The Interaction Between Self and Emotion:

A Pilot Study on Self-positivity Bias

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Abstract

We aimed the processing of self-related information under the prime paradigm using event-related potentials (ERPs) to provide evidence for implicit self-positivity bias in Chinese individuals. Due to tight schedule, we only focus on behavioral level. Reaction time was recorded when participants made positive or negative emotional judgments to personality-trait adjectives about themselves or others. It was found that faster responses occurred to self-related positive adjectives and other-related negative adjectives, indicating implicit self-positivity bias at the behavioral level. In the future, we will lay more emphasis on EEG especially three components-N200, N400, P300, and gain neurological evidence of self-positivity bias.

Keywords: Implicit Association Test, Self-Positivity Bias, Self, Emotional Valence

Introduction

The self-positivity bias, referring to a psychological tendency in which individuals perceive themselves in a more positive light compared to others, is very common in our daily life (Alicke et al., 1995; Armor & Taylor, 2002). Imagining in a group of students who have received their exam results, individuals who hold the self-positivity bias may perceive their performance more positively than the average or peers, instead of rating themselves more negative than others (Allison et al., 1989; Heine et al., 2007).

Previous studies indicated that when processing self-related information, participants always had a better performance. In a self-reference paradigm, participants need to rate adjectives on four tasks designed to force varying kinds of encoding: structural, phonemic, semantic, and self-reference (Rogers et al., n.d.; Symons & Johnson, n.d.). Results showed that adjectives rated under the self-reference task were recalled the best, which indicating that self-reference facilitated the processing of information from word stimuli. A meta-analysis examined the magnitude, ubiquity, and adaptiveness of the self-positivity bias, and the results showed that the self-positivity bias is pervasive in the general population but demonstrated significant variability across age, culture, and psychopathology (Mezulis et al., 2004).

Studies on the self-positivity bias suggested that self-referential information is related with a positive emotional valence. One study tested whether mere valence affects self-other comparison in the domain of trait characteristics, and they found that comparative self-positivity biases may be based on a general positivity bias (Pahl & Eiser, 2005). This finding

illustrated that individuals tend to attribute positive traits or outcomes to themselves, while attribute negative traits to the aspects that is not relevant to themselves. Another study examined the relationship between self-reference and emotional valence (Watson et al., 2007, 2008). Participants were required to judge the self-referential content combining with positive and negative words. All the words were divided into two categories based on their emotional valence and self-reference judgements. Within the self-positivity bias, there are self-positive and non-self-negative words that convey positive or neutral information about oneself. Outside of the bias, there are self-negative and non-self-positive words associated with negativity. The results showed that participants responded faster to words within self-passivity bias than to those outside of the bias. That is to say, individuals preferred to positive character traits than negative character traits through rating positive words as self-descriptive and negative words as non-self-descriptive.

Recently, more and more studies have focused on the neural mechanism of the self-positivity bias. One study attempted to identify and separate the processing of self-reference and emotional valence through ERPs. And they found the interaction was identified in ERP waveforms in the time range of N400 component at fronto-central electrode sites, with larger N400 amplitudes for words outwith the self-positivity bias (Fields & Kuperberg, 2015; Watson et al., 2007). Recently, there are many studies pointed out that the medial prefrontal cortex (mPFC) is highly involved in the processing of information relevant to self. A study based on the transcranial magnetic stimulation technology examined the neural correlates of self-enhancement bias, and the results showed that the MPFC played an important role in self-

enhancement (Kwan et al., 2007). An fMRI study revealed that the prioritisation effects for self and positive emotions are tightly linked together, and the MPFC plays a large role in discriminating between positive and negative emotions in relation to self-relevance (Yankouskaya & Sui, 2021).

In the previous studies, the self-report method and self-reference paradigm were widely applied, and there are many factors, such as presentation, culture, age, were found to impact on explicit self-positivity bias (Al-Zahrani & Kaplowitz, 1993; Brown et al., 2009). Except the explicit component, individuals often endorse another type of attitude, that is implicit attitude (unconsciously and automatic) according to the model of dual attitudes (Wilson et al., 2000). The attitude to self is similar. Meanwhile, there are many studies yielded that self-positivity bias varies from western country to eastern country. That is, self-positivity bias may be culturally conditioned (Heine & Hamamura, 2007; Kanagawa et al., 2001).

This study aims to investigate the interaction between self-positivity bias and emotional valence when processing of self-referential information at the implicit level and explore the neural mechanism through the ERPs technology in Chinese background. We hypothesized that self-reference and emotion valences would be highly associated with both the behavioral and electrophysiological levels.

