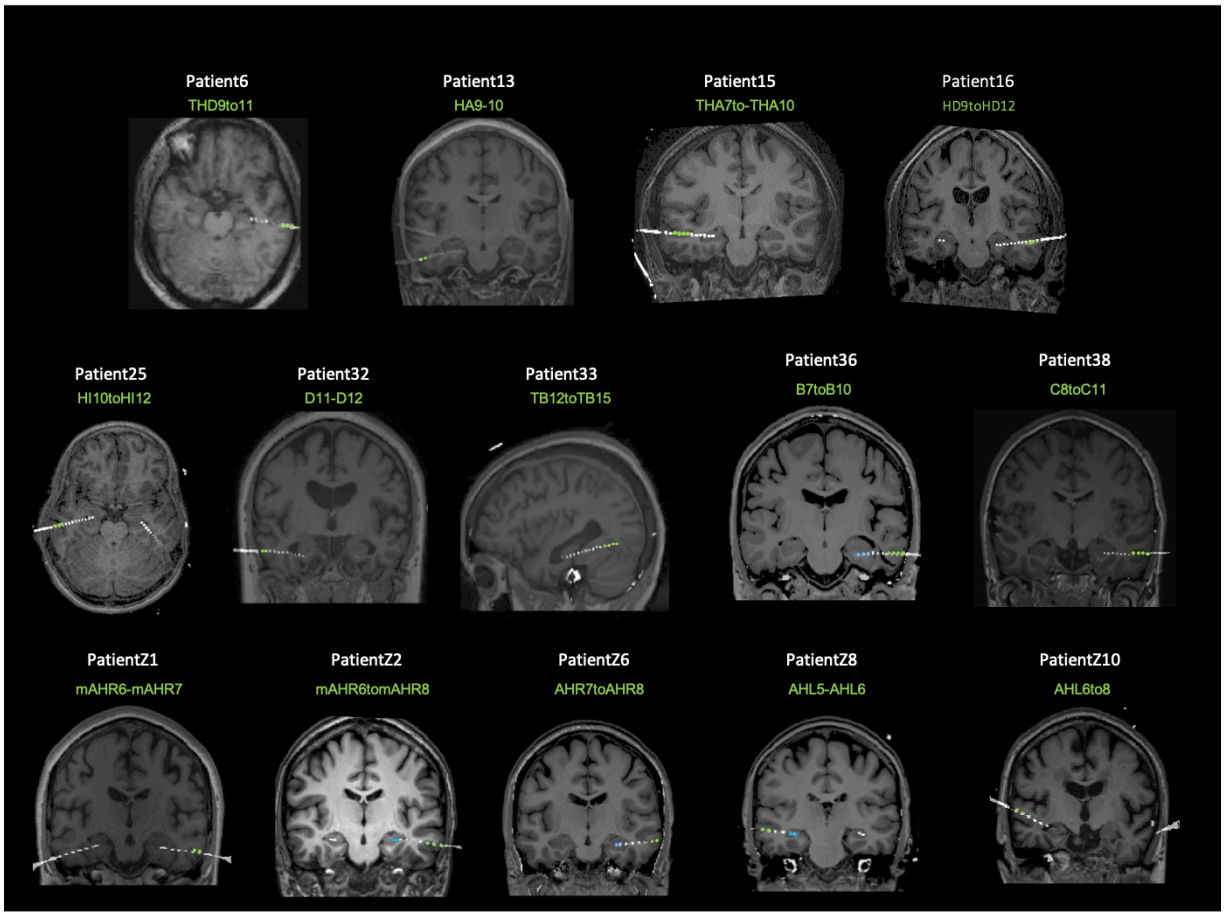
Supplementary Table 3. Statistical values reflect follow-up analyses of the emotion-by-memory interaction, recomputed after excluding subjects with fewer than 5 trials. Analyses were performed on mean values extracted from significant clusters identified in the initial cluster-based permutation tests (corrected for multiple comparisons across time and frequency). For each cluster, the interaction effect was computed and tested using two-sided paired-sample t-tests. No additional corrections were applied at this stage, as the cluster-based approach already controls for multiple comparisons. Reported values include t-statistics, associated p-values, and effect sizes (Cohen's d). Sample sizes: n = 14 for amygdala analysis; n = 10 for hippocampal and amygdala–hippocampus reactivation analyses. Results are consistent with those presented in the main text in Figs. 2b, 3b–c, 4e–f, and 5e

Follow-up analysis	T-value	P-value	Effect Size (Cohen's d)
		Hippocampus	
Time frequency cluster for the emotion by memory interaction	$T_9 = 3.94$	0.003	1.24
Global Encoding-Retrieval similarity	$T_9 = -1.97$	0.079	-0.62
		Amygdala	
Global Encoding-Retrieval similarity	$T_{13} = -2.38$	0.033	-0.63
		Amygdala-Hippocampus	
Encoding-Encoding similarity	$T_9 = 2.74$	0.022 (from 0.7 to 1 s)	0.86
Encoding-Retrieval similarity	$T_9 = 4.35$	0.001 (from 0.9 to 1.1 s)	1.37
	$T_9 = 2.58$	0.029 (from 0.4 to 0.7 s)	0.81
		Hippocampus-Hippocampus	
ERS based on Amygdala-Hippocampus EES	$T_9 = 3.39$	0.007	1.07

