P1-P-86

Do I know you? Brain responses to familiar and AI-generated faces

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Background

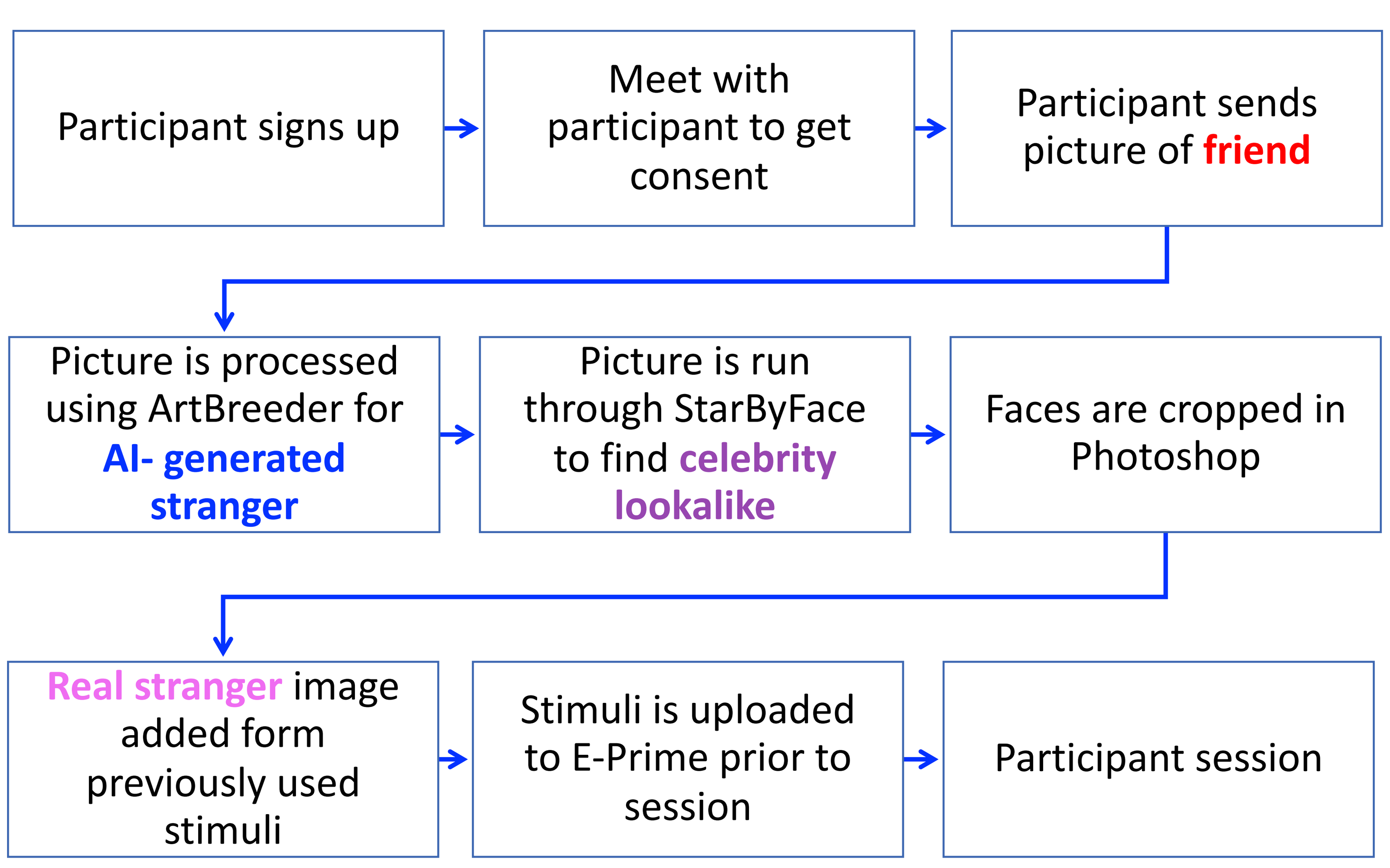
- AI is rapidly progressing in its ability to generate realistic faces and videos, which has significant social implications when considering the advancements of deepfakes and virtual friends/influencers.
- Prior research[1] suggests that the brain is typically able to distinguish between photo-realistic, artificially-generated images and authentic images, even if the individual does not know they perceive the difference.
- It is unknown how this processing intertwines with processing at different levels of facial familiarity.

