

# Mo... - o ...



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## ABSTRACT

B... (M) ... M fl ... M ... o ...

2010; M... 2011; M... 2010; L o... 2015).

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B... o... o... o... (Jo o... 2002).

(D... 2011).

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fMRI data acquisition and analysis

Participants were seated in a 3-MGE 750 (GE Healthcare, USA) 3-T MRI scanner. The axial slices were acquired with a T2-weighted echo planar imaging (EPI) sequence with a TR = 2000 ms, TE = 30 ms, flip angle = 90°, FOV = 24 × 24 cm.

Participants were instructed to perform a PM8 (Painful Music) task. The task consisted of listening to 8-minute music clips (MNI) and rating their pain level on a scale from 0 (no pain) to 10 (worst imaginable pain).

The fMRI data were analyzed using a general linear model (GLM) approach. The first-level analysis was performed using SPM8 (Wellcome Trust Centre for Neuroimaging, UK).

For each subject, the fMRI data were analyzed using a GLM. The design matrix was constructed using the task timing information. The resulting beta maps were entered into a second-level analysis using a mixed-effects model. The results were then entered into a permutation test to assess the significance of the findings.

Results

Experiment 1

Behavioral results

Behavioral data were analyzed using a 2 (Condition) × 2 (Group) ANOVA. The results showed a significant main effect of Condition ( $F(1,31) = 15.81, < 0.001, \eta^2 = 0.345$ ).

Table 1

Table 1: Behavioral data for Experiment 1. Columns include Group (M, NA), EEG (N, P), and A (N, P) with corresponding values in parentheses.

Table 2

Table 2: Behavioral data for Experiment 2. Columns include Group (M, NA) and A (N, P) with corresponding values in parentheses.

> 0.1.

Behavioral data were analyzed using a 2 (Condition) × 2 (Group) ANOVA. The results showed a significant main effect of Condition ( $F(1,31) = 15.06, < 0.001, \eta^2 = 0.334$ ).

ERP results

ERP data were analyzed using a 2 (Condition) × 2 (Group) ANOVA. Significant differences were found in the P1 (88–148 ms), P2 (128–188 ms), and P3 (400–700 ms) components.