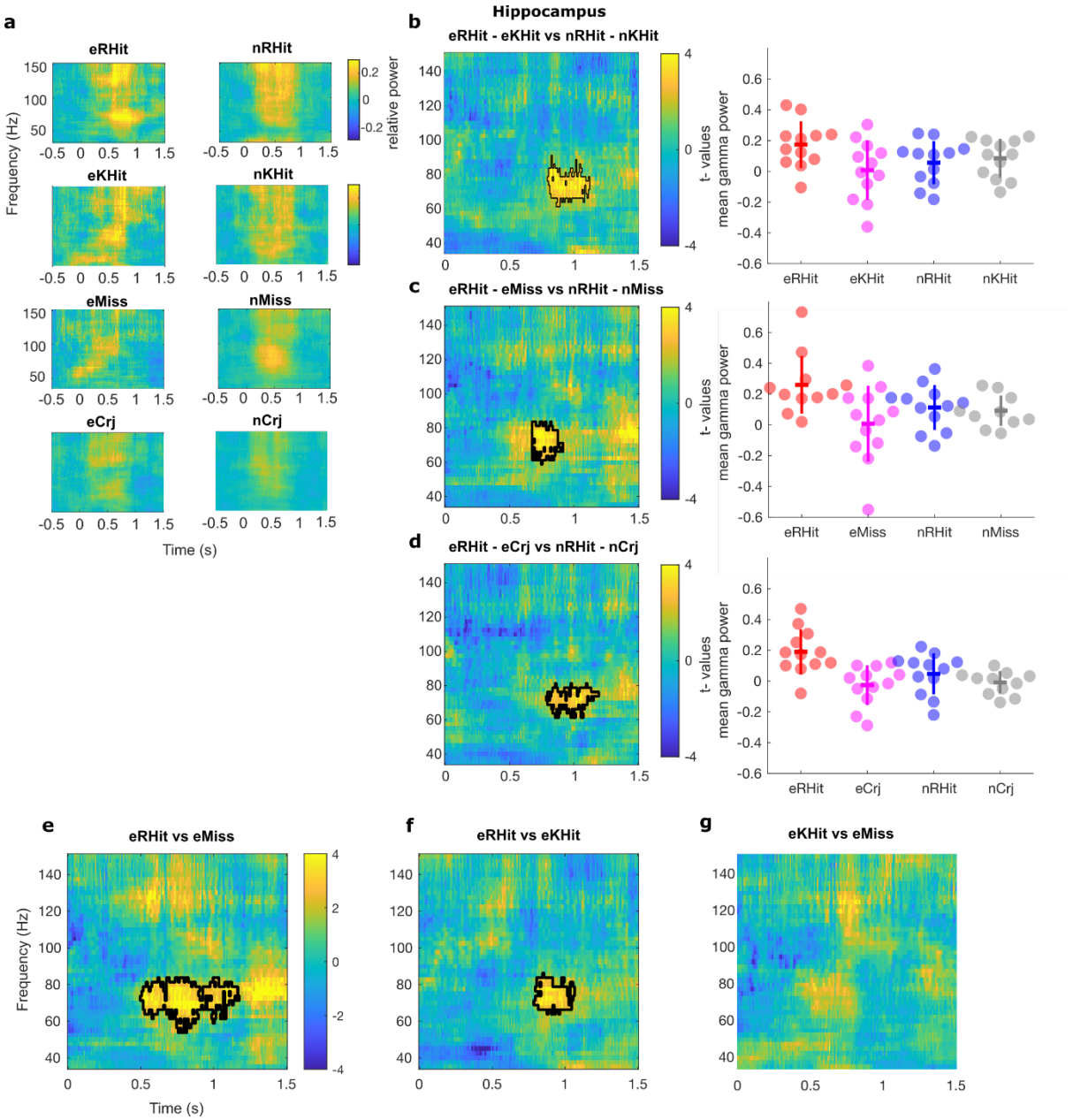


Supplementary Fig. 1. a, Electrode contact localization for the 14 patients with macroelectrodes localized in both amygdala and hippocampus. Post-operative CT images have been co-registered with the corresponding pre-operative MRI scans in native space for each patient. The CTs have been thresholded so as to only show electrode contacts and superimposed to the pre-operative MRI to display amygdala and hippocampal contacts. Red

dots indicate amygdala contacts and blues dots hippocampal contacts included in the analyses. Each contact code number is displayed above each image.

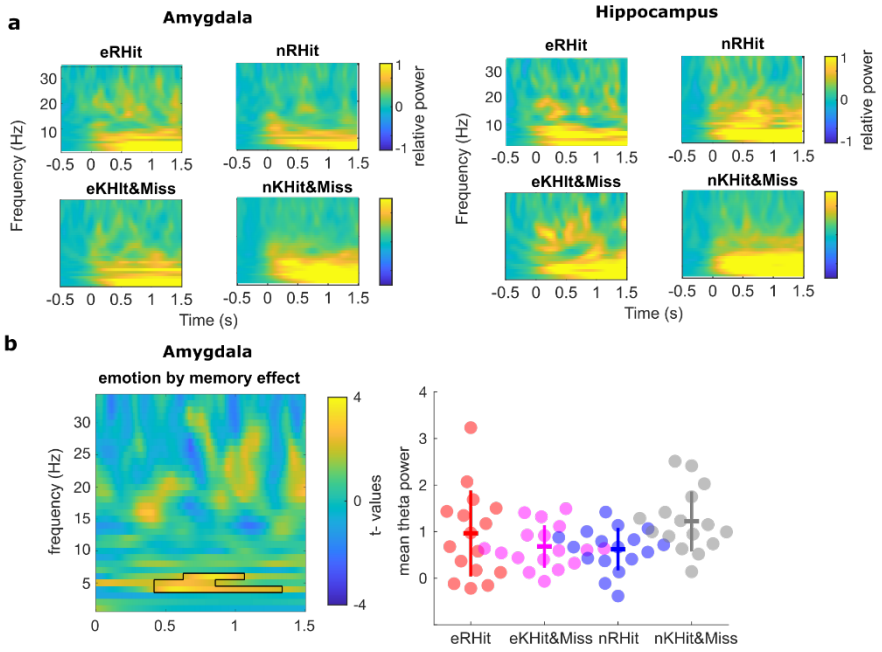


Supplementary Fig. 2. Electrode contact localization for the 14 patients with macroelectrodes localized in the lateral temporal cortex. Image overlays are as for Supplementary Figure 1. Green dots indicate lateral temporal contacts included in the analyses. Each contact code number is displayed above each image.

