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Presence of an Attachment Figure Is Associated With Greater Sensitivity to Physical Pain Following Mild Social Exclusion

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Abstract

Social exclusion has been shown to influence sensitivity to physical pain. Attachment theory suggests a primary response to rejection should be seeking out the company of a close other. Based on this prediction, we hypothesized that the presence of an attachment figure versus a stranger following rejection would permit acknowledgement of distress and thus stronger reports of physical pain. Healthy participants reported their pain sensitivity before receiving exclusion or inclusion feedback in an online chat. Participants were then randomly assigned to have access to their attachment figure or a stranger and had pain sensitivity measured again. As predicted, excluded participants who had access to their attachment figure evidenced heightened pain sensitivity (lower pain threshold and tolerance), whereas those who sat with a stranger evidenced some degree of a decrease in pain sensitivity (higher pain tolerance). These data may shed light on the impact social ties can have during painful situations.

Keywords

social pain, physical pain, pain sensitivity, social exclusion, attachment

Introduction

Researchers have produced evidence to suggest an overlap between physical pain and social pain (pain experienced upon the damage to or loss of social connections). Besides similar nomenclature (e.g., "hurt feelings"; MacDonald & Leary, 2005), overlap between pain systems is evidenced by the increase in neural activity in the dorsal anterior cingulate—a brain region implicated for pain regulation—during the experience of exclusion (Eisenberger, Lieberman, & Williams, 2003). Kross, Berman, Mischel, Smith, and Wager (2011) further showed that the neural overlap between social rejection and physical pain also recruits brain regions (secondary somatosensory cortex and dorsal posterior insula) involved in the sensory components of physical pain. Although there is currently controversy regarding the extent of brain overlap (Cacioppo et al., 2013; Woo et al., 2014), other points of overlap exist. For example, researchers have recognized that opioids are effective in alleviating both physical pain (Ballantyne & Mao, 2003) and social pain (e.g., separation distress; Panksepp, Herman, Conner, Bishop, & Scott, 1978). Together, these data suggest that experiences of social threat (e.g., social exclusion) may stimulate both emotional and physical pain responses.

Research on social threat presents a seeming paradox such that, as with physical injury, social exclusion can both heighten and decrease sensitivity to physical pain. For example, stronger experiences of exclusion (e.g., being told one's future life will be spent alone) lead to numbness (DeWall & Baumeister, 2006) whereas more mild exclusions (e.g., being told one's future life will include only a few short-term relationships) lead to heightened pain sensitivity (Bernstein & Claypool, 2012).[1] Another key moderator may be the social conditions present after the experience of exclusion that may facilitate or hinder coping with rejection. According to attachment theory (Bowlby, 1982), people are motivated to seek out close others following social threats. The sense of safety afforded by attachment figures may permit acknowledgement of emotional distress, whereas not having a validating social partner may lead to the denial of emotional distress (Maxwell, Spielmann, Joel, & MacDonald, 2013). Thus, those who receive support from an attachment figure following an experience of mild social exclusion may experience more normative access to their feelings (i.e., more access to pain). On the other hand, those who do not have an accepting other available may deactivate the

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attachment system (Maxwell et al., 2013) and thus experience interference with access to feelings including pain.

We explored whether the presence of an attachment figure versus a stranger following social exclusion would lead to differences in sensitivity to physical pain. Participants were randomly assigned to bring their attachment figure to the lab or to come alone and were randomly assigned to receive exclusion or inclusion feedback in an online chat. We hypothesized that individuals who had an available attachment figure would experience increases in sensitivity to physical pain following the experience of a mild social exclusion. Conversely, we hypothesized that participants who did not have a viable social connection postexclusion would experience significant drops in pain sensitivity from baseline (i.e., numbing).