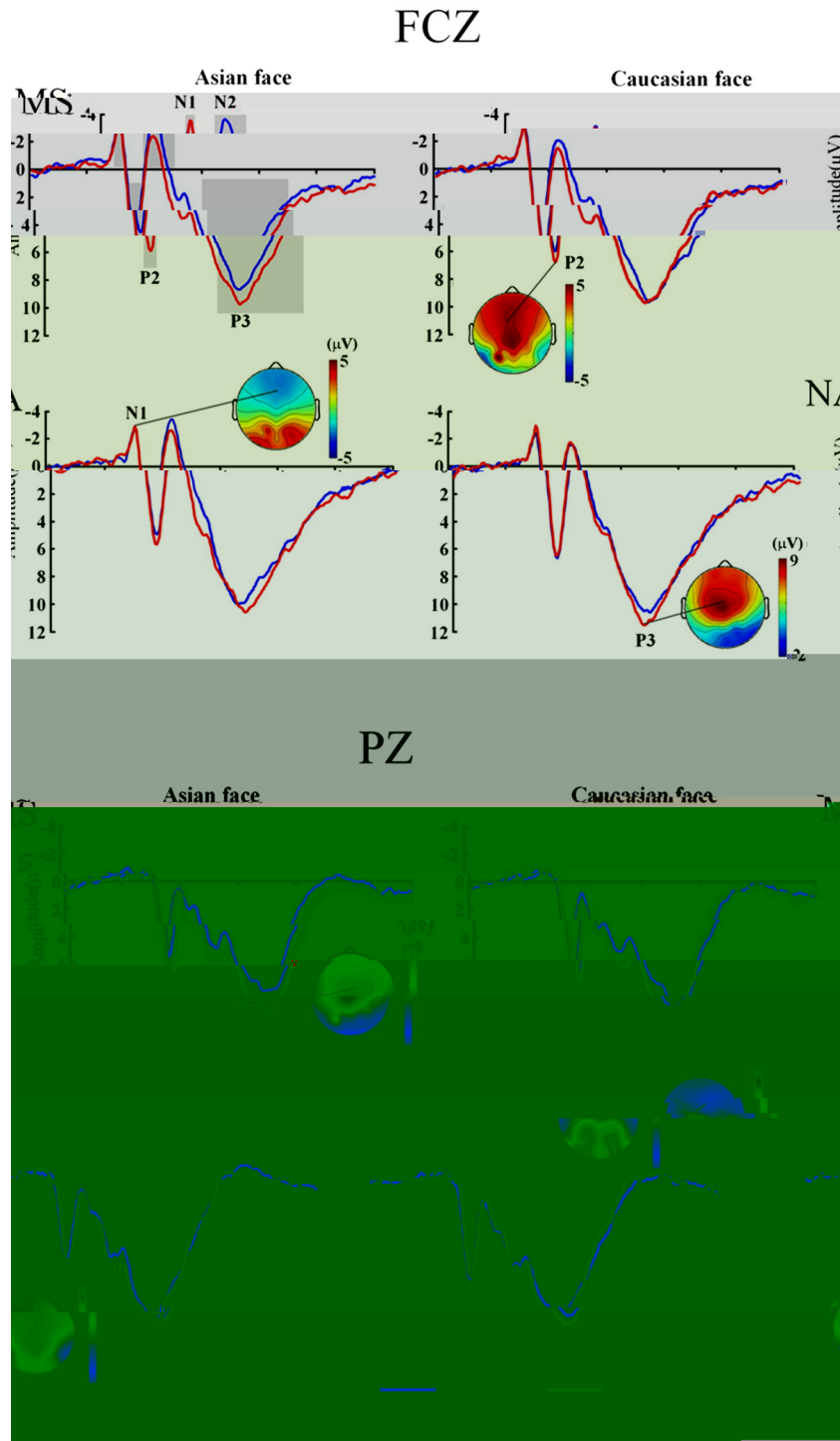
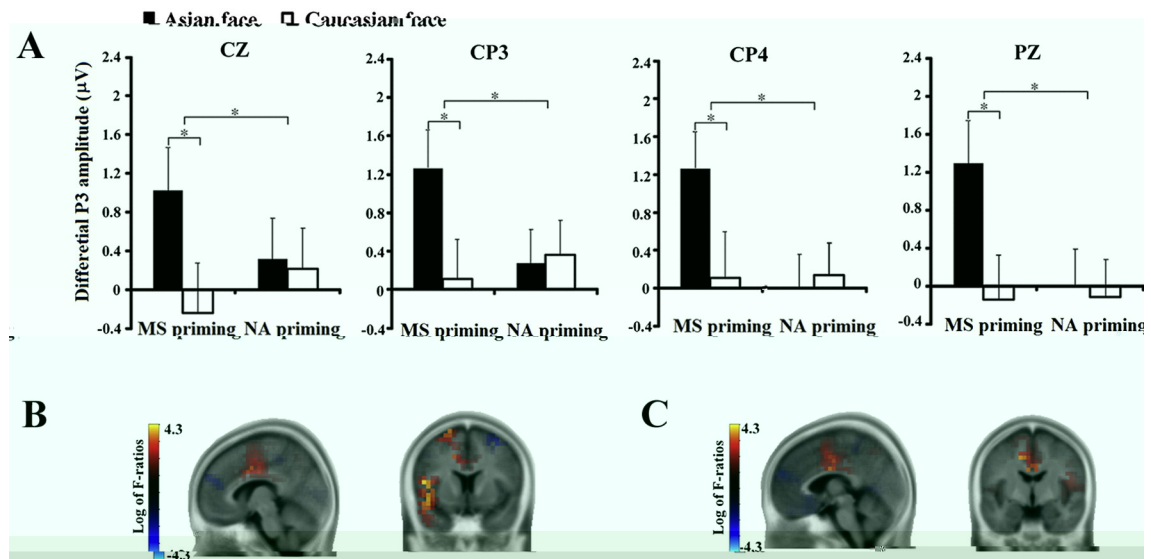


Fig. 2.1. ERP waveforms and topographic maps for FCZ (P2, N2, P3) and PZ components in response to Asian and Caucasian faces. The y-axis represents amplitude in  $\mu\text{V}$ . The x-axis represents time in milliseconds. NA: N1, N2, P2, P3.

