The effects of the concreteness of differently valenced words on affective priming

Zhao Yao, Zhenhong Wang *

School of Psychology, Shaanxi Normal University, Xi'an, Shaanxi, 710062, China

ABSTRACT

This study aimed to determine whether affective priming is influenced by the concreteness of emotional words. To address this question, we conducted three experiments using lexical decision-priming task. In Experiment 1, positive-abstract (PA) and positive-concrete (PC) words were used as primes to examine the effect of the concreteness of positive words on affective priming, and in Experiment 2, negative-abstract (NA) and negative-concrete (NC) words were used as primes to examine the effect of the concreteness of negative words on affective priming. Results showed that participants responded faster to affectively congruent-abstract trails than incongruent-abstract trails in PA prime conditions, but for PC or negative word (NC and NA) prime conditions, there were no differences between the response times of congruent trails and incongruent trails. To examine the reliability of the priming effects observed in Experiments 1 and 2, we set up a neutral condition as a baseline in Experiment 3, through which we confirmed the difference in the affective priming effect between positive and negative primes in a concrete–abstract dimension. PA words were found to have the tendency to possess more emotional load and facilitate affective association between the prime and the target. The study finding suggests that aside from arousal and valence, the concreteness of positive words also has an impact on affective priming effect.

© 2013 Elsevier B.V. All rights reserved.

1. Introduction

The affective priming effect refers to the facilitated response to a target when it is preceded by an affectively congruent prime instead of an affectively incongruent prime (see Fazio, 2001). For example, target words (e.g., *wedding*) that are preceded by prime words with the same valence (e.g., *happy*) produce quicker responses than those preceded by prime words with the opposite valence (e.g., *corpse*). Although current literature on affective priming has focused on the contributions of arousal and valence to the affective priming effect (De Houwer, Hermans, Rothermund, & Wentura, 2002; Hinojosa, Carretie, Mendez-Be´rtolo, Mı´guez, & Pozo, 2009; Spruyt, Hermans, De Houwer, Vandromme, & Eelen, 2007; Steinbeis & Koelsch, 2009; Thomas & LaBar, 2005; Zhang, Lawson, Guo, & Jiang, 2006), recent studies suggested that the concreteness of words plays an important role in affective processing (Kanske & Kotz, 2007; Kousta, Vigliocco, Vinson, Andrews, & Del Campo, 2011; Tse & Altarriba, 2009; Wang & Yao, 2012). Based on such relationship, the present study explored the contributions of concreteness of words to affective priming.

As so far, the vast majority of studies have examined the contributions of arousal and valence of words to the affective priming effect. For instance, Thomas and LaBar (2005) reported that high-arousing
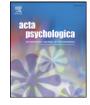
negative words (taboo words) showed greater priming effect than low-arousing negative and neutral words in the lexical decision task. Hinojosa et al. (2009) demonstrated that the processing of high-arousing incongruent trials, as compared with high-arousing congruent trials, was associated with enhanced amplitude of a late positive component (LPC) that peaks approximately 500 ms after the presentation of the stimulus, whereas no difference was observed between low-arousing congruent and low-arousing incongruent trials. Aside from arousal, valence dimension has also been the focus of affective priming research. Zhang et al. (2006) used pictures and words as primes to investigate visual affective priming effects. They reported that the individuals responded faster to affectively congruent trials than to affectively incongruent trials. Steinbeis and Koelsch (2009) reported that participants evaluated emotional words congruous to the affect expressed by a preceding chord (chord-positive words) faster than words incongruous to the preceding chord (chord-negative words).

Studies have shown that the size of priming effects between positive and negative prime words is different. Neutral and positive words as primes yielded significant priming effects, whereas negative primes did not (Rossell & Nobre, 2004; Rossell, Shapleske, & David, 2000; Sass et al., 2012). One explanation for such results is that the emotional cue of a prime can govern both the activation and use of affective associations (Clore & Storbeck, 2006; Gasper, 2004). Specifically, a positive affect increases accessibility and the use of associations, whereas a negative affect inhibits it (Storbeck & Clore, 2005).

* Corresponding author. Tel./fax: +86 29 85303312.
  E-mail address: wangzhenhong@snnu.edu.cn (Z. Wang).

Another explanation is that the positive affect supports a holistic processing mode, characterized in memory by the activation of wide semantic fields, including weak or remote associates. By contrast, negative affect supports an analytic processing mode, characterized by a more restricted spread of activation to close associates and dominant word meanings (Bolte, Goschke, & Kuhl, 2003). Thus, positive and negative primes are known to have facilitatory or inhibitory roles in affective priming.

