Trial #90 — Recognition Potential Analysis

OK

Subject	AF • recorded 08/17/2025 10:44 • dataset Celebrities
Stimuli	1001 images: 135 clear, 866 scrambled • 135 keypresses (131 matched to clear images, median RT 481 ms)
EDF file	AF_20250817_104423.edf
Alignment	photodiode on CH21 (positive and negative spikes, matched to every image); clock offset 3591 ms (EDF header would give -23000 ms); 931/1001 images matched; drift -102 ppm; jitter 21.8 ms
Electrodes	noise after filtering — O1 29 µV ✓, O2 27 µV ✓, T5 27 µV ✓, T6 28 µV ✓, P3 578 µV, P4 541 µV, Pz 561 µV, Cz 7 µV ✓ (✓ = used, threshold 50 µV)
Processing	60 Hz notch, 0.5–15 Hz bandpass, epochs -200 to 800 ms, baseline -200 to 0 ms, reject > 100 µV peak-to-peak

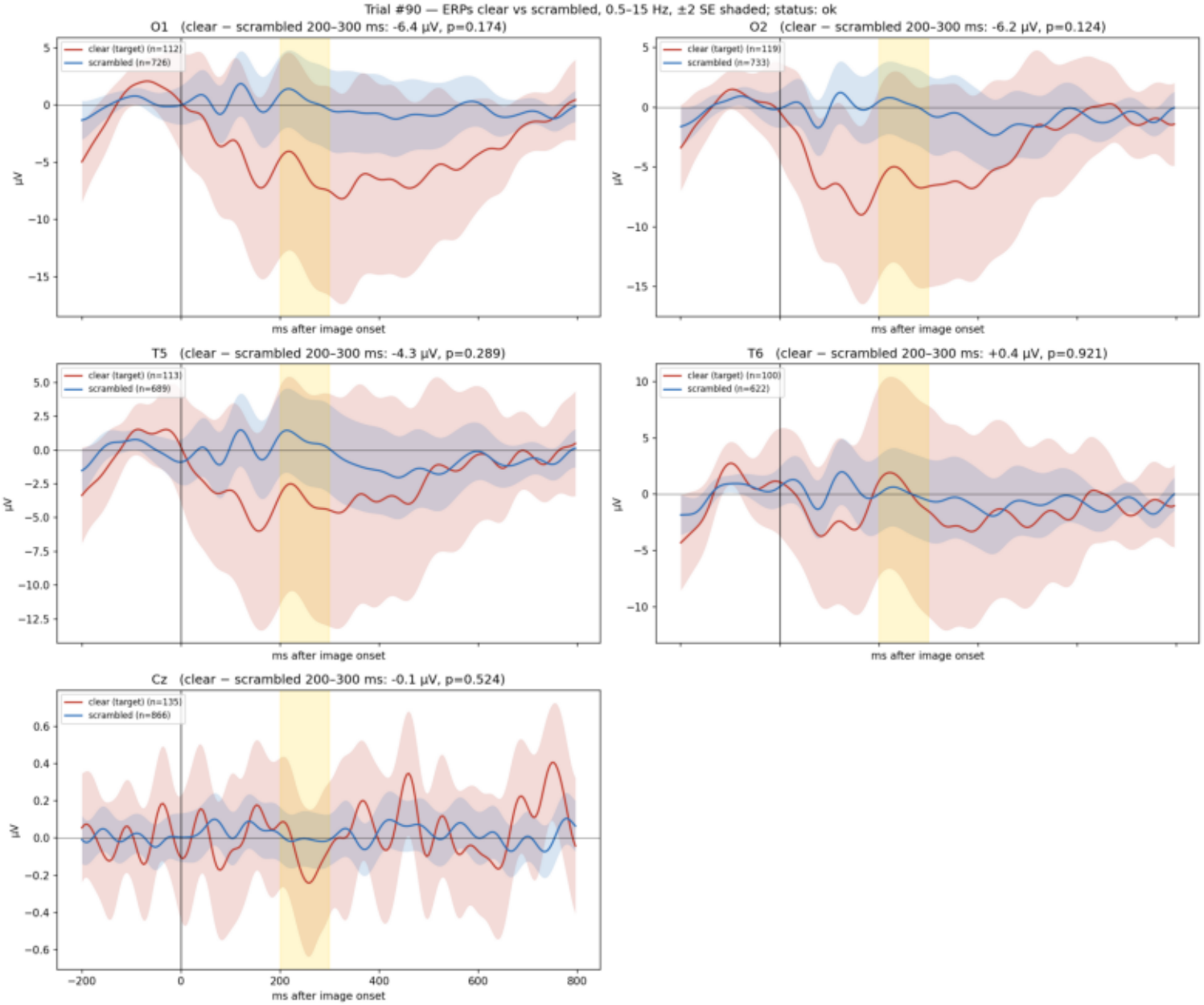
