

Cold and Lonely: Does Social Exclusion Literally Feel Cold?

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Abstract

Metaphors such as *icy stare* and *cold reception* depict social exclusion using cold-related concepts; they are not to be taken literally and certainly do not imply reduced temperature. Two experiments, however, revealed that social exclusion literally feels cold. Experiment 1 found that a recall of a social exclusion experience led to lower estimated room temperature than the recall of an inclusion experience. Experiment 2 directly induced social exclusion through an online virtual interaction (Williams, Cheung, & Choi, 2000) and found that being excluded relative to being included led participants to report greater desirability for warm foods and drinks. These findings are consistent with the embodied view of cognition and support the notion that social perception involves physical and perceptual content. The psychological experience of coldness not only aids our understanding of social interaction but also is an integral part of our experience of social exclusion.

Deprivation of social contact is stressful to both humans and animals. Being rejected by others induces not only anxiety (Baumeister & Tice, 1990; Beck, Laude, & Bohnert, 1974) and depression (Coie, Terry, Zakriski, & Lochman, 1995), but also pain – the experience of social exclusion activates brain areas that are known to regulate physical pain (Eisenberger, Lieberman, & Williams, 2003). Although there is little doubt that social exclusion has significant adverse effects on our psychological and physical well-being, this paper asks a different question: Does social exclusion literally feel cold?

Loneliness and coldness seem to go side by side in everyday language. In a popular 1970's song *Lonely This Christmas*, for example, Nicky Chinn and Mike Chapman wrote, "It'll be lonely this Christmas, lonely and cold, it'll be cold so cold, without you to hold." This linguistic coupling between social isolation and coldness may reflect people's predisposition to use concepts that are based on bodily experience (e.g., cold) to describe complex concepts such as social rejection (Lakoff, 1987). For example, early research revealed that traits such as generous, sociable, popular, and humane cluster around the impression of a "warm" person (Asch, 1946) and lecturers tended to receive lower audience participation when they were described, prior to presenting, as "cold" rather than "warm" (Kelley, 1950). At the extreme, members of groups that are seen as cold and incompetent (e.g., the homeless) activate brain patterns in observers that resembled those of non social objects (Harris & Fiske, 2007).

Not only do people consciously describe social interactions using temperature concepts, they understand interpersonal situations differently depending on temperature concepts that are activated incidentally. In a recent study by Williams and Bargh (2008), the experimenter asked participants to hold a cup of hot or cold coffee temporarily before having them fill out some trait assessments of a person. This very implicit temperature manipulation changed people's later

assessment of personality traits: contact with a cup of hot coffee led individuals to rate a random person as warmer and friendlier than contact with a cup of cold coffee. As Lakoff and Johnson (1980) and Bargh (2006) noted, metaphors are not simply isolated concepts; they are constellations of concepts and experiences established through our interaction and negotiation with the natural and social environment and are then later used to understand more complex interactions.

Metaphors are not usually literal (e.g., Galinsky & Glucksberg, 2000) – the term *icy stare* makes no reference to actual experience with ambient temperature. In fact, metaphors have been typically considered unidirectional (Bargh, 2006; Lakoff & Johnson, 1980), such that concepts learned earlier such as coldness should prime more abstract ones such as interpersonal interaction (Williams & Bargh, 2008), but priming interpersonal interaction should not affect experience with ambient temperature (Bargh, 2006; Lakoff & Johnson, 1980). Boroditsky (2000), for example, found that priming spatial information affected how people construe time, but priming temporal information did not influence how people think about space. Recent studies, however, suggested otherwise. In a number of experiments, Zhong and Liljenquist (2006) found that people not only describe moral transgressions using terms related to physical cleanliness (e.g., he has a *clean* record), they actually experience the need to physically cleanse after recalling past misdeeds. This suggests that how people think about moral concepts influence how they perceive physical cleanliness. Likewise, Schubert (2005) showed that priming power automatically induced positional reference such that words related to high power physically placed below words related to low power are judged more slowly than the other way around. In both cases, priming complex and abstract experience (i.e., morality and power) changed the perception of physical concepts (i.e., cleanliness and spatial relationship).

These recent findings are consistent with theories in embodied cognition and perceptual symbols. Embodied theories argue that cognition includes not only abstract and modal mental representations but also amodal perceptual content from various sensors (Barsalou, 1999; Varela, Thompson, & Rosch, 1991, p. 172). These perceptual inputs are recorded by systems of neurons in sensory-motor regions of the brain that capture information about perceived events in the environment and in the body (Barsalou, 1999). They are then later used in perception, categorization, and judgment to construct and run simulations, similar to mental models. In other words, thinking is argued to involve perceptual simulation (Schubert, 2005). Thus, when asked to pick pairs of words typed with the same finger (e.g., FV) or different fingers (e.g., FJ), skilled typists were more likely than novice typists to select the latter pair with less typing interference even though they could not explain why (Beilock & Holt, 2007). This suggests that in skilled typists, perceiving letters prompts covert sensorimotor simulation of typing them, which in turn influences affective judgments about this information. Similarly, the activation of elderly stereotype has been shown to automatically induce behavioral changes consistent with the stereotype, leading people to actually walk slower (Bargh, Chen, & Burrows, 1996).

