

Dynamic bicultural brains: fMRI study of their flexible neural representation of self and significant others in response to culture primes

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Abstract. This study examined the neural representation of self and significant others in response to culture primes. The study used functional magnetic resonance imaging (fMRI) to measure brain activity in the medial prefrontal cortex (MPFC) in response to culture primes. The results showed that the MPFC was activated in response to culture primes, and that the activation was greater for self-referent primes than for other-referent primes. This suggests that the MPFC is involved in the flexible neural representation of self and significant others in response to culture primes.

Key words: culture priming, independent self-construal, interdependent self-construal, functional magnetic resonance imaging (fMRI), medial prefrontal cortex, self-inclusiveness.

Introduction

The concept of self-inclusiveness has been proposed as a way to understand the relationship between the self and others. Self-inclusiveness is defined as the extent to which individuals include others in their self-concept (Tang & Leary, 2000). This concept is important because it helps to explain why people sometimes act in ways that are inconsistent with their self-interest. For example, people who are high in self-inclusiveness are more likely to help others in need (Tang & Leary, 2000). This is because they see others as part of themselves and therefore care about their well-being. Self-inclusiveness is also important for understanding cultural differences. In individualistic cultures, the self is typically defined in terms of personal attributes and achievements. In collectivist cultures, the self is typically defined in terms of relationships with others (Tang & Leary, 2000). This difference in self-construal leads to differences in self-inclusiveness and, consequently, in behavior.

Self-inclusiveness and self-other differentiation: Evidence from social and cultural psychology

Research in social and cultural psychology has shown that self-inclusiveness is a dynamic process that can change in response to culture primes. For example, exposure to individualistic culture primes increases self-inclusiveness, while exposure to collectivist culture primes decreases self-inclusiveness (Tang & Leary, 2000).

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Bicultural participants

et al., 2000). In a series of experiments, we have shown that bicultural individuals (those who are fluent in both cultures) exhibit a more flexible and context-dependent self-representation compared to monicultural individuals. For example, bicultural individuals are more likely to identify themselves as Chinese when in a Chinese context and as American when in an American context. This flexibility is thought to be a result of the bicultural individuals' ability to activate and use different cultural schemas depending on the situation. This research has important implications for understanding the self and for developing interventions to help individuals better understand and manage their cultural identity.

Western and Chinese culture primes

The study used two different cultural primes to activate different self-representations in bicultural participants. The Western prime was a photograph of a person with a Western appearance, and the Chinese prime was a photograph of a person with a Chinese appearance. These primes were used to test whether bicultural individuals would identify themselves as the person in the photograph when the prime was from their own culture.

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Scanning procedure

The scanning procedure involved presenting participants with a series of stimuli in a specific order. The stimuli included a photograph of a person, a name, and a question. The order of the stimuli was as follows: a photograph of a person (80s), a name (15s), a question (80s), and a null response (15s). The stimuli were presented in a sequence that allowed participants to identify themselves as the person in the photograph. The scanning procedure was designed to measure the brain's response to the stimuli and to identify the neural regions involved in self-representation.

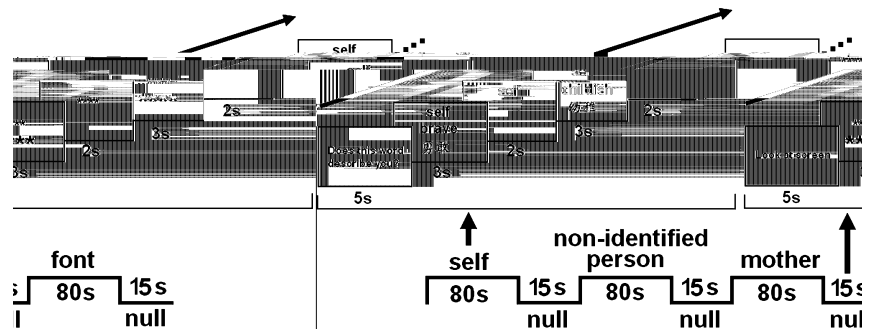


Figure 1 Illustration of the stimuli and procedure.

... (p < 0.05, ...)

... (p < 0.01, ...)

Results

Brain imaging

... (1).

... (10/11).

Table 1 Regions of significant increased activation in comparison between self, mother and NIP with font judgments (corrected, $p < 0.05$)

Region	X	Y	Z	T	Z
...	5	-7	5	-	0
...	0	-7	-17	0	0
...	1	5	-7	5	1
...	7	10	4	0	0
...	1	-0	-7	0	0
...	5	7	-4	-1	0
...	11	-7	1	0	1
...	0	7	1	0	1
...	5	-5	0	-1	1
...	4	1	-5	-1	0
...	5	-	-0	1	-1
...	1	-	0	0	0
...	7	17	-1	1	0
...	10	-	-	1	5
...	10	0	-	0	1

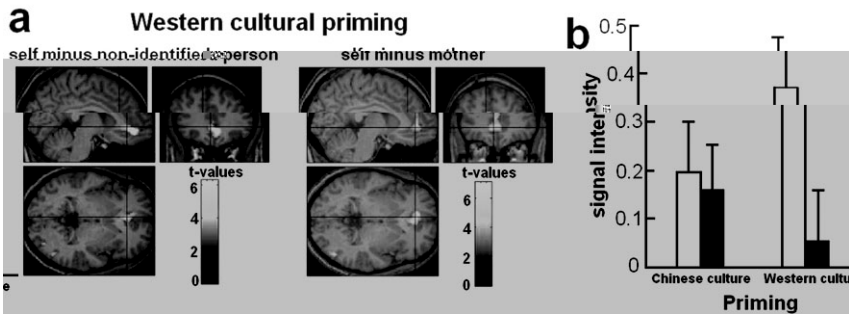


Figure 2 (a) Brain activation observed in the contrasts between self vs non-identified person and between self vs mother after Western cultural priming. (b) Results of region-of-interest analysis of the parameter estimates of signal intensity in the ventral medial pre-frontal cortex. ■, non-identified person; □, self.

Table 2 Mean behavioural performances (SD) during the scanning procedure

	Chinese culture	Western culture	Chinese culture	Western culture
Accuracy (%)	77.1 (10.1)	77.1 (10.1)	77.1 (10.1)	77.1 (10.1)
Reaction time (ms)	1150 (200)	1150 (200)	1150 (200)	1150 (200)
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Reaction time (ms)	1150 (200)	1150 (200)	1150 (200)	1150 (200)

ANOVA ($F(1, 17) = 11.1, p < 0.001$)

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Discussion

Behavioural performance

ANOVA ($F(1, 17) = 11.1, p < 0.001$)

et al. (2000)

... (2010).

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