Clear − scrambled, 200–300 ms RP window

Channel	Epochs (clear / scrambled)	Mean difference	p (permutation, 2000)	Largest difference 150–350 ms
O1	112 / 726	-6.37 µV	0.174	-7.6 µV @ 324 ms
O2	119 / 733	-6.21 µV	0.124	-8.8 µV @ 160 ms
T5	113 / 689	-4.34 µV	0.289	-5.6 µV @ 152 ms
T6	100 / 622	+0.42 µV	0.921	-3.9 µV @ 152 ms
Cz	135 / 866	-0.09 µV	0.524	-0.2 µV @ 256 ms

Bold = $p < 0.05$. Not corrected for testing several channels.

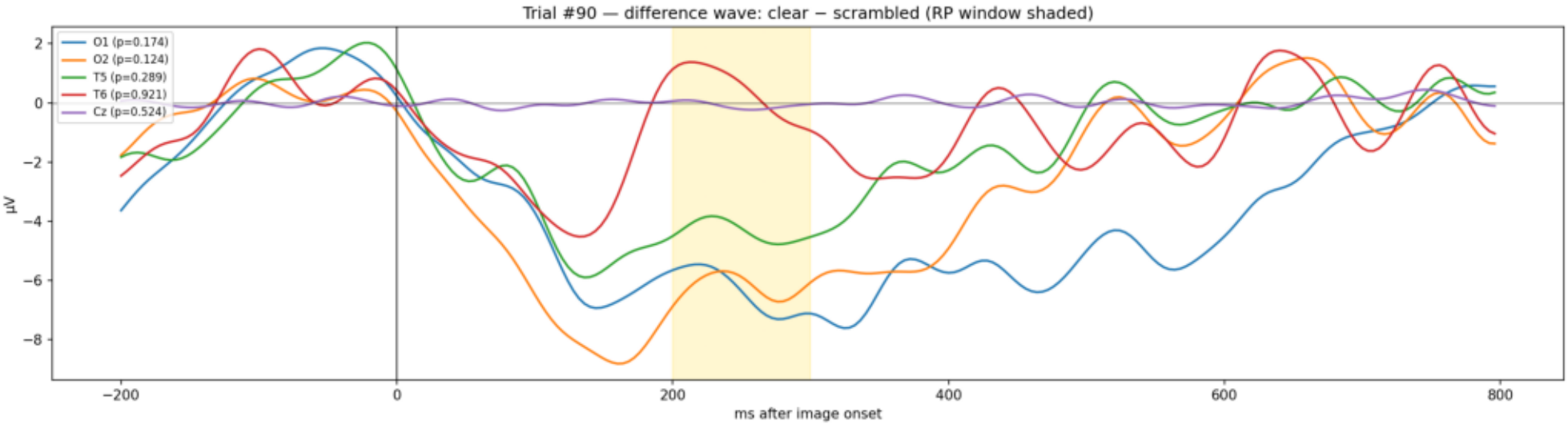
Event-related potentials: clear vs scrambled

The recognition potential (RP) appears about 200–300 ms after a recognisable (clear) image as a deflection that is absent for scrambled images; its sign depends on the reference. The RP window is shaded; bands are ±2 standard errors.