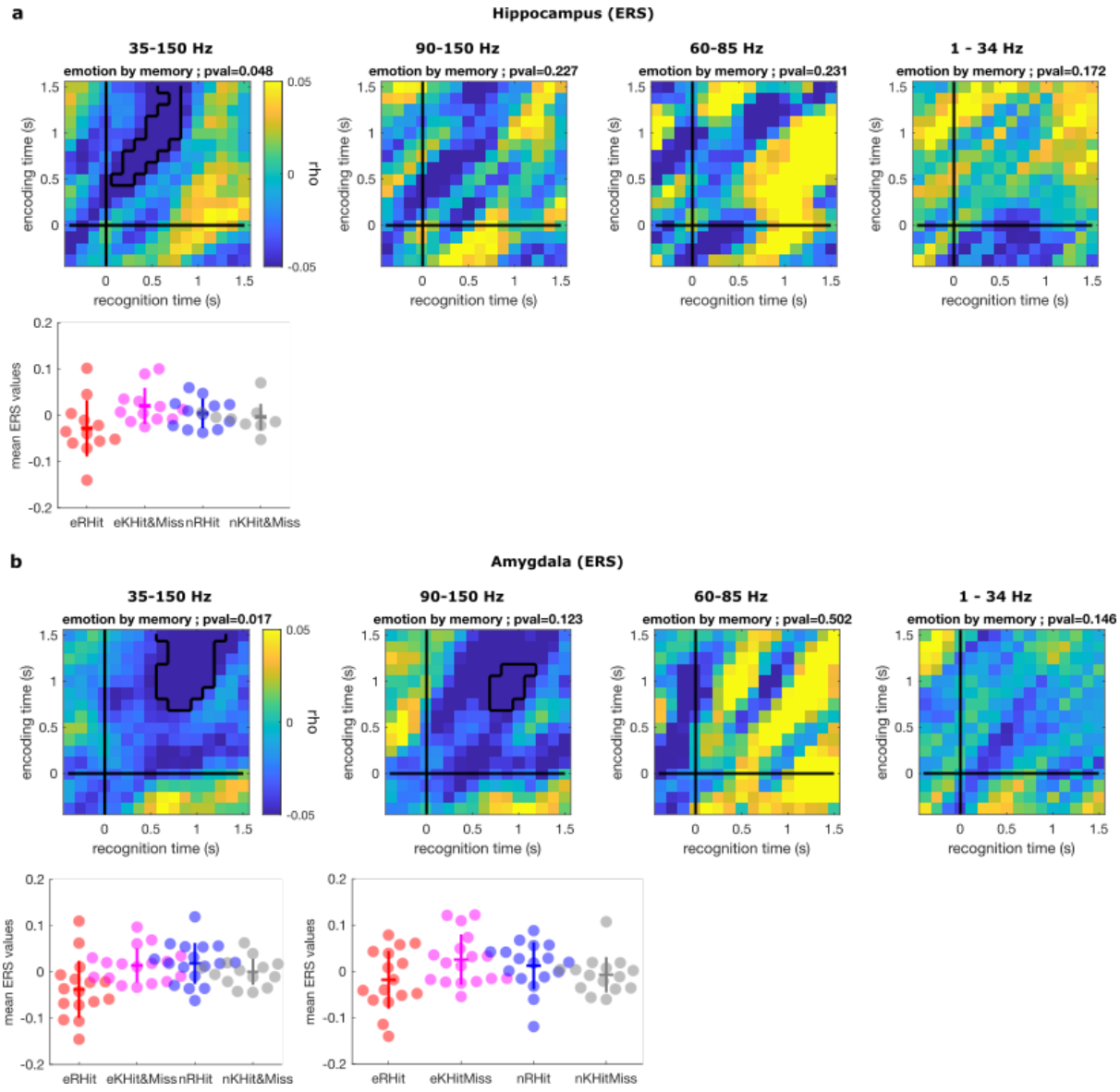


Supplementary Fig. 3. **Hippocampal responses during recognition of emotional aversive (e) and neutral (n) scenes. a** Time frequency plots showing gamma (35–150 Hz) responses in the hippocampus for aversive and neutral scenes that were remembered (eRHit, nRHit), judged as familiar (eKHit, nKHit), missed (eMiss, nMiss) and correctly rejected (eCrj, nCrj). **b** Results of time frequency resolved comparison of (eRHit – eKHit vs nRHit – nKHit) . Similar to the effect shown in the main manuscript, in which we collapsed over KHit and Miss trials (Fig. 2 a-c, emotion by memory interaction; summed t-value=743.09, P=0.014, n=12), the black outline denotes a cluster significant at trend from 0.80 s to 1.12 s in a gamma range (63-90Hz). The scatter plot indicates the mean hippocampus gamma power values for each subject within the outlined area, as compared to baseline for each condition included in the statistical test**.** Horizontal and vertical line reflects mean and standard error of the mean. **c** Similarly, the comparison (eRHit – eMiss and nRHit – nMiss) shows a cluster starting at 0.68s and lasting until 0.91s in the gamma range from 60 to 83Hz, (summed t-value=475.04, P=0.043, n=12). The scatter plot indicates the same as for **b**, but for the significant cluster shown in **c**. The comparisons in **b** and **c** survive one-tailed correction (two-sided t-test threshold p<0.025). **d** A trend-level significant cluster arising from comparison (eRHit – eCrj vs nRHit – nCrj) extended

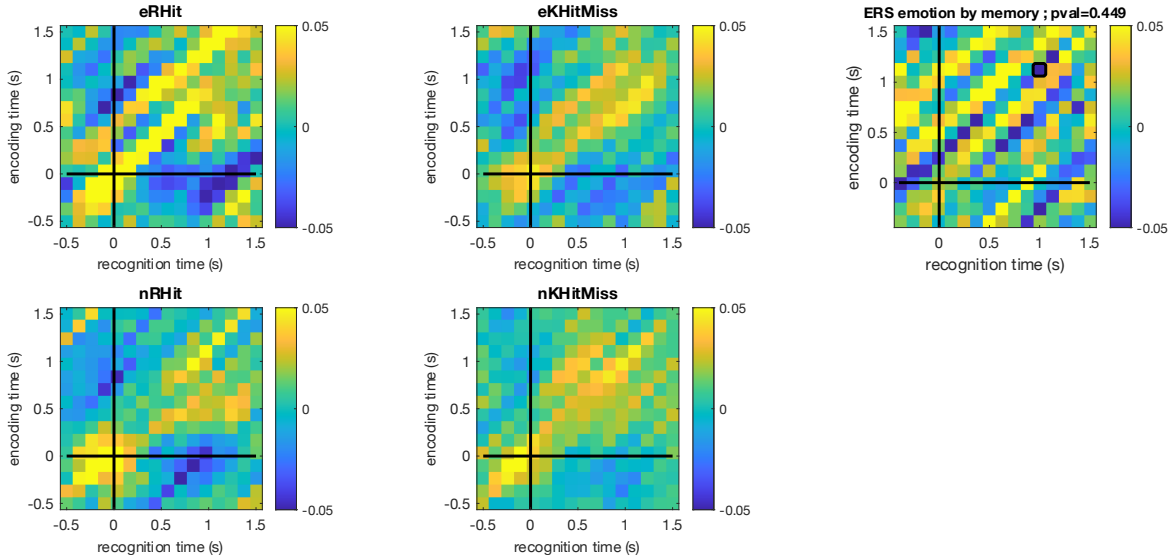
from 0.79 s to 1.19 s in a similar gamma range (63-80Hz) (summed t-value=441.59, P=0.069, n=12) as in **b** and **c**. The scatter plot indicates the same as above, but for cluster shown in **d**. **e** Direct comparison between eRHit vs. eMiss (summed t-value = 1300.21, P = 0.0054); **f** eRHit vs. eKHit (summed t-value = 449.82, P = 0.061) and **g** eKHit vs. eMiss trials (summed t-value= 246.79, P=0.15).



