Familiarity Modulates Mirror Neuron and Mentalizing Regions During Intention Understanding

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De a e f Ps ch l g , Peki g U i e si , Beiji g, Pe le's Re blic f Chi a

Abstract:

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Key words:

INTRODUCTION

Figure 1.
Examples of still images of the stimuli. Participants observed 2-s videos of familiar gestures (left panel), unfamiliar gestures (middle panel), and control still images (right panel). Each gesture and still image was performed by an actor of the participants' own race (Chinese) and an actor of a different race (Caucasian). Original videos were presented in full color.

MATERIALS AND METHODS

Participants

Stimuli

Action observation

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Action execution

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Task Design and Procedure

Action observation

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Behavioral methods

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fMRI Image Acquisition and Analysis

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TABLE I. Localization of brain activations from random effects analysis

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L Inferior parietal lobule	**40**	**4.80**	**515**	**[−52, −32, 34]**
L Inferior frontal gyrus	**44**	**4.09**	**336**	**[−48, 10, 38]**
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R Posterior cingulate cortex	**23**	**5.38**	**498**	**[6, −38, 32]**
L Temporoparietal junction	**39**	**4.85**	**334**	**[−50, −66, 38]**
L Dorsal medial prefrontal cortex	**32/9**	**4.09**	**421**	**[−4, 44, 26]**
R Temporoparietal junction	**39**	**3.56**	**267**	**[52, −68, 40]**
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L Inferior parietal lobule	**40**	**6.90**	**515**	**[−52, −30, 36]**
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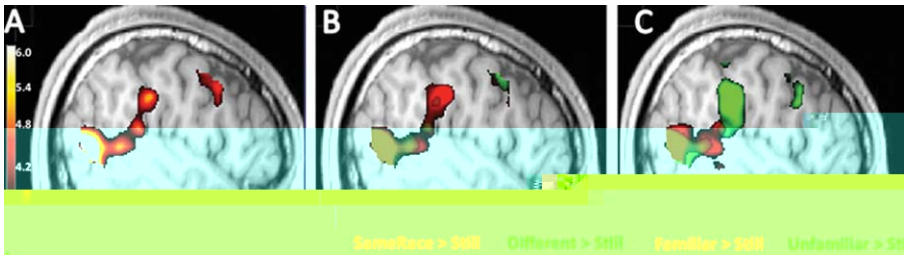

Figure 2.

Brain responses to observations of gestures versus still images (all images displayed at $P < 0.001$ uncorrected for visualization purposes; $x = -51$). **A**: Observation of all gestures across familiarity and races versus still images evoked greater activity in components of the pMNS [the left dorsal inferior frontal gyrus (IFG) and dorsal premotor cortex and inferior parietal lobule (IPL)], as well as the posterior superior temporal sulcus (pSTS) and posterior cingulate cortex (PCC; not shown). **B**: Observation of the same race versus still (red) evoked activity in the left IPL and pSTS, while observation of a different race versus still (green) evoked activity in the left dorsal premotor cortex and pSTS. **C**: Observation of familiar gestures versus still images (red) evoked greater activity in the left pSTS, while unfamiliar gestures versus still images (green) evoked activity in dorsal IFG, IPL, and pSTS.

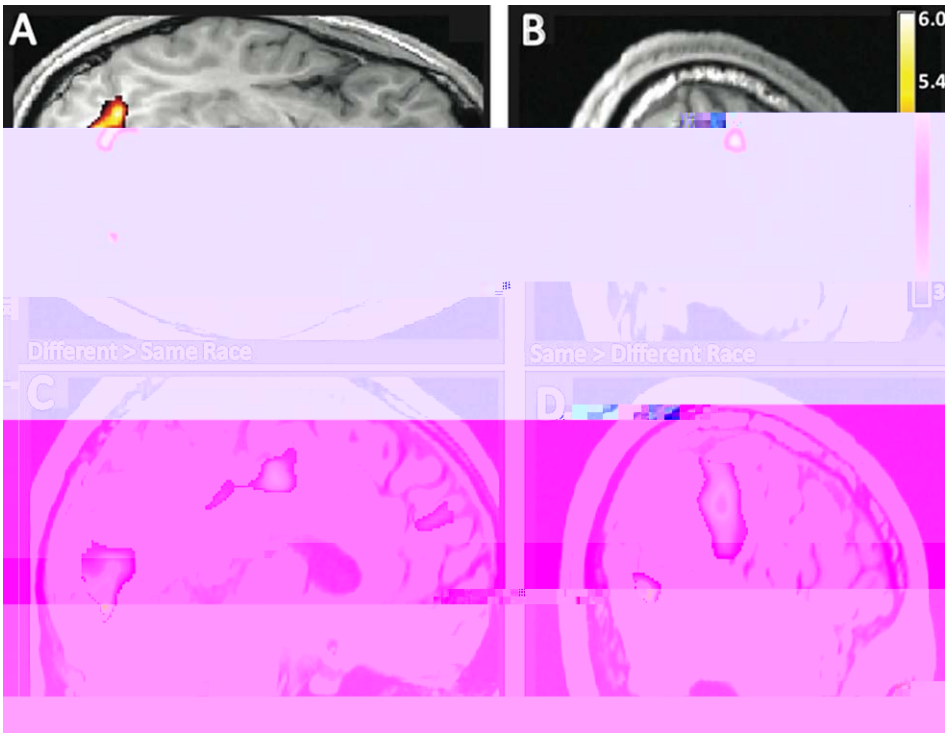

Figure 3.

Race-driven and experience-driven brain responses (all images displayed at $P < 0.001$ uncorrected for visualization purposes). **A**: Observations of another race versus one's own race (DifferentRace > SameRace) evoked greater activity in the occipital cortex bilaterally in the fusiform gyrus and middle temporal gyrus (area V5/MT; not shown; $z = -11$). **B**: Observations of one's own race versus another race (SameRace > DifferentRace) evoked greater activity in the left IPL and right posterior insula (not shown; $x = -59$). **C**: Observations of familiar gestures versus unfamiliar gestures (Familiar > Unfamiliar) evoked greater activity in the dorsal medial prefrontal cortex (dMPFC), the posterior cingulate (PCC), the cuneus, and the bilateral temporoparietal junctions (not shown), regions associated with mentalizing and reasoning processes ($x = -4$). **D**: Observations of unfamiliar gestures versus familiar gestures (Unfamiliar > Familiar) evoked greater activity in the left IPL and postcentral gyrus and the bilateral middle temporal gyri (area V5/MT) in the putative extrastriate body area (EBA; $x = -53$).

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RESULTS

Behavioral Results

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fMRI Results

All gestures versus control still images

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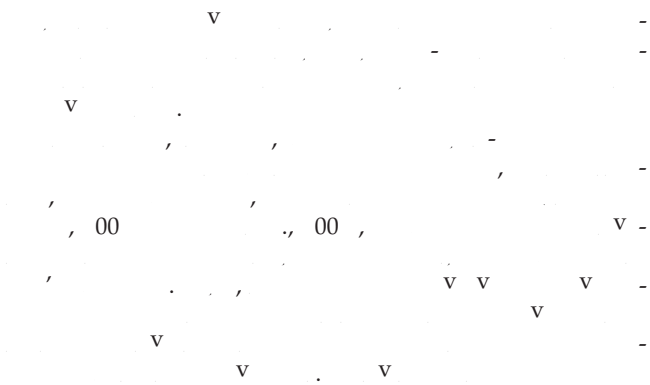
DISCUSSION

Abstract Gestures

Processing Perceptual Familiarity in Individuals of the Same Versus a Different Race

Gesture Familiarity



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