Trial #47 — Recognition Potential Analysis

OK

Subject AH1 • recorded 6/18/2025 20:53 • dataset Celebrities

Stimuli 101 images: 18 clear, 83 scrambled • 17 keypresses (17 matched to clear images, median RT 405 ms)

EDF file AH1_20250618_205308.edf

Alignment photodiode on EKG2 (positive and negative spikes, matched to every image); clock offset 11491 ms (EDF header would give -8000 ms); 99/101 images matched; drift -560 ppm; jitter 18.7 ms

Electrodes noise after filtering — O1 14 µV ✓, O2 13 µV ✓, T5 14 µV ✓, T6 15 µV ✓, P3 1083 µV, P4 1121 µV, Pz 586 µV, Cz 21 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

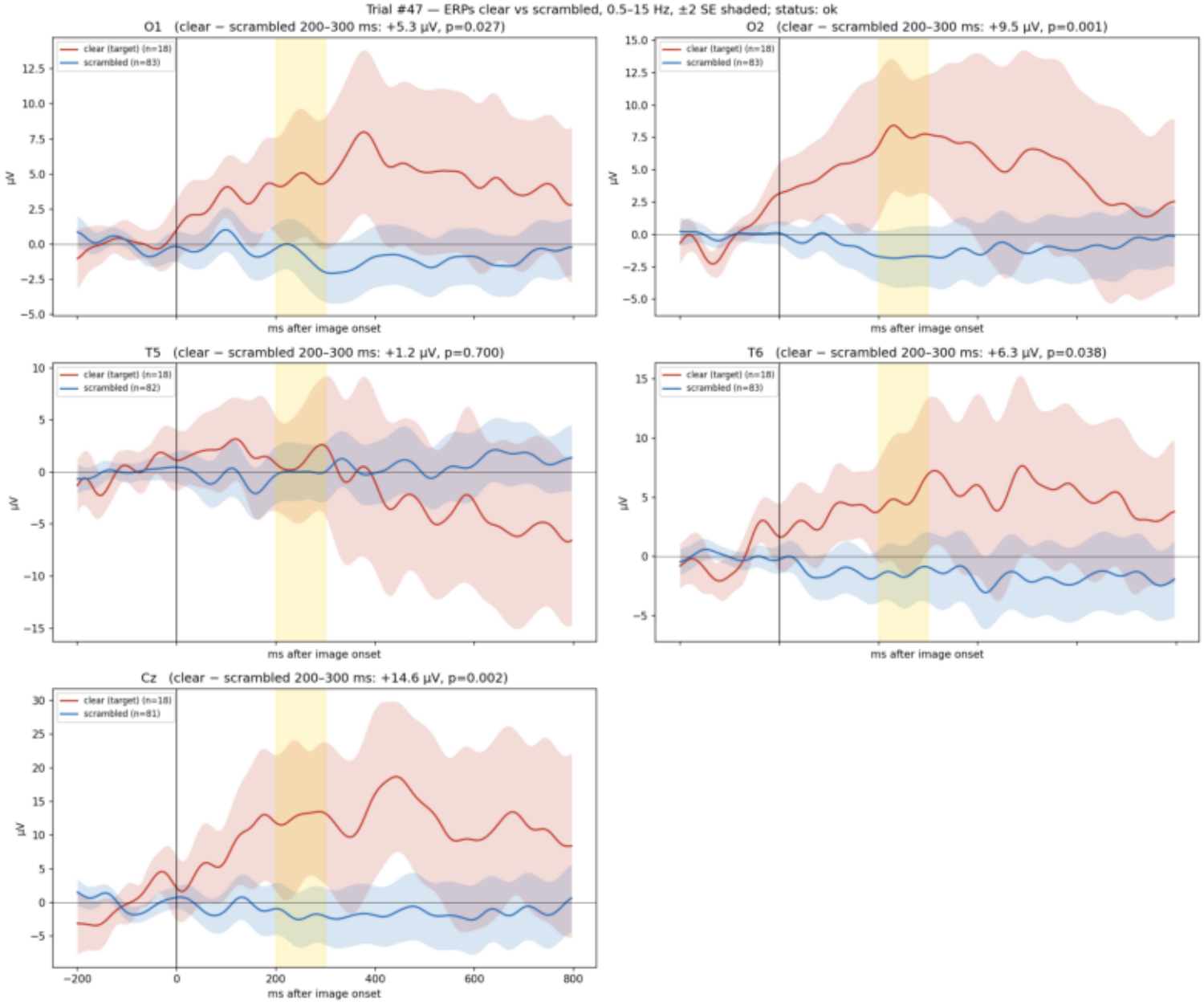
Clear − scrambled, 200–300 ms RP window

Channel	Epochs (clear / scrambled)	Mean difference	p (permutation, 2000)	Largest difference 150–350 ms
O1	**18 / 83**	**+5.30 µV**	**0.027**	**+8.6 µV @ 348 ms**
O2	**18 / 83**	**+9.52 µV**	**0.001**	**+10.3 µV @ 232 ms**
T5	18 / 82	+1.17 µV	0.700	+3.4 µV @ 152 ms
T6	**18 / 83**	**+6.31 µV**	**0.038**	**+8.5 µV @ 320 ms**
Cz	**18 / 81**	**+14.59 µV**	**0.002**	**+15.6 µV @ 252 ms**