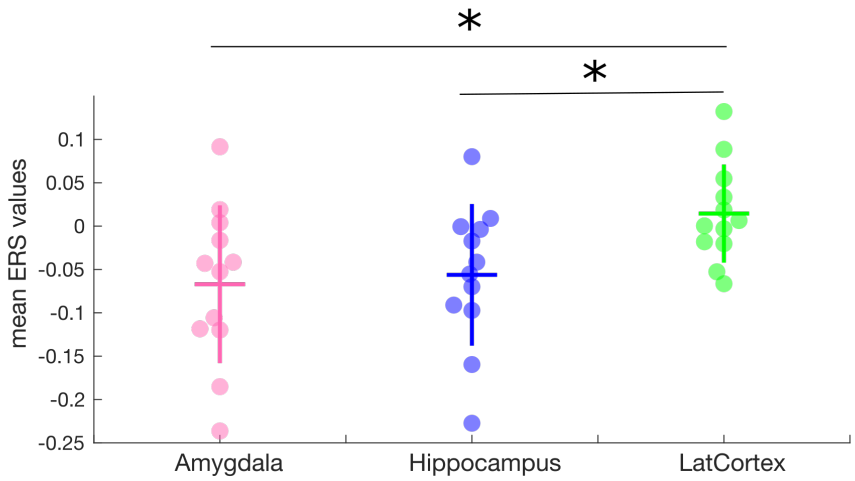
Supplementary Fig. 4. **Hippocampal and amygdala low frequency oscillatory power during retrieval of aversive and neutral scenes**. **a** Time frequency plots showing low frequency (0 –34 Hz) responses in the amygdala (n=17) and the hippocampus (n=12) for aversive (e) and neutral (n) scenes remembered (Hit) and correct "know" and incorrect "new" responses (KHit&Miss). **b** Low frequency time-frequency plots showing an amygdala emotion by memory interaction in the theta range (4 - 6 Hz, from 0.4 until 1.3 s), cluster summed t-value=493.11, P=0.016. Post-hoc t-tests on mean power changes across significant time-frequency clusters showed no difference for aversive scene memory (eRHit vs. eKHit&eMiss t_{16} = 1.07, P = 0.29, d = 0.26) but a significant difference for neutral scenes (nRHit vs. nKHit&nMiss t_{16}= -3.81, P = 0.0015, d = -0.92). The scatter plot shows the mean theta power values for each subject within the outlined area, as compared to baseline for the four conditions. Horizontal and vertical line reflects mean and standard error of the mean



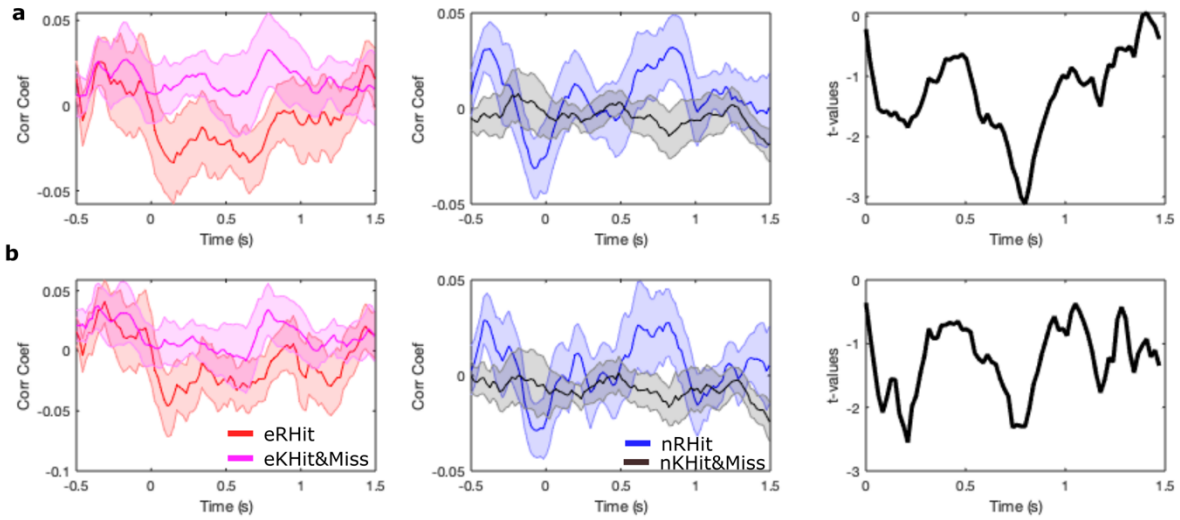
Supplementary Fig 5. Summary figure for encoding-retrieval similarity across frequencies ranges in the hippocampus (a) n=12 and amygdala (b) n=17. In each structure, results of the test for the interaction (eRHit-eKHit&Miss) – (nRHit-nKHit&Miss) are shown for each selected frequency band: 35-150 Hz (i.e., the same as in Fig. 3), 90-150 Hz, 60-85 Hz and 1-34 Hz. Scatter plot show the mean ERS values in the significant cluster, for each patient, n=12 in the hippocampus and n=17 in the amygdala. Horizontal and vertical line reflects mean and standard error of the mean. Note that results in the low frequencies remain non-significant if we consider ERS in the theta (4-8Hz), alpha (8-12Hz), or beta range (12-28Hz).



