Trial #78 — Recognition Potential Analysis

OK

Subject AF • recorded 08/10/2025 17:16 • dataset Celebrities

Stimuli 1001 images: 137 clear, 864 scrambled • 128 keypresses (115 matched to clear images, median RT 509 ms)

EDF file af_20250810_171551.edf

Alignment photodiode on CH21 (positive and negative spikes, matched to every image); clock offset 29468 ms (EDF header would give 9000 ms); 893/1001 images matched; drift -62 ppm; jitter 20.8 ms

Electrodes noise after filtering — O1 30 µV ✓, O2 30 µV ✓, T5 30 µV ✓, T6 31 µV ✓, P3 817 µV, P4 910 µV, Pz 1014 µV, Cz 30 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

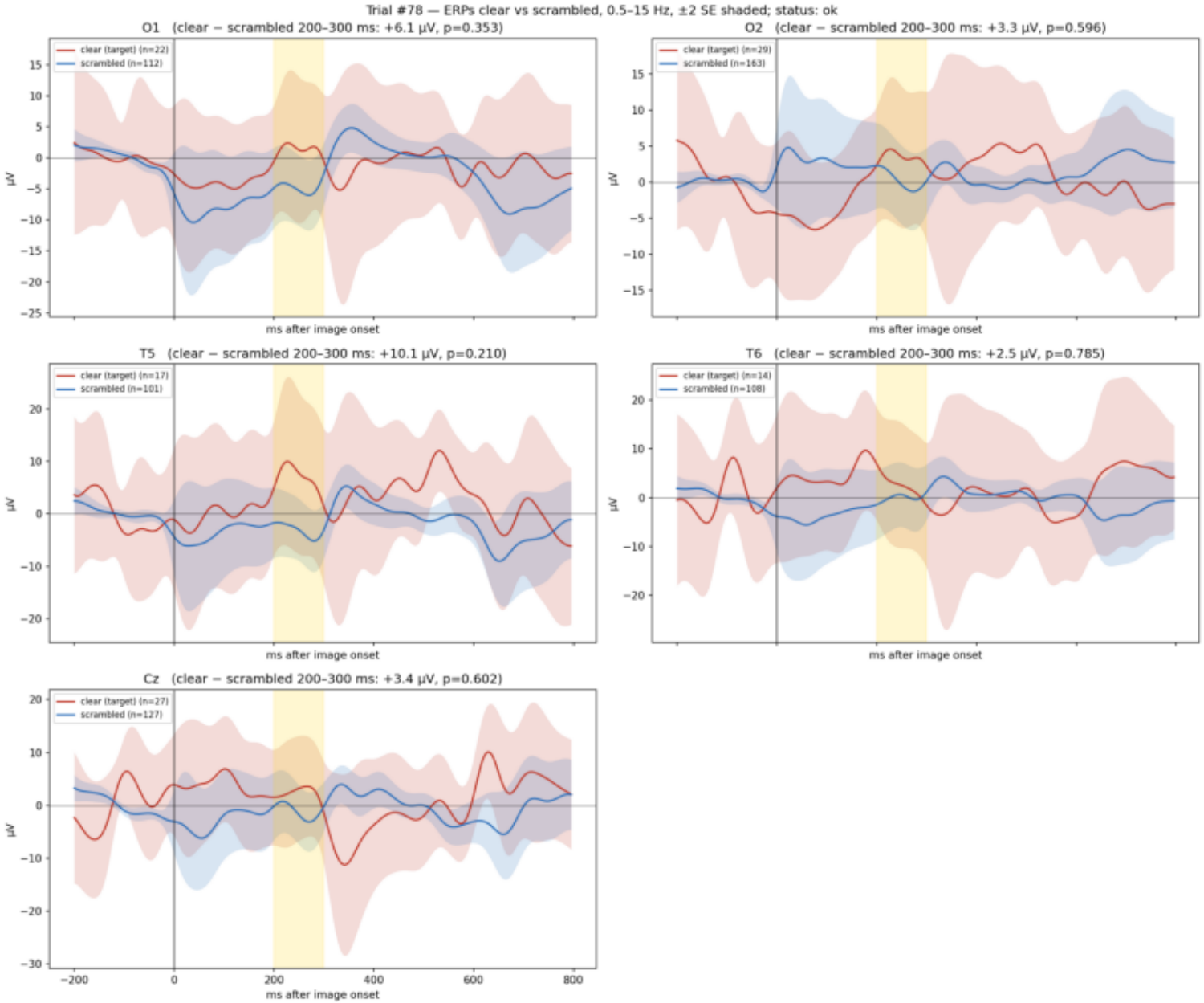
Clear − scrambled, 200–300 ms RP window

Channel	Epochs (clear / scrambled)	Mean difference	p (permutation, 2000)	Largest difference 150–350 ms
O1	22 / 112	+6.14 µV	0.353	-9.2 µV @ 340 ms
O2	29 / 163	+3.27 µV	0.596	+4.6 µV @ 276 ms
T5	17 / 101	+10.14 µV	0.210	+12.1 µV @ 228 ms
T6	14 / 108	+2.50 µV	0.785	+11.6 µV @ 176 ms
Cz	27 / 127	+3.41 µV	0.602	-15.1 µV @ 340 ms