Method

Participants

One hundred and twelve participants (75 females, age range 18–30 years) were recruited through a first-year psychology class at the University of Toronto as well as advertisements posted on the university campus and online classified websites. Participants were excluded if they had any of the following medical conditions: high blood pressure, cardiovascular disease, diabetes, asthma, seizures, frostbite, past trauma to hands, Raynaud's syndrome, arthritis or other joint disease, or injury. Additionally, participants were required to refrain from consuming alcohol, psychoactive drugs, anti-inflammatory medications, or analgesics within 48 hr prior to the study. All participants recruited were eligible to take part in the study. Ethical approval was granted by the relevant university committee. All participants gave written informed consent to the experimental procedures. Four participants were excluded from participating in the study due to equipment failure. Data from the remaining 108 participants were included in the main analyses.

Setup

During the initial correspondence with participants via e-mail, participants were asked to indicate the name of their "close other" (i.e., their attachment figure) defined as "the person that you can always depend on, that you receive the most support from, and that you will miss being away from" (adapted from the WHOTO Scale; Fraley & Davis, 1997). Participants were told that they may or may not be asked to bring their attachment figure to the lab. Half of the participants were randomly chosen to bring their attachment figure for the study. To keep the experimental procedures consistent across conditions, we required a participant with their attachment figure and a solo participant to come to the lab at the same time.

The participants were initially deceived as to the nature of the study. Specifically, participants were told that the purpose of the study was to investigate the relation between empathic accuracy (EA) and physical pain sensitivity. Participants were informed that an initial physical pain test would be followed by a rest period to allow their sensitivity to return to baseline before proceeding to complete the EA task and second pain test. During the rest period, participants were asked to complete a pilot study investigating online impression formation in computer chat rooms. Thus, under the cover of a separate study, participants took part in an online discussion with two "participants," which was actually our manipulation of social exclusion.

After the chat manipulation, participants were told that the EA task would begin. In fact, this was our manipulation of access to an attachment figure. For this task, participants were told that their attachment figure/a stranger (who is referred to as the "empathic accuracy judge" among experimenters) would attempt to infer their emotional states. The attachment figure who was brought to the lab served as the EA judge for both participants. Thus, participants were put in proximity either to their attachment figure or to a stranger. Based on the participant's nonverbal cues (e.g., facial expressions, gestures), the EA judge was asked to estimate each participant's experience of positive emotions such as excitement and determination as well as negative emotions such as fear and shame using a scale from 1 (*not at all*) to 5 (*extremely*), (adapted from the Positive and Negative Affect Schedule (PANAS); Watson, Clark, & Tellegen, 1988).

Measures

Attachment figure. The 6-item WHOTO Scale (Fraley & Davis, 1997) identified each participant's primary attachment figure based on three critical attachment functions. These three functions included the following: the proximity seeking and separation protest function (e.g., who is the person you most like to spend time with?), the safe haven function (e.g., who is the person you would count on for advice?), and the secure base function (e.g., who is the person you can always count on?). For each item, the participants indicated the first name of the person who best served the attachment function and the relational role of the individual (e.g., mother, friend, romantic partner). This scale was used to confirm whether each participant who came to the lab with their close other actually brought one of their attachment figures.

Pain. A Wagner pressure algometer (Wagner Force One Model FDIX50) device was used to identify the force needed to elicit an individual's pain threshold and tolerance. Pressure algometry allows for precise pain measurement and does not pose any serious risks for participants. Algometer devices have been shown to be both reliable and valid measures of pain sensitivity (Kinser, Sands, & Stone, 2009), with relevant use in social exclusion research (Borsook & MacDonald, 2010; DeWall & Baumeister, 2006). The pain algometer device was mounted on a stand in order to ensure controlled raising and lowering of the device and to reduce variation in pressure applied by the experimenter across trials and participants (Borsook & MacDonald, 2010). The participants were required to press a handheld push button pendant (Switchcraft 921KX) when reporting their pain threshold and tolerance to ensure precise recording of their pain sensitivity by a computer program called MESUR Lite (Mark-10).