Method

Participants

Fourteen Chinese students (4 males and 10 females: age M = 23.50 and SD = 1.19) were recruited as volunteers. None of the participants had a history of or currently suffered from neurological or psychiatric conditions. All participants were right-handed with normal or corrected-to-normal vision and were treated in accordance with the ethical guidelines of American Psychological Association.

Experimental Design

2 (Prime: self vs others) × 2 (emotional valence: positive or negative) within-subject design is used. Dependent variables are RTs and the amplitude of N200, N400 and P300.

Materials

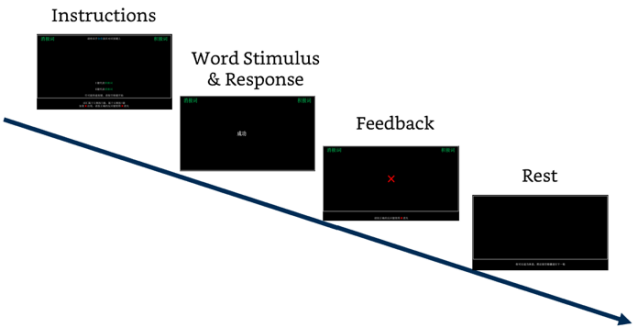
Target word stimuli consisted of 20 affective words (10 positive and 10 negative) selected from materials on GitHub. Each target word was paired with a prime stimulus (I or he), and in total, we had 10 self-positive word pairs (e.g., I: friendly), 10 self-negative word pairs (e.g., I: greedy), 10 other-positive word pairs (e.g., he: friendly) and 10 other-negative word pairs (e.g., he: greedy). All stimuli were presented using PsychoPy.

Procedure

Participants were asked to perform an emotional judgment task (positive/negative) to personality-trait adjectives presented after prime stimuli I or he. “I” was presented in the self-related condition, and participants were asked to imagine themselves. Meanwhile, “he” was presented in the other-related condition, and participants were asked to imagine an unfamiliar other people. Then, participants performed positive or negative emotional judgment tasks to personality-trait adjectives after the prime stimuli in both conditions. Participants indicated their choice by pressing the “I” or “E” key, respectively, on a keyboard with the index fingers of the left or right hand. The whole procedure includes 5 steps, and 2 of them involve both test trial and practice trial. Procedure of one single trial is shown in Figure 1 below.

Figure 1

Procedure of one single trial



Note. There are four parts of one trial. The first one is instructions, which tell participants how to press. Then comes the word stimulus, and participants show response to these stimuli

as quick as possible according to the instructions. Then there will be feedback to their response, and after that there will be a rest.

Results

Behavioral results

A two-way repeated-measures ANOVA, including the factors prime (self vs. other person) and emotional valence (positive vs. negative) on RTs, was performed (Table 1). The interaction between prime and emotional valence was significant, $F(1,13) = 16.57$, $p < 0.001$(Fig.3). The simple effects analysis revealed that participants responded faster to word pairs within the bias (self-positive 268.50 ms; other-negative 297.78 ms) than to those outside of it (other-positive 269.08 ms; self-negative 295.69 ms), which was consistent with the self-positivity bias (Fig. 2). However, the main effects of prime and emotional valence were not significant (Table.2).

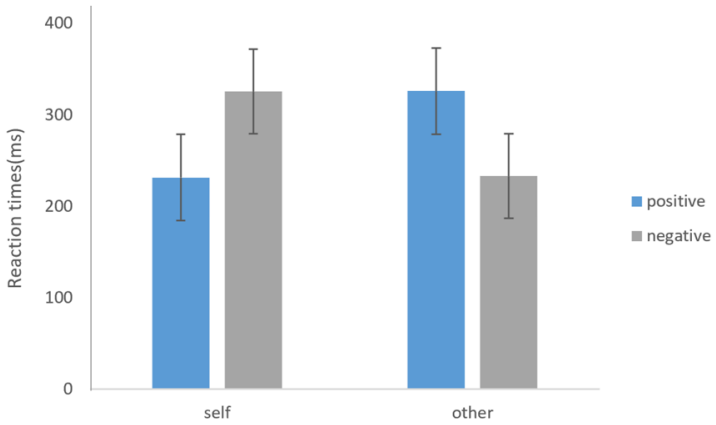
Table 1

The reaction time under different conditions(ms)

	Self-positive	Self-negative	Others-positive	Others-negative
Mean	268.50	295.69	297.78	269.08
SD	99.57	66.85	67.47	97.53

