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FlashReport

Warmth, spatial proximity, and social attachment: The embodied perception of a social metaphor

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ABSTRACT

Recent experiments in embodied social cognition suggest a fundamental link between physical warmth and social affiliation. Findings from two experiments support the hypothesis that physical warmth serves as a symbolic cue signaling the close proximity of a source of affiliation. In Experiment 1, participants perceived a warm object as being physically closer than a cold object. In Experiment 2, being primed with warmth led participants to display higher levels of self-reported social affiliative motivation. In both studies, effects were moderated by individual differences in attachment style; priming effects were pronounced among those low in attachment avoidance and those high in attachment anxiety. These findings contribute to a growing literature suggesting deep connections between perception, physical experience, and social cognition.

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Introduction

Up is moral. Large is mighty. Warm is friendly. Social life is filled with powerful metaphors (Bargh & Shalev, 2012; Ijzerman & Semin, 2009, 2010). Recent work in embodied cognition suggests that such metaphors may be rooted in people's physical interactions with their environment (Barsalou, 2008; Ijzerman & Semin, 2009, 2010; Kaschak & Maner, 2009; Zhong & Leonardelli, 2008; cf., Landau, Meier, & Keefer, 2010).

The current research focuses on a key social metaphor – that linking physical warmth with social affiliation – and it aims to advance the literature in two ways. First, we investigate hypothesized links between warmth and perceptions of physical proximity – a variable that is intrinsically tied to social affiliation (Ijzerman & Semin, 2010). Second, we investigate the possibility that the psychological links between warmth and social affiliation are moderated by a person's attachment style.

Warmth is frequently used to characterize interpersonal relationships. Expressions such as a “warm friendship” or a “cold shoulder” rely on an understanding of warmth as a proxy for psychological intimacy (Ijzerman & Semin, 2009; Lakoff & Johnson, 1999). Williams and Bargh (2008) demonstrated that merely holding a warm cup of liquid led people to perceive a social target as more affable – as “warmer.” Experiencing warmth can even increase people's sense of emotional intimacy in their relationships (Ijzerman & Semin, 2009).

Conversely, feeling lonely is accompanied by a perception of physical coldness (Ijzerman & Semin, 2010; Zhong & Leonardelli, 2008) and actual reductions in body temperature (Ijzerman, Gallucci, et al., 2012). Thus, physical warmth serves as a powerful metaphor for social affiliation, such that people's minds bridge the gap between physical and social experiences.

But why is social affiliation linked to the feeling of warmth as opposed to, say, the smell of roses? From the perspective of embodied cognition, the association between physical and social warmth is grounded in some aspect of physical or perceptual experience. Here, we suggest that the physical experience of warmth signals that a potential source of affiliation is nearby (in the literal sense of being physically close). From the first moments of life, infants experience physical warmth emanating from the body of their mother. Bowlby (1969) suggested that infants require physical contact with caregivers, which, among other things, involves the experience of bodily warmth. Indeed, an important element of the experience of physical warmth is that warmth is spatially limited. For example, human bodies are warm, but one must be close to a body to feel its warmth. That is, warmth implies spatial proximity to the heat source. As such, people may employ perceptions of warmth as a means of interpreting abstract concepts like social closeness or intimacy (Ijzerman, Karremans, Thomsen, & Schubert, in press; Williams, Huang, & Bargh, 2009).

Based on the expectation that salient temperature perceptions (warmth or coldness) activate affiliative concepts (Bargh & Shalev, 2012), we derive a number of novel hypotheses about the way people should respond when primed with physical warmth. First, if physical warmth is a cue to the proximity of an affiliative target, warm objects should be perceived as physically closer than cold objects. We tested this hypothesis in Experiment 1. Notably, the hypothesis also fits with

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research suggesting that desired objects are perceived as physically close (Balcetis & Dunning, 2010).