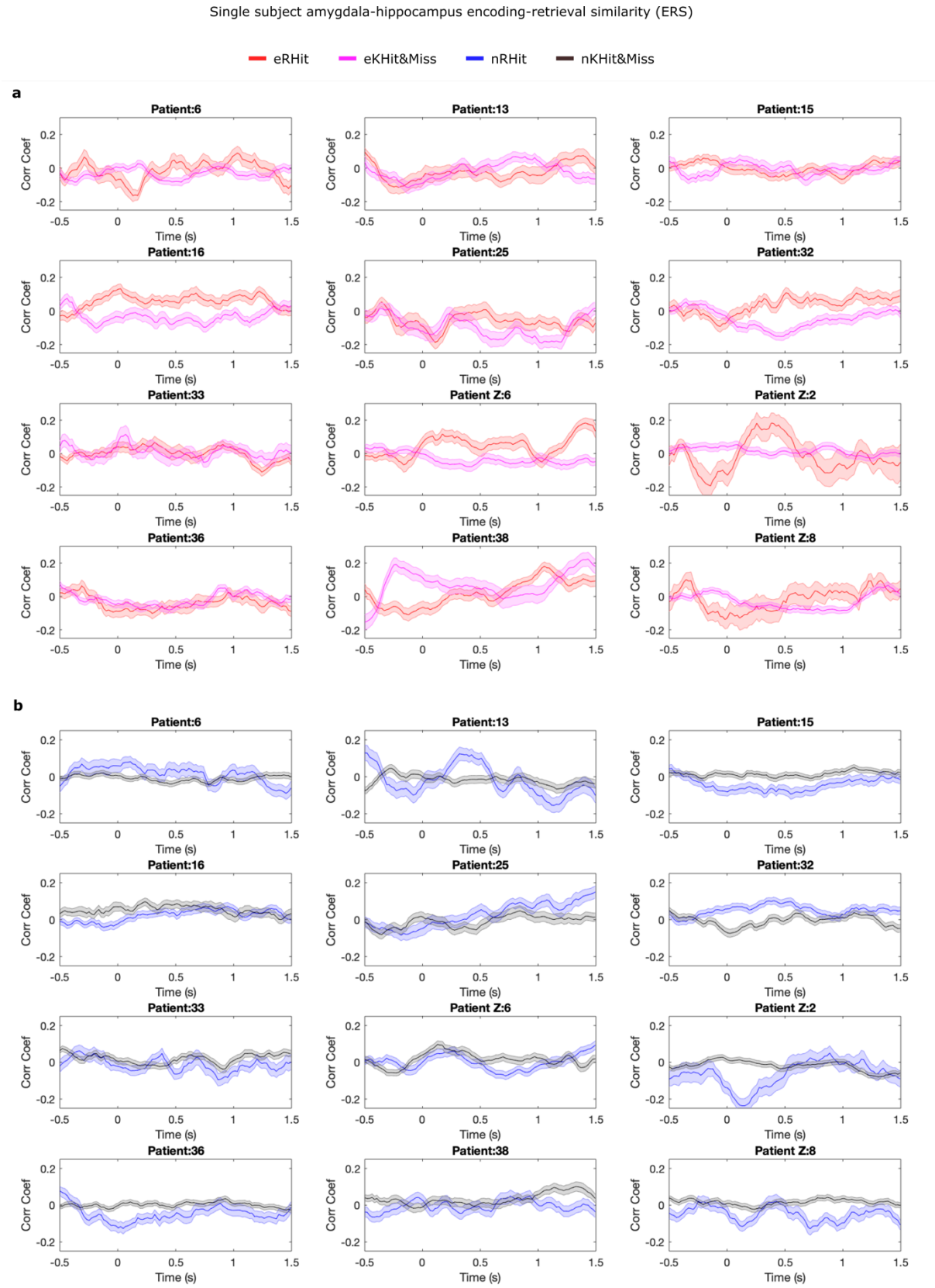
Supplementary Fig. 6 Encoding-retrieval similarity in the gamma range (35-150 Hz) using channels in the lateral temporal cortex reported in Supplementary Fig. 2, n=12.



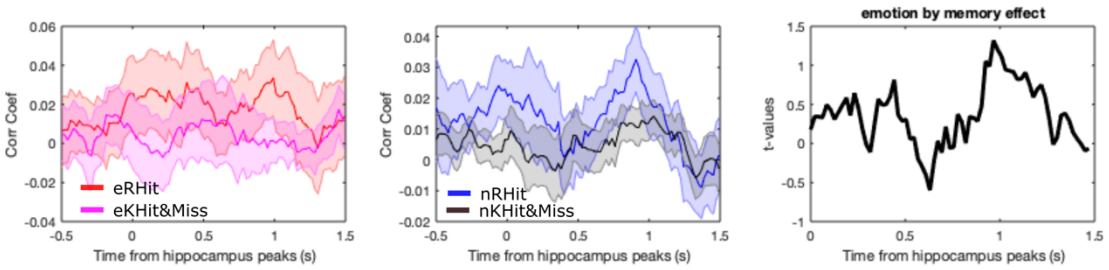
Supplementary Fig. 7 Direct comparison of mean encoding-retrieval similarity values in the amygdala, hippocampus, and lateral temporal cortex. The star indicates significant differences between the amygdala and lateral temporal cortex, as well as between the hippocampus and lateral temporal cortex. The mean ERS values for each patient n=12 and the three brain regions is plotted. Horizontal and vertical line reflects mean and standard error of the mean.