Figure 2

The reaction time under different conditions



Note. It shows mean reaction time for self-positive stimuli, self-negative stimuli, other-positive stimuli, and other-negative stimuli. Participants responded faster to self-positive and other-negative pairs than self-negative and other-positive pairs

Figure 3

The interaction between prime and emotional valence

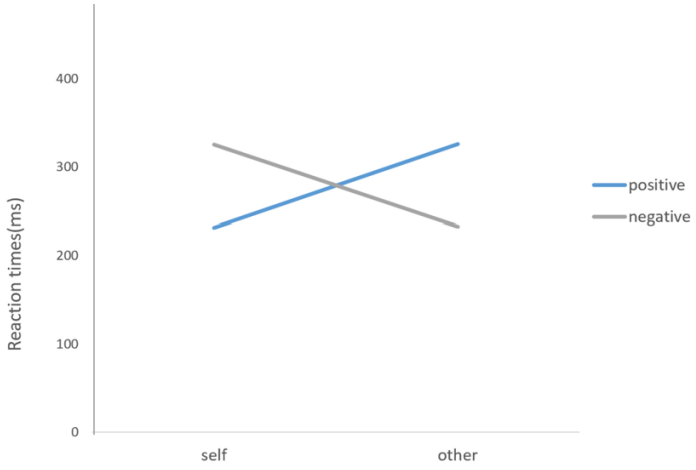


Table 2

Two-way Repeated-measures ANOVA

	F	p	Partial η^2
Prime (main effect)	0.003	0.96	0.00
Emotion (main effect)	0.00	0.98	0.00
Prime x Emotion	16.57	<0.001	0.43

Note. This is the result of ANOVA. It showed that while the main effect of two variables is not significant, the interaction between them is significant.

Discussion

Previous studies indicate that individuals tend to integrate positive information into their self-concept. And the self-reference paradigm is closely linked to the processing of self-relevance and emotional valence, and the interaction between them provides evidence for self-positivity bias (Mezulis et al. 2004; Moran et al. 2006; Pahl and Eiser 2005; Watson et al. 2007, 2008; Zhong et al. 2010).

At the behavioral level, self-related positive words and other-related negative words gain less reaction time. The interaction between prime and emotion in the reaction time confirms implicit self-positivity bias, with faster response to words within the bias than to those outside of it, indicating that information about self and emotional valence is processed highly dependently at implicit level. In addition, faster response to self-priming than to other person priming, which fits the self-schema theory, suggesting that self consists of a highly structured mental representation and that it allows individuals to select and filter input information according to the self-schema and process information about self faster than others (Kihlstrom et al. 2002).

Our results align with existing research, affirming the existence of a self-positivity bias, wherein individuals exhibit a tendency to assign positive emotions to themselves more readily than negative ones. The prevalence of this bias underscores its influence on decision-making processes, as individuals may prioritize or discount information based on its alignment with their positive self-concept. Furthermore, within the realm of social interactions, the self-positivity bias may shape perceptions of others and influence interpersonal dynamics, potentially impacting relationship formation and maintenance. Thus, recognizing and understanding this bias is integral to comprehending the intricate interplay of cognition, emotion, and behavior in human psychology.

Other studies indicated that the implicit self-positivity bias was confirmed in Chinese individuals. The results reverse the viewpoint of cultural relativism that characterizes the self-positivity bias as a uniquely western phenomenon, and it is absent or strongly attenuated in non-western cultures (Anderson 1999; Heine et al. 1999; Mezulis et al. 2004). When researchers compared people's implicit self-esteem in western and eastern cultures, they discovered that people in eastern cultures had an equivalent level of implicit self-esteem. The results are consistent with the perspective of cultural universalism, which regards the self-positivity bias as ubiquitous. However, people in Asian cultures, like China, tend to express it more subtly and implicitly than people in western cultures (Cai et al. 2009; Yamaguchi et al. 2007). Our study also provides evidence for implicit self-positivity bias in Chinese individuals comparing the reaction time with incongruent stimuli. Thus, the bias towards self-positivity is not

unique to Western culture. It's possible that the effect is universal across many cultures, but further research is needed to confirm this.

However, it's essential to acknowledge the limitations of our study. Firstly, the small sample size (14 participants) and limited demographic diversity may restrict the generalizability of our findings. Since we only examined the self-positivity bias in Chinese students within a minimal scale, our study focused primarily on the general population, neglecting potential differences across various demographic groups (e.g., age, gender, cultural background). Future research should aim to replicate these results using larger and more diverse samples to ensure the robustness and reliability of the observed effects. In addition, subsequent studies ought to investigate the ways in which cultural norms, individual differences, and life experiences can impact the expression of self-positivity bias.