As shown in Fig. 3A, the ERP waveforms for the PZ component in response to Asian and Caucasian faces were significantly different ( $F(1,15) = 0.00-0.85, p > 0.5$ ). The topographic maps for the PZ component in response to Asian and Caucasian faces are shown in Fig. 3B and C. The PZ component in response to Asian faces showed a significant difference from the PZ component in response to Caucasian faces ( $F(1,15) = 0.00-0.85, p > 0.5$ ). The topographic maps for the PZ component in response to Asian and Caucasian faces are shown in Fig. 3B and C. The PZ component in response to Asian faces showed a significant difference from the PZ component in response to Caucasian faces ( $F(1,15) = 0.00-0.85, p > 0.5$ ). The topographic maps for the PZ component in response to Asian and Caucasian faces are shown in Fig. 3B and C.



**Fig. 3.** (A) Individual subject differential P3 amplitudes (µV) for Asian and Caucasian faces at CZ, CP3, CP4, and PZ electrodes. Error bars represent SEM. \* indicates significant differences between MS and NA priming conditions ( $p < 0.05$ ). (B) Brain maps showing Log of F-ratios for the CZ electrode. (C) Brain maps showing Log of F-ratios for the PZ electrode. MNI coordinates: CZ (-7/10/3), CP3 (30/-20/-17), CP4 (0/-20/-22), PZ (0/-22/4).

Individual subject P3 amplitudes (µV) for Asian and Caucasian faces at CZ, CP3, CP4, and PZ electrodes. Error bars represent SEM. \* indicates significant differences between MS and NA priming conditions ( $p < 0.05$ ). MNI coordinates: CZ (-7/10/3), CP3 (30/-20/-17), CP4 (0/-20/-22), PZ (0/-22/4).

Individual subject P3 amplitudes (µV) for Asian and Caucasian faces at CZ, CP3, CP4, and PZ electrodes. Error bars represent SEM. \* indicates significant differences between MS and NA priming conditions ( $p < 0.05$ ). MNI coordinates: CZ (-7/10/3), CP3 (30/-20/-17), CP4 (0/-20/-22), PZ (0/-22/4).

## Experiment 2

### Behavioral results

Behavioral results for Experiment 2. MNI coordinates: CZ (-7/10/3), CP3 (30/-20/-17), CP4 (0/-20/-22), PZ (0/-22/4).

**Table 3**

BOLD signal change (M I) (D) E (1, 2).

	Group	M I				D) E			
		N	Mean	SD	P	N	Mean	SD	P
ANOVA	M	2552	350	2582	339	2568	337	2576	348
	NA	2731	249	2691	318	2769	320	2687	269
A (10%)	M	98.1	4.5	97.8	6.3	96.7	7.1	97.8	4.7
	NA	97.7	4.5	98.6	2.6	98.0	2.9	95.9	6.7

**fMRI results**

A significant difference in BOLD signal change was observed in the cingulate cortex and precentral gyrus (ANOVA,  $F(1, 54) = 3.11, p = 0.08$ ). This difference was also significant in the right hemisphere ( $F(1, 27) = 3.75, p = 0.06$ ) and the left hemisphere ( $F(1, 27) = 3.33, p = 0.08$ ).

Significant differences were also found in the right hemisphere for Asian faces ( $F(1, 57) = 3.56, p = 0.06$ ) and Caucasian faces ( $F(1, 57) = 3.35, p = 0.07$ ). In the left hemisphere, significant differences were observed for Asian faces ( $F(1, 57) = 4.00, p = 0.05$ ) and Caucasian faces ( $F(1, 57) = 3.47, p = 0.06$ ).

Significant differences were also found in the right hemisphere for the right hemisphere ( $F(1, 57) = 3.96, p = 0.05$ ) and the left hemisphere ( $F(1, 57) = 3.45, p = 0.06$ ).

