DOES CLEFT PALATE REPAIR SURGERY RESTORE NORMAL NEURAL PROCESSING FOR INFANT FACES?

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STUDY INFORMATION

Infant faces readily capture our attention❶ and elicit enhanced neural processing❷, likely due to their importance in facilitating bonds with caregivers. Cues of poor health are associated with a lower degree of parental investment❸ and facial malformations have been shown to negatively impact early infant-caregiver interactions❸, possibly due to altered perceptual processing of these faces compared to normal infant faces. A common facial malformation is cleft lip/palate and is estimated to effect 1 in 700 live births worldwide❹, and is associated with difficulties in early caregiver interactions. Previous neuroimaging studies have shown that cleft lip/palate alters early [N170] and late [P200, LPP] neural responses to infant faces, likely due to the configural disruption cleft lip/palate causes❺. Craniofacial structure is often repaired via surgical intervention for infants with cleft lip/palate. However, it remains unknown whether cleft lip/palate repair surgery restores normal neural processing of infant faces. The current study used electroencephalography (EEG) to investigate adults' (N = 22, mean age = 30 ± 11. 8yrs) early visual processing of infant faces before and after craniofacial repair surgery. We find evidence supporting this restorative function of repair surgery for both the N170 and P200 components, but not the LPP, suggesting that craniofacial repair surgery may restore more normative visual and perceptual encoding of infant faces but not affective processing.
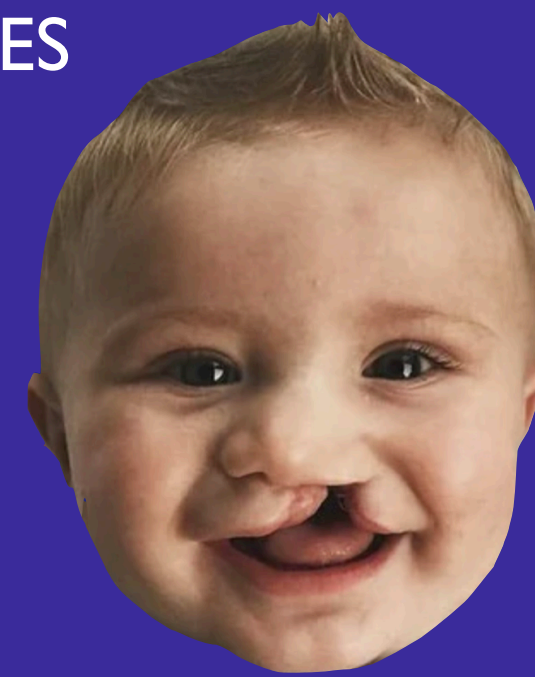
PROCEDURE
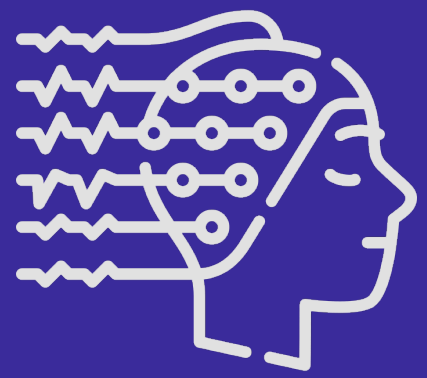
EEG was recorded from 64 scalp sites (10-5 placement, BioSemi ActiveTwo Ag/AgCl electrodes). Each infant was shown before and after craniofacial repair surgery (upright and inverted orientation). Participants also rated the cuteness of each face on a 1 (not very cute) to 5 (very cute) scale.
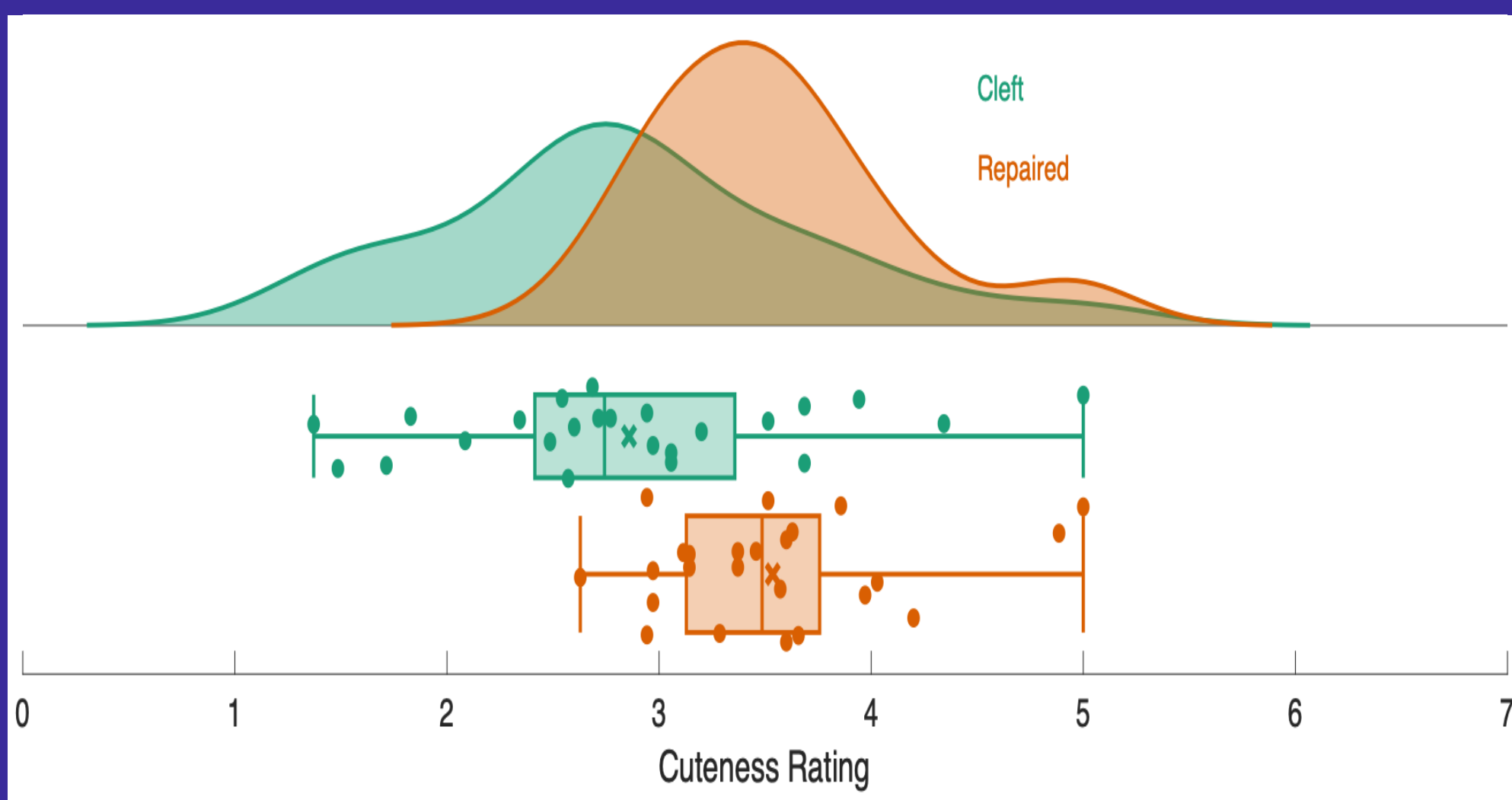
INFANT FACES

