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ROUND SHAPES ARE FOR DATING, SQUARE SHAPES ARE FOR BUSINESS: PRIMING THE CONCEPT OF WARMTH AND COMPETENCE ACTIVATES THE REPRESENTATION OF SHAPES

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Abstract

Research in cognitive linguistics suggests that individuals understand abstract concepts by using knowledge of the superficially dissimilar, and more concrete concepts through conceptual metaphors. Previous studies have reported round-warm and square-competent associations: such that curved shapes (e.g., rounds) increase the perception of warmth and angular shapes (e.g., squares) enhance the perception of competence in a metaphor-consistent manner. The study investigated whether manipulating abstract concepts (e.g., social judgments) influenced the processing of concrete concepts (e.g., shapes). Participants were asked to select round or square ornaments in a restaurant in a dating (warm) or a business (competent) situation. Results indicated that participants in the dating condition selected more round ornaments whereas those in the business condition selected more square ornaments, revealing that the representations of a round shape were activated in the dating condition, whereas the representations of a square shape were activated in the business situation. The theoretical implications of this finding are discussed.
Keywords*: cognitive linguistics, metaphor-consistent effects, round and square, social judgments.*

Introduction

Shapes are an important visual feature providing information about the physical world. They also play a role as concrete signals representing various personality traits and representing more abstract concepts. For example, it has been reported that round shapes are related to weakness, gentleness, mildness, kindness, comfortableness, approachableness, and harmony, whereas angular shapes are associated with hardness, harshness, cruelty, toughness, strength, and individuality (Berlyne,1974; Jiang, Gorn, Galli, & Chattopadhyay, 2016; Lundholm, 1921; Zhang, Feick, & Price, 2006). More recent research based on the stereotype content model (Fiske, Cuddy, Glick, & Xu, 2002) has suggested that the round shape is associated with the trait of warmth and the square shape is related to the trait of competence (Liu, Bogicevic, & Mattila, 2018; Okamura & Ura, 2018a, 2018b). These findings support the effect of exposure to shapes on social judgments.

The concrete-abstract association has been explained by the conceptual metaphor theory (CMT: Lakoff & Johnson, 1980). The authors have elucidated that "the essence of metaphor is understanding and experiencing one kind of thing in terms of another" (Lakoff & Johnson, 1980, p.5),

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and proposed the CMT in which metaphors create meanings at a cognitive level. CMT consists of two elements: a source and a target concept. The authors have pointed out that metaphors function as conceptual mappings between source concepts and superficially different target concepts. One characteristic of these concepts is that source concepts represent concrete knowledge and embodied experiences, whereas target concepts, in contrast, represent more abstract knowledge that is difficult to comprehend. Psychological research has demonstrated that manipulating source or target concepts result in the activation of the other concept in a metaphor consistent manner (see Landau, Meier, & Keefer, 2010), which is known as the metaphor consistent effect. Williams and Bargh (2008), for example, reported that touching a warm cup increased impressions of warmth and friendliness toward another person, which is suggestive of the conceptual metaphor AFFECTION IS WARMTH (Grady, 1997). Likewise, shapes are also mapped onto more abstract personality traits. Linguistic expressions such as "a *well-rounded* character" and "be there or be *square*" support metaphoric mapping.

The directionality of metaphor-consistent effects has been the topic of extensive debate because the directionality could be critical for clarifying the mechanisms of these effects. One assumption is that the link between the concrete, or the source concept, and the abstract, or the target concept, is unidirectional. Casasanto and Boroditsky (2008), for instance, have reported that information about how objects relate to one another in space influences how people construe abstract temporal relations. However, activating information about time does not influence how people construe spatial relations. On the contrary, the other assumption is that the link is bidirectional. He, Chen, and Li (2014) have demonstrated that perceptions of weight influence the processing of power concepts and the processing of power concepts influence perceptions of weight. Therefore, the directionality of the effect has been inconsistent in different studies. Moreover, the mediator and moderator variables influencing directionality are unclear. IJzerman and Koole (2011) suggested that most metaphor-consistent effects could be bidirectional and pointed out that CMT could explain bidirectional effects because even metaphors with unidirectional representational structures could, with repeated use, produce bidirectional psychological effects. Lee and Schwarz (2012) noted that psychological effects differed from linguistic patterns. In daily language, metaphors are always unidirectional. However, in psychological representations, metaphors could be bidirectional. The processing of conceptual metaphors might differ from their psychological consequences.

