

ORIGINAL ARTICLE

Dissociated Neural Representations of Pain Expressions of Different Races

F S^{1,3,†}, X H^{1,2,†}, S H^{1,2}

¹D P PKU-IDG/M G I B R , ³G S M , P U , B C

A S H , D P P U , 52 H R , B 100080, C E : @

†F.S. X.H.

Abstract

T C C (RS) 128–188 (P2) 200–300 (N2) / P2/N2 C O fi

Key words: EEG, , ,

Introduction

A .2012). E (ERP) 100 (N1) (I B 2009; K , I U 2003; K I 2007), 170 (N170, S I 2013). A 200 (P200) (I U 2003; K I 2007; I B 2009). W (R . 2003)

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... ? A MRI ... /
(L2008) (C2008) ERP
... / / ...
... (K ... I 2007).
O MRI
ERP MRI
... (X ...
2009; A2013; S2014). ERP
... (...
/ 128-188 (P2) 200-300 (N2)
... (S ... H 2012; S2013;
H H 2014). F ...
... (S2014) (A ...
... .2010).
T fi ...
... (J2002;
D2011). H ...
... (B ... Y 1986) (H ...
... .2002)
... T ...
... (...)
H(2002) ...
...) ...
...) S ...
... fi ...
... (I B 2009; K2012)
... T ...
... 2 ... T fi ... 2
... T ...

