



Keep in touch: The effects of imagined touch support on stress and exploration



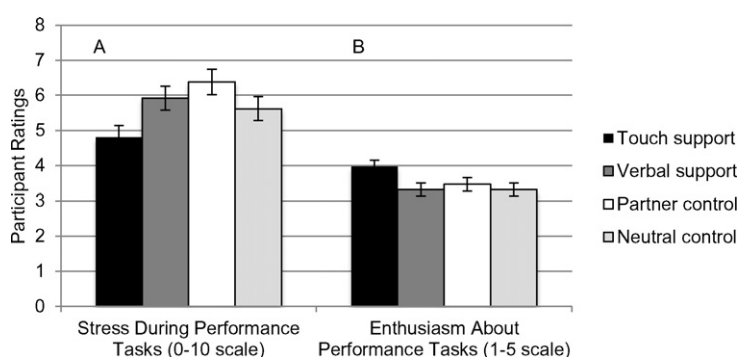
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HIGHLIGHTS

- We assigned participants to supportive or control imaginations before stress tasks.
- We compared two supportive imaginations: touch and verbal support.
- Imagined touch buffered stress and pain during the tasks better than verbal support
- Imagined touch support also buffered stress better than control imaginations
- Participants who imagined touch expressed the most enthusiasm about the tasks.

GRAPHICAL ABSTRACT



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ABSTRACT

Although social support buffers stress and helps individuals to embrace challenges (exploration), individuals often experience stressors when close others are not proximally available to provide support. The current research tested whether imagining supportive touch from a romantic partner promotes exploration and buffers stress better than imagining verbal support or control imagination tasks. Participants completed a 5-min imagined support manipulation prior to experiencing a physical stressor, the cold pressor pain task (Exp. 1) or social/performance stressors, the Trier Social Stress task (Exp. 2). In **Experiment 1**, participants who imagined touch support experienced pain-buffering benefits compared to participants who imagined verbal support, and women who imagined touch support were more likely than women in other conditions to accept the challenge of a more difficult cold pressor task. In **Experiment 2**, participants who imagined touch support were more buffered from the stress of the socially-evaluative tasks and viewed these tasks with more enthusiasm than participants in all other imagination conditions. Potential mechanisms and implications are discussed.

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1. Introduction

Stressors occur daily: flights are delayed, presentations have “technical difficulties,” car crash, and natural disasters cause disruptions and physical injuries. Close others can help to mitigate the negative effects of stressors and help individuals to embrace challenges by providing social support (e.g., tangible resources, verbal or nonverbal expressions of caring; Cohen, 2004; Feeney, 2004). Social support

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helps individuals to appraise fewer difficulties as threatening and to be less reactive to stressors (e.g., Kane, McCall, Collins, & Blascovich, 2012; Uchino, Cacioppo, & Kiecolt-Glaser, 1996). According to social baseline theory (SBT), any difficulty is most threatening when one is alone because individuals are most vulnerable, and therefore most attentive to risk, in this context (e.g., Coan, 2008). When others are proximal, individuals can be less attentive to risks because risks will be distributed among the group and group members can cooperate to overcome obstacles (Coan, 2008). For example, individuals who were asked to climb a hill with a heavy backpack estimated the hill as less steep when they stood with a friend than when they stood alone (Schnall, Harber, Stefanucci, & Proffitt, 2008; Study 1). Relatedly, married women subjected to the possibility of painful shocks displayed attenuated neural threat activation when they held their husband's hand; holding a stranger's hand attenuated the neural threat response to a lesser degree (Coan, Schaefer, & Davidson, 2006). As these studies demonstrate, stress reactions are situationally-constructed; the social context impacts the level of stress one experiences.

This research also demonstrates that specific close others—such as romantic partners—are especially likely to buffer stress. According to attachment theory, the theory from which SBT developed, humans have an innate behavioral attachment system that motivates them to form and maintain a unique bond with a few caregivers, called attachment figures (Bowlby, 1973). In childhood, an individual's primary attachment figure is usually a parent; in adulthood, a romantic partner tends to serve this role (Hazan & Shaver, 1987). Attachment figures help to promote safety and exploration (i.e., the enthusiastic pursuit of challenges, growth, learning) throughout the lifespan through their availability and responsive support (Bowlby, 1969, 1973, 1988). Environmental threats encountered during exploration activate the attachment system and prompt individuals to seek proximity to attachment figures. When an attachment figure is available and responsive, a feeling of security is restored, stress is diminished, and individuals can shift their focus back to exploration (Bowlby, 1969, 1973, 1988). Through this process, sensitive and responsive partner support helps individuals to experience less stress and to pursue challenges and goals with enthusiasm (Feeney, 2004, 2007; Feeney & Thrush, 2010; Jakubiak & Feeney, 2014).

