Short Communication

A study on the metaphor of social exclusion from embodied cognition

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The research seeks to further understand the metaphor between social exclusion and coldness. In study 1, participants primed with social exclusion estimated that food contains more calories, compared with participants in the control condition, while in study 2, participants categorized words presented on a computer screen. However, social exclusion words were categorized more quickly in the cold font than in the hot font. These findings are consistent with the embodied cognition theory. The research demonstrates that the priming of social exclusion induces an actual feeling of coldness, and the connection between social exclusion and physical coldness is automatic and unconscious.

Key words: Conceptual metaphor, embodied cognition, social exclusion, temperature, psycholinguistics, social cognition, cognitive psychology.

INTRODUCTION

The association between social exclusion and physical coldness exists in different languages, such as English and Chinese. The theory of 'conceptual metaphor' holds that metaphor is not merely a linguistic phenomenon, but a cognitive matter (Lakoff and Johnson, 1980). Metaphor allows people to think abstractly because it links abstract concepts to concrete sensory experiences, for example, social exclusion is physical coldness (Zhong and Leonardelli, 2008), good is up (Meier and Robinson, 2004), bad is down (Meier and Robinson, 2006), powerful is up (Schubert, 2005), and morality is cleanliness (Schnall et al., 2008; Zhong and Liljenquist, 2006). Without such links, concepts would lack reference to the physical world and it would be difficult to communicate to other people (Lakoff and Johnson, 1999).

Arsh found that some personality traits (such as generous, sociable, popular, and humane) are related to hot-cold dimension (Asch, 1946). In Williams and Bargh's study (Williams and Bargh, 2008a), participants who held a cup of hot coffee assessed a target person much warmer than participants who held a cup of cold coffee. In a recent study by Zhong and Leonardelli (2008), participants who recalled a social exclusion experience estimated room temperature lower than the participants in the control condition. We conducted a study to further understand the metaphor between social exclusion and physical coldness, and we tested whether the connection between social exclusion and physical coldness is automatic or unconscious.

METHODOLOGY

Study 1

Study 1 examined whether the priming of social exclusion will result in an actual feeling of coldness by estimating food calories. We predicted that participants primed with social exclusion, compared with participants in the control condition, would feel colder and estimate food to contain more calories.

This experiment argues that if social exclusion could induce physical coldness, the participants, at this very moment, would need to eat food with more calories so as to keep out of cold, and that if they were asked to estimate how many calories the present food contained, the participants who felt cold would overestimate the number of calories contained in the food.

Participants

A total of 44 undergraduates from Hebei Normal University took part

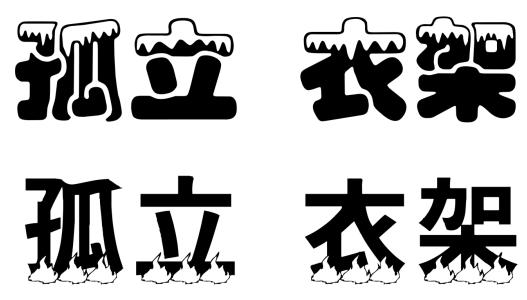*Corresponding author. E-mail: luzhongyi@mail.hebtu.edu.cn.
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Figure 1. Example of words presented in Study 2.

in the experiment.

Materials and procedure

In this study, we primed people with a scrambled-sentences task (Costin, 1969; Schnall et al., 2008). Participants were asked to complete a scrambled-sentences task involving 40 sets of four words each (in Chinese). By underlining any three words in a set, a sentence could be formed. In the exclusion condition, half of the sets contained words related to the theme of social exclusion (for example, rejection and discrimination), and the other sets contained only neutral words. In the control condition, all 40 sets contained only neutral words.

Subsequently, participants were instructed to estimate the number of calories of a hamburger on the table, with range from 0 to 600 calories (Williams and Bargh, 2008b), although they were not aware of the experimental hypothesis.

Study 2

In study 2, we tested whether the connection between social exclusion and physical coldness is automatic and unconscious. If so, conceptual processing of social exclusion would be facilitated by the presentation of cold-related cues. In the study, participants were asked to categorize social exclusion and control words that appeared in a font suggestive of either hot or cold temperatures; and we predicted that participants categorized social exclusion words more quickly when they are paired with fonts suggestive of cold temperatures.

Participants

A total of 25 undergraduates from Hebei Normal University took part in the experiment.