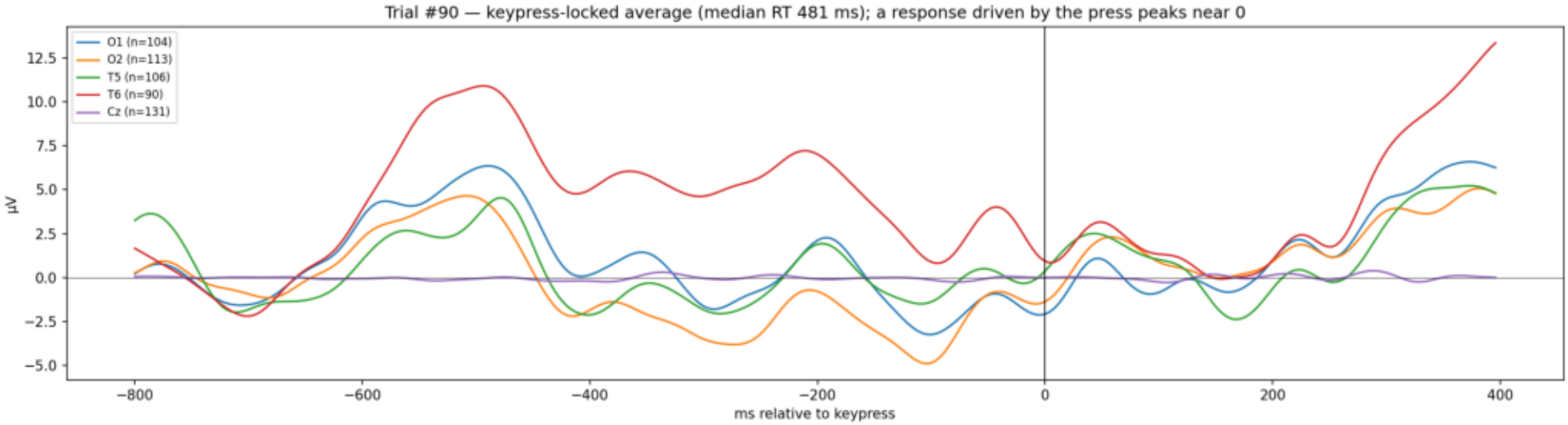
Difference wave (clear − scrambled)

Images arrive every ~330 ms, so each epoch also contains responses to neighbouring images. Subtracting the scrambled average removes that shared part and isolates the RP.