Supportive physical touch (e.g., hand-holding, pats, rubs, and squeezes; Jones & Yarbrough, 1985) may be especially effective to buffer stress and promote exploration, but it has been relatively understudied compared to other enactments of support. Individuals receive and benefit from physical touch from attachment figures throughout the lifespan, from infancy to late adulthood (e.g., Feldman, Singer, & Zagoory, 2010; Heiman et al., 2011). Supportive touches may saliently and viscerally indicate a caregiver's care, acceptance, and availability to buffer stress and promote exploration. Initial studies have demonstrated physiological stress-buffering effects of naturally-occurring physical touch (e.g., hugging, holding hands) in relationships (e.g., Burleson, Trevathan, & Todd, 2007; Ditzen, Hoppman, & Klumb, 2008), and interventions that increased physical touch between romantic partners also reduced stress (Holt-Lunstad, Birmingham, & Light, 2008). In the laboratory, women who received touch support (i.e., a standardized shoulder massage) from their romantic partners prior to a stressful speech task had lower cortisol responses than women who received no support or verbal support from their partners (Ditzen et al., 2007). Taken together, these studies provide preliminary evidence that physical touch has a stress-buffering effect.

However, in many stressful situations, support-providers are not proximally available. Many people spend short periods of time away from their significant others when they work, travel, or pursue independent goals; other situations, such as military deployment and long distance relationships, necessitate even greater time apart. In these situations, individuals cannot receive touch support, but they may benefit from recalling and imagining touch support from a partner. Individuals internalize cognitive representations of their attachment figures

through repeated experiences with them (e.g., Baldwin, 1992), so adults are able to rely on their attachment figures for a stress-buffering effect even when those individuals are distant (Smith, Ruiz, & Uchino, 2004). When adults encounter threats, they automatically activate their mental representations of attachment figures to seek *symbolic proximity* to them (Mikulincer, Gillath, & Shaver, 2002). Symbolic proximity can be powerful, comparable to physical proximity. For instance, individuals who imagined a close other subsequently estimated a hill to be less steep than individuals who imagined a non-close other (Schnall et al., 2008; Study 2). Thinking of an attachment figure also buffers stress better than thinking of an acquaintance, and viewing a picture of one's partner can provide the same pain-buffering effects as actual proximity to him or her (e.g., Master et al., 2009; Smith et al., 2004; McGowan, 2002).

Imagining supportive touch experiences may be even more effective to buffer stress and facilitate exploration than thinking of one's partner generally. Responsive partner support buffers stress more effectively than a partner's mere physical presence (Kane et al., 2012), and touch may actively demonstrate responsiveness. Additionally, consistent with previous research (Ditzen et al., 2007), imagining touch support may be more beneficial than imagining verbal support. When individuals receive or imagine verbal support, they may be concerned that they will be evaluated by the support-provider, that the support-provider's continued acceptance and positive regard is contingent upon success on the task, or that they lack the self-efficacy to respond to the threat alone because the support provider felt the need to offer guidance (Bolger & Amarel, 2007; Bolger, Zuckerman, & Kessler, 2000; Feeney & Thrush, 2010; Taylor et al., 2010; Uchino, 2009). Receiving or imagining touch support may circumvent these costs. Specifically, verbal support may focus on the stressor or the support-recipient's ability to handle the stressor and may implicitly increase pressure to perform to maintain approval, whereas touch support may communicate non-contingent acceptance. Additionally, verbal support may be more likely to be interpreted as support provided in response to vulnerability and thus threaten self-efficacy, whereas touch support may not threaten self-efficacy because it may be construed as an affectionate rather than as a supportive behavior. Indeed, touch within romantic relationships is more commonly interpreted as indicative of love than support (Pisano, Wall, & Foster, 1986). Because touch is a normal expression of intimacy and is interpreted as such, it may circumvent evaluation or self-efficacy concerns, and it may not be interpreted as intrusive.

In two experiments, we tested whether imagined touch support buffers stress/pain and promotes exploration (i.e., embracing challenges, expressed enthusiasm for challenges) better than other mental activations of support. Adult participants completed standard laboratory stress tasks—the cold pressor pain task (Exp. 1; Lowery, Fillingim, & Wright, 2003) and the Trier Social Stress Test (Exp. 2; Birkett, 2011; Kirschbaum, Pirke, & Hellhammer, 1993)—and we tested whether recalling and imagining *touch support* buffered stress/pain during the tasks and promoted exploration better than imagining *verbal support*, a partner's physical features (*partner control*), or a printer (*neutral control*).

2. Experiment 1: cold pressor

2.1. Method

2.1.1. Participants

Participants were 95 (41 male, 54 female) individuals recruited from a private university in Pittsburgh, PA and from the local community ($M_{age} = 21.3$, $SD = 5.0$; 45% Caucasian, 38% Asian, 17% other). Sample size was determined by a power analysis. To be included in the study, volunteers had to be involved in a romantic relationship with the same person for at least the past five months ($M = 23.8$ months, $SD = 23.3$ months). Four participants were excluded from analysis

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