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Touching a Teddy Bear Mitigates Negative Effects of Social Exclusion to Increase Prosocial Behavior

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Abstract

There is little empirical research to date that looks at how the deleterious effects of social exclusion can be mitigated. We examined how touching an inanimate object—a teddy bear—might impact the effect of social exclusion on prosocial behavior. Across two studies, we found that socially excluded individuals who touched a teddy bear acted more prosocially as compared to socially excluded individuals who just viewed the teddy bear from a distance. This effect was only observed for socially excluded participants and not for socially included (or control) participants. Overall, the findings suggest that touching a teddy bear mitigates the negative effects of social exclusion to increase prosocial behavior. In Study 2, positive emotion was found to mediate the relationship between touch and prosocial behavior. These results suggest a possible means to attenuate the unpleasant effects of social exclusion.

Keywords

social exclusion, touch, prosocial behavior, dictator game

The motivation to maintain a sense of social connection and seek attachment with others is a fundamental need (see Baumeister & Leary, 1995 for a review). The socially isolated are less healthy—physically and psychologically (House, Landis, & Umberson, 1988). From a social standpoint, social exclusion (hereafter exclusion) increases aggressive behaviour (see Leary, Twenge, & Quinlivan, 2006 for a review), impairs self-regulation (Baumeister, DeWall, Ciarocco, & Twenge, 2005), and decreases prosocial behavior (Twenge, Baumeister, DeWall, Ciarocco, & Bartels, 2007). Given the negative consequences of exclusion, there is surprisingly little research on ways to mitigate its deleterious effects.

Several studies have shown that physiological mechanisms implicated in physical pain may also be involved in social pain caused by exclusion (see MacDonald & Leary, 2005; Panksepp, 1998). For example, exclusion activates the dorsal anterior cingulate cortex—the same brain region that corresponds to physical pain (Einsberger, Lieberman, & Williams, 2003). Social rejection is also linked to increased blood pressure and cortisol (Stroud, Tanofsky-Kraff, Wilfley, & Salovey, 2000) just as physical pain is (Bruehl, Carlson, & McCubbin, 1992). Overall, these findings suggest that it may be possible to use interventions at the physical level to alter people's social psychological states due to the overlap between the physical and the social pain systems.

Given the need for social connection and the pain of exclusion, one might think that excluded individuals would be inherently motivated to develop social bonds. One way to build social bonds is to be more prosocial as a means to reconnect with others. However, there is little empirical evidence to suggest that this is the case. Surprisingly, when people feel excluded, they become less prosocial (Twenge et al., 2007). One proposed explanation is that following rejection, people have a flattened mood that reduces empathy, which in turn reduces prosocial behavior (DeWall & Baumeister, 2006).

Given that engaging in prosocial behaviour may be an effective means to regain social connection following rejection, we sought ways to alleviate the pain of exclusion to increase prosocial behavior. The overlap between the physical and social pain systems means that we may be able to use touch, a physical intervention, to alleviate the pain of exclusion. A recent meta-analysis finds that touch can indeed relieve physical pain (So, Jiang, & Qin, 2008). Therefore, we propose that touch may mitigate the pain of exclusion thereby increasing prosocial behavior.

Touch

There is indirect evidence to suggest that touch may indeed alleviate the pain of exclusion. Studies have shown that gentle touch in early life can ameliorate the pain of social separation (see MacDonald & Leary, 2005 for a review). When infants express physical discomfort through crying, caregivers alleviate their distress through physical touch such as holding or patting (Bowlby, 1973). The allure of physical touch is not limited to human infants but can also be observed in other primates. In Harlow's (1958) classic study, two groups of baby rhesus macaques were separated from their mothers. In the first group, a cloth surrogate mother provided no food, while a wire surrogate mother did. In the second group, a cloth surrogate mother provided food, while the wire surrogate mother did not. The results show that the young monkeys preferred the cloth surrogate mother whether or not it provided them with food, and that the young monkeys chose the wire surrogate mother only when it provided food. The fact that the cloth surrogate mother did not provide food seemed to be as important, if not less, than its ability to provide the young monkeys with comfort through touch. Given the restorative effects of touch, we think that it may also reduce the pain of exclusion.