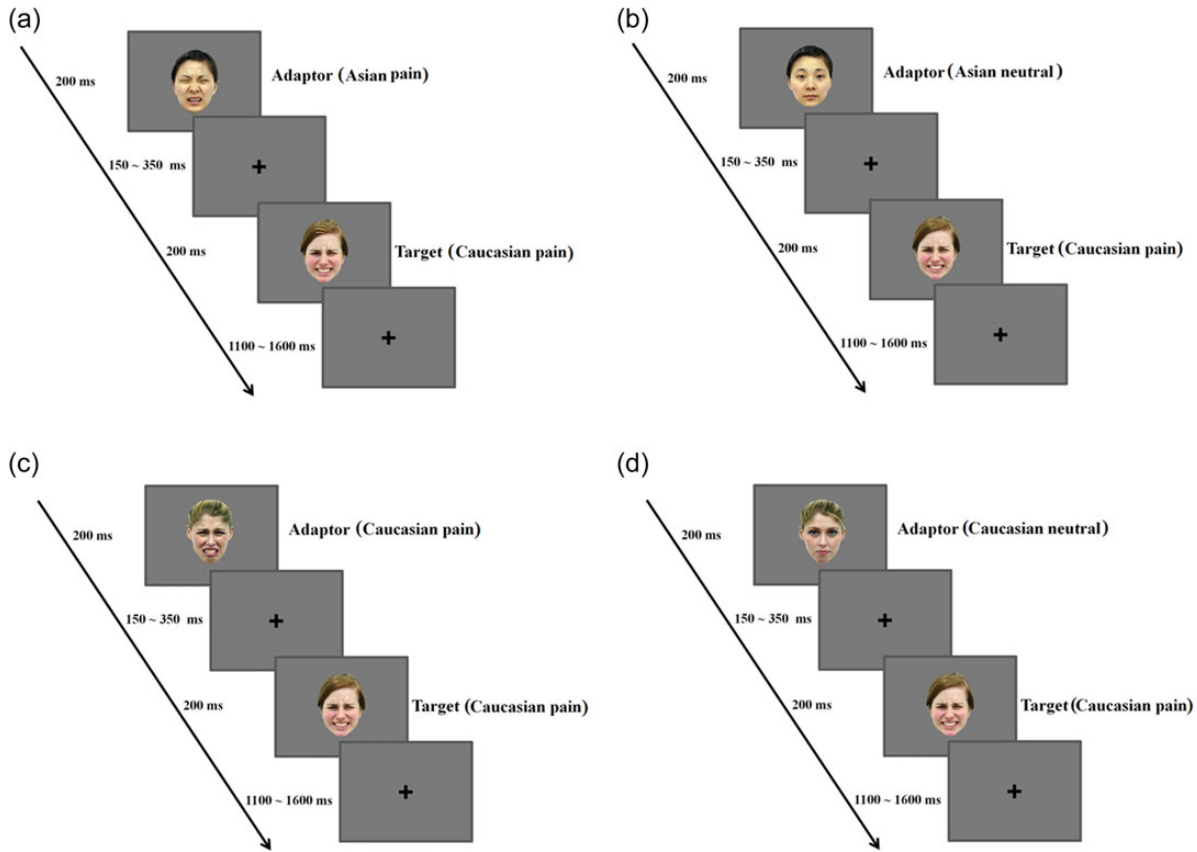


Figure 1.1

EEG, A, T, C, O, H, A, H, T, RS, C, C, W, ERP, C, C, t₃₀ = 0.72, P = 0.479). A, fi, E, H, I, (O. fi. 1971), T, S, H, 2012), 32, 16 A, (8), 32, 16 C, (8), T, 2, R, /A, A, C, (S, H, 2012), E, 200, 150, 350, A, 200, 1100, 1600, (F. 1), E, 120, A, 3.8, 4.7, A

Materials and Methods

Participants

S, C, (8, 19, 27, M = 21.56, SD = 2.50), 16 C, (8, 17, 27, M = 21.06, SD = 2.62), B, C, C, C, 7 G, 4 A, 2I, 2F, 1S, C, 1, 1, (= 6), P, E, I, M, (P, 1992), (C, : 2.73 | 0.45; C, : 2.85 | 0.46,

Stimuli and Procedure

S, 32, 16 A, (8), 32, 16 C, (8), T, 2, R, /A, A, C, (S, H, 2012), E, 200, 150, 350, A, 200, 1100, 1600, (F. 1), E, 120, A, 3.8, 4.7, A

... O ...
 ... 1 2 . T ... 8. 128 . A
 ... T ...
 ... (...)
 ... T ...
 ...
 ... 9- L ... (1=
 ... , 9=
 ... (EEG) ... P
 ... I ... R ... I ...
 (IRI, D 1983) 5- ... (0=
 ... , 4=
 I A T (IAT, G1998)
 ... A C
 ... A ... 10 A ... 10 C ... (...
 ...) 20 ... 40 ...
 ... C ... / ... / ...
 ... I ... 20 ... 40 ...
 ... C ... / ...
 ... T IAT ... I ... A ...
 ... (G2003),
 ... 2 ...
 ... A D ... 0 ... D ...