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

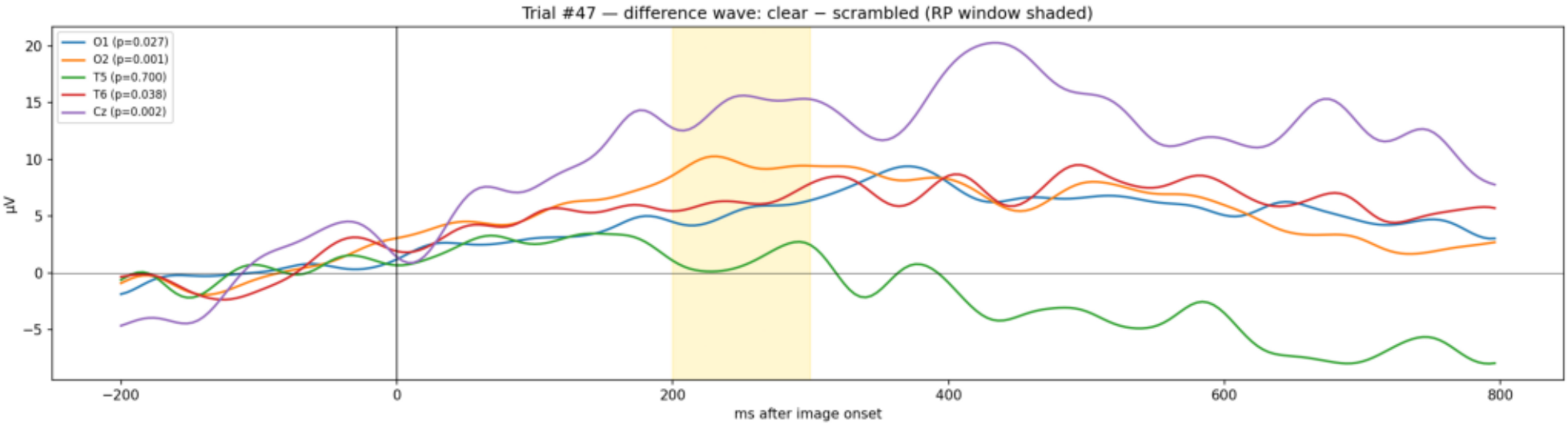
Event-related potentials: clear vs scrambled

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.



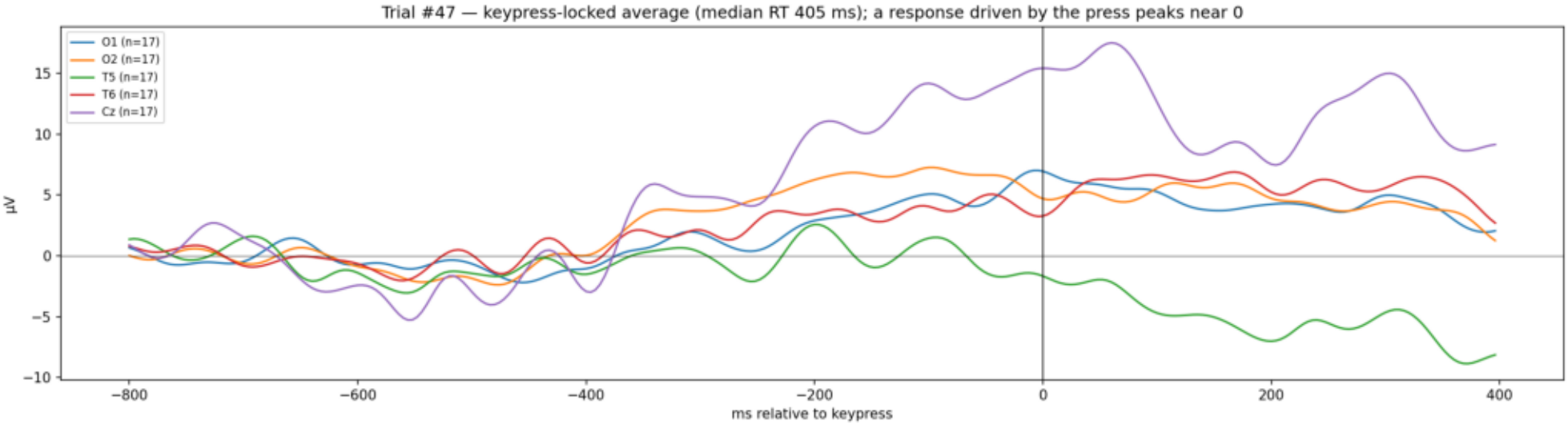
Difference wave (clear − scrambled)

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.