Objective

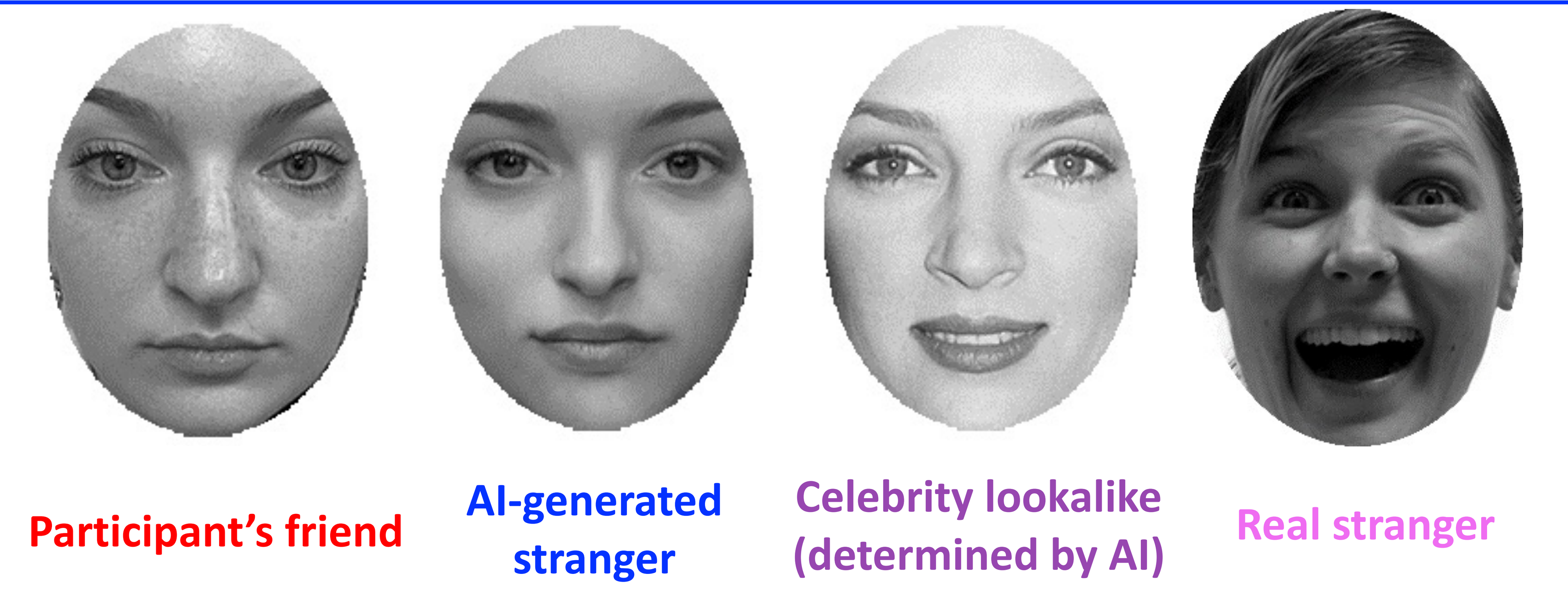
- This study aimed to identify how the brain differentiates between
  - AI-generated faces and real faces
  - Familiar intimate (friend), familiar non-intimate (celebrity), and unfamiliar (stranger) faces
- We expected that there would be a difference in amplitude between the familiar and unfamiliar faces[2] and between AI-generated faces and real faces.

Methods

- Demographics:
  - N= 22 adults aged 18-35 years (2 male, 1 female/nonbinary; 2 non-white)
- Adult brain responses to faces based upon type (photograph versus AI) and context (familiar friend, familiar celebrity, stranger) were captured via electroencephalography (EEG).
- Amplitude and latency were extracted for primary EEG outcomes, post-face onset: P1 component (80-160 ms), N170 (125-200 ms), P2 component (180-260 ms), and P3 (270-450 ms)[3].