 ... 9 ... D ... 0 ...
 ... A ...
 ... 9- L ... (1= 9=
 ... A
 C

EEG Recording and Analysis

A N S EEG ...
 T EEG ... 62 ...
 E ...
 ... T ... 1.5
 ... T EEG ... 250 H ...
 (0.1-100 H) ... 250 H ...
 T ERP ... 200 ...
 1000 ...
 ... 50 μV ...
 ... T ...
 ... 91 | 14 ... 91 | 15 ...
 ... T ...
 ERP ... 200- ...
 ...
 W ... fi ... RS ...
 ... ERP ...

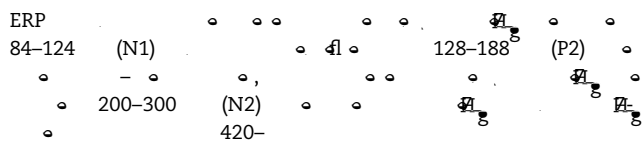
... S ... fi ...
 ... ERP ... F ...
 ... 1a ... b, ERP ... F ...
 ... 1c ... d. T ... (...) ...
 ... a) ... 2 ... RS ...
 ... 2 ... S ...
 ... F ... 1 ...
 C ... RS ...
 fi . A ... RS ...
 ... ERP ... F ... 1a ... b ...
 ... ERP ... F ... 1c ... d. H ... , ...
 ... , ... RS ...
 ... ERP ...
 ... F ... 1c ... d. " " ... ERP ...
 ... F ... 1a ... b.
 M ... N1, P2, N2 ...
 ... (F , F3, F4) ... (C , C3,
 C4) ... M ... P3 N170 ...
 ... / ... (C , C3, C4, P , P3, P4) ...
 ... (P7 P8) ... R ...
 ... (ANOVA) ... ERP ...
 ... (RT), A R ...
 ... , A E ... (...), T ... R ...
 (...) ...
 ... ANOVA ... ERP ...
 ... (... C3 C4) ...
 ... , H ...
 H ... H ...
 ... R ... W ...
 ... ERP ...
 ... fi ... fi ... (F < 1) . O ...
 ...)