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

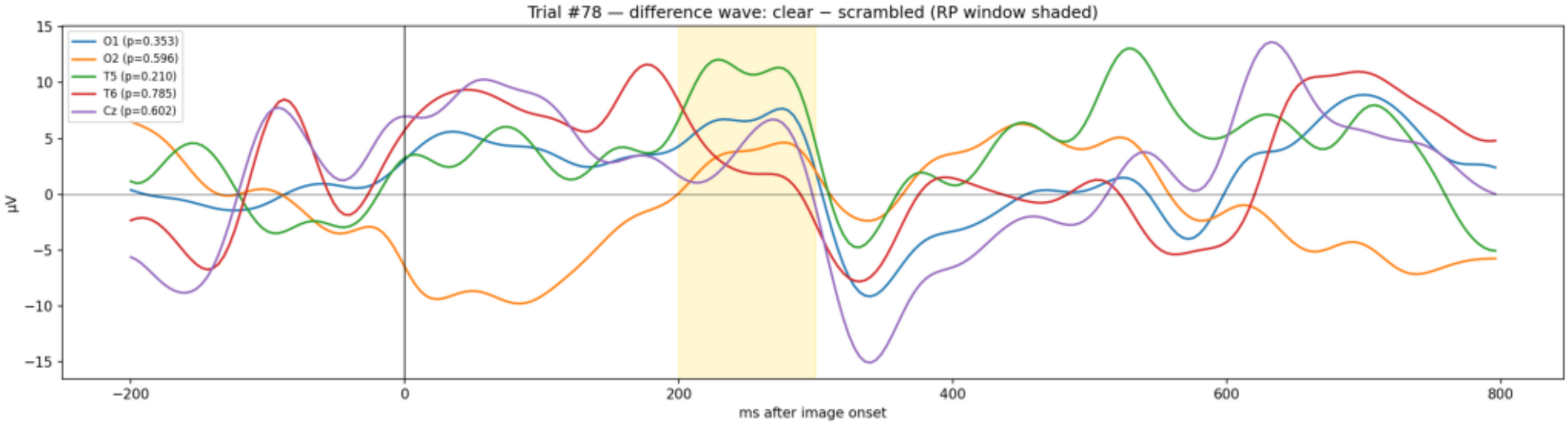
Event-related potentials: clear vs scrambled

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.



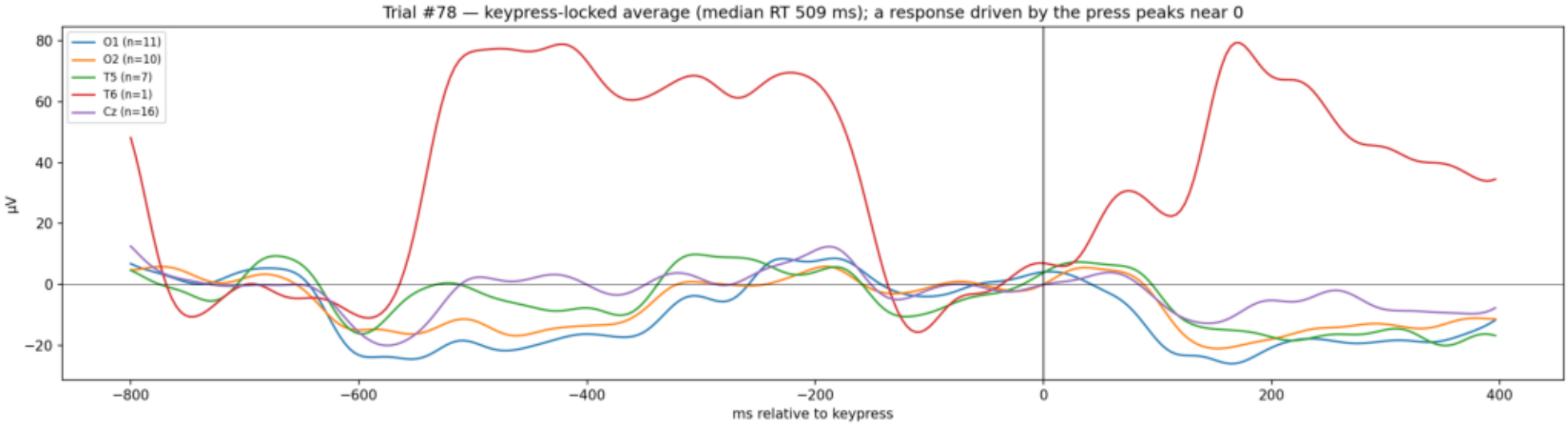
Difference wave (clear − scrambled)

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.