Touch, as a modality of communication, remains an under-researched topic in the psychological sciences. Nevertheless, a recent study by Levav and Argo (2010) showed that even a minimal touch such as a pat on the back could increase people's sense of security that in turn affects risk-taking. Furthermore, several lines of research suggest that touch is important in human social life (see Hertenstein, Verkamp, Kerestes, & Holmes, 2006 for a review). For example, Burgoon, Buller, and Woodall (1996) argued that nonverbal modes of communication such as touch are more effective in reducing stress as compared to verbal modes of communication such as speech. Recent research finds that exclusion is related to increased cortisol—a hormone associated with stress (Blackhart, Eckel, & Tice, 2007). As touch can reduce stress, it may also be effective in reducing the stress of exclusion. We examine how touching a teddy bear may potentially mitigate the stress of exclusion.

Current Research

In our current research, we sought a novel solution to mitigate the effects of social pain caused by exclusion—touching a teddy bear. We chose a teddy bear over other inanimate objects for three reasons.

First, recent research shows that people following exclusion are likely to anthropomorphize—imbue inanimate objects with human-like characteristics (Epley, Akalis, Waytz, & Cacioppo, 2008). The process of anthropomorphizing teddy bears has evolved over five decades. For example, teddy bears had a larger forehead and a shorter snout in the 1980s as compared to the 1930s (Hinden & Barden, 1985), suggesting that it may be a result of anthropomorphizing. People are more likely to anthropomorphize an object when it has traits such as fuzziness and softness that are associated with “cuddliness” and “warmth” (Horowitz & Bekoff, 2007). Therefore, we propose that teddy bears are suitable inanimate objects that may serve as substitutes for human physical touch.

Second, children often engage in “pretend play”—a process to express their ideas and feelings about the social world (see Fein, 1981 for a review; Garvey, 1984). It is not surprising that children who engage in pretend play with teddy bears often form an attachment to the bear in the process. Consistent with this understanding, Morris, Reddy, and Bunting (1995) found that younger children liked to “play with” their favorite bear and older children liked to “cuddle” or “sleep with” the bear. As a result of these actions, it is likely that children will form an attachment to teddy bears.

Finally, teddy bears have often been used as “transitional objects” to enable children to cope with sleeping alone (Markt & Johnson, 1993). Being forced to sleep alone is a culturally relative practice (see Latz, Abraham, & Lozoff, 1999) that may be experienced by some children as a form of exclusion. Transitional objects are entities that provide temporary emotional support (Wastell, 1999). Thus, children may associate teddy bears with positive feelings because they provide emotional security and comfortable tactile sensations, which can be gratifying. In sum, we argue that teddy bears may have specific psychological significance as a source of comfort and positive feeling for coping with exclusion.

We argue that touching a teddy bear will increase positive emotions of excluded individuals and this in turn will lead to more prosocial behavior. Studies on touch have shown that touch is associated with positive emotions. For example, participants reported greater positive affect when touched by a confederate acting as a library clerk as compared to participants who were not touched (Fisher, Rytting, & Heslin, 1976). In another study, female patients who were touched by a confederate acting as a female nurse while awaiting treatment reported increased positive affect in comparison to female patients who were not touched (Whitcher & Fisher, 1979). Overall, these findings suggest that touch may increase positive emotions.

Although we propose that touching a teddy bear increases positive emotions, it remains unclear whether the experience of exclusion increases negative emotions. Studies that examine whether exclusion affects mood have generated mixed findings. Some studies find that exclusion increases negative emotions (Baumeister et al., 2005; see Gerber & Wheeler, 2009, for a meta-analysis) while other studies find that exclusion simply flattens mood (see Blackhart, Nelson, Knowles, & Baumeister, 2007, for a meta-analysis; DeWall & Baumeister, 2006). Although some studies find that excluded individuals may experience

more negative emotions than included individuals, these mood differences do not mediate the effects of exclusion.