Based on these findings, it was hypothesized that the metaphor-consistent effect of shapes and social judgments is bidirectional. As mentioned above, previous studies have shown that shape priming influences social judgments in a metaphor-consistent manner (e.g., Okamura & Ura, 2018a). Therefore, the purpose of the present study was to investigate the opposite effect: the influence of the concept of warmth and competence priming on the activation of representations of shapes. Of primary interest was whether priming the warmth trait would lead to activate the representation of a round shape, whereas priming the competence trait would lead to activate the representations of a square shape.

Research Methodology

General Background

An online survey was conducted for the purpose of recruiting participants with a wide range of age. Data analysis was conducted using HAD ver. 15.106, a free software program for statistical analysis (Shimizu, 2016). The survey was conducted in October 2018.

Participants

Sample sizes were calculated using G*Power 3.1.9.2 (Faul, Erdfelder, Lang, & Buchner, 2007) and the parameters alpha = .05, the power = 0.8, and the effect size f = .25 based on Cohen (1988). All participants were office workers (100 men and 100 women; aged between 20 and 59 years). We obtained informed consent from the participants.

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Experimental Stimuli

The 12 identical colored images that were used in Study 1 by Liu, Bogicevic, and Mattila (2018) were used as dependent variables with the consent of the authors. Six of these images are round ornaments, whereas the other six are square ornaments.

Procedure

All participants were recruited through a Web-based survey company. They were assigned to one of two conditions (dating or business). Participants assigned to each condition were asked to read and imagine the respective scenario and select the ornaments that were in a restaurant (see sample scenario in Appendix 1). Finally, as a manipulation check, participants responded to two additional questions: one inquired about the degree of felt warmth or the degree of felt competence in the dating or the business situation (e.g., "*To what extent did you feel warmth on the situation?*", whereas the other question inquired about the participants' preferred shape in the forced-choice (round or square) task ("*Which shape do you prefer?*").

Then, the participants responded to the 16-item Warmth-Competence Scale, which comprised eight items assessing warmth and eight items assessing the competence of their personality (see Appendix 2 for the complete scale). This scale was developed based on Hofstee, De Raad, and Goldberg (1992). In responding to the scale, the participants rated the extent to which statements such as, "*I am interested in other people*", and "*I learn quickly*", were applicable to them using a 5-point Likert scale ranging from 1 (*very inaccurate*) to 5 (*very accurate*).

Research Results

An independent chi-square test was conducted on shape preferences, which revealed that a round shape (57.0%) was preferable to a square shape (43.0%; χ^2 (1) = 3.92, p = .048, φ = .14). The test also showed that men preferred a square shape (59.3%) to a round shape (40.7%), whereas women preferred a round shape (57.0%) to a square shape (43.0%; χ^2 (1) = 4.59, p = .032, φ = .15).

Then, a manipulation check was conducted using a one-way analysis of variance (ANOVA) to confirm whether imagining each situation aroused feelings of warmth or competence. The result showed that the participants in the dating condition (M = 2.98, SE = .07) felt more warmth than those in the business condition (M = 2.79, SE = .05; F (1, 198) = 4.23, p = .041, η_p^2 = .02). Conversely, participants in the business condition (M = 2.74, SE = .07) felt more competence than those in the dating condition (M = 2.53, SE = .07; F (1, 198) = 4.45, p = .036, η_p^2 = .02). These results indicated that the manipulation was valid.

An analysis of covariance (ANCOVA) was conducted with the selection of round or square shapes as the dependent variables, and the condition (dating or business situation) as the independent variables, with the shape preference as a covariate. This indicated significant effects of the covariate (F (1, 197) = 33.62, p < .001, η_p^2 = .15) and conditions (F (1, 197) = 4.54, p = .034, η_p^2 = .02). Participants in the dating condition (M = 3.12, SE = .14) were more likely to select round ornaments than those in the business condition (M = 2.71, SE = .14), and those in the business condition (M = 3.41, SE = .15) were more likely to select square ornaments than those in the dating condition (M = 2.76, SE = .15; F (1, 198) = 9.76, p = .002, η_p^2 = .05), revealing that the representations of a round shape were activated in the dating condition, whereas the representations of a square shape were activated in the business situation.

An exploratory factor analysis was conducted on the responses to the 16-item Warmth-Competence Scale using the maximum likelihood estimation and Promax rotation. Our theoretical perspective assumed that the factor-structure of the scale would consist of two dimensions; warmth and competence. The results indicated a good fit to the data (χ^2 (89) = 225.13, p < .001, CFI = .92, RMSEA = .09, AIC = 295.95). The two dimensions that were identified were interpreted as competence (α = .87) and warmth (α = .91). An ANOVA conducted on the mean scores of each items of warmth and competence as the dependent variable indicated no significant difference of dating (F (1, 198) = 1.01, p = .32, *ns*) or business (F (1, 198) = 1.67, p = .20, *ns*) condition.