Furthermore, we will also consider replacing some of the ambiguous words that would exist in the Chinese context. Certain Chinese words (such as renjia) have different meanings when used in different contexts. As a prime word, it can be used in the first person to refer to oneself, or in the third person to refer to oneself. This may mislead participants so we will make substitutions for these words Moreover, our study utilized a cross-sectional design, limiting our ability to draw causal conclusions about the relationship between self-perception and emotional bias. Longitudinal studies could help elucidate the temporal dynamics and developmental trajectories of self-positivity bias over time.

Additionally, our study employed self-report measures to assess participants' emotional experiences, which could be subject to biases and inaccuracies. Incorporating objective

measures, such as physiological indicators or behavioral assessments, could provide a more comprehensive understanding of the relationship between self and emotion. Some studies have pointed out that P300, N200 and N400 may be used as neuro-indicators of implicit self-positivity bias and to examine these phenomena when cognitive maladjustment occurs in self-awareness. From 200 to 300 ms after target stimulus onset, the N2 amplitude tended to become more negative for self-negative and other-positive words than for self-positive and other-negative ones (Fornells et al. 2006; Jonathan and Folstein 2008). The interaction of prime and emotion also happened with the P300 amplitude, especially at the front regional sites, the front-central regional sites, and the central regional sites. Larger P300 amplitudes occurred for self-positive and other-negative words than for self-negative and other-positive words (Ito and Cacioppo 2000; Gray et al. 2004). Self-positivity bias was also found to modulate the N400 component (Ruixue Xia et al. 2021). The N400 component is sensitive to violations of self-positivity bias in the priming paradigm in the present study and reflects differential memory activation due to priming (Franklin et al. 2007; Rhodes and Donaldson 2008; White et al. 2009). So we will incorporate the measurement of EEG to mutually validate with existing results.

In conclusion, while our pilot study offers some insights into the interaction between self and emotion, there is still much to explore and understand in this complex relationship. Addressing the limitations outlined above and embarking on future research endeavors will contribute to a more nuanced understanding of how individuals perceive and experience emotions in relation to themselves.

Random Thoughts*

Sexism always refers to a reflection of hostility toward women. While behind this conception, a truth which has been hindered is: the positive subjective feelings towards women that are frequently accompanied by sexist antipathy (Glick & Fiske, 1996). The ambivalent sexism inventory (ASI) divided sexism into two sets of sexist attitudes: hostile and benevolent sexism. In contrast, benevolent sexism (BS) encompasses a set of interconnected attitudes towards women that involve stereotypical views and limited roles, yet are subjectively positive in terms of emotional tone for the individual holding these attitudes. Furthermore, benevolent sexism tends to elicit behaviors commonly classified as prosocial, such as helping, or intimacy-seeking, like self-disclosure (Glick et al., 2000).

These two sets of sexism attitudes are pervasive but vary in type: from benevolent to hostile and implicit to explicit. And compared to the explicit prejudice (which referring to HS here), this implicit, invisible, and unrecognized attitude may bring more negative effects on women. A study indicated that undergraduate women who experienced benevolent sexism reported higher levels of surveillance and shame, constructs associated with self-objectification (Shepherd et al., 2011). Except on campus, in the workplace, BS negatively impacted participants' self-efficacy in mixed-sex interactions, and further impacted the performance in workplace (Jones et al., 2014). Previous studies revealed the negative effects of BS on women's well-being from many aspects, such as self-incompetence, relational self-descriptions, justified restrictions (Barreto et al., 2010; Dumont et al., 2010; Moya et al., 2007).

The current studies suggested the associations between women's psychological health and BS. As a prejudice seeing everywhere in life, it is easy to internalize such a negative attitude. Moreover, BS often involves warm, prosocial elements, making it less easily recognizable as a prejudice compared to the more overtly HS.

However, few research focuses on the mechanism between self and BS. Specifically speaking, can women recognize BS, and are they able to reject it even if it contains prosocial and warm components? Are women who endorse benevolent sexism actively accepting or passively accepting? I am expecting to answer these questions through investigating the mechanism between self-positivity bias and BS at the implicit level in the future.

***Note**: Sorry for adding this section which is not up to the requirement of the APA format. After the first presentation of our group work, and in the sequent progress of preparing this task, I found the self-positivity bias can be combined with the very interesting and invisible phenomenon: benevolent sexism. Because the time available to us was limited, it is a very big pity for me to explore more about it. But I still want to share these random thoughts for you.

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