Less familiar and AI-generated faces had higher amplitudes than faces of friends



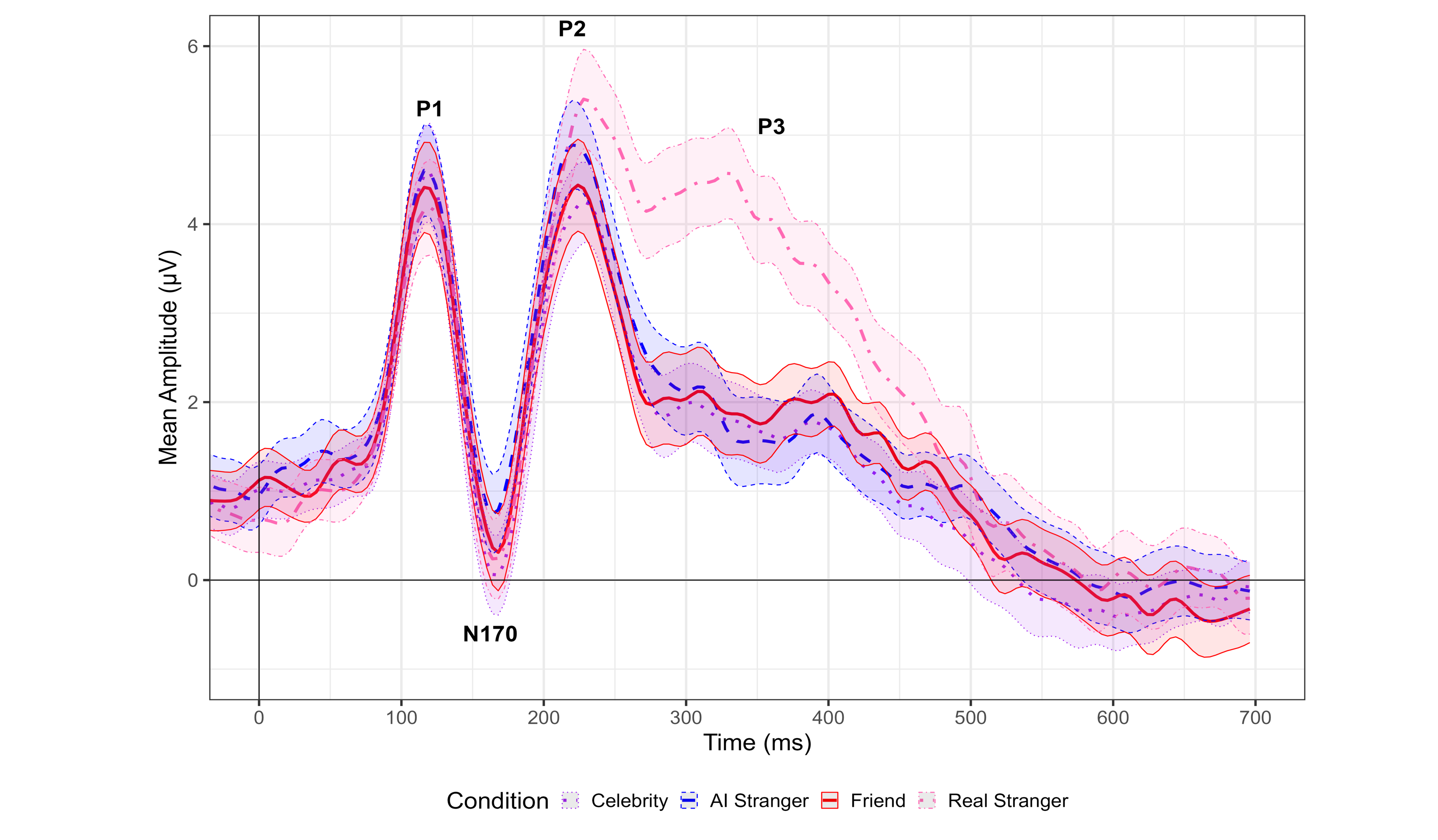


Figure 1. Waveforms of each condition. Condition significantly predicted latency for P2, $F(3, 8315) = 36.89$, $p < 0.0001$ and P3, $F(3, 8293) = 5.229$, $p = 0.001$.