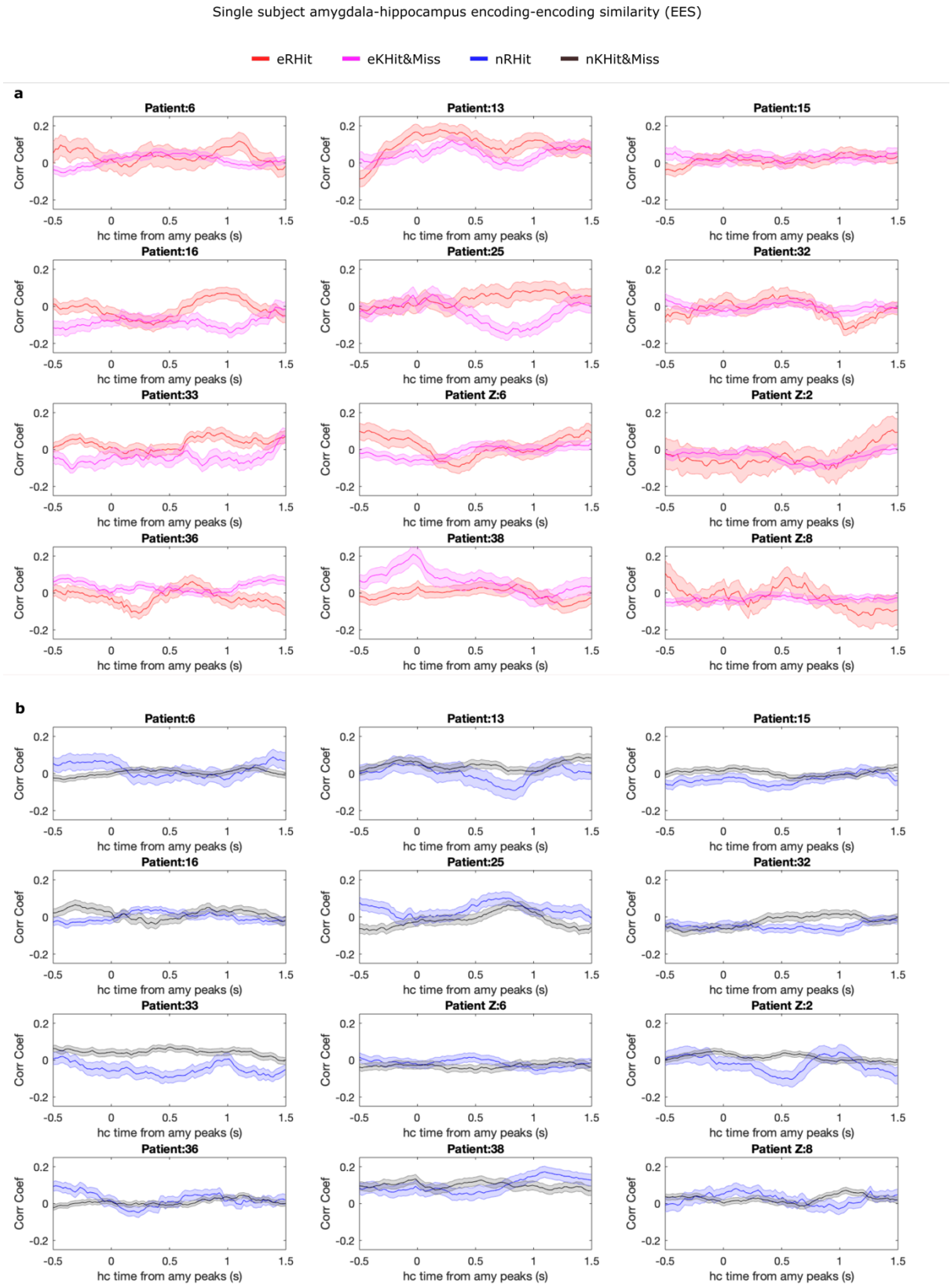
Supplementary Fig. 8. **a Amygdala-amygdala Encoding Retrieval similarity (ERS) using representational patterns locked to amygdala high gamma (90-150 Hz) peaks, n=12. a** ERS selecting all peaks in each trial and minimum interpeak distance of 0.1s. **b** ERS selecting all peaks in a trial and minimum interpeak distance of 0.3s. No significant emotion by memory ineraction was observed. Data are presented as mean values ± SEM. T-values are plotted over time.



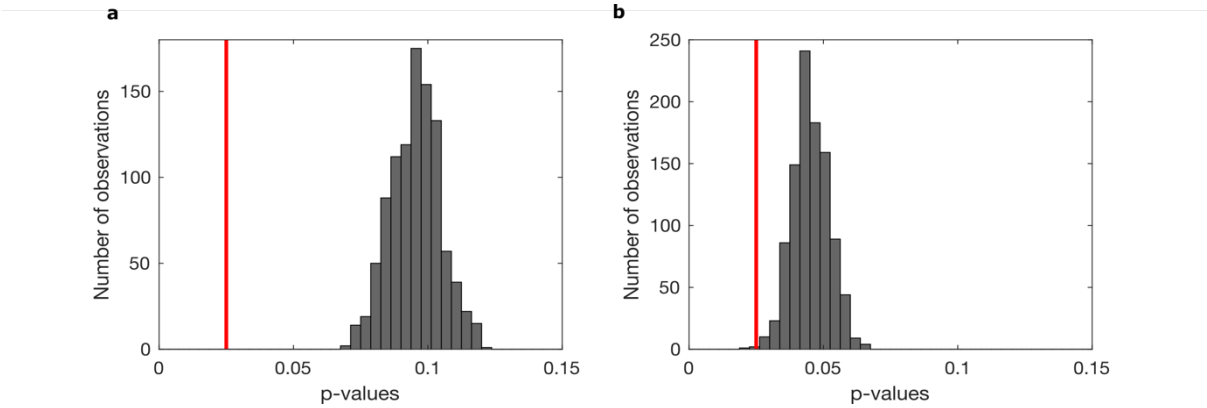
Supplementary Fig. 9. Single subject result for the amygdala-hippocampus Encoding Retrieval similarity (ERS) analysis using representational patterns locked to amygdala high gamma (90-150 Hz) peaks for eRHit, eKHit&Miss (**a**) and nRHit, nKHit&Miss (**b**).