All pain measurements were taken at the dorsal interosseus muscle (i.e., behind the first knuckle) of the index, middle, and ring fingers. Pressure was applied to the finger at a consistent rate (5 N/s). For pain threshold trials, pressure was applied to each finger until the participant said "now" and simultaneously pressed the push button pendant indicating that they were feeling a sensation that they considered painful. For pain tolerance, pressure was applied to the participant's finger until the participant said "stop" and simultaneously pressed the pendant button deeming the sensation too uncomfortable/painful to continue. The algometer was immediately retracted when the participant indicated that they reached their pain threshold or tolerance. The amount of pressure applied until cessation was recorded using the MESUR Lite program. A pain test was administered both before and after the experimental manipulation. Each pain test consisted of six pain measurement trials: three trials of pain threshold measurement followed by three trials of pain tolerance measurement. The administration of the three trials of pain threshold and tolerance was delivered in random order to the index, middle, and ring finger of either the right or left hand (determined randomly). Participants rested for 1.5 min between trials to prevent habituation to the pain. There was high internal consistency across trials for both premanipulation measures of pain (Cronbach's α .97 for pain threshold and .96 for pain tolerance) and postmanipulation measures of pain (Cronbach's α .98 for pain threshold and .98 for pain tolerance).

Affect. The PANAS (Watson et al., 1988) is a 20-item self-report questionnaire that measures positive affect with 10 items (e.g., strong, inspired) and negative affect with 10 items (e.g., nervous, afraid). Participants indicated the degree to which they were currently experiencing each of the 20 emotions using a 5-point Likert-type scale ranging from 1 (*very slightly or not at all*) to 5 (*extremely*). The PANAS was administered immediately before the pre- and postmanipulation pain tests. Cronbach's α for the premanipulation PANAS was .89 for positive affect and .88 for negative affect. Cronbach's α for the postmanipulation PANAS was .91 for positive affect and .86 for negative affect.

Inclusion. To assess whether the manipulation had its intended effect, participants completed a 6-item questionnaire assessing experienced inclusion in the online chat (e.g., "How much did you think you were included by Participant X in the chat?"). Responses were given on a scale from 1 (*not at all*) to 7 (*a lot*). The scale had good internal reliability with a Cronbach's α coefficient of .92.

Procedure

Step 1: Introduction and consent. Upon arrival at the laboratory, the two participants and the attachment figure/stranger were each brought into a separate room by the experimenter and given a consent form. The experimenter went over the study with each person. All individuals involved in the study then provided informed consent.

Step 2: Premanipulation measures and pain test. Participants were first asked to complete the WHOTO Scale and PANAS. Then, the experimenter brought in the pressure algometer. The experimenter explained the function of the algometer and then proceeded to conduct the premanipulation pain test as described in the pain measures section.

Step 3: Social manipulation. After the first pain test, the participants proceeded to take part in the chat manipulation guised as a pilot study investigating impression formation in online chat rooms. Participants were given a consent form with details of the pilot study. All participants agreed to participate in the pilot study.

The experimenter randomly assigned the participant to the exclusion or inclusion condition. Each participant was instructed to enter a chat room with two other "participants." The experimenter followed a scripted chat[2] and responded as Participants "X" and "Z" (adapted from Molden, Lucas, Gardner, Dean, & Knowles, 2009). For the exclusion condition, both Participants X and Z disagreed with the participant's opinions using expressions such as "I don't understand people like you!" For the inclusion condition, both Participants X and Z engaged in friendly conversation with the participant by asking open-ended questions such as "How often do you take the subway?" and remaining in accordance with the participant's view. After the chat was finished, participants completed the manipulation check.

Step 4: Access-to-attachment figure. Participants were brought to another room and were instructed to sit with the EA judge for 3 min of silence as detailed in the setup section. Upon completion of the EA task, the experimenter brought the participants back to their computer rooms to complete the final postmanipulation measures. Once the participants left the room, the EA judge was instructed to record their perceptions of each participant's experienced emotions.