Studies have found that concreteness has an impact on the processing of emotional words. Generally, concrete words (it refers to specific objects or events, e.g., *apple, corpse*) are found to have cognitive processing advantages over abstract words (it refers to more general and/or complex concepts, e.g., *courage, revenge*). Such a characteristic defines the so-called "concreteness effect" (Paivio, 1991). Interestingly, when a word contains not only a conceptual component that reflects an object or event but also an emotional component that reflects a certain attitude or emotion (for example, the word "*wedding*" contains both the concept of "*ceremony*" and the emotion of "*happiness*"), the emotional feature and concreteness can influence each other in processing the words (Kanske & Kotz, 2007; Wang & Yao, 2012). For example, Wang and Yao (2012) found the advantage of concrete words disappearing whenever concrete and abstract words both contained emotional concepts in the lexical decision task. Tse and Altarriba (2009) found that the concreteness effect occurred for positive words but not for negative words in immediate serial recall. Additionally, an fMRI study exploring the relation between the concreteness and emotionality of words suggested that emotional valence ratings significantly predicted concreteness ratings. More valenced words tend to be more abstract, whereas neutral words tend to be more concrete. And for abstract words, ratings of emotionality predicted modulation of BOLD (blood oxygen level dependent) signal in the rostral anterior cingulate cortex, an area associated with emotional processing (Vigliocco et al., 2013).

With respect to the interaction between concreteness and emotionality of words, Kousta et al. (2011) proposed a new hypothesis of how emotionality of words plays roles in the processing of concrete and abstract concepts. Specifically, they proposed that concrete and abstract words are composed of different types of information: experiential information (sensory, motor, and affective) and linguistic information. The processing of concrete and abstract words differs according to the composition of sensory, motor, or affective information in the word, with sensory-motor information being more preponderant for concrete concepts and affective information being more preponderant for abstract concepts. Researchers proposed that the processing advantage for abstract words was due to differences in affective information between concrete and abstract words, abstract words tend to be more affectively associated or have a higher emotional load than concrete words (Kousta et al., 2011; Vigliocco, Meteyard, Andrews, & Kousta, 2009; Vigliocco et al., 2013). Note here that affective association or emotional load should be considered as a continuous variable spanning across words of all types (rather than a variable identifying the special category of emotion words, as originally hypothesized by Altarriba, Bauer, & Benvenuto, 1999), which implies that the meaning of words is related to emotion in semantic memory but binds together different weights and amounts of affective information. In this sense, all kinds of words (regardless of whether they are concrete or abstract words) contain affective information to some extent, but they all concerned with the emotion weakly or strongly. In view of the differences in affective association between concrete and abstract words, we inferred that concrete and abstract words should play different roles in the processing of affective priming. However, whether the concreteness of words influences on affective priming effect by virtue of abstract words having more affective associations than concrete words, it remains an open question.

Taken together, a large number of studies to date have investigated the contribution of arousal and valence of words to affective priming, but only a few have considered the role of concreteness of words. According to literature on the relationship between emotionality and concreteness, the first aim of the present study is to investigate whether concreteness influences affective priming in the lexical decision-priming task, thereby expanding and enriching current literature on affective priming. We hypothesized that abstract primes showed stronger affective priming than concrete primes. According to the different roles of primed valence, the second aim of the present study is to replicate past research demonstrating the difference in positive and negative primes in priming processing. We hypothesized that a significant affective priming effect occurred for positive primes but not for negative primes in a concrete–abstract dimension. In exploring these issues in the present study, concrete and abstract words that shared similar polar valence and arousal as primes were separately set up in Experiments 1 and 2. Additionally, we completed a third experiment using a neutral condition as a baseline to examine the reliability of priming effects elicited by positive and negative prime words in a concrete–abstract dimension.

2. Experiment 1: the contribution of positive concrete and abstract prime to affective priming

2.1. Method

2.1.1. Participants

Forty two right-handed volunteers (18 males, 24 females; mean age = 21.6) from Shaanxi Normal University participated in this experiment. All participants reported normal or corrected-to-normal vision, and received monetary compensation for participating in the study.

2.1.2. Materials

Words that were presented in our study were selected from Chinese Affective Words System (CAWS) (Wang, Zhou, & Luo, 2008). Word pairs were made based on four pools of stimuli (see Appendix): 9 positive-concrete words (PC: e.g., *gift, feast*), 9 positive-abstract words (PA: e.g., *talent, honor*), 9 negative-concrete words (NC: e.g., *refugee, burglar*), and 9 negative-abstract words (NA: e.g., *false, deprive*). In a previous phase, a 120-word list (30 words each) was evaluated by 25 subjects (different from those who participated in the LDT), who rated the valence, arousal, concreteness and familiarity of each word on a 9-point scale (9 being very positive, very activating, very concrete or very familiar, respectively). Words that were presented to participants in the formal experiments were selected

Table 1

Means of valence (1, negative to 9, positive), arousal (1, calming to 9, arousing), and concreteness (1, abstract to 9, concrete).

	Valence	Arousal	Concreteness	Familiarity	Strokes
Positive concrete primes	6.8	5.7	6.8	5.2	15.9
Positive abstract primes	6.8	5.6	4.4	5.3	15.8
Negative concrete primes	2.9	5.8	6.7	5.0	16.2
Negative abstract primes	3.0	5.5	4.3	5.1	15.4
One-way ANOVA on each factor	$F_{(3,32)} = 438.1$, $p < .000$	$F_{(3,32)} = 1.38$, $p = .27$,n.s	$F_{(3,32)} = 176.7$, $p < .000$	$F_{(3,32)} = 1.16$, $p = .34$,n.s	$F_{(3,32)} = 1.48$, $p = .24$,n.s

n.s. = nonsignificant. ANOVA = analysis of variance.