Second, priming people with physical warmth should increase their level of social affiliative motivation. Several theories of motivation suggest that, as proximity to a goal increases, so too does a person's motivation for seeking that goal (Fishbein & Ajzen, 1974; Förster, Liberman, & Friedman, 2007). If physical warmth signals that a source of affiliation is nearby, then warmth should increase people's desire for social bonding. We tested this hypothesis in Experiment 2.

Third, if the warmth–affiliation metaphor involves using warmth as a cue to the proximity of an affiliative target, then the two hypothesized effects described above should be moderated by attachment style (Ijzerman & Koole, 2011; Ijzerman, Gallucci, et al., 2012). Attachment style reflects a person's chronic schemas pertaining to social intimacy (Bowlby, 1969) and is thought to reflect two dimensions: avoidance and anxiety.

The avoidance dimension is conceptualized as a person's level of discomfort with intimacy (Fraley & Shaver, 2000; Hazan & Shaver, 1994). Secure individuals tend to be low in avoidance; they are able to easily maintain intimate relationships with others. Thus, we expected that people low in avoidance would perceive a warm object as spatially close and to respond with increases in affiliative motivation. People with avoidant attachment styles, in contrast, shy away from intimacy and psychologically distance themselves from others (DeWall et al., 2011; Tidwell, Reis, & Shaver, 1996). Thus, we did not expect physical warmth to increase perceptions of spatial proximity for individuals high in avoidance. Indeed, if warmth implies the presence of a close other, avoidant individuals might even be motivated to view those objects as more spatially distant. Thus, we predicted that warmth would promote perceptions of spatial proximity and increases in affiliative motivation among individuals low (but not high) in attachment avoidance.

Although our primary hypotheses pertained to attachment avoidance, we also explored possible moderating effects of attachment anxiety. We considered two possible moderating patterns. On one hand, people high in anxiety are presumed to have developed that anxious style because they lacked secure connections with early caregivers (Bowlby, 1969). Thus, one might not expect strong effects of warmth among anxious individuals because they may have lacked an early experiential basis for the warmth–affiliation metaphor. Alternatively, anxious individuals presumably have had at least some opportunities to experience the link between physical and social warmth and, moreover, they are especially motivated to maintain and increase intimacy with others (Brennan, Clark, & Shaver, 1998; Feeney & Collins, 2001). From this perspective, one might expect that effects of warmth would be especially pronounced among those high in attachment anxiety; i.e., stronger among those high in anxiety than those low in anxiety. Our studies allowed us to differentiate between these two moderating patterns.

Experiment 1

Participants briefly held either a hot or cold cup of water (see Williams & Bargh, 2008). They then reported their perceptions of spatial distance between themselves and the cup.

Method

Participants

One hundred sixteen undergraduates (ages 18–46; 80 women, 36 men) participated for course credit.

Materials and procedure

First, the experimenter unobtrusively asked the participant to hold a cup (for approximately 5 s) of either hot water or ice water (condition was randomly assigned). Next, the experimenter explained that the

first part of the experiment involved a spatial perception task in which participants would estimate their proximity to the cup. Balcetis and Dunning (2010) reported that “self-report measures where participants supply numeric assessment of perceptual experiences reflect the same types of biases as perceptually based measures.” Therefore, to increase reliability we assessed participants' distance perceptions using both a self-report and a perceptually based measure. Participants stood facing a wall 120 inches away. The experimenter placed the cup on a table by that wall; above were two pieces of tape 26 inches apart. First, participants reported (verbally) how far away they perceived the cup to be (in inches). Second, we used a distance-matching procedure similar to what Balcetis and Dunning (2010, Study 3b) used. Participants were asked to stand such that the distance between themselves and the cup matched the distance between the two lines of tape on the wall. The experimenter measured the distance from the cup to the front of the participant's shoe; standing further away from the cup indicated that participants perceived the cup as closer. The self-report measure and the perceptual measure were standardized and combined (after reverse scoring the perceptual measure, so that higher scores reflected greater perceived distance).