Discussion

The result for shape preference in this study was consistent with previous findings: individuals tended to prefer round to angular shapes (e.g., Bar & Neta, 2006; Blazhenkova & Kumar, 2018). This phenomenon has been found in both Western and non-Western cultures, and in newborn babies as well as other primates, supporting the universality and innateness of the preference of the round shape (Gómez-Puerto, Munar, & Nadal, 2016) despite that the mechanisms that underlie this shape preference remain to be clarified.

The bidirectionality of metaphor consistent effects has been reported in various studies. The result of the present study sheds light on this issue by providing two new findings: one confirmed the directionality from social judgments to shapes, and the other suggests shapes are selected in a context-dependent regardless of the preference for roundness or squareness. Importantly, this is the first study to demonstrate that social judgments of warmth and competence can be mapped onto the more concrete concepts of roundness or squareness. This finding supports CMT and suggests the possibility of psychological effects in the direction from the abstract to the concrete, which are opposite to original linguistic mapping that is from the concrete to the abstract (Lee & Schwarz, 2012). In addition, priming the concept of warmth or competence did not affect the estimation of warmth or competence as a personality characteristic of the participants. This could be because the priming effect, which is likely to occur when a target is ambiguous (e.g., Olivers & Meeter, 2006), was not significant because self-reported personality traits are remarkably stable over time (McCrae & Costa, 1994).

Problems have been reported in replicating social priming effects (e.g., Earp & Trafimow, 2015). Nevertheless, the ANCOVA in this study indicated that the social priming effect of warmth and competence on shape selection did not diminish when shape preference was considered as a covariate, suggesting that the priming effect was strong enough to influence judgments. However, more research is needed to replicate the findings of the present study and identify the mediators and moderators of this effect. For example, the goal system framework (Motoki, Saito, Nouchi, Kawashima, & Sugiura, 2018; Zhang & Risen, 2014) was submitted regarding the social and physical warmth. It argues that physical warmth increases preference for the relevant products in relation with the participants' goal. When the participants are in warm ambiance, they are likely to have goals to reduce the warm and prefer cold food (e.g., sushi). Hence, it would of course be valuable to replicate the results of the present study using the framework.

In this study, square shapes were only focused among different angular shapes. This is because the square is unique in that it is a pure creation of the human mind because of its singularity, homogeneity, regularity, and symmetry (Pinna, 2011). However, the concept of angular shapes includes other shapes such as triangles and spikey objects. Gómez-Puerto, Munar, and Nadal (2016) have pointed out that a unified term indicating the lack of curvature does not exist (e.g., sharp, straight, angular). Hence, it cannot be determined whether priming of the concepts of warmth and competence has an identical influence on judgments of square and other angular shapes. Further research is required to clarify this issue.

Conclusions

This research highlighted the metaphor-consistent effect on shapes and social judgments: the influence of the concept of warmth and competence priming on the activation of representations of shapes. In conclusion, this research provides support of CMT and proposes the possibility of psychological effects of the metaphor-consistent effects in the direction from the abstract to the concrete.

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Appendix 1

Sample scenario and images

1. On a weekend night, you and your fiancé (or your business partner) go out to a new restaurant named "TARRAGON", which opened a few months ago. There is a signboard at the store front. Which type of signboard do you feel would be there?

2. You enter the restaurant and look around. You find that the crystal ceiling lights convey an elegant, modern feeling. Which type of ceiling lights do you feel would be hanging from the ceiling?

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3. You find that the waiting area is decorated with fresh flowers and candles. Which type of flowers and candles do you feel would decorate the waiting area?




4. You look at an abstract painting on the wall. Which type of painting do you feel would be hanging on the wall?


5. A waiter greets you with a smile and takes you to a table. Which type of table do you feel you would be directed?


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Appendix 2

Warmth

1. Am interested in people.
2. Make people feel at ease.
3. Know how to comfort others.
4. Inquire about others' well-being.
5. Take time out for others.
6. Make people feel welcome.
7. Show my gratitude.
8. Make others feel good.

Competence

1. Learn quickly.
2. Use my brain.
3. Excel in what I do.
4. Do things in a logical order.
5. Come straight to the point.
6. Seek explanations of things.
7. Need things explained only once.
8. Believe in a logical answer for everything.

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