If thinking involves perceptual simulation of the senses, possibly including thermal perception, we expect that experiencing social rejection can induce an actual feeling of coldness because coldness perception often covaries with social exclusion. This association may be rooted in our early experience with caregivers as well as later interactions with general others. As an infant, being held closely by the caregiver produces warmth, whereas distance from the caregiver induces coldness. This basic exposure may produce our first understanding that social closeness equals warmth, whereas social distance equates coldness (Williams & Bargh, 2008). The same correlation may be experienced in later stages of our lives as well when social company elevates

ambient temperature as a result of increased body heat emission or when cold weather reduces human contact. Indeed, warmer weather has been associated with increased crimes that involve interpersonal contact such as assault (Sommers & Moos, 1976). Thus, our experience of loneliness is often accompanied by the perception of reduced ambient temperature; experience of social exclusion may not only evoke conceptual metaphors that aid in the understanding of the situation but also activates perceptual and sensory simulations that change our perception of the ambient temperature.

Two experiments tested whether social exclusion induces an actual feeling of coldness by asking participants to estimate current room temperature (Experiment 1) and indicate their preference for warm versus cold foods or drinks (Experiment 2). We expect that priming social exclusion, as opposed to inclusion, will lead participants to report lower room temperature and a preference for warm foods or drinks. Together, these studies suggest a psychological connection between social exclusion and coldness that has not been previously captured in the literature.

Experiment 1

This experiment investigated whether recalling past experience of social exclusion can induce the feeling of coldness, measured by room temperature estimate. A total of 65 undergraduates at the University of Toronto voluntarily participated in exchange for course credit. Upon arrival, participants were led to a cubicle and told that the experiment consisted of several unrelated tasks. In the first task, they were randomly assigned to one of two conditions, recalling a situation in which they felt being socially excluded or included. Afterwards, the experimenter asked participants to estimate the current room temperature. As a cover story the experimenter explained that this information was requested by the lab maintenance staff. None of the participants indicated any suspicion.

The temperature estimates ranged from 12 to 40 degree Celsius¹. As expected, participants who recalled the experience of being socially excluded estimated lower room temperature ($M = 21.44$, $SD = 3.09$) than those who recalled being included ($M = 24.02$, $SD = 6.61$), $t(63) = 2.02$, $p_{rep} = .88$ ². Thus, the experience of exclusion, through a recall of past events, induced a feeling of coldness.

Experiment 2

Experiment 2 sought to replicate Experiment 1 by creating a real experience of social exclusion through a ball-tossing exercise (Williams et al, 2000) that is often used to induce social ostracism (e.g., Eisenberger et al, 2003). Also, we examined whether socially excluded participants would be more likely to seek warmth, reflected in the preference for warm foods and drinks, than those in the control condition.

A total of 52 undergraduates at the University of Toronto voluntarily participated in exchange for course credit. The experiment consisted of a 2 (prime: exclusion vs. control) \times 2 (foods/drinks: warm vs. control) mixed design with foods/drinks being the within-participant factor. Upon arrival, participants were led into a computer cubicle and told that the experiment consists of several unrelated tasks. In the first task, participants engaged in what they believed to be a virtual ball-tossing exercise, where they tossed a ball around with three other participants who were supposedly connected online. In actuality, a computer program controlled the throws of the other players (Williams et al, 2000). Participants were randomly assigned to the exclusion or control conditions. Those in the exclusion condition received the ball twice in the beginning,

¹ Celsius ($^{\circ}\text{C}$) is interpretable in terms of Fahrenheit ($^{\circ}\text{F}$) using the following formula: $^{\circ}\text{F} = \frac{9}{5}^{\circ}\text{C} + 32$.

² Without assuming equal variances between the two conditions did not change the conclusion of the inferential test, $t(43.63) = 2.00$, $p_{rep} = .88$.

but were excluded from the rest of the 30 throws; those in the control condition received the ball intermittently throughout the exercise. Afterwards, participants completed a supposedly unrelated marketing survey and rated the extent to which they desired different products. Participants rated five products on a 7-point Likert scale (1 = *extremely undesirable*, 7 = *extremely desirable*). One was a warm drink (*hot coffee*) and another was a warm food (*hot soup*); the other three included two control foods (*apple* and *crackers*) and a control drink (*coke*). None of the participants suspected the connection between the ball-tossing exercise and product rating.