Results

Behavioral Performances

T ... 1 ... RT ...
 ... ANOVA RT ...
 ... ANOVA) ... fi ... (P > 0.1). P ...
 ... (6.39 | 1.15 . 1.78 | 0.94, F_{1,30} = 422.92,
 P < 0.001) ... (4.44 | 1.96
 . 1.77 | 0.97, F_{1,30} = 79.23, P < 0.001). R ...
 ... A C ...
 ... (P > 0.1). O ... IAT D ...
 ... D ... fi ... 0 C ...
 (0.51 | 0.28, t₁₅ = 7.29, P < 0.001).
 C ... (0.18 | 0.41, t₁₅ = 1.79, P = 0.094). I ...
 ... fi ... D ... C ...
 ... C ... (t₃₀ = 2.65, P < 0.05).
 T , C ...
 ... C I ...
 ... IRI ... C ... C ...
 (T ... 2, P > 0.2).

ERPs to Adaptor Faces



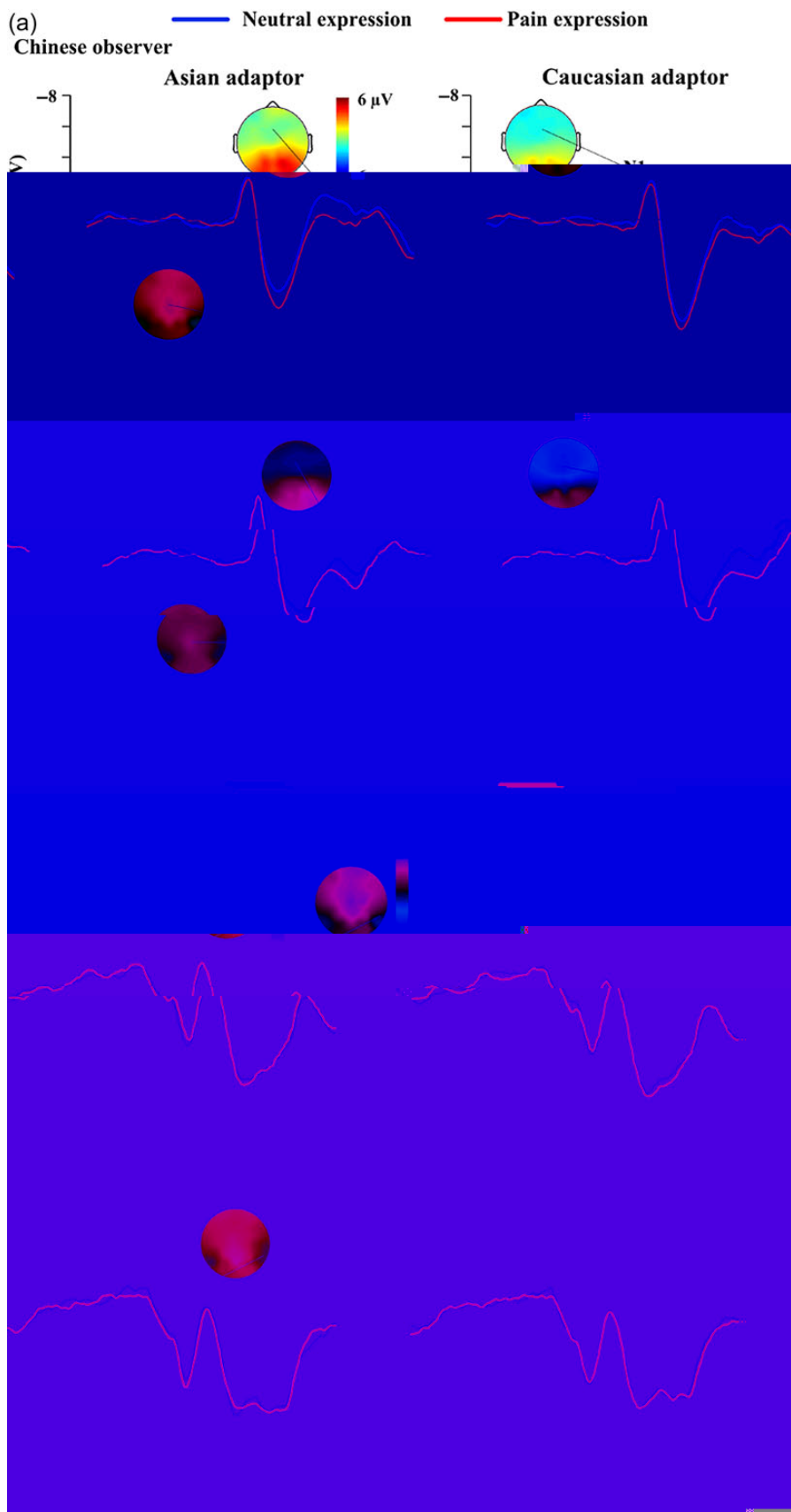


Figure 2. (a) I ERP (C). M P2/N2 (P8). T (b) I ERP C C

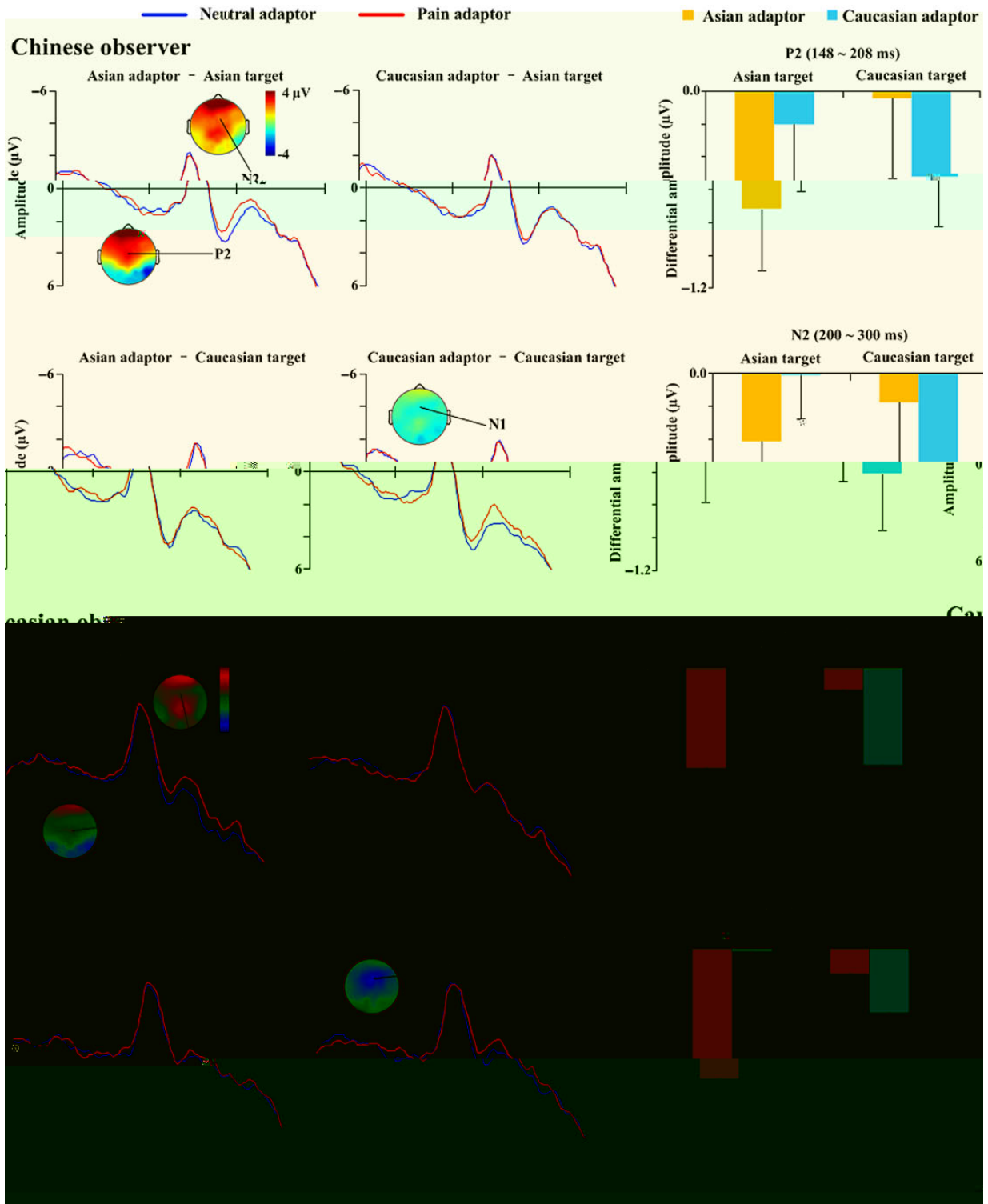
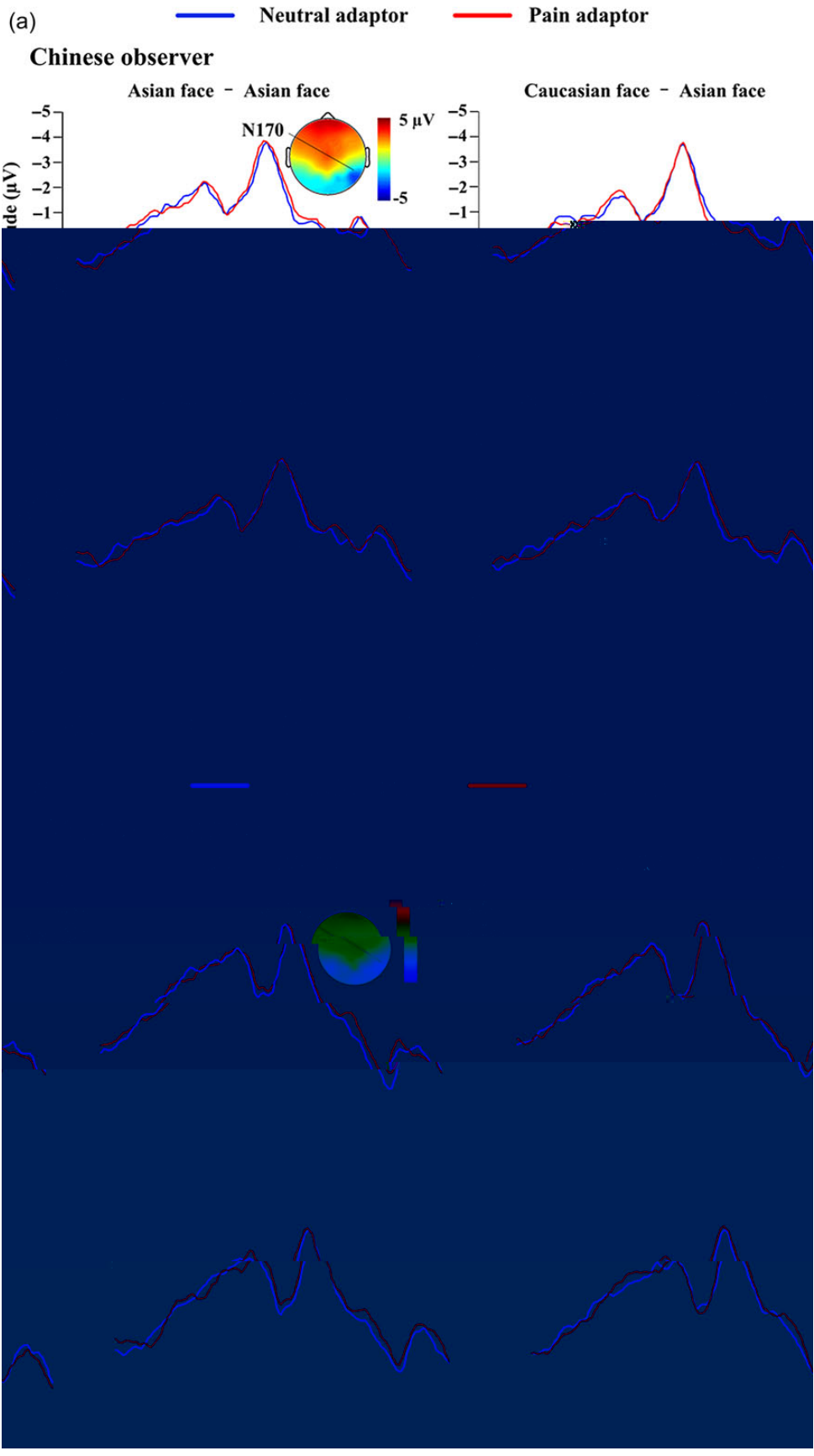