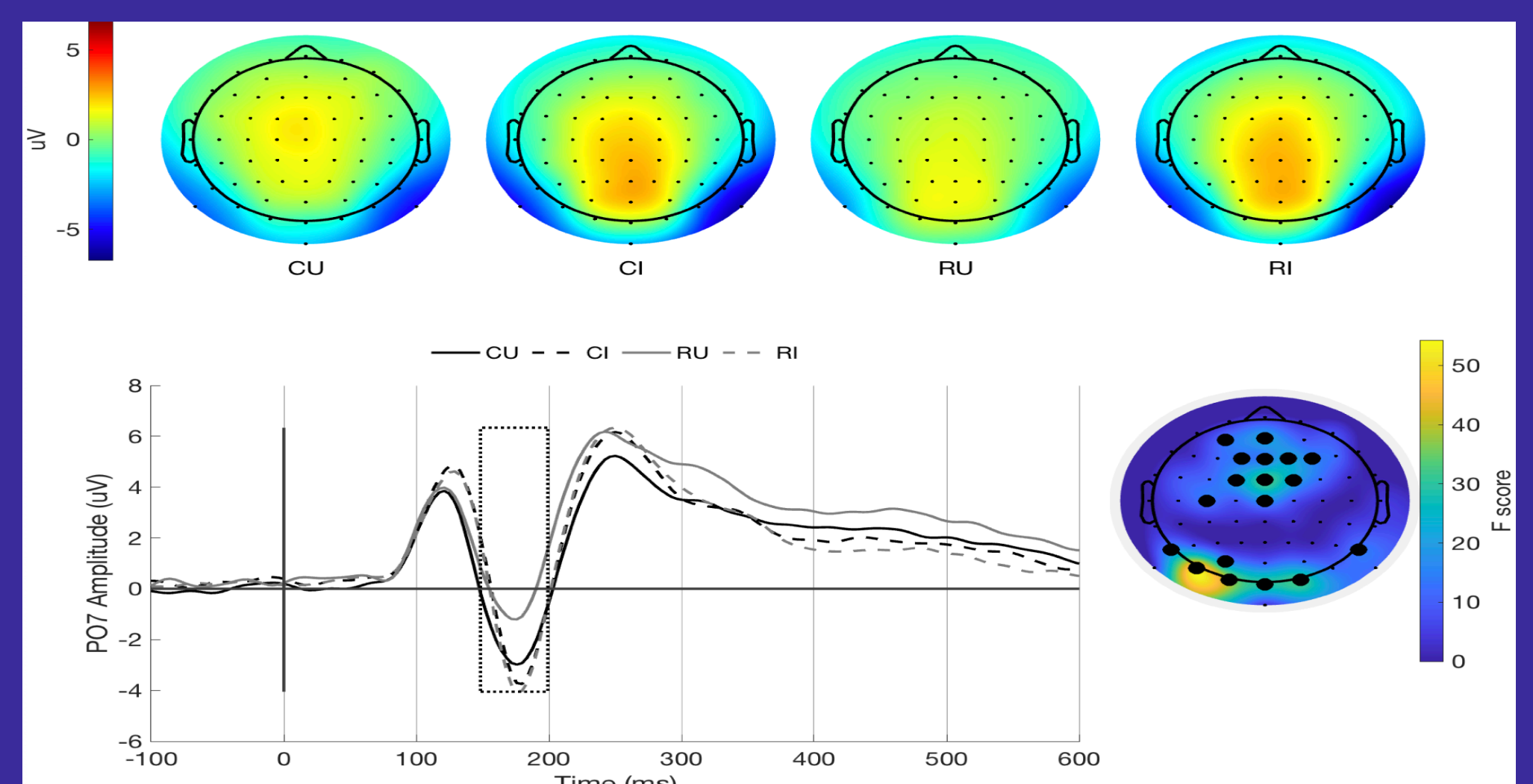35 infants pre-surgery

35 infants post-surgery

RESULTS: PERCEIVED CUTENESS

A paired samples t-test was used to compare cuteness ratings for infants before and after craniofacial repair surgery. As predicted, infant faces were rated as significantly cuter after craniofacial repair surgery (t(23) = -6.88., p = 5.17e-7, cohens d. = 0.89).


RESULTS: N170 COMPONENT

The N170 reflects the structural encoding of faces. The N170 was larger (i.e., more negative) for infant faces pre-surgery when presented in the upright, but not inverted, orientation suggesting recruitment of additional processing mechanisms for cleft faces.