Step 5: Postmanipulation measures and debriefing. Participants completed the PANAS questionnaire followed by the postmanipulation pain test. The pain stimulus trials were administered using the same finger order, but opposite hand of the premanipulation pain test. For the final task of the study, participants completed a self-affirmation exercise (values essay; Sherman, Nelson, & Steele, 2000) to resolve any negative feelings that may have come about during the chat manipulation. Participants were subsequently debriefed about the true nature of the study and compensated for their participation.

Table 1. Correlations Between Pre- and Postmanipulation Pain and Affect Outcome Variables.

Variable	1	2	3	4	5	6	7
Premanipulation pain threshold (N)							
Postmanipulation pain threshold (N)	.88**						
Premanipulation pain tolerance (N)	.71**	.69**					
Postmanipulation pain tolerance (N)	.66**	.73**	.91**				
Premanipulation negative affect	.04	.08	.09	.12			
Postmanipulation negative affect	−.07	−.06	.09	.11	.50**		
Premanipulation positive affect	.12	.09	−.03	−.03	.02	−.03	
Postmanipulation positive affect	.16	.13	.13	.11	.06	−.04	.84**

Note. $N = 108$, Newtons (N) is the unit of measurement for pain threshold and tolerance.
***$p < .001$.

Table 2. Change in Pain and Affect Outcome Variables from Pre- to Postmanipulation.

Variable	Pain Threshold	Pain Tolerance	Negative Affect	Positive Affect
Premanipulation	55.55 (27.87)	100.44 (39.32)	1.54 (0.62)	2.83 (0.84)
Postmanipulation	51.69 (27.79)	96.17 (42.84)	1.45 (0.56)	2.67 (0.91)
Change	−3.86	−4.27	−0.09	−0.15
p	.003	<.001	.13	.002

Note. Change scores were computed by subtracting postmanipulation pain or affect ratings from premanipulation ratings. *p* Values represent the statistical difference between pre- and postmanipulation scores.

Results

Attachment Figure Check

Participants who brought their close other to the lab nominated their close other for at least 5 (25.9%) or all 6 WHOTO items (74%) on the scale. Thus, all close others served some degree of the three critical attachment functions. The type of companion that participants brought to the lab was a romantic partner (46.3%), friend (35.2%), sibling (16.7%), or parent (1.9%).

Manipulation Check

An independent samples t test revealed that participants who were excluded reported feeling significantly less included ($M = 1.72$, $SD = .93$) than participants in the inclusion group ($M = 5.63$, $SD = 1.24$), $t(104) = 18.29$, $p < .001$, Cohen's $d = 3.56$.

Descriptive Information

Zero-order correlations are presented in Table 1. All pre- and postmanipulation pain threshold and tolerance outcomes are significantly related ($p < .001$). The negative affect outcomes at pre- and postmanipulation are significantly related ($p < .001$) as well as the positive affect outcomes at both time points ($p < .001$). Changes in pain and affect outcomes from pre- to postmanipulation are presented in Table 2. Similar to the emerging main effects in the Hierarchical Linear Modeling (HLM) analysis (presented below), pain threshold ($p = .003$) and tolerance ($p < .001$) decreased from pre- to postmanipulation. Positive affect also significantly decreased from pre- to postmanipulation ($p = .002$), but negative affect did not ($p = .13$).

