Losing oneself upon placement in another's position: The influence of perspective on self-referential processing

Tianyang Zhang [a], Ying Zhu [a], Yanhong Wu [a,b,*]

[a] D_e_ar__e___ P_c___, P__ U__er__, B__e__, C__a
[b] K_e_ Lab_ra__r__ Mac___e_P__rce___ (M___r_ Ed_ca___), P__ U__er__, B__e__, C__a

A B   A C

Self-referential processing is considered to be an essential index for exploring

Kelley et al., 2002; Lombardo et al., 2010; Moran, Heatherton, & Kelley, 2009; Wu, Wang, He, Mao, & Zhang, 2010; Zhu, Zhang, Fan, & Han, 2007).

A central question in self-referential processing concerns the account and critical influence factor of self-advantage (Klein & Loftus, 1988; Ma & Han, 2010; Symons & Johnson, 1997; Wang, Zhang, & Sui, 2011). Many investigators have noted that human adults not only can assess or remember information related to themselves in their own perspective but also can assess or remember information by adopting the perspective of another person, seeing themselves "from the outside" (Nigro & Neisser, 1983; Robinson & Swanson, 1993; Ruby & Decety, 2004; Ruby et al., 2009; Vogeley et al., 2004). Several investigators have suggested that the perspective may be responsible for self-advantage (Vogeley & Fink, 2003; Vogeley et al., 2004; Wang et al., 2011). For instance, Vogeley and Fink (2003) proposed that the first-person perspective (1PP) is insufficient but necessary for human self-consciousness because the 1PP refers to the centeredness of one's own multimodal experiential space upon one's own body. Consistent with this notion, Wang et al. (2011) used a face orientation identification task to assess the function of the third-person perspective (3PP) in the self-advantage effect by manipulating the perspective. In this study, self-face or friend-face was randomly presented in different orientations on a computer screen; the participants had to judge the orientations of faces from their own position or from another person's position as quickly and accurately as possible within 1000 ms. Wang et al. found that the advantage effect was decreased in the 3PP. They also suggested that the self-advantage in face processing is evident among the participants who adopted the 1PP.

Although these findings support the assumption that self-face advantage benefits from the 1PP, whether the advantage effect is concealed under the difficult 3PP task has not been established (Zacks, Rypma, Gabrieli, Tversky, & Glover, 1999). From the previous results, the participants might sacrifice reaction time to ensure accuracy in the 3PP condition. Moreover, the studies mentioned above specifically concerned perspective in space or action; whether these results could generalize to a perspective on a more abstract level (e.g., perspective in language, nonverbal memory, social interaction or self-reflection) has not been defined. Meanwhile, previous studies have likewise found that self-related information can be categorized to that related to the physical self (e.g., self-face recognition, body recognition or agency) and the psychological self (e.g., personal traits judgment, autobiographical memory). Although some research has reported that making judgments about one's own personality traits, current mental states, and physical attributes share the same neural response modality (Jenkins & Mitchell, 2011), self-face recognition and personal traits judgment manifest in different behavioral and neural response modalities (Devue & Brédart, 2011; Gillihan & Farah, 2005; Van der Meer, Costafreda, Aleman, & David, 2010). Therefore, whether a perspective is responsible for self-advantage and whether the SRE based on self-referential processing is also involved in a perspective have not been established. Additionally, reasons that explain why the 1PP is necessary for self-advantage and why the 3PP can eliminate self-advantage have not been identified.

Compared with completing a face orientation identification task in the other person's position, a simpler task for participants is to reflect on their or others' personal traits in the other person's perspective, given that human adults need to use this social interaction skill to "read other's minds" in everyday life (Baron-Cohen, 1997). In fact, several earlier studies have explored the neural activity of self-referential processing in different perspectives using the self-reference paradigm (D'Argembeau et al., 2007; Ochsner et al., 2005; Ruby et al., 2009). However, these studies have primarily focused on distinct neural regions associated with self-referential processing and perspective and not on whether the perspective is responsible for self-advantage. From the behavioral data, we could not find direct evidence for the perspective that is responsible for self-advantage: Ochsner et al. (2005) found that response times for judgments involving direct appraisals or reflected appraisals (self in the other person's perspective) were made with similar speed; D'Argembeau et al. (2007) found that the primary effect of response times for judgment target and the interaction between judgment target and perspective was not significant. D'Argembeau et al. (2007) noted that different regions of the MPFC are related to self-referential processing and perspective and that the adopted 3PP can decrease self-referential neural processing in the left dorsal MPFC using MRI data. This finding implied that adopting different perspectives might affect self-advantage in self-referential processing.

In the present study, we used a self-reference task in conjunction with different instructions; we measured memory performances to examine whether adopting 3PP during self-referential processing would impair SRE. We used a mixed design with between-subject measures concerning a perspective factor, in which a participant only needs to adopt one kind of perspective (i.e., 1PP or 3PP). This design reduces the difficulty of 3PP, given that the participants do not need to repeatedly change their perspectives within the experimental task (Turk et al., 2012). Before the experiment, the participants were asked to choose a close friend. For the 3PP condition, the participants were instructed to imagine for a minute that they

2. Method

2.1. Par c a   a d d

A total of 42 healthy Chinese participants (26 females and 16 males; 22 ± 2 years old) participated in the experiment. Half of the participants were assigned to the 1PP condition (13 females and 8 males; 22 ± 2 years old), and the other half were assigned to the 3PP condition (13 females and 8 males; 22 ± 2 years old). The participants were all right-handed and had normal or corrected-to-normal visual acuity. None of them had a history of neurological or psychiatric disorders. All of the participants provided informed consent prior to the experiment in accordance with Peking University's Psychology Ethics Committee. The experiment had a 2 (perspective: 1PP or 3PP) × 3 (the type of referential processing: self, close friend, or famous person) mixed design, with repeated measures on the second factor.