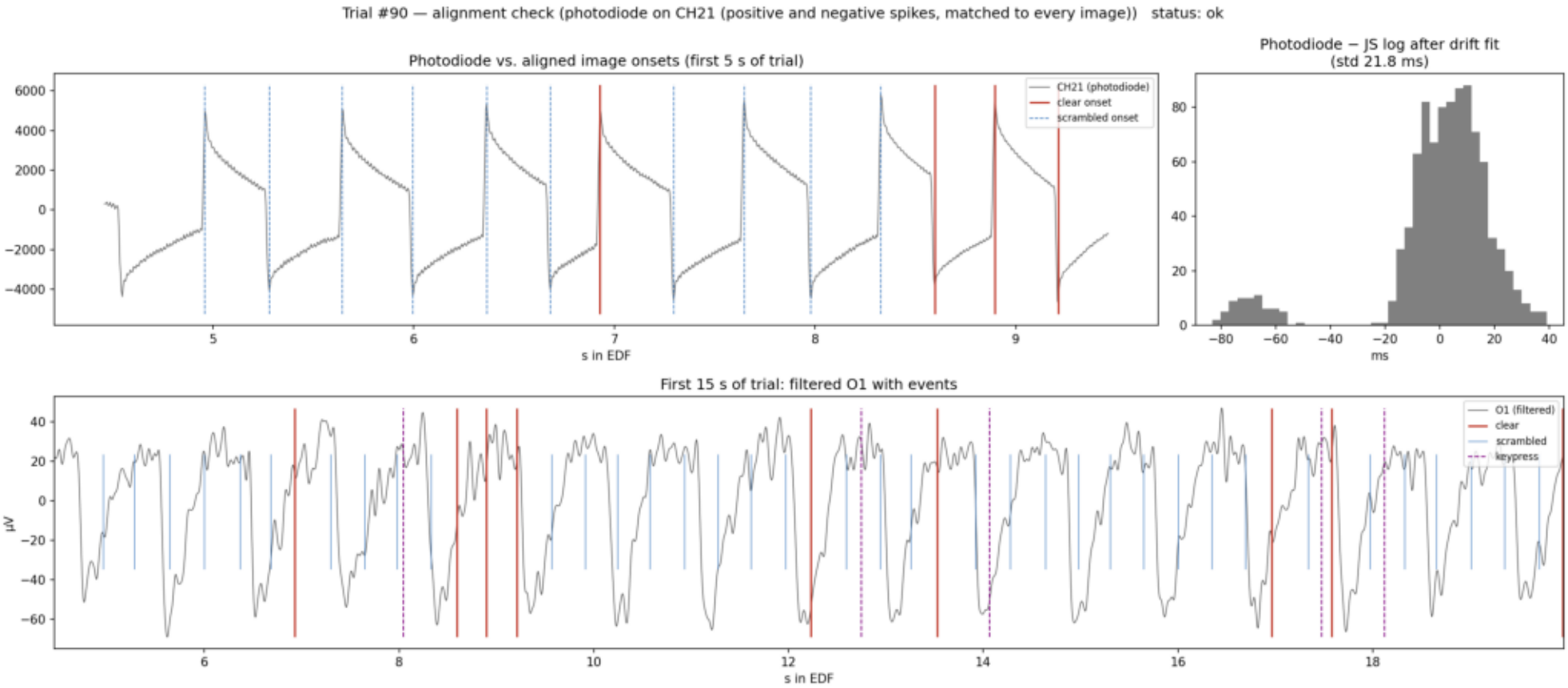
Keypress-locked average

Checks whether activity tied to the button press, rather than recognition, drives the difference between clear and scrambled images.



Alignment check and signal overview

Each image onset is snapped to its photodiode spike. Bottom: the first 15 s of the filtered signal with image onsets and keypresses.



Analysis log

```
============================================================
Trial #90 — subject AF, 08/17/2025 10:44
  EDF: /home/japhy/eegdata/media/trialData/AF_20250817_104423.edf
  250 Hz, 368 s; 1001 images (135 clear, 866 scrambled); 135 presses
  alignment: photodiode on CH21 (positive and negative spikes, matched to every image)
    offset 3591 ms (EDF header says -23000); 86% of images matched (typical 20%); drift -102 ppm; jitter 21.8 ms
  electrode noise (µV): O1 29, O2 27, T5 27, T6 28, P3 578, P4 541, Pz 561, Cz 7
  using: O1, O2, T5, T6, Cz
  131 of 135 clear images followed by a keypress (median RT 481 ms)
  O1: clear−scrambled 200–300 ms = -6.37 µV, p=0.174, peak -7.6 µV @ 324 ms
  O2: clear−scrambled 200–300 ms = -6.21 µV, p=0.124, peak -8.8 µV @ 160 ms
  T5: clear−scrambled 200–300 ms = -4.34 µV, p=0.289, peak -5.6 µV @ 152 ms
  T6: clear−scrambled 200–300 ms = +0.42 µV, p=0.921, peak -3.9 µV @ 152 ms
  Cz: clear−scrambled 200–300 ms = -0.09 µV, p=0.524, peak -0.2 µV @ 256 ms
  status: ok
```