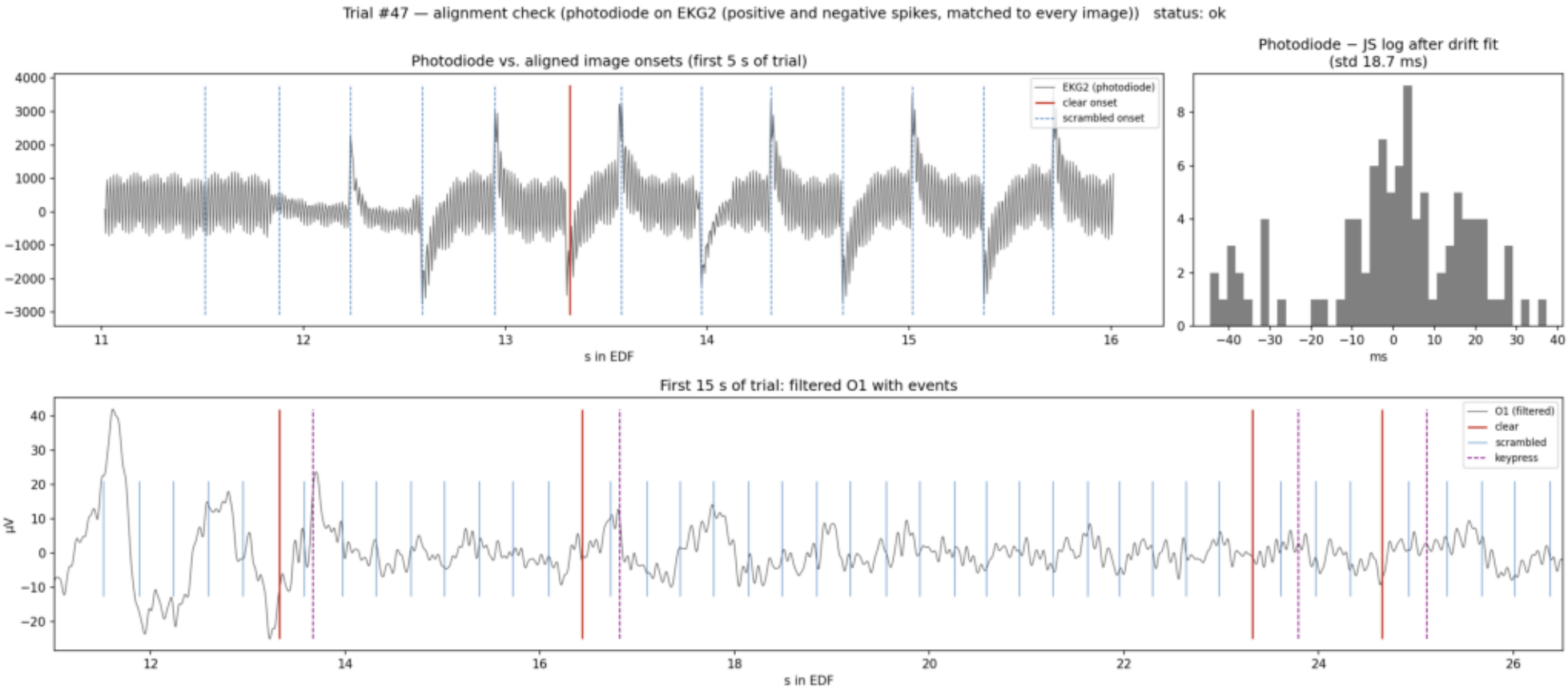
Keypress-locked average

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

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Trial #47 — subject AH1, 6/18/2025 20:53
  EDF: /home/japhy/eegdata/media/trialData/AH1_20250618_205308.edf
  250 Hz, 76 s; 101 images (18 clear, 83 scrambled); 17 presses
  alignment: photodiode on EKG2 (positive and negative spikes, matched to every image)
    offset 11491 ms (EDF header says -8000); 96% of images matched (typical 11%); drift -560 ppm; jitter 18.7 ms
  electrode noise (µV): O1 14, O2 13, T5 14, T6 15, P3 1083, P4 1121, Pz 586, Cz 21
  using: O1, O2, T5, T6, Cz
  17 of 18 clear images followed by a keypress (median RT 405 ms)
  O1: clear−scrambled 200–300 ms = +5.30 µV, p=0.027, peak +8.6 µV @ 348 ms
  O2: clear−scrambled 200–300 ms = +9.52 µV, p=0.001, peak +10.3 µV @ 232 ms
  T5: clear−scrambled 200–300 ms = +1.17 µV, p=0.700, peak +3.4 µV @ 152 ms
  T6: clear−scrambled 200–300 ms = +6.31 µV, p=0.038, peak +8.5 µV @ 320 ms
  Cz: clear−scrambled 200–300 ms = +14.59 µV, p=0.002, peak +15.6 µV @ 252 ms
  status: ok
```