Effects of Exclusion Manipulation on Physical Pain and Affect

To test our main hypotheses, we estimated three-level hierarchical linear models using PROC MIXED in SAS to account for the fact that pre- and postmanipulation pain measurements (Level 1) are nested within people (Level 2), which are further nested within dyads (Level 3; i.e., the two participants that sat with the same individual who served as both an attachment figure and a stranger in a single session). Our sample size exceeds multilevel power recommendations to detect cross-level interaction effects, where the Level 1 sample size (pain measurement: 216 observations) has a relative premium of 2:1 compared to the Level 2 sample size (participants: 108) and exceeds the 3:2 guideline (Aguinis, Gottfredson, & Culpepper, 2013; Mathieu, Aguinis, Culpepper, & Chen, 2012). We first conducted unconditional multilevel models, or models with a single independent variable and no predictors, to assess intraclass correlations, which confirm that sufficient variance in the dependent variable is accounted for by the different levels of the three-level HLM (Hox, 2010). Results of unconditional models demonstrated sufficient variation in repeated measures of pain between persons (49–90%) and between persons within dyads (9–15%).

Next, conditional models with Level 1 (time of pain measurement) and Level 2 predictors (exclusion condition and attachment figure availability) were conducted to examine cross-level interactions and main effects. We conducted four

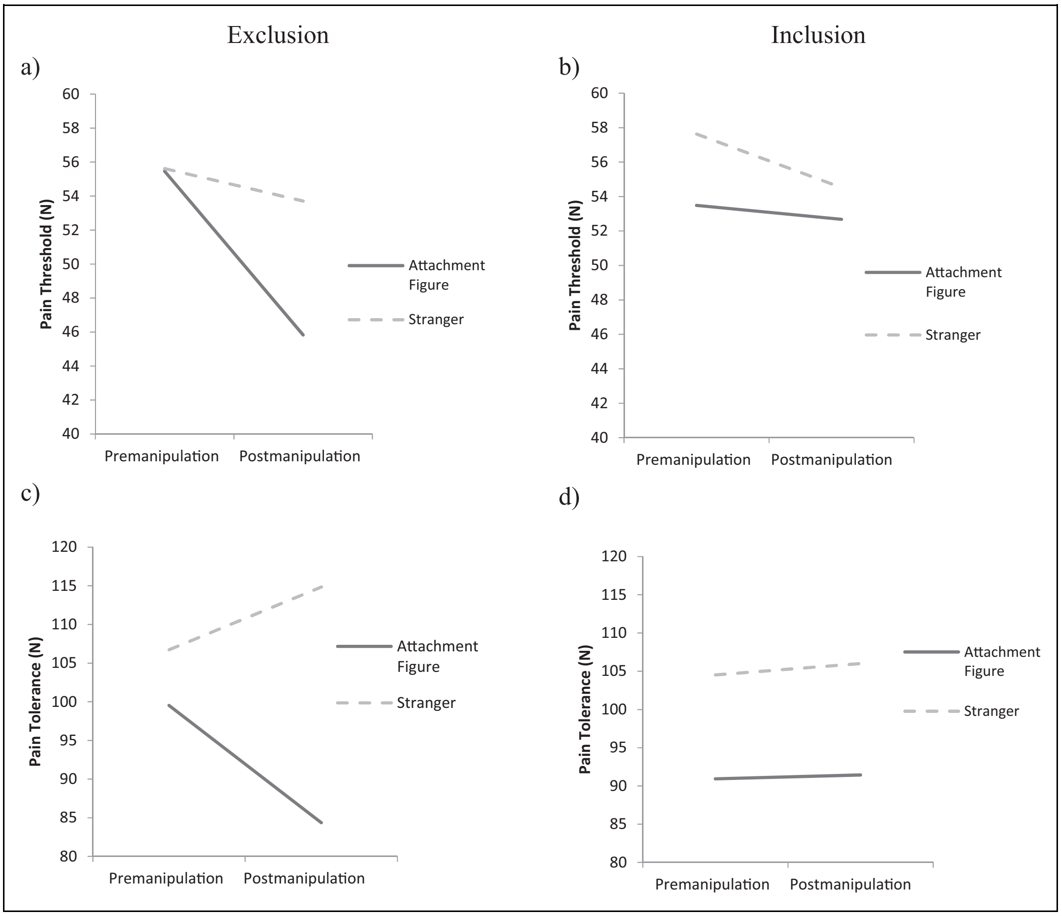

Figure 1. Changes in pain threshold and tolerance from pre- to postmanipulation depending on whether one's attachment figure was available and whether one was included versus excluded.

conditional models for each outcome (i.e., pain threshold, pain tolerance, positive affect, and negative affect). For each model, we entered the main effect of time of pain measurement, the main effect of attachment figure availability, the main effect of exclusion condition, and the respective two-way and three-way interactions between the three predictor variables. Simple effects tests were conducted to locate effects for the outcome variables when interactions were found.