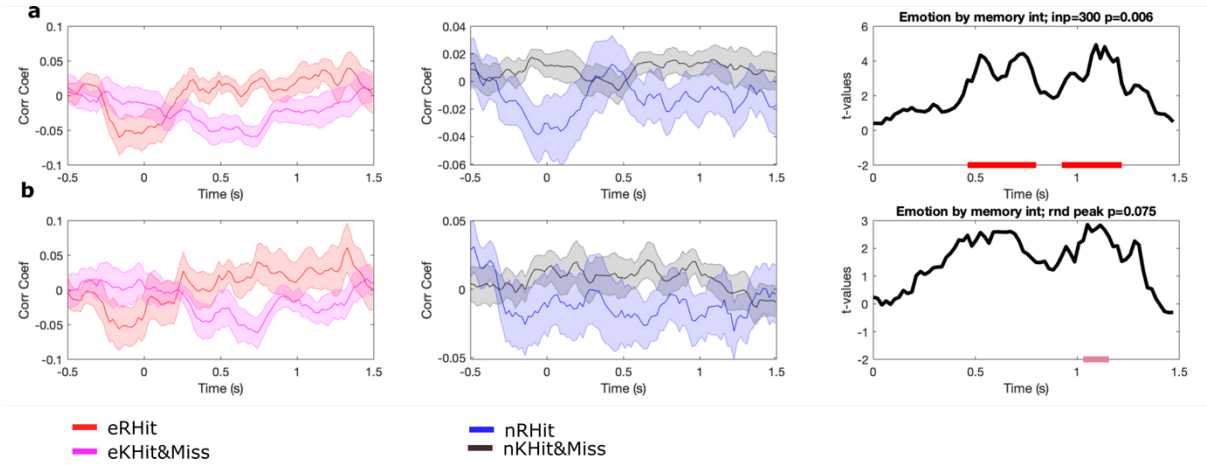
Supplementary Fig. 10. Representational patterns around hippocampal gamma peaks at encoding are not significantly reactivated in the hippocampus during retrieval of remembered aversive scenes, n=12. Data are presented as mean values ± SEM. T-values are plotted over time.



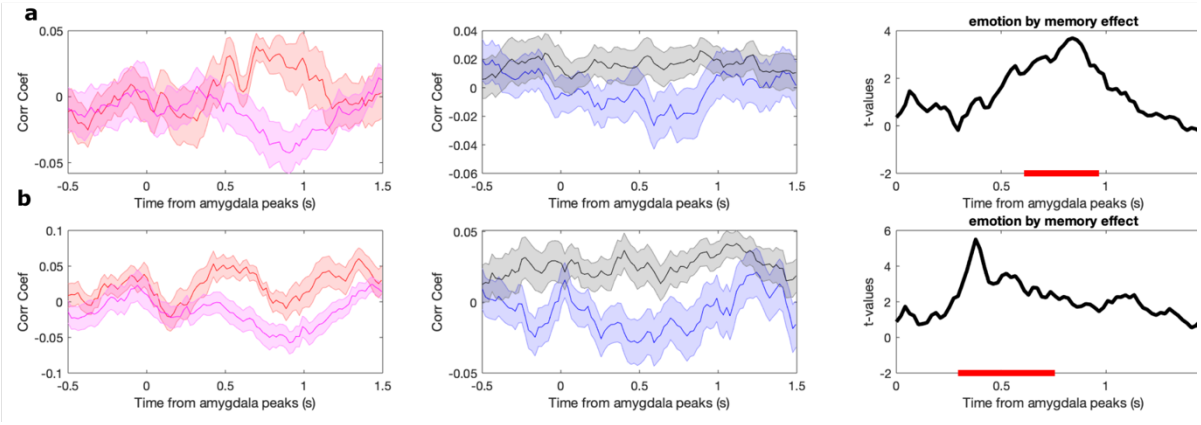
Supplementary Fig 11. Single subject result for amygdala-hippocampus Encoding- Encoding similarity (EES) analysis using representational patterns locked to amygdala high gamma (90-150 Hz) peaks for eRHit, eKHit&Miss (**a**) and nRHit, nKHit&Miss (**b**).



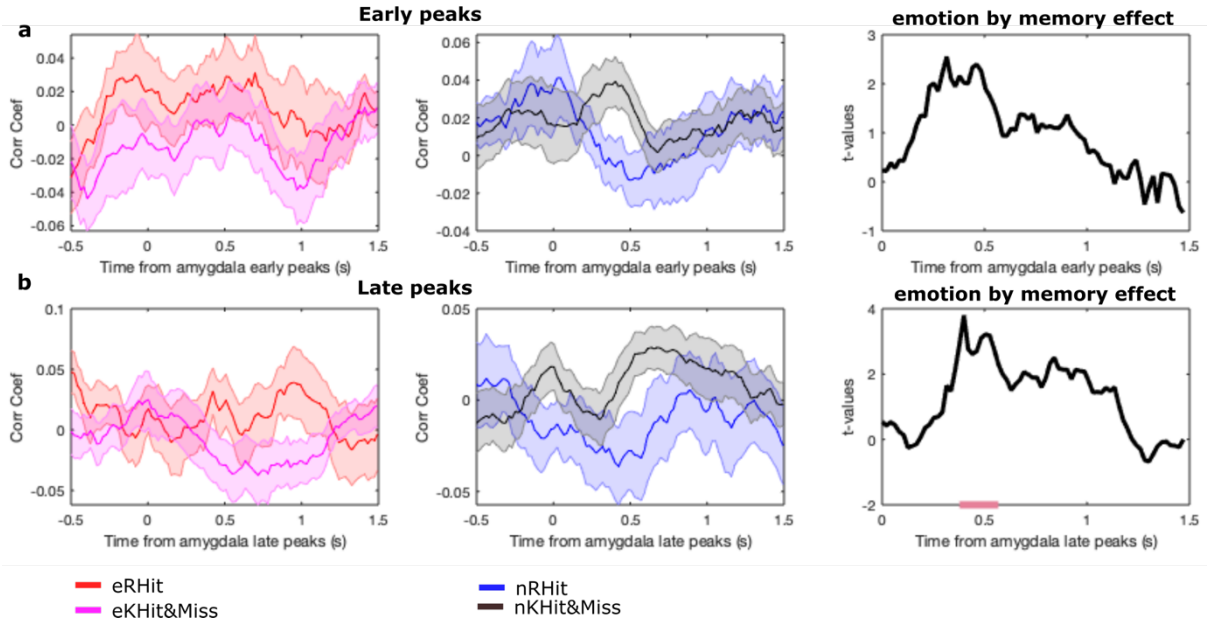
Supplementary Fig. 12. **Amygdala-hippocampus EES and ERS random non-peak selection analysis, n=12.** We selected as many data segments from the signal as there were peaks in a single trial. These selected segments were of the same time window as used for the peak-related analyses (+/- 0.05 seconds) and were positioned at least 0.03 seconds away from the peak, both before and after it. **a** EES p-values obtained for the emotion by memory interaction using 1000 random non-peak selections. **b** same as in **a** but for the ERS analysis. The red line represent the significant threshold at p=0.025. Both analyses revealed non-significant results. Considered together with the results reported in the main manuscript (Fig. 4), these control analyses highlight the specific relevance of amygdala gamma peaks for hippocampal emotional memory reactivation.