Figure 3. M... RS P2 N2 ERP C A
 C... ERP... P2/N2... O... C
 ANOVA N2... M... (F_{1,30} > 29.31, P < 0.001), (F_{1,30} > 4.99, P < 0.05),
 T R... N2... RS... N2... T RS



E. A R T R (F_{1,30} > 4.43, P < 0.05).
 S , RS N2 (F_{1,30} = 2.53 - 3.49, P = 0.071 - 0.122).
 P > 0.6). I , RS N2 (F_{1,30} < 1, P < 0.05).
 T P2 N2 (F_{1,30} > 4.65, (F_{1,30} < 1, P > 0.4, F_{1,30} > 2).
 . S S T 4
 O P3 (F_{1,30} > 15.14, P < 0.001). ANOVA N170
 10.50, P < 0.005), T R (F_{1,30} = N170
 N170 P3 (F_{1,30} > 4). N (P > 0.05).
 ANOVA P2/N2/P3/N170
 (P > 0.05),
 , RS ERP C
 C . W
 P2/N2 RS
 ') > va85.9 (able)-27result (())TJ/T1_2 1 Tf 20.9237 10.043 > 0.05).

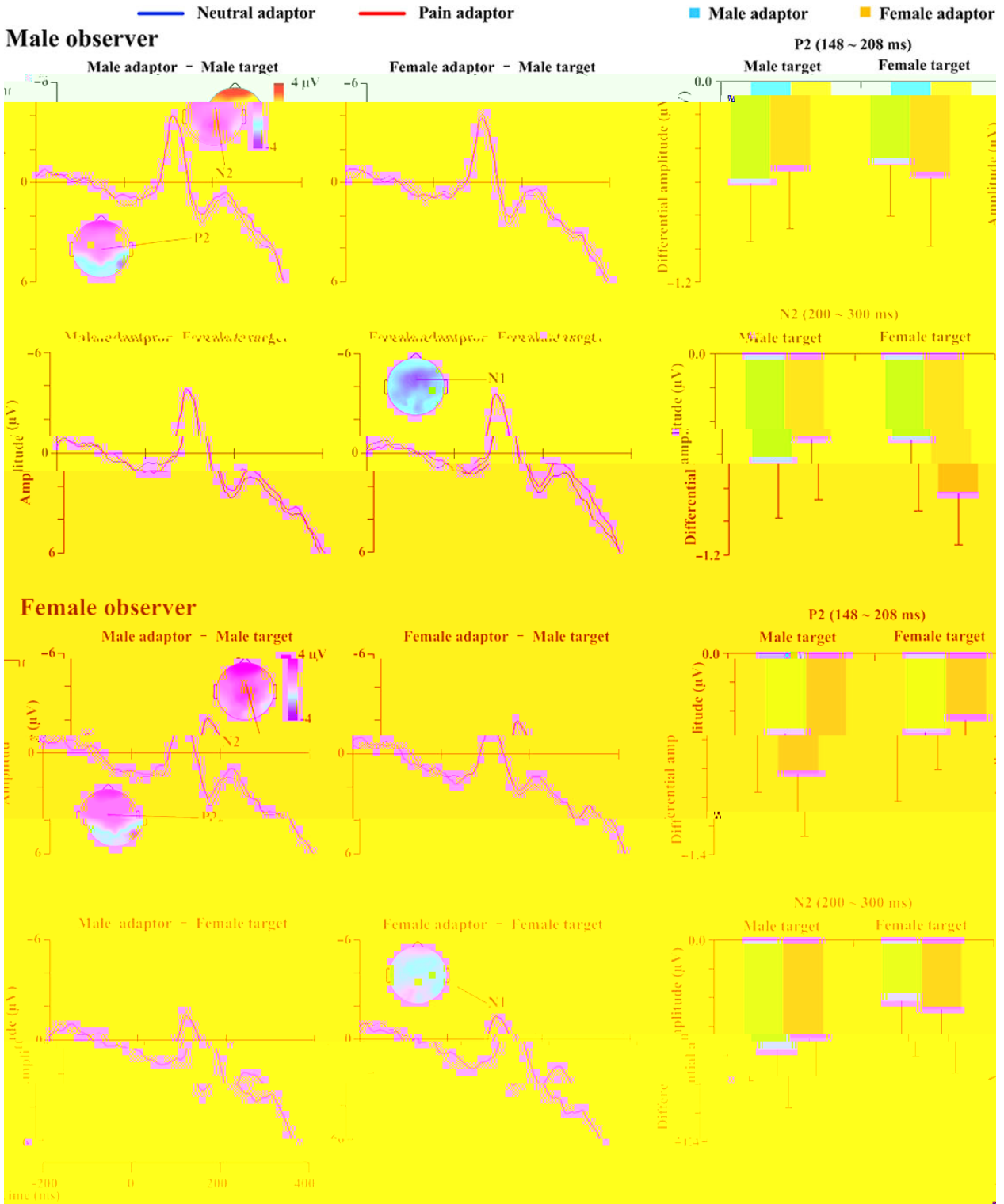


Figure 5. P2/N2 ERP components in male and female observers. The figure displays ERP waveforms and topographic maps for P2 and N2 components. The topographic maps show the spatial distribution of the components, with color scales indicating amplitude in μV . The ERP waveforms show the amplitude (in μV) over time (in ms). The differential amplitude plots show the difference in amplitude between the male and female targets for the P2 and N2 components. The legend indicates the adaptor types: Neutral adaptor (blue line), Pain adaptor (red line), Male adaptor (light blue bar), and Female adaptor (orange bar).

S (2014) (X 2009; A 2013; S 2014). S P2 P2 H P2 S F MRI P I (V 1992; V 2010) H 2012). R P2 T fi (S 2013). T fi T fi M ERP / N1, P2, N2, P3 B W (I B 2009; K 2012). M P2/N2 (I B 2009). S H 2012) P2 C RS P2 N2 T N1 2003; D B 2007) P300 (I U 2005; W J I 2006) (I B 2009). T N170 2010). O fi RS P2/N2 H ? F B C 3 (K 2005). B 6 (K 2007). A K 3 9 E C 3 9 (S 2005). T fi

D A T fi N170 (R 2013). T F A fi (O W 2003) (R 2000), fi RS 2 A (V 2008; M S 2008). MRI 2 F E (EBA) (FBA) M EBA FBA. T fi 2 H 2 (A , 2 H () 2 O 2 I 2

ERP fi . I . 2 . T . RS . N . P2 . T . R . RS . C . C . EEG . RS . R . ERP . MRI . (.) . (R . . 2001; S . . 2006; S . . 2011; G . . 2014). T . ERP . (. N170) . RS . T . T . I . ERP . RS . O fi . F . (X . . 2009; A . . 2010; S . . H . 2012; A . . 2013; S . . 2014; S . . 2014) . (J . . 2002; D . . 2011). O fi . RS . 2 . R . (. RS .) . (.) .

Supplementary Material

S //

Funding

T . N . N . S . F . C . (P . 31470986, 31421003, 91332125 81161120539) . M . E . C . (P . 20130001110049).

Notes

Conflict of Interest: N

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