2.2. Pr c d r a d   a r a

The participants were first asked to elicit trait judgments based on the 1PP or 3PP condition. In the 1PP condition, the participants were asked to judge, in their opinion, whether an adjective properly describes a specific person. The persons included were (1) self (e.g., "在你看來, 自己是樂觀的嗎?"["According to you, are you optimistic?"]), (2) a friend (e.g., "在你看來, 張天陽是樂觀的嗎?" ["According to you, is Tianyang Zhang optimistic?"]), and (3) someone famous (e.g., "在你看來, 姚明是樂觀的嗎?" ["According to you, is Ming Yao optimistic?"]). In the 3PP condition, the participants were asked to adopt a close friend's perspective during the entire experiment and judge whether an adjective properly describes a specific person. The persons included were (1) self (e.g., "在張天陽看來, 曹志軍是樂觀的嗎?" ["According to Tianyang Zhang (a friend's name), is Zhijun Cao (participant's own name) optimistic?]"), (2) a friend (e.g., "在張天陽看來, 自己是樂觀的嗎?" ["According to Tianyang Zhang, is Tianyang Zhang optimistic?"]), and (3) a famous person (e.g., "在張天陽看來, 姚明是樂觀的嗎?" ["According to Tianyang Zhang, is Ming Yao optimistic?"]). Each trial in the trait judgment tasks consisted of a "cue" sentence (white on a black background) above a personality trait adjective that appeared at the center of the screen for 2000 ms. The "cue" sentence and adjective disappeared, and then the participants had to respond within 3000 ms. After one practice block of five trials, each participant completed nine experimental blocks of 16 trials. Within each experimental block, the participants were asked to respond to one specific person.

After the trait judgment tasks, the participants received instructions for completing a numerical cancellation test within 5 min. During this time period, the participants were instructed to circle all the number 7s in a random number (integer, 0–9) matrix on the papers. This task was used to interfere with the participants' memory and prevent the participants from thinking about other things. After completing this task, the participants were asked to answer an unexpected recognition memory test. A total of 144 previously seen words and 144 never-seen words were randomly presented. The participants made "old" or "new" judgments using the keyboard without a time limit. If an "old" response was selected, they were asked to make a remember/know (R/K) judgment. If the participants could consciously recollect having seen the word in the trait judgment task and could retrieve any specific detail regarding the word, they were instructed to make a "remember" response. However, if they selected an "old" response simply based on a feeling of knowing and could not recollect any detail, they were instructed to make a "know" response. The memory for words can be classified into two types (Tulving, 1985; Van den Bos, Cunningham, Conway, & Turk, 2010; Williams, Conway, & Moulin, 2013): the subjective recollective experience (R-judgment) and the feeling of familiarity (K-judgment). Conway and Pleydell-Pearce suggested that the memory performance of R-judgment should be a solid index to reflect self-referential cognition (Conway & Pleydell-Pearce, 2000). If the 1PP is an essential factor for self-advantage in self-referential cognition, we predicted that R-judgment would be decreased, whereas K-judgment would be increased when the participants assessed a self-trait word in 3PP because the participants might perceive themselves as though they were assessing another person. In contrast, when the participants assessed friend-trait word in the friend's perspective, R-judgment would be increased, whereas K-judgment would be decreased.

A total of 288 unique Chinese adjectives were selected from those used in previous studies on personality trait adjective judgments. Each adjective consisted of two Chinese characters. Half of the words were positive and the other half were negative. Each of the Chinese characters subtended 1.0° ("cue" sentence) or 2.0° (trait adjective) visual angle. The experiment was conducted in a dimly lit room, in which the participants sat approximately 60 cm away from a 21-in. cathode ray tube monitor (1024 × 768 pixel resolution, 85 Hz6l9428s1Tf

and 3PP conditions [(40) = −.735;

''remember'' recognition accuracy of friend's trait words was significantly increased in the 3PP condition. Thus, such an explanation could not account for the current results.

If the memory for self-trait words in the 3PP condition was not decreased due to divided attention, why can the 3PP eliminate self-advantage? Moreover, why is the 1PP necessary for self-advantage? Based on the current results, we speculate that on the representational level (Vogeley & Fink, 2003; Vogeley et al., 2004), the participants use different reference frames when they process the related information of self-others in different perspectives. In the 1PP condition, the participants tend to use egocentric (subject-to-object) reference frames to process the self-related information and allocentric (object-to-object) reference frames to process the others-related information. On the contrary, in the 3PP condition, the participants first need to translate their own viewpoint into the other person's viewpoint. Although the task is centered on the body of the agent, the body of agent, however, is the other person's agent (Klatzky, 1998; Vogeley & Fink, 2003). The participants tend to use allocentric reference frames to process the self-related information and egocentric reference frames to process the others-related information (Fig. 2). Previous studies have shown that two different neural streams exist when the participants use the egocentric and allocentric reference frames; the egocentric and allocentric representa-

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