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The primacy of the individual versus the collective self: Evidence from an event-related potential study

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HIGHLIGHTS

- We embed the present study into a social theory of self-concept.
- The present study uses ERP measures to test the relative primacy of the selves.
- N2 amplitudes are smaller for individual self-relevant than for collective self-relevant stimulus conditions.
- P3 amplitudes are larger for individual self-relevant than for collective self-relevant stimulus conditions.
- The primacy of the individual self is supported at neurophysiologic levels.

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ABSTRACT

Behavioral studies have suggested that the individual self is primary in self-conception as compared to the collective self. The aim of the present investigation was to further investigate the primacy of the individual self versus the collective self at neurophysiologic levels. In the present study, event-related potentials (ERPs) to three types of experimental stimuli (individual self-relevant, collective self-relevant and non-self-relevant stimuli) were recorded while subjects performed a three-stimulus oddball task. The results showed that larger P2 amplitudes were evoked by individual self-relevant and collective self-relevant stimuli than by non-self-relevant stimuli, and that there was no P2 amplitude difference observed between individual self-relevant and collective self-relevant stimuli. Furthermore, N2 amplitudes evoked by individual self-relevant stimuli were smaller than those evoked by collective self-relevant and non-self-relevant stimuli, and no difference was observed in N2 amplitudes between collective self-relevant and non-self-relevant stimuli. Moreover, individual self-relevant stimuli elicited larger P3 amplitudes than did collective self-relevant stimuli, which, in turn, elicited larger P3 amplitudes than did non-self-relevant stimuli. In summary, in addition to finding a classic self-relevant effect at the early P2 processing stage, the present study demonstrates the primacy of the individual self versus the collective self at the N2 and P3 processing stages.

1. Introduction

The question of the self is one of the most important issues in the fields of philosophy and psychology. However, the self is usually conceptualized at the level of the individual self. It has been suggested that both the individual self and the collective self are fundamental self-representations of self-concept [2,12,13,33]. The individual self consists of cognition regarding one's personal traits, states, or behaviors, and contains those aspects of the self-concept that differentiate the person from other persons. In contrast, the collective self involves cognition regarding group memberships, relationships, or social roles, and contains those aspects of the self-concept that differentiate in-group from out-group members [2,33,34].

Although the individual self and collective self are both fundamental and meaningful, they may not be equally fundamental and meaningful. The individual-self primacy hypothesis suggests that the individual self is the more fundamental or primary self, is closer to the core of the self-concept, and is more central to human experience [14–16,34]. In contrast, the collective-self primacy hypothesis suggests that the collective self is the more fundamental or primary self. These two hypotheses are theoretically plausible. However, a number of behavioral studies suggested that the individual self is

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more fundamental. Gaertner et al. [14,15] carried out a series of experiments to test the relative primacy of the selves. They found that unfavorable feedback is felt more negatively and reacted to more intensively when it is directed at the individual self rather than the collective self, suggesting the emotional primacy of the individual self [14]. Furthermore, experiencing a threat to the individual self ignited protective strategies—namely, an identity shift to the collective self to buffer the threat to the individual self. Corresponding protective strategies were not used in situations that posed a threat to the collective self. These results demonstrate the motivational primacy of the individual self [14,15]. del Prado et al. [9] have also provided empirical evidence for the motivational primacy of the individual self by using the Aspects of Identity Questionnaire, in which participants perceived their individual self as more important than their collective self.

Using explicit behavioral measures, these studies have provided evidence supporting the hypothesis of individual self-primacy [9,14,15]. However, it was necessary to test this hypothesis by adopting other experimental materials, tasks, and methods, particularly to investigate the neural correlate underlying the individual self-primacy effect. It has been suggested that one of the advantages of ERPs over behavioral measures is that they can provide an online measure of stimuli processing even when there is no behavioral response [23]. ERPs, which have high temporal resolution, are a good method for exploring the time course of cognitive processing. Indeed, ERPs have frequently been used to investigate the temporal features of emotional/motivational processing [7,19,31,32]. For example, it has been suggested that the late positive component (LPC) is related to emotional/motivational significance, with larger LPC (or P3) amplitudes elicited by emotional stimuli than by neutral stimuli [19,31,32]. Moreover, a growing number of ERP studies have found evidence of the self-relevant effect. For example, it has been found that self-relevant information elicits larger P2 amplitudes than does non-self-relevant information [8,20,26]. In addition, the self-relevant effect has also been observed in the N2 processing stage, with smaller N2 amplitudes elicited by the subject's own handwriting or face than by the handwriting or faces of others [6,22]. Moreover, considerable research indicates that the P3 component could be the most noticeable marker of the self-relevant effect, with larger P3 amplitudes elicited by self-relevant stimuli (e.g. the subject's own name, face, or object) than by non-self-relevant stimuli [1,17,25,27,35]. Additionally, a more recent study has found the P3 component to be sensitive to the degree of self-relevance, such that stimuli with high self-relevance elicit higher P3 amplitudes than do stimuli with low self-relevance [8].