Materials and procedure

Study 2 was completed using Pentium-IV computers with the Windows XP operating system and E-Prime software (Version 2.0). The experimental stimuli were 10 social exclusion words in Chinese (for example, rejection and discrimination), while the control stimuli were 10 furniture-related words in Chinese (for example, bookcase and mattress). However, there was no difference between social exclusion words and control words in terms of word frequency or word length (ps > 0.50).

Participants were taken to the laboratory, and were told that the experiment concerned how people categorize words in different fonts. The font of the words was suggestive of either a hot or cold temperature (Figure 1). All the words were in black and white (Wilkowski et al., 2009) and each word was presented at the center of a computer screen. Participants were told that font appearance was a task-irrelevant information and they were asked to ignore the information. Participants were instructed to categorize each word for social-interactions-related or furniture-related as quickly and accurately as possible, by pressing one of the two keys on the keyboard (1-key and 0-key). Consequently, the response options (1-key and 0-key) were counterbalanced across participants. Correct trials were separated by a blank screen for 200 ms, and if participants were inaccurate, the word "INCORRECT" appeared in red font for 1,500 ms. Each of the words was presented twice in the hot font and twice in the cold font. Stimulus presentation order was generated randomly across participants by the computer, with the constraint that each word/font combination had to appear once before any word/font combination could be repeated (Wilkowski et al., 2009).

RESULTS

Study 1

Measurement values, beyond 3 standard deviations in either direction from the mean of participants' assessment result, were considered outliers and as such, were removed. In total, 2 participants' data were removed. Participants in the exclusion condition estimated that the food contained more calories (M = 354.27; SD = 110.62), than participants in the control condition (M = 284.70;

SD = 86.31). As a result, F (1, 40) = 5.09, p<0.05 and partial η2 = 0.11. In accordance with the assumption, it suggests that people primed exclusion improves sensitivity to the energy of the food. In addition, social exclusion can induce an actual feeling of physical coldness.

Study 2

Inaccurate trials were dropped from the analysis (3.4% of trials), and because RT data are typically skewed positively, RTs were subsequently log-transformed. Finally, to reduce the undue impact of outliers, RTs 2.5 SDs above or below the mean (2.3% of trials) were replaced with cutoff scores (Robinson, 2007; Wilkowski et al., 2009). Although the analyses involved these log-transformed means, the descriptive statistics was reported in terms of the original millisecond unit for ease of the interpretations. Consequently, A 2 (Word type: social exclusion versus control) × 2 (Cue type: hot versus cold) repeated measures analysis of variance (ANOVA) was performed on the RTs.

The main effect of 'cue type' was significant [F (1, 24) = 6.038, p = 0.022], indicating that participants evaluate the words in the cold font (M = 565.14 ms) faster than in the hot font (M = 585.30 ms), while the main effect of 'word type' was not significant [F (1, 24) = 3.503, p = 0.073]. Of utmost importance, the interaction of word type × cue type was significant [F (1, 24) = 12.490, p < 0.01, partial η2 = 0.342]. Participants categorize social exclusion words faster when presented with words in the cold font (M = 551.24 ms; SD = 72.49 ms), than in the hot font (M = 588.84 ms; SD = 76.02 ms) [F (1, 24) = 15.99, p = 0.001]. The variable "cue type" did not influence the categorization of RT for furniture-related words (hot font M = 581.76 ms, SD = 75.00 ms; cold font M = 579.04 ms, SD = 71.95 ms) (F < 1). All additional effects in these analyses were not significant (Fs < 1).

DISCUSSION

We find that the abstract concept of social exclusion is related to bodily experiences of physical coldness. These findings are consistent with predictions of embodied cognition theory, and people's social experience is not independent of physical and somatic perception (Barsalou, 2008; Ijzerman and Semin, 2009; Ijzerman and Semin, 2010; Landau, Meier, and Keefer, 2010; Meier, Robinson and Clore, 2004; Moeller, Robinson, and Zabelina, 2008; Zhong and Leonardelli, 2008). In summary, the findings suggest that the priming of social exclusion induces an actual feeling of coldness, and the connection between social exclusion and physical coldness is automatic and unconscious.

Limitations of the research

Social exclusion causes physical coldness. However, due to the limitations of the experimental methods, we consider that this effect is weak. Issues concerned need to be further studied, such as "Will social exclusion and physical coldness activate the same brain areas?", conversely, "Can physical coldness give rise to social exclusion?", "Are sufferers of autism more sensitive to physical coldness than normal people?", etc.

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