On account of these inconsistent findings, we do not predict whether exclusion would decrease mood or flatten mood. However, based on our theoretical arguments, we predict that touching a teddy bear may increase positive emotions of excluded individuals regardless of whether they experience negative emotions or flattened mood following exclusion. Gerber and Wheeler (2009) argued that people try to elevate their emotions to recover from exclusion. We suggest that touching a teddy bear may help to elevate people's emotions following rejection. On the other hand, touching a teddy bear may not significantly increase positive emotions of included individuals due to a ceiling effect. This is consistent with the finding that social acceptance causes only a slight elevation in positive mood (Blackhart, Nelson, Knowles, & Baumeister, 2007). Thus, we expect that included individuals may not reap the benefits that the touch of a teddy bear provides to excluded individuals.

There is strong evidence to show that positive emotions promote prosocial behavior (e.g., Carlson, Charlin, & Miller, 1988; George, 1991; Isen, 1970). Positive emotions are more likely to lead people to perceive the world in a positive light (e.g., Carson & Adams, 1980), adopt a positive social outlook (Carlson et al., 1988), and help more, so as to maintain their positive state (e.g., Clark & Isen, 1982). All of these factors should contribute to increased prosocial behavior.

Taken together, we hypothesize that touching a teddy bear may mitigate the negative effects of exclusion to increase prosocial behavior. Furthermore, we hypothesize that positive emotions mediate the effects of touch on prosocial behavior during exclusion. We test our predictions in two studies. In Study 1, we had excluded, included, and control participants either touch a teddy bear or not touch a teddy bear, after which they were asked to volunteer for extra experiments that were supposed to take place immediately after the study. In Study 2, we used a different manipulation for exclusion. Socially excluded and included individuals played as allocators of an endowment in a dictator game. We also examined if positive emotion mediates the effects of touch on the allocation decision in the dictator game.

Study 1

In Study 1, we manipulated exclusion by randomly assigning individuals to receive false feedback about the future course of their social lives (Twenge, Baumeister, Tice, & Stucke, 2001). We also manipulated touch by either getting participants to touch a teddy bear or not touch a teddy bear. The number of extra lab experiments that the participants chose to volunteer after the study was the dependent variable.

Method

Participants and Design

Participants were 181 undergraduates (115 women and 66 men) who participated for course credit. Study 1 had a 3 (social feedback: future-alone vs. future-belonging vs. misfortune-control) x 2 (touch vs. no touch) between-participants factorial design.

Procedure

Participants were instructed to complete a personality questionnaire. They then received false feedback supposedly based on their personality profile from the questionnaire. Following a

procedure derived by Twenge et al. (2001), participants were randomly assigned to one of the three social feedback conditions: future-alone, future-belonging, and misfortune control. Those in the future-alone condition read statements suggesting that they will be socially excluded in their lives (e.g., “You are the type who will end up alone later in life”). Participants in the future-belonging condition read statements suggesting that they will be socially included in their lives (e.g., “You are the type who has rewarding relationships throughout life”). Those in the misfortune-control condition read statements suggesting that they will encounter adversity in their lives (e.g., “You’re likely to be accident prone later in life”). This condition was intended to describe a negative outcome that was not connected with exclusion or relationships.

Next, participants were asked to evaluate a consumer product—an 80 cm teddy bear—and rate its appeal on various filler items. In the “touch” condition, the experimenter placed the bear on the participants’ lap. The experimenter then instructed and encouraged the participants to touch the bear in order for them to evaluate the bear more accurately. Participants were left alone in the room for 3 min to touch and evaluate the teddy bear. In the “no-touch” condition, the experimenter placed the teddy bear on the table at an arm’s length away from the participants so that they could not touch it. None of the participants touched the bear. After the product evaluation, participants completed a short questionnaire that served as our filler task. The experimenter then asked participants to volunteer for extra experiments and they could choose to volunteer for up to three experiments. Given the nature of the exclusion manipulation, participants were thoroughly debriefed before being dismissed. None of the participants reported any suspicion about the study and its purpose.