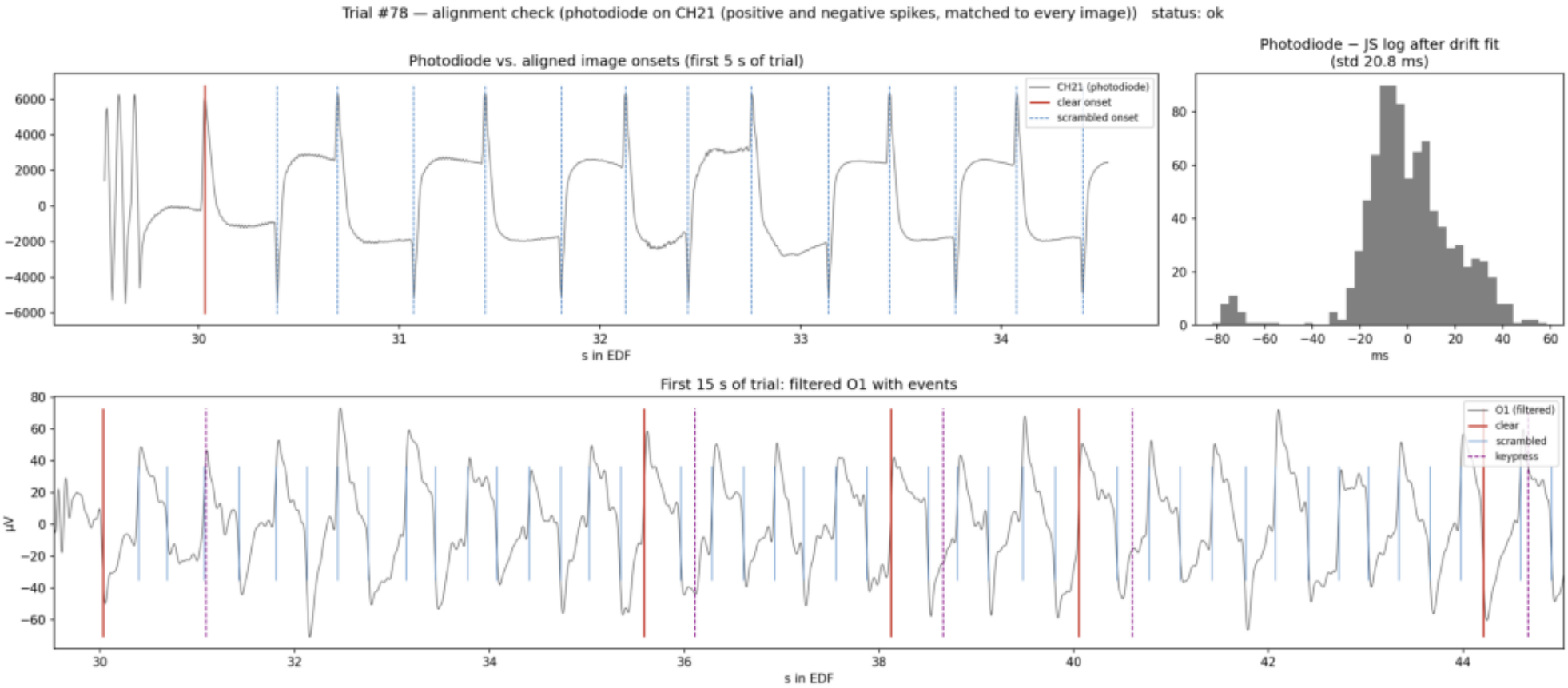
Keypress-locked average

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 #78 — subject AF, 08/10/2025 17:16
  EDF: /home/japhy/eegdata/media/trialData/af_20250810_171551.edf
  250 Hz, 372 s; 1001 images (137 clear, 864 scrambled); 128 presses
  alignment: photodiode on CH21 (positive and negative spikes, matched to every image)
    offset 29468 ms (EDF header says 9000); 85% of images matched (typical 22%); drift -62 ppm; jitter 20.8 ms
  electrode noise (µV): O1 30, O2 30, T5 30, T6 31, P3 817, P4 910, Pz 1014, Cz 30
  using: O1, O2, T5, T6, Cz
  115 of 137 clear images followed by a keypress (median RT 509 ms)
  O1: clear−scrambled 200–300 ms = +6.14 µV, p=0.353, peak -9.2 µV @ 340 ms
  O2: clear−scrambled 200–300 ms = +3.27 µV, p=0.596, peak +4.6 µV @ 276 ms
  T5: clear−scrambled 200–300 ms = +10.14 µV, p=0.210, peak +12.1 µV @ 228 ms
  T6: clear−scrambled 200–300 ms = +2.50 µV, p=0.785, peak +11.6 µV @ 176 ms
  Cz: clear−scrambled 200–300 ms = +3.41 µV, p=0.602, peak -15.1 µV @ 340 ms
  status: ok
```