Participants then completed the Experiences in Close Relationships Questionnaire – Revised (ECR-R; Fraley, Waller, & Brennan, 2000) to measure attachment avoidance (e.g., “I get uncomfortable when a romantic partner wants to be very close.”; $\alpha = .95$) and anxiety (e.g., “I often worry that my partner will not want to stay with me.”; $\alpha = .94$) on 7-point scales from *strongly disagree* to *strongly agree*. The manipulations did not affect responses to the ECR-R in either study. Participants also underwent an exploratory manipulation in which they wrote about a caregiver, a threat, or a neutral topic (before holding the cup). No main or moderating effects of this procedure were observed and it is not discussed further.

Results and discussion

Five participants were excluded after freely volunteering their foreknowledge of Williams and Bargh's (2008) hot/cold cup manipulation.¹ There were no main effects or interactions associated with gender in either study, so it is not discussed further.

We regressed the composite measure of perceived distance on experimental condition (hot vs. cold cup), level of attachment avoidance, anxiety, and their interactions. There was no main effect of warmth condition ($\beta = -.03$, $p = .72$). However, warmth (versus coldness) did interact with both avoidance ($\beta = .41$, $p < .001$, semi-partial r (sr) = .32; Fig. 1) and anxiety ($\beta = -.23$, $p = .05$, $sr = -.18$).

We interpreted these interactions by testing the simple effects of warmth condition at high and low levels (mean ± 1 SD) of avoidance and anxiety. First, consistent with our hypotheses, participants low in avoidance perceived the warm cup as closer than the cold cup ($\beta = -.45$, $p < .01$, $sr = -.27$); participants high in avoidance displayed the opposite tendency, perceiving the warm cup as further away than the cold cup ($\beta = .38$, $p < .05$, $sr = .23$). Second, participants high in anxiety perceived the warm cup as (marginally) closer than the cold cup ($\beta = -.27$, $p = .08$, $sr = -.16$); no effect of temperature was observed among participants low in anxiety ($\beta = .20$, $p = .18$).

We also tested the simple effects of avoidance and anxiety within the warm and cold conditions. Relative to those high in avoidance, participants low in avoidance perceived the warm cup as closer ($\beta = .37$, $p < .05$, $sr = .21$) and the cold cup as further away ($\beta = -.46$, $p < .01$, $sr = -.25$). Participants high in anxiety perceived the cold cup as marginally further away ($\beta = .33$, $p = .08$, $sr = .17$) than those low in anxiety. There was no effect of anxiety on perceptions of the warm cup.

¹ Analyses including those 5 participants produced similar results.

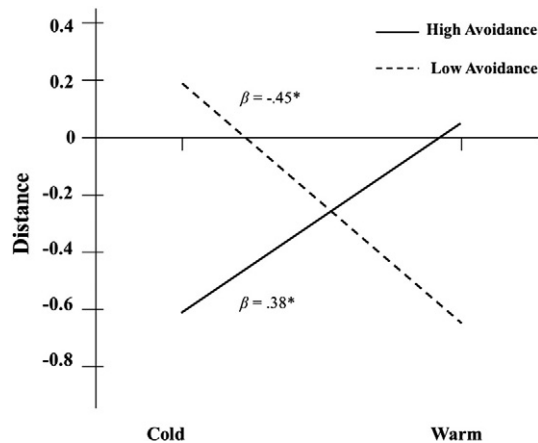


Fig. 1. Interaction between warmth and attachment avoidance on distance perception. * $p < .05$.

We also examined effects on the two measures of perceived distance individually. The interaction between temperature and avoidance was observed for both the perceptual measure ($\beta = .39$, $p < .01$, $sr = .30$) and the self-report measure ($\beta = .25$, $p < .05$, $sr = .19$). Among those low in avoidance, the warm cup was perceived as significantly closer than the cold cup on both measures ($ps < .05$). (Among those high in avoidance, the warm cup was perceived as further away on the perceptual measure ($p < .05$), but not the self-report measure ($p = .46$)). Thus, regardless of the measure, participants low in avoidance viewed warmth as closer than coldness. No significant interaction between temperature and anxiety was observed for either of the two measures.