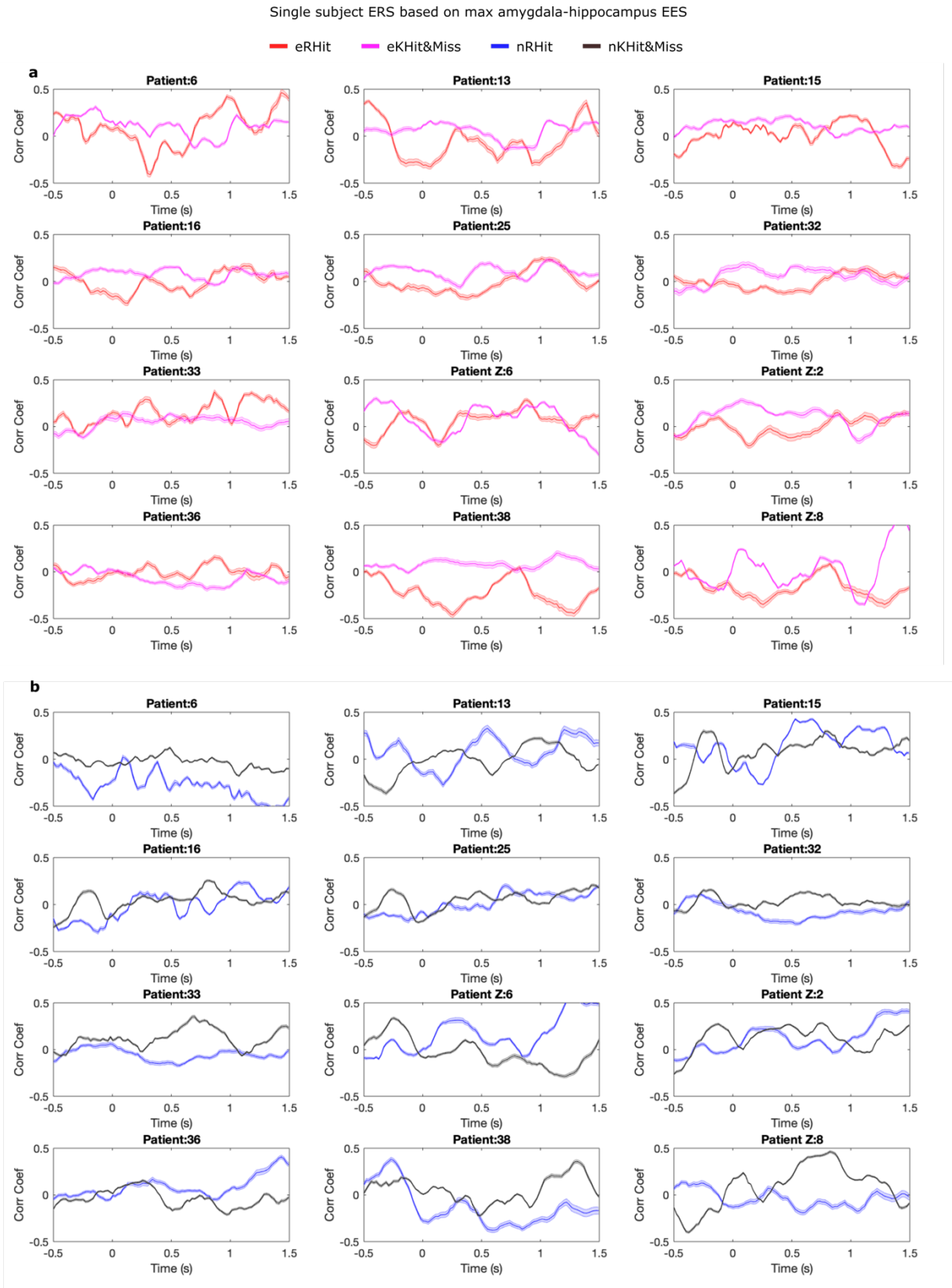
Supplementary Fig. 13. a Amygdala-hippocampus encoding retrieval similarity (ERS) using representational patterns locked to amygdala high gamma (90-150 Hz) peaks, n=12. **a** ERS selecting all peaks in a trial and minimum interpeak distance of 0.3s. **b** ERS randomly selecting one peak in each trial, and interpeak distance of 0.1s. Data are presented as mean values ± SEM. T-values are plotted over time.



Supplementary Fig. 14 Amygdala-hippocampus encoding-encoding similarity (EES) using representational patterns locked to amygdala high gamma (90-150 Hz) peaks, n=12. **a** EES selecting all peaks in a trial and minimum interpeak distance of 0.3s. **b** EES randomly selecting one peak in each trial, interpeak distance of 0.1s. Data are presented as mean values ± SEM. T-values are plotted over time.



Supplementary Fig 15. Amygdala-Hippocampus encoding-encoding similarity (EES) analysis using representational patterns locked to amygdala high gamma (90-150 Hz) peaks, n=12. This analysis tests for the effect using early or late peaks separately. In each trial, amygdala peaks are detected between 0.4 and 1.1 s, with a constraint of minimum inter-peak interval of 0.1 s, typically resulting in 4 to 6 peaks per trial. To ensure consistency in peak number post-division, we designated the first two peaks as 'early' and the last two as 'late'. Data are presented as mean values ± SEM. T-values are plotted over time.



Supplementary Fig 16. Single subject result for the Encoding Retrieval similarity (ERS) analysis using patterns of hippocampal gamma activity at encoding that are most similar to amygdala activity at encoding and that are reactivated in the hippocampus during emotional retrieval for eRHit, eKHit&Miss (**a**) and nRHit, nKHit&Miss (**b**).