RESULTS: P200 COMPONENT

The P200 (late-stage visual encoding) is linked to typicality. The P200 was reduced for infant faces pre-surgery when presented in the upright, but not inverted, orientation suggesting repaired faces have a more 'face typical' appearance.
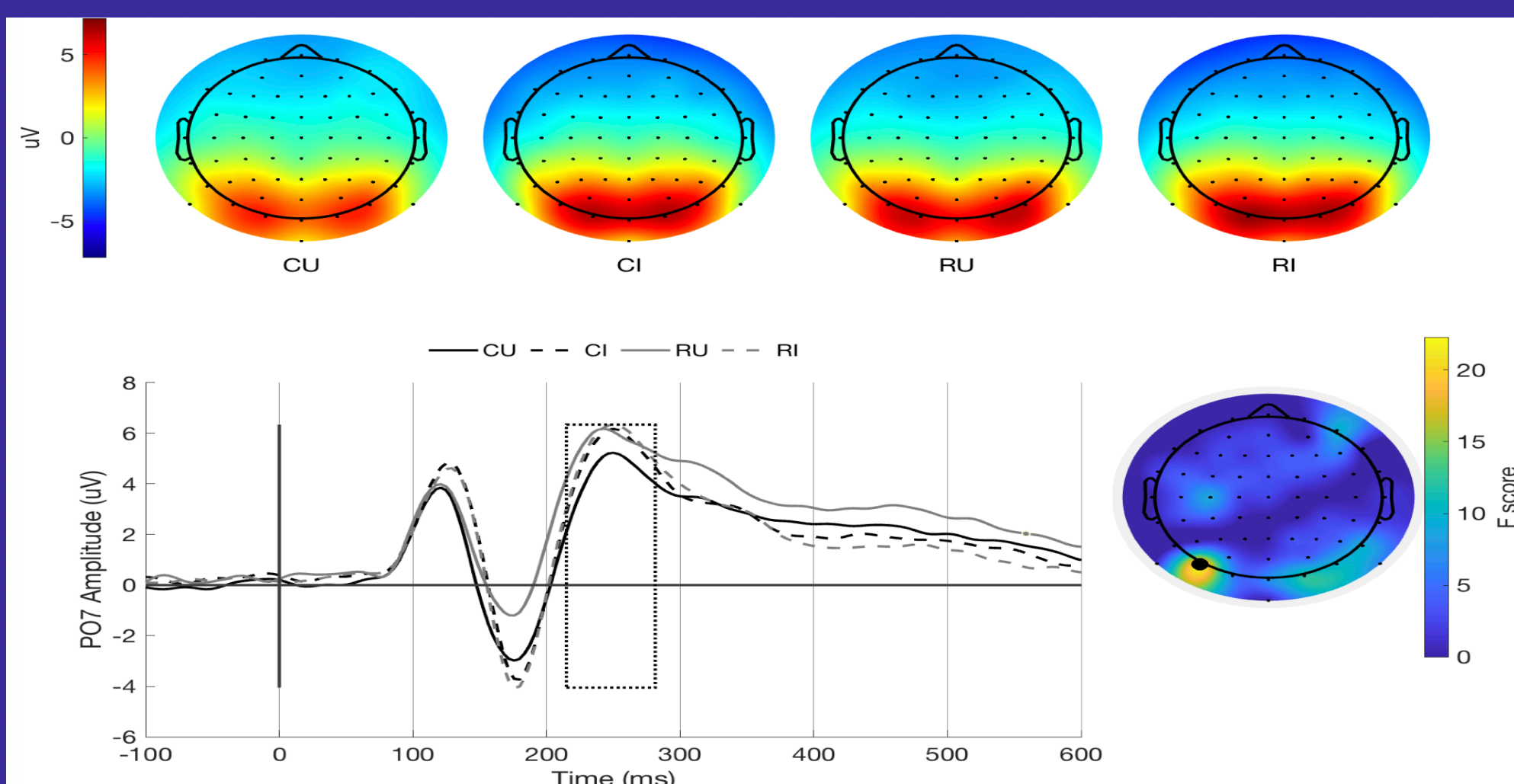
RESULTS: LPP COMPONENT

The Late Positive Potential (LPP) is linked to affective processing. The LPP was similar for pre-surgery (cleft) and post-surgery (repaired) faces, suggesting these may not differ in terms of their emotional salience

❶ Brosch et al (2007) Emotion ❷ Kringelbach et al (2008) PLoS one ❸ Monterosso et al (2012) Journal of Pediatric Psych ❹ Mossey et al (2009) Lancet ❺ Huffmeijer et al. (2018)