Pain threshold. On average, there was a significant decrease in pain threshold from pre- to postmanipulation, $\beta = -17.37$, $t(104) = -3.07$, $p = .002$. This main effect was qualified by a significant interaction between time of pain measurement and attachment availability, $\beta = 7.73$, $t(104) = 2.16$, $p = .03$, and time of pain measurement and exclusion condition, $\beta = 18.86$, $t(104) = 2.36$, $p = .02$, indicating that the difference in pain between pre- and postmanipulation depended on whether one's attachment figure was available and whether one was included versus excluded. The two-variable interactions were qualified by a significant three-variable interaction between exclusion condition, attachment figure availability, and time of pain measurement, $\beta = -10.32$, $t(104) = -1.98$, $p = .05$.

We conducted simple effects tests to examine the patterns of the interactions for pain threshold. Participants who experienced social exclusion and sat with their attachment figure showed significant decreases in pain threshold $\beta = -9.64$, $t(52) = -3.06$, $p = .004$, from pre- to postmanipulation (see Figure 1a). Participants who were excluded and thereafter sat with a stranger did not evidence a significant change in pain threshold, $\beta = -1.92$, $t(52) = -.61$, $p = .54$ across time. Participants who were included experienced a marginal decrease in pain threshold if they sat with a stranger, $\beta = -3.10$, $t(52) = -1.83$, $p = .07$ (see Figure 1b) but did not experience significant changes in pain threshold if they had an available attachment figure, $\beta = -.80$, $t(52) = -.47$, $p = .64$.

Pain tolerance. A main effect of time of pain measurement was found, indicating decreases in pain tolerance from pre- to postmanipulation, $\beta = -38.43$, $t(104) = -5.64$, $p \leq .001$. This main effect was moderated by attachment figure availability, $\beta = 23.26$, $t(104) = 5.40$, $p \leq .001$, and exclusion condition, $\beta = 37.92$, $t(104) = 3.94$, $p \leq .001$, suggesting that participant's change in pain responding from pre- to postmanipulation was influenced by having an available attachment figure or not, and whether they experienced social exclusion or inclusion.

The two-variable interactions were qualified by a significant three-variable interaction between attachment figure availability, exclusion condition, and time of pain measurement, $\beta = -22.27$, $t(104) = -3.66$, $p < .001$.

A simple effects analysis revealed that participants who experienced social exclusion and sat with their attachment figure showed significant decreases in pain tolerance, $\beta = -15.16$, $t(52) = -4.13$, $p \leq .001$, from pre- to postmanipulation (see Figure 1c). Participants who were excluded and thereafter sat with a stranger experienced significant increases in pain tolerance, $\beta = 8.10$, $t(52) = 2.20$, $p = .03$ across time. Similar to the effects on pain threshold, participants who were included did not experience significant changes in pain tolerance regardless of whether they had an available attachment figure, $\beta = .49$, $t(52) = .22$, $p = .83$ or sat with a stranger, $\beta = 1.49$, $t(52) = .66$, $p = .51$ (see Figure 1d).

Affect. There were no significant main effects or interactions in predicting positive or negative affect using the three-level conditional HLM models.