Results

A 3 (future-alone vs. future-belong vs. misfortune control) x 2 (touch vs. no touch) between-participant ANOVA on the number of lab experiments volunteered revealed a significant main effect of social feedback, $F(1, 179) = 5.62, p = .01$. Simple effects analysis showed that the excluded group volunteered ($M = .80, SD = .87$) marginally lesser than the included group ($M = 1.07, SD = .73$), $t(118) = 1.84, p = .07$. There was no significant difference between the excluded group and the control group ($M = .60, SD = .76$), $t(117) = 1.31, p = .19$.

More importantly, the main effect was qualified by a significant interaction between social feedback and touch, $F(1, 179) = 3.00, p = .05$ (see Figure 1a). Simple effects analysis showed that the excluded–touch group ($M = 1.10, SD = .84$) volunteered more than the excluded–no touch group ($M = .48, SD = .78$), $t(57) = -2.91, p < .01$. However, for the included group there is no significant difference between the “touch” group ($M = 1.13, SD = .73$) and the “no touch” group ($M = 1.00, SD = .73$), $t(59) = -.71, p = .48$. Similarly for the misfortune control group, there were no differences between the “touch” group ($M = .60, SD = .67$) and the “no touch” group ($M = .60, SD = .86$), $t(58) = 0, p = 1$ (see Figure 1a). Overall, these findings suggest that excluded individuals who touched a teddy bear volunteered for more experiments as compared to excluded individuals who did not touch a teddy bear. However, touching a teddy bear did not significantly increase volunteering behavior across included and control participants.

One potential alternative explanation for our results in Study 1 may be that participants who touched the teddy bear enjoyed the experiment more than those who did not touch the teddy bear. Perhaps, participants volunteered for more experiments in the expectation that the additional experiments would be enjoyable too. Although this should apply to all

experimental conditions, we did not observe this pattern of results across control and included participants. Nonetheless, in order to address this potential alternative explanation, Study 2 measured prosocial behavior using a different dependent measure.

