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When does heat promote hostility? Person by situation interactions shape the psychological effects of haptic sensations

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HIGHLIGHTS

- We examine effects of heat on hostile cognition and behavior.
- Heat promoted hostility, but only in the presence of agonistic social motives.
- Effects were only observed after a rejection and only among people high in FNE.
- Results imply sensory primes interact with aspects of the person and situation.

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ABSTRACT

The current article provides evidence that the psychological consequences of incidental haptic sensations depend on motivations within the perceiver and, consequently, the effects of those sensations are moderated by motivationally relevant aspects of the individual and the immediate social context. Results from two experiments demonstrate that the physical experience of heat promotes hostile social responses, but that the strength of this effect depends on an interaction between factors in the person (level of fear of negative evaluation) and the situation (whether or not someone has just experienced rejection). People primed with heat (compared to neutral temperature) displayed increases in aggressive cognitions (Experiment 1) and aggressive behavior (Experiment 2), but those effects were observed only after rejection (not in a control condition) and only among individuals high in fear of negative evaluation (those who typically respond with agonistic motives following rejection). Findings suggest that motivationally relevant aspects of the person and situation are critical to understanding the priming effects of haptic sensations.

Introduction

Fluid motions promote creative thinking (Slepian & Ambady, 2012). Tactile sensations influence gender and political categorization (Slepian, Rule, & Ambady, 2012; Slepian, Weisbuch, Rule, & Ambady, 2011). Physical weight increases perceptions of importance (Ackerman, Nocera, & Bargh, 2010; Jostmann, Lakens, & Schubert, 2009). A growing literature suggests that low-level sensory experiences can exert profound and surprising effects on higher-order cognition. How people perceive and think about the world around them is shaped by fundamental links between physical and psychological states.

Research from a variety of theoretical perspectives, most notably theories of priming (e.g., Bargh, 2006; Tulving & Schacter, 1990; Williams & Bargh, 2008) and embodied cognition (e.g., Barsalou, 2008; Niedenthal, Barsalou, Winkielman, Krauth-Gruber, & Ric, 2005), suggests that incidental haptic sensations can affect a variety of higher-order cognitive processes. Thus far, however, such studies have focused primarily on demonstrating the presence of main effects of sensory states on psychological processes. Thus, the extant literature sometimes provides a view in which sensory primes seem to activate higher-order psychological processes in a relatively constant fashion across people and situations.

Nevertheless, there are reasons to think that effects of haptic sensations on psychological processes depend on the perceiver's current motivations. Because motivations vary considerably across individuals and situations, the effects of sensory primes too may vary across people and situations. Thus, an important step toward understanding the motivational properties of sensory priming effects is to delineate their boundary conditions (i.e., moderating factors; see Bargh, 2006; Meier, Schnall, Schwarz, & Bargh, 2012).

We propose that low-level sensory experiences interact with features of the person and the situation to shape how people interface with the social world. Classic perspectives in social psychology emphasize the importance of person by situation interactions (Lewin, 1935). In particular, psychological processes are influenced by an interplay between goals within the perceiver and motivationally relevant

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aspects of the social context (Kenrick, Griskevicius, Neuberg, & Schaller, 2010). We suggest that such interactions also influence how and when haptic sensations shape people's responses to social situations. Although studies have started attending to individual difference moderators of sensory primes (IJzerman, Karremans, Thomsen, & Schubert, 2013; Schnall, Haidt, Clore, & Jordan, 2008), very few to our knowledge have assessed whether effects of haptic primes hinge on a functional interplay between aspects of the person and aspects of the situation.

In the current paper, we attempt to enrich the sensory priming literature by testing the hypothesis that motivationally relevant features of the person and situation jointly determine psychological responses to sensory primes. We predicted that the experience of heat would interact with motivationally relevant aspects of the situation (whether or not one has just experienced rejection) and the person (level of fear of negative evaluation) to affect social cognition and behavior. In testing this hypothesis, we integrate literatures on sensory priming, social exclusion, and social anxiety.

Heat and reactions to social threats

One important sensation that powerfully influences social processes is heat (DeWall & Bushman, 2009; Lakoff, 1987). A sizable literature in social psychology demonstrates that heat can promote hostility (Anderson, 2001; Anderson, Anderson, Dorr, DeNeve, & Flanagan, 2000; DeWall & Bushman, 2009; Wilkowski, Meier, Robinson, Carter, & Feltman, 2009). Being primed with hot temperatures, for example, causes people to display anger and hostile cognitions (Anderson, Deuser, & DeNeve, 1995; DeWall & Bushman, 2009; Wilkowski et al., 2009) and to become more aggressive (Anderson, 2001).

One explanation for the heat-hostility link involves the fact that heat can produce physical discomfort and high levels of negative affect. Indeed, classic studies demonstrate that when people experience negative affect or discomfort as a result of heat, they tend to become more aggressive (Reifman, Larrick, & Fein, 1991). For example, violent crimes tend to increase during hot summer months and this can be attributed, at least in part, to increases in negative affect and physical discomfort (Anderson, 1989).