Discussion

As predicted, we found that participants who were socially excluded and subsequently had access to a support provider (i.e., their attachment figure) reported significant increases in pain sensitivity (lower pain threshold and tolerance) relative to baseline. Also, partially in accordance with our hypotheses, individuals who experienced mild social exclusion and did not have subsequent access to an attachment figure reported a significant decrease in pain sensitivity on one of two measures (pain tolerance but not pain threshold). Because attachment theory predicts that the most basic response to emotional distress is pursuing proximity with an attachment figure (Bowlby, 1982; Mikulincer & Shaver, 2007), the effects of an attachment figure in the context of responses to social exclusion are of strong real-world importance. The finding that contact with an attachment figure was associated with heightened pain sensitivity following a mild social exclusion is compatible with the attachment theory postulate that access to an attachment figure allows more open processing of distressing feelings including physical pain. On the other hand, contact with a strange other appeared to lead to either unchanged or less access to pain in our study. Given that mild social exclusion normally leads to heightened pain sensitivity (Bernstein & Claypool, 2012), these data suggest that not every social contact allows continued access to emotional distress. Instead, being accompanied by a stranger appeared to interfere with normal access to painful feelings.

Although our a priori hypotheses are consistent with attachment theory, existing literature suggests a potentially different perspective.[3] Krahé, Springer, Weinman, and Fotopoulou (2013) summarized the results of experimental studies examining how interpersonal factors (e.g., presence) of a social observer influences pain outcomes. These studies suggest that both interactive social support (e.g., speaking to an empathic experimenter; Jackson, Ieezi, Chen, Ebnet, & Eglitis, 2005) and noninteractive social support, such as holding a spouse's hand (Coan, Schaefer, & Davidson, 2006; Master et al., 2009), viewing a photo of a significant other (Master et al., 2009), or the presence of a social partner (Brown, Sheffield, Leary, & Robinson, 2003), can be effective in decreasing pain. These findings could be taken to suggest that pain sensitivity should decrease instead of increase for those who receive support from an attachment figure following exclusion. However, there are key methodological differences between the current study and the studies referenced above. First, the literature referenced above involved pain testing not in the context of social exclusion manipulations. In addition, in all the referenced studies, the attachment figure was present/acknowledged during the painful experience whereas, in our study, the attachment figure was present before, but not during, the pain test. These considerations suggest that future research examining the effect of direct social contact during pain testing that follows a social exclusion experience would be important in fully reconciling the present results with existing literature.

The outcome of our study builds on previous literature suggesting an overlap of the physical and social pain systems and thus may have important implications for both acute and chronic pain experiences. Specifically, our work suggests that social context may have an important impact on how interpersonal challenges spill over to physical pain experiences. Our research suggests that patients in pain accompanied by family members may be better able to provide accurate reports of their pain particularly if the situation is experienced as unsupportive or rejecting (as may be somewhat frequent in healthcare settings). In this way, although pain is experienced more sharply in the short term, the presence of the attachment figure may allow more direct, problem-focused strategies for coping with pain. Also, research has shown social support can enhance psychological well-being and overall adjustment to chronic experiences of pain (Newton-John, 2013). Our research suggests that this influence may be particularly important when chronic pain is accompanied by difficult social conditions. Ultimately, evidence in support of the overlap between the social and physical pain systems can inform assessment and management practices of pain.

Our research may also be useful for investigators exploring the dynamics and impact of social exclusion. According to attachment theory, distress caused by social exclusion should strongly motivate an individual to seek out the support of an attachment figure. However, in experimental exclusion studies, attachment figures are unavailable thus frustrating the pursuit of what is arguably the primary means of coping (Maxwell et al., 2013). Although exclusion studies sometimes provide social options for coping (Lakin, Chartland, & Arkin, 2008; Maner, DeWall, Baumeister, & Schaller, 2007), the use of strangers in this role mimics the social context of our control condition. Our data suggest that the availability of a stranger may interfere with open acknowledgment of pain and produce results quite different from what would be expected from real-world social coping through closeness with attachment figures.