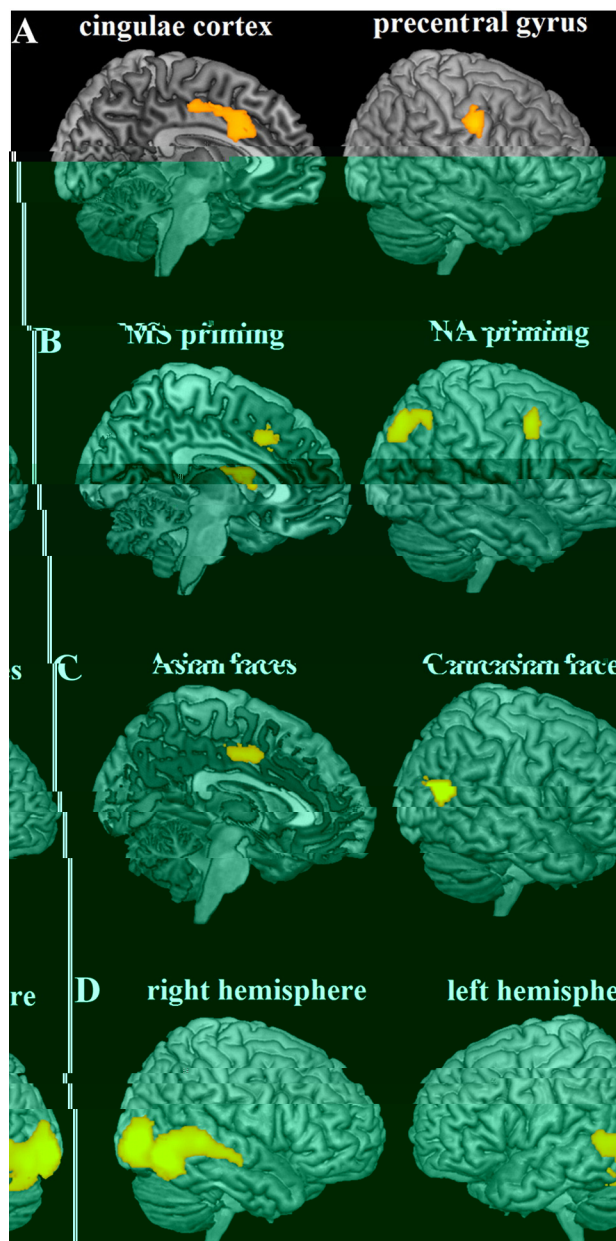
Significant differences were also found in the right hemisphere for the right hemisphere ( $F(1, 57) = 5.06, p = 0.03$ ) and the left hemisphere ( $F(1, 57) = 4.65, p = 0.04$ ).

**Table 4**

BOLD signal change (M I) (D) E (1, 2).

		M	NA
I I	P	17.55	18.65
	F	16.35	17.65
	E	18.10	19.25
	P	14.50	15.15
D		51.40	57.75
		13.95	14.64

> 0.1.



**Fig. 5.1** fMRI results showing brain activation in the cingulate cortex and precentral gyrus. (A) cingulate cortex and precentral gyrus. (B) M I priming and NA priming. (C) Asian faces and Caucasian faces. (D) right hemisphere and left hemisphere.

**Discussion**

The present study found significant differences in BOLD signal change in the cingulate cortex and precentral gyrus. These findings are consistent with previous research showing that the cingulate cortex is involved in emotion and the precentral gyrus is involved in motor control.

The results also showed significant differences in the right hemisphere for Asian faces and Caucasian faces, and in the left hemisphere for Asian faces and Caucasian faces. This suggests that the right hemisphere is more involved in processing Asian faces and the left hemisphere is more involved in processing Caucasian faces.

The results also showed significant differences in the right hemisphere for the right hemisphere and the left hemisphere for the left hemisphere. This suggests that the right hemisphere is more involved in processing the right hemisphere and the left hemisphere is more involved in processing the left hemisphere.

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I, M, NA, A, G, (B, 2002), (K, 1994; , 2002), (H, 2003), (, Jo, 2002; D, 2011), M, NA, (P, 2010), F, o, fi, M, fi, o, M, (Jo, 2002), o, fi, o, o, (, 2008), M, o, o, (B, 2011), O, E, P, M, I, M, E, (P, 2002), fi, (P, 2002), v, I, (P, 2002), M, (G, 1986; P, G, 1999), o, fi, (H, 2010; K, 2014; H, 2013), (F, 2011), A, EEG, EEG, EEG, 5(1)-11, 09, 12( )-398( ) J/ 1-469

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