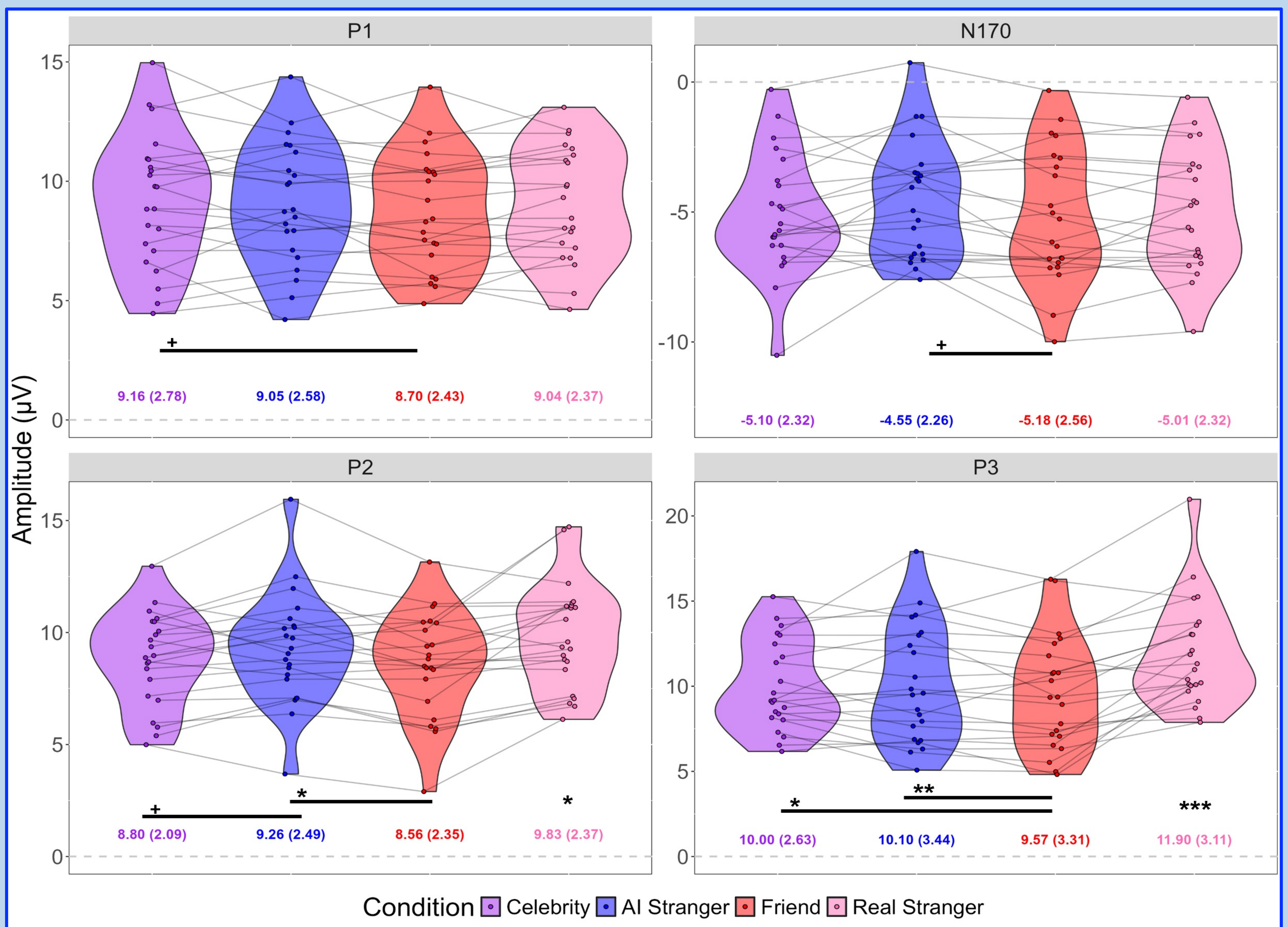


Figure 2. EEG component amplitude per condition. Condition significantly predicted amplitude for P1, $F(1,8319) = 3.38$, $p = 0.017$, P2, $F(1, 8315) = 14.86$, $p < 0.0001$, and P3 $F(1, 8293) = 46.02$, $p < 0.0001$. Note: ***$p < 0.0001$, **$p < 0.005$, *$p < 0.01$, +$p < 0.05$

- The AI-generated faces had significantly larger amplitudes than friend faces at N170, P2, and P3.
- Across each component, friend faces had the smallest amplitudes compared to all other conditions, which suggests that there may be a negative relationship between amplitude size and familiarity.
- AI-generated facial processing may correlate with processing at different levels of familiarity in that these faces are unfamiliar, yet responses still differ between real, unfamiliar faces and artificial, unfamiliar faces.

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