Thus, our research suggests that there may be value in allowing participants more freedom in selecting their own means of coping so that experimental convenience does not interfere with researchers' understanding of responses to exclusion.

In line with other research, we failed to find changes in mood in response to social rejection (Gerber & Wheeler, 2009). Further, regardless of the availability of attachment figures, participants in the current study did not report any changes in positive or negative affect postexclusion. It is perhaps surprising that social rejection did not influence reports of affect. The failure to find any mood effects has been attributed to the strength of the effect rejection has on physical behaviour in comparison with the marginal effect it has on mood (Gerber & Wheeler, 2009). Single studies have been posited to lack the power needed to detect mood effects that are evident when conducting meta-analytic studies (Blackhart, Knowles, Nelson, & Baumeister, 2009; Gerber & Wheeler, 2009).

Strengths and Limitations

The current study provides an important addition to both the rejection and attachment literatures with the introduction of a novel methodology that allows investigation in the laboratory of a primary means by which people cope with distressing situations in the real world (i.e., turning to an attachment figure). Arguably, our pain-based methodology allows insight into the extent to which individuals acknowledge painful emotions in a fashion that allows (a) direct control over the presence/absence of painful feelings and (b) the presence/absence of an attachment figure. In this way, our paradigm may prove useful for more directly and precisely testing some of attachment theory's key postulates.

Despite the strengths of our study, there are also important limitations that should be noted. One challenge in designing this study was developing an appropriate control condition. We did not have a group of participants that spent time alone after experiencing rejection as the complexities of recruiting participants made three experimental conditions not feasible. Arguably, the lack of an alone condition gives rise to interpretational ambiguity, as we cannot know whether excluded participants with an attachment figure had heightened pain sensitivity comparable to the effect of a mild exclusion without another's presence. However, inclusion of an alone condition would also involve interpretational issues because it is possible that excluded participants who are alone could exhibit a similar response to excluded participants who had contact with their attachment figure, but due to different processes. For example, the presence of another person may stimulate attachment system deactivation due to a defensive postexclusion posture which is reversed through the comfort provided by the attachment figure. On the other hand, if the person is alone, there may be no attachment system deactivation because there is no other person to defend against. The result in both cases is access to painful feelings but through different processes. As such, we favored a control condition that involved a social partner.

We recognize that there is a growing body of evidence that suggests adult attachment patterns influence the ways in which people respond to pain. Specifically, researchers have found that attachment anxiety is associated with higher pain sensitivity in response to social rejection (MacDonald, 2008; Meredith, Strong, & Feeney, 2006; Wilson & Ruben, 2011), whereas blunted social pain responses have been linked to avoidant attachment (Andrews, Meredith, & Strong, 2011; DeWall et al., 2012; Wilson & Ruben, 2011). It is possible that individual differences in attachment could help to explain the findings in the current study. We were not able to examine the moderating role of individual differences in attachment in the relationships between having an attachment figure present, the experience of social exclusion, and self-reports of physical pain due to concerns of insufficient power. Nevertheless, this seems like an important future direction for extending the current findings.

Conclusion

To our knowledge, the current study is the first to demonstrate that seeking out social support from an attachment figure after an experience of social rejection may help individuals acknowledge pain. Our study contributes to the broader social support and pain literature, where studies have shown that social support, and not the mere presence of a stranger, attenuates physiological responses (Roberts, Klatzkin, & Mechlin, 2015) and cortical responses to physical pain (Johnson et al., 2013). Together with these studies, our research demonstrates how much of an impact our social ties can have during pain-stricken situations and emphasizes the importance of social support for overall physical and mental health.

Declaration of Conflicting Interests

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Notes

1. Borsook and MacDonald (2010) showed that a brief, negative interaction with a stranger was associated with decreased pain sensitivity. It is unclear whether this manipulation is best described as mild or strong.
2. The full-scripted online chat is available upon request.
3. As suggested by reviewers, we have included literature that supports a counterhypothesis.

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