Therefore, ERP measures might be an effective method by which to test the individual-self primacy hypothesis, especially the temporal features underlying this effect. Based on these considerations, the present study utilized ERP measures to test the primacy of the selves. Because the P3 component has been established as a valid index for self-relevant processing and emotional processing [1,17,19,25,27,31,32,35,39], and higher self-relevance contributes to higher P3 amplitudes [8]. Thus, if the individual self is emotionally and motivationally primary in self-conception, individual self-relevant stimuli should elicit larger P3 amplitudes than do collective self-relevant stimuli.

In order to set up an experimental situation similar to real-life settings, where the occurrence of self-relevant stimuli is often task-irrelevant and unpredictable (e.g. detecting one's own name in a noisy cocktail party), the present study used a three-stimulus oddball task, in which subjects engaged in detecting a rare target, and the experimental stimuli (individual self-relevant, collective self-relevant and non-self-relevant stimuli) were interspersed unpredictably in the stream of standard and target trials as distractor stimuli [28]. We selected subjects' own forenames as the individual self-relevant stimuli, and subjects' own surnames as the collective self-relevant stimuli. Forenames, which vary among family members and have abundant individual meanings, are a typical symbol of personal identity. In contrast, surnames, shared in common with other members of the family and inherited from ancestors, are a typical symbol of family identity. Therefore, according to the definitions of the individual and collective selves described above [2,33,34], the forename is a typical individual self-relevant stimulus and the surname is a typical collective self-relevant stimulus.

In summary, using ERPs, the present study aimed to test the primacy of the selves in a three-stimulus oddball task. Moreover, we advocate the primacy of the individual self versus the collective self.

2. Experimental procedures

2.1. Participants

As paid volunteers, 18 Chinese undergraduate students (10 females, 8 males), with an average age of 21.3 years (SD = 1.46), participated in the experiment. All subjects were healthy, right-handed, with normal or corrected to normal vision, and reported no history of affective disorder. Furthermore, all subjects signed an informed consent form for the present experiment.

2.2. Stimuli

Five categories of stimuli were used in the three-stimulus oddball paradigm. A small circle was used as the target stimulus, and a big circle was used as the standard stimulus. The individual self-relevant stimulus (the subject's own forename), the collective self-relevant stimulus (the subject's own surname) and a non-self-relevant stimulus were used as distracters. The non-self-relevant stimulus was a familiar name, which was always the same for each subject. All name stimuli were one-character Chinese words, made into images using Microsoft Office Picture Manager, with the image size matched across the three experimental conditions. The size of each name stimulus was about 3 cm wide and 3 cm high, and subtended a visual angle of $1.43^\circ \times 1.43^\circ$ at a viewing distance of 120 cm.

2.3. Task design

In this study, the big circle was presented 490 times (approximately 64%), the small circle 70 times (approximately 9%), and each set of experimental stimuli 70 times (approximately 9%). The entire experiment was divided into seven blocks, and the sequence of stimuli was randomized across conditions in each block.

In order to familiarize participants with the task, experiment started with 25 practice trials. Each trial was initiated by a 300-ms presentation of a small white cross on the black computer screen. Afterwards, a blank screen was presented with a duration ranging from 500 to 1000 ms, which, was followed by the presentation of one of the five categories of stimuli for 300 ms. For each participant, the task was to detect the small circle interspersed in a train of big circles. Subjects were instructed to press the J key on the keyboard with their right index finger if the stimulus was a small circle; no response was required for the other stimuli. Each stimulus was followed by a blank screen for 1200 ms. After each block, subjects were allowed to rest for several minutes.

2.4. ERP recording and analysis

Electroencephalography (EEG) was recorded from 64 scalp sites using tin electrodes mounted in an elastic cap (Brain Products),