Findings from Experiment 1 are consistent with the hypothesis that priming people with warmth would promote perceptions of spatial proximity, but that this effect would depend on individual differences in attachment avoidance. Although we saw some evidence for the moderating effect of attachment anxiety, this pattern was relatively weaker and less consistent than that for avoidance.

Experiment 2

If warmth signals proximity to a source of affiliation, then being primed with warmth should increase affiliative motivation because the closer one is to a goal the more one tends to desire that goal. Based on the findings of Experiment 1, we predicted that this effect would be evident primarily among individuals low in attachment avoidance (and perhaps also high in attachment anxiety).

Method

Participants

Seventy-six undergraduates (ages 18–46; 63 women, 13 men) participated for course credit.

Materials and procedure

Participants were randomly assigned to sit either on a chair with a heat pad set to 'low heat,' or on an unheated chair (thus, unlike the "cold" condition in Experiment 1, this represented a neutral control). Participants completed two measures designed to assess affiliative motivation. First, participants completed the Need to Belong (NTB) scale (e.g., "My feelings are easily hurt when I feel that others do not accept me." $\alpha = .83$), responding on 5-point scales from *strongly disagree* to *strongly agree* (Leary, Kelly, Cottrell, & Schreindorfer, 2007). Second, participants completed the Interpersonal Orientation Scale (IOS; e.g., "I would find it very satisfying to be able to form new friendships with whomever I

liked." $\alpha = .90$), responding on 5-point scales from *not at all true* to *completely true* (Hill, 1987). As in Experiment 1, participants also completed the ECR-R.

Results and discussion

Two participants removed the heat pad and were excluded. We tested whether warmth increased self-reported affiliative motivation by regressing the NTB and IOS on warmth condition, avoidance, anxiety, and their interactions. For NTB, we observed a main effect of warmth ($\beta = .21$, $p < .05$, $sr = .21$) such that people in the warmth condition reported greater need to belong. More importantly, warmth interacted with attachment avoidance ($\beta = -.35$, $p < .01$, $sr = -.31$) and anxiety ($\beta = .36$, $p < .01$, $sr = .32$); see Fig. 2. Similar interactions were observed for the IOS (with avoidance: $\beta = -.39$, $p < .01$, $sr = -.35$; with anxiety: $\beta = .36$, $p < .01$, $sr = .33$).

These interactions conceptually mirrored those observed in Experiment 1. Participants low in avoidance (1 SD below the mean) responded to warmth with heightened NTB ($\beta = .56$, $p < .001$, $sr = .37$); no effect was observed among participants high in avoidance ($\beta = -.14$, $p = .38$). Participants high in anxiety also responded to warmth with heightened NTB ($\beta = .57$, $p < .001$, $sr = .38$); no effect was observed among participants low in anxiety ($\beta = -.15$, $p = .35$). We observed the same pattern for the IOS. Participants low in avoidance responded to warmth with higher IOS ($\beta = .49$, $p < .01$, $sr = .32$); no effect was observed among those high in avoidance, and the trend was in the opposite direction ($\beta = -.38$, $p = .08$). Participants high in anxiety responded to warmth with increased IOS ($\beta = .46$, $p < .01$, $sr = .31$), whereas those low in anxiety did not ($\beta = -.34$, $p = .11$). Thus, consistent with our expectations, warmth increased self-reported affiliative motivation among those low, but not high, in attachment avoidance. Moreover, consistent with findings for the composite measure in Experiment 1, warmth increased affiliation among those high, but not low, in attachment anxiety.

We also examined the effects of attachment style within the warmth and control conditions. Relative to those high in avoidance, participants low in avoidance responded to warmth with more self-reported affiliative motivation (NTB: $\beta = -.42$, $p < .05$, $sr = -.26$; IOS: $\beta = -.47$, $p < .05$, $sr = -.29$). In the warmth condition, participants high in anxiety displayed more affiliative motivation than those low in anxiety (NTB: $\beta = .82$, $p < .01$, $sr = .38$; IOS: $\beta = .40$, $p < .05$, $sr = .27$). No significant effects of avoidance or anxiety were observed in the control condition.