Desirability ratings for individual product are listed in Figure 1. Analysis of variance revealed a significant two-way interaction between the exclusion prime and foods and drinks, $F(1, 50) = 4.62, p_{rep} = .90$. Participants in the exclusion condition desired warm foods and drinks ($M = 5.17, SD = 1.11$) more than those in the control condition ($M = 4.33, SD = 1.60$), $F(1, 50) = 4.90, p_{rep} = .91$. However, they desired control foods and drinks ($M = 4.12, SD = 1.12$) to the same extent as those in the control condition ($M = 4.23, SD = 1.01$), $F(1, 50) = .15, p_{rep} = .36^3$. Thus, experience of social exclusion during virtual interaction seemed to induce preference for warm foods and drinks.

General Discussion

In two experiments we found that people literally felt cold (Experiment 1) or preferred warm food (Experiment 2) when being socially excluded, regardless of whether such experience was induced through a recall of past experience or virtual interaction. These findings are consistent with theories of embodied cognition and suggest that our social experience is not

³ Analyses comparing *coffee* vs. *coke* yielded a consistent pattern: social exclusion marginally increased desirability for coffee ($M = 4.81, SD = 3.85$ vs. $M = 3.85, SD = 2.33$), $F(1, 50) = 2.84, p_{rep} = .82$, but not for coke ($M = 4.38, SD = 2.17$ vs. $M = 4.58, SD = 2.04$), $F(1, 50) = .11, p_{rep} = .33$.

independent of physical and somatic perception (Barsalou, 1999; Varela et al, 1991). They also highlight that metaphors are not just language that we use to communicate; they are fundamental vessels through which we understand and experience the world around us (Bargh, 2006; Lakoff & Johnson, 1980). Not only does physical experience aid our understanding of more abstract, complex phenomena, but also that domains of different experiences merge and intertwine such that the activation of one is automatically accompanied by another (e.g., Zhong & Liljenquist, 2006); the subjective feeling of coldness may be an integral part of our experience of social rejection.

Our research complements early studies on the relationship between physical temperature and personality evaluation. Whereas Williams and Bargh (2008) showed that incidentally touching warm or cold objects influences our assessments of other people, we showed the opposite – being rejected by others induces an actual feeling of coldness. In both cases, an abstract psychological experience was scaffolded onto a physically experienced dimension (Bargh, 2006; Williams & Bargh, 2008). Thus, metaphors such as cold and lonely do not seem to be mere accidents – why is social exclusion described as cold but not dirty? Our findings provide empirical support to the theoretical proposition that metaphors may form based on concurrent psychological or bodily experiences (Lakoff & Johnson, 1980). It is possible that people use coldness to describe social interaction patterns partly because they observe, at an abstract level, that the experience of coldness and social rejection coincide.

These findings open up new opportunities in exploring the interaction between environment and psychology. First, an interesting direction would be to determine whether experiencing the warmth of an object could reduce the negative experience of social exclusion. Such an implication has been used metaphorically in the self-help literature (i.e., the “Chicken

Soup for the Soul” series), but our research suggests that warm soup may be a literal coping mechanism for social exclusion. Second, given that physical coldness seems to be part of the experience of social rejection, an interesting direction would be to explore how physical temperature can change the perception and evaluation of social rejection. Earlier research on ambient temperature tended to focus on the effects of ambient temperature on productivity and cognitive processing, possibly mediated through mood (e.g., Allen & Fischer, 1978; Sinclair, Mark, & Clore, 1994). Our research, however, suggests two possible ways through which ambient temperature can exert direct impact on people’s interpretations of social situations. On the one hand, it is possible that people in cold weather may (mis)attribute part of their coldness feeling as a result of exclusion to the physical coldness in the environment and hence reduce the reactance to social rejection. On the other hand, it is also possible that a warm environment can compensate and rid the coldness feeling after rejection altogether. It would be particularly beneficial to not only people being rejected but also those around them if either of these cases were true because social rejection not only reduces subjective well-being (Leary, Tambor, Terdal, & Downs, 1995) but also induces hostile reactivity towards others (Ayduk, Mischel, & Downey, 2002). Controlling ambient temperature may thus be a relatively inexpensive and nonintrusive way to restore group cohesiveness and prevent damages of interpersonal frictions.

Third and finally, perhaps the connection between coldness and social exclusion may suggest other environmental causes of affective disorders. Seasonal affective disorder (Rosenthal et al, 1984), also called “winter depression,” refers to the experience of depression during the winter months in individuals who are otherwise healthy. Research has predominantly focused on the connection between reduced daylight and the increased likelihood of winter depression, although some evidence supports that reduced temperature also contributes to greater depressive

experience (Molin, Mellerup, Bolwig, Scheike, & Dam, 1996). Our research suggests one reason why that may be: perhaps cold temperature in the winter serves as a catalyst to the psychological experience of social exclusion.

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Tables and Figures

Figure 1. Desirability for foods and drinks (Experiment 2)