However, there is also a deeper psychological explanation for the link between heat and hostility. As illustrated by metaphors such as "hot under the collar," there are conceptual and semantic associations between representations of heat and hostility. Indeed, merely priming the abstract concept of heat can activate hostility-related concepts. For example, compared to cold or neutral temperature word primes, heat word primes lead people to complete more word stems with aggressive words and to interpret ambiguous behaviors as more hostile (DeWall & Bushman, 2009). Moreover, heat-related imagery (compared to neutral temperatures) biases the categorization of ambiguous facial expressions as reflecting anger, an emotion which facilitates hostile social behavior (Wilkowski et al., 2009). Thus, heat can promote hostility, even in the absence of physical discomfort.

It should be noted that temperature-related words and experiences can be applied to a range of social experiences. Heat, warmth, or coldness may be linked with hostility and aggression (e.g., DeWall & Bushman, 2009), propensities for clear, logical thinking versus impulsivity (e.g., Metcalfe & Mischel, 1999), and friendliness versus social isolation (e.g., Fiske, Cuddy, Glick, & Xu, 2002; IJzerman & Semin, 2009). Thus, there are several domains of social phenomena that may be related to or activated by tactile experiences involving temperature. Our framework implies that the specific effects of temperature should depend on the perceiver's active social motives and, in the current research, we are interested specifically in the link between agonistic social motives, heat, and hostility. We refer to 'heat' rather than 'warmth' to remain consistent with common metaphors that are used to describe hostility, not to describe a particular range of temperature.

Heat, hostility, and rejection

The psychological association between heat and hostility may become particularly important in negative contexts involving agonistic interpersonal motivations. The presence of agonistic motives might potentiate the link between heat and hostility because hostility reflects a potentially functional response to situations involving such motives. That is, the heat-hostility link may come online especially in situations that are perceived as warranting hostile behavior. Rejection, for example, thwarts people's need for social belonging (Baumeister & Leary, 1995) and constitutes a painful and highly motivating interpersonal experience (Eisenberger, Lieberman, & Williams, 2003; Leary, 1990; Williams, 2001). The agonistic motives that result from rejection may potentiate the activational link between heat and hostility. Models of parallel constraint satisfaction (e.g., Schröder & Thagard, 2013) imply that, although heat is semantically related to many different concepts (Lakoff, 1987), those relationships can become activated or inhibited based on the present context and state of the perceiver.

Hostile and highly agonistic social motives are commonly observed in response to rejection (DeWall, Twenge, Gitter, & Baumeister, 2009; Reijntjes et al., 2011; Twenge, Baumeister, DeWall, Ciarocco, & Bartels, 2007; Twenge, Baumeister, Tice, & Stucke, 2001) and thus rejection may increase the likelihood that heat would result in hostile social responses. Under neutral conditions, in contrast, the absence of any salient motivating context might result in weaker links between heat and hostility. As noted earlier, heat is associated with a variety of mental structures (e.g., sunbathing, cooking, impulsivity) and in the form of "warmth" is even associated with benevolent forms of cognition (Williams & Bargh, 2008). In the absence of clear social motives, such as those following rejection, heat might activate a variety of mental structures and thus none, in particular, should move to the fore. In a neutral social context, therefore, one might expect weaker effects of heat on hostility than would be expected after rejection.

The role of fear of negative evaluation

The motives people experience in response to rejection depend on individual differences. Evidence suggests that those motives depend, in particular, on people's levels of social anxiety and its core component — fear of negative evaluation (Mallott, Maner, DeWall, & Schmidt, 2009; Maner, DeWall, Baumeister, & Schaller, 2007; Maner, Miller, Schmidt, & Eckel, 2010). Fear of negative evaluation (FNE; Leary, 1983) reflects chronic concerns about eliciting negative reactions from others. People high in FNE tend to interpret their social environments as being threatening and filled with possible rejection (Heimberg, Lebowitz, Hope, & Schneier, 1995) and they tend to respond to rejection with agonistic interpersonal motives (Maddux, Norton, & Leary, 1988). Those motives often take the form of social passivity and withdrawal (Mallott et al., 2009; Maner et al., 2010), because such reactions reduce the likelihood of immediate rejection (Allen & Badcock, 2003). Thus, after rejection, people high in FNE often withdraw and behave passively to avoid the threat of negative social evaluation. Indeed, just as flight often is the preferred initial response to threat among many species (Blanchard, Flannelly, & Blanchard, 1986; Stankowich & Blumstein, 2005), flight (in the form of passivity and withdrawal) is also the default respond to rejection among people high in FNE. By avoiding others, people high in FNE reduce the possibility that they will be harmed through further rejection.

Sometimes the agonistic motives of high FNE individuals can manifest in anger and hostility (Erwin, Heimberg, Schneier, & Liebowitz, 2003), however, and we hypothesized that this tendency would become exacerbated by the experience of heat. Although flight may be the preferred initial threat response, humans and other animals often instead opt to fight, particularly when aggression is perceived as a useful response to the threat (Blanchard et al., 1986). The activation of hostile mental structures resulting from exposure to heat may shift the