General discussion

Priming people with physical warmth altered their perceptions of spatial proximity and self-reported levels of affiliative motivation.

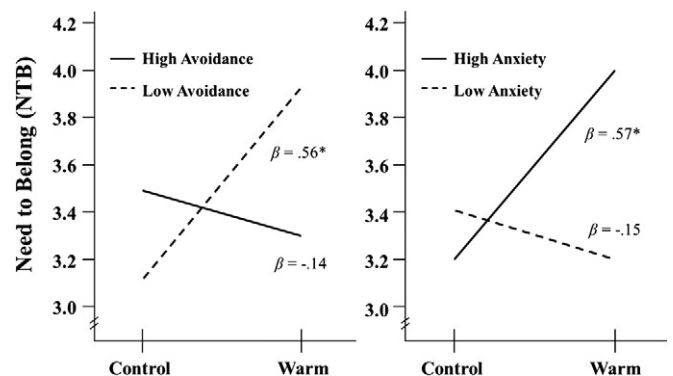


Fig. 2. Interactions between warmth and attachment orientations on responses to the Need to Belong scale. * $p < .001$.

The specific pattern of effects, however, depended on attachment style. As predicted, individuals low in avoidance responded with perceptions of spatial proximity and increased affiliative motivation. High levels of avoidance blocked these effects and, if anything, avoidant individuals responded to physical warmth in the opposite way (greater perceptions of distance and lower affiliative motivation). This pattern fits with the relationship schemas of those low versus high in avoidance. Effects of warmth were also observed among those high, but not low, in attachment anxiety. This is consistent with the view of anxious individuals as strongly desiring closeness and intimacy. More broadly, these findings are consistent with a view in which physical warmth is linked with social intimacy in part because physical warmth signals that a source of affiliation is nearby. Individuals low in avoidance and high in anxiety may perceive warm objects as close because warmth signals that affiliation is potentially available.

The current findings are the first to report on perceptions of spatial proximity as they relate to the warmth–affiliation link and they are the first to demonstrate independent moderating effects of attachment avoidance and anxiety. Our work adds to a burgeoning literature suggesting that the experience of physical warmth is an important component of social affiliative cognition (Ijzerman & Semin, 2010). For instance, our findings are consistent with previous evidence suggesting that warmth increases prosociality (Ijzerman, Gallucci, et al., 2012). Although we did not test the developmental processes through which the metaphorical association between warmth and affiliation might develop, evidence for the moderating effect of attachment style is consistent with the possibility that the association might be based on and perpetuated by close physical interactions people have with sources of social affiliation, perhaps beginning with early infant–caregiver attachments.

The current findings imply that warmth can activate social affiliative motives. This can be contrasted with previous evidence suggesting that warmth partially satisfies people's affiliative desires (Bargh & Shalev, 2012). Whether warmth activates versus satisfies affiliative goals may depend on a dynamic interaction between the degree of warmth and a person's level of affiliative motivation. For example, if someone is very thirsty, a sip of water might amplify that person's desire for water, whereas swallowing a liter of water is likely to sate the person's thirst. This view fits with existing theories of motivation, which suggest that achieving goal-relevant rewards can both increase people's motives (i.e., “getting begets wanting”; Vohs & Baumeister, 2007) or temporarily inhibit those motives (Förster et al., 2007), depending on whether the goal is fully satisfied.

A recent explosion of research demonstrates that social–physical metaphors play a powerful role in social life. The current experiments advance the literature by linking the warmth–affiliation metaphor to perceptions of spatial proximity and by demonstrating that both attachment avoidance and anxiety moderate the warmth–affiliation connection. An important goal for future research is to investigate the developmental processes (e.g., parent–child bonding) through which the warmth–affiliation metaphor originates. The current work provides a valuable springboard for tackling such investigations.

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