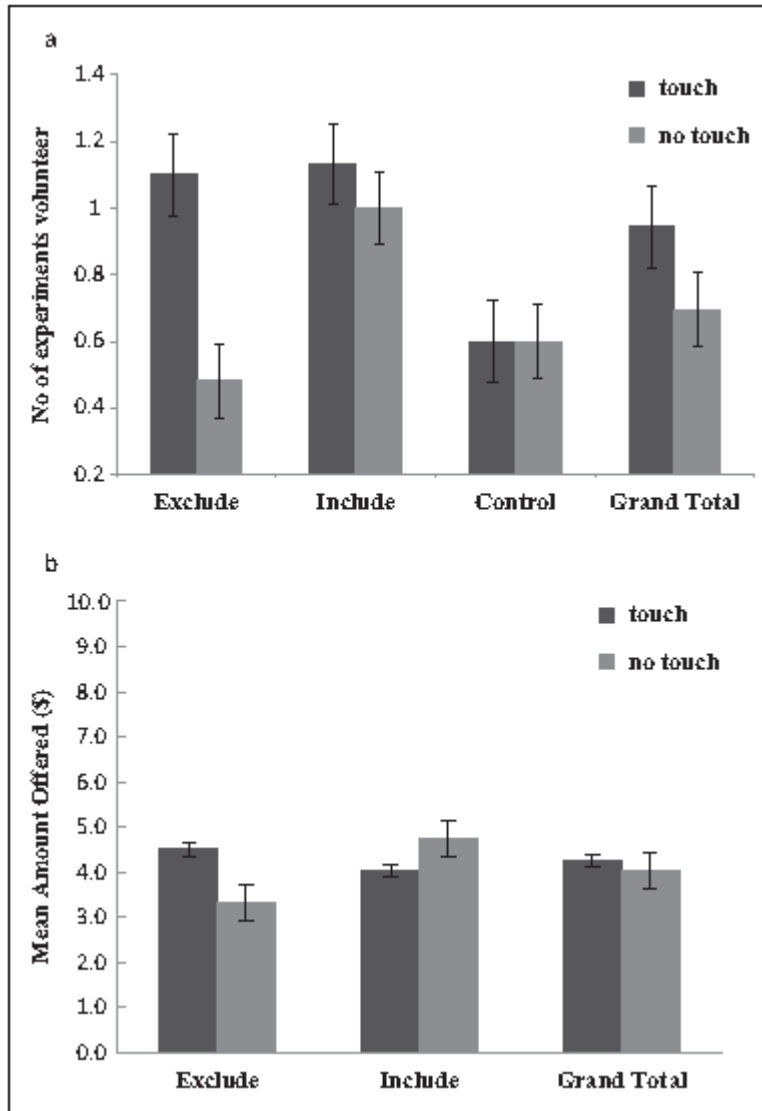


Figure 1a. Results from Study 1; mean number of experiments volunteered in respective social feedback conditions (exclude, include and control). Error bars indicate standard errors of the means. Fig1b. Results from Study 2: mean amount offered in dictator game in respective social feedback conditions (exclude and include). Error bars indicate standard errors of the means.

Study 2

Study 2 sought to replicate the findings from Study 1, with a more direct manipulation of exclusion and a different form of prosocial behavior. Study 2 had a manipulation of actual exclusion instead of potential exclusion. Furthermore, Study 1 relied on individual's behavioral intentions (willingness to volunteer) as the dependent variable, thus it remains unclear whether the effects generalize to actual behavior. In this study, we consider actual behavior with economic consequences for the study participants. We used the dictator game in which allocators control a fixed sum of money (e.g., \$10) and can choose to give any amount they want to give to recipients (Forsythe, Horowitz, Savin, & Sefton, 1994; Hoffman,

McCabe, Shachat, & Smith, 1994). Recipients may then accept or reject the allocators' offers. Although allocators should keep their endowments to themselves as giving any amount to recipients is monetarily detrimental, a majority of allocators share their money (e.g., Hoffman et al., 1994). Giving money to recipients is considered a prosocial behavior that entails a monetary cost to the self. Thus, Study 2 provides a stricter test of our predictions by using an interpersonal resource allocation task involving real monetary consequences. Lastly, we also test whether positive emotion would mediate the relationship between touch and amount offered in the dictator game.

Method

Participants and Design

Participants were 95 undergraduates (55 women and 40 men) who participated for course credit. Study 2 had a 2 (exclusion vs. inclusion) x 2 (touch vs. no touch) between-participants factorial design.

Procedure

We manipulated exclusion with a procedure developed by Leary, Tambor, Terdal, and Downs (1995). Participants met in a small group of four people and were asked to indicate their member preference by selecting two out of three members to work with. After the member preference exercise, participants were randomly assigned to be excluded or accepted by the group. In the exclusion condition, participants were told the following: "I hate to tell you this, but no one chose you as someone they wanted to work with." In the inclusion condition, participants were told the following: "I have good news for you—everyone chose you as someone they'd like to work with." After they were given the false feedback, participants then underwent the "touch" manipulation as in Study 1. Following this, participants were told that they would take part in another study on decision-making that involved other participants from a makeup study.

The instructions explained that the study was a decision making task in which the participant was the "offerer" and paired with another participant who was the "receiver." Participants were told that the other participant was in another room and that their identities would remain anonymous. The instructions explicitly stated that there would be no future interaction after the exercise. Participants were endowed with \$10 and they could divide it in any way between themselves and the other person. The \$10 was placed in 10 stacks of 50 cent coins in front of the participants. The participants then placed any money to be given to the receiver into a pouch and were told that the experimenter would not know the amount they left in the pouch (double-blind procedure). Participants then answered an open-ended question probing the reason behind their allocation decision. The amount offered to the receiver was the dependent measure.

We measured participants' emotion with an open-ended question probing the reason for their allocation decision. We did not ask participants to rate their emotions because we were concerned that doing so may unduly influence their subsequent decision in the dictator game. This is a concern that other studies have expressed and recommended the use of an open-ended format (Pillutla & Murnighan, 1996). The open ended format allowed us to examine the thought process and emotional reactions behind the choices people made without leading our participants to suspect what we were interested in. We submitted participants' essays to a linguistic analysis using the word-based language program Linguistic Inquiry and Word Count (LIWC; Pennebaker, Booth, & Francis, 2007). LIWC works by comparing all words of

a text document to an internal dictionary of more than 2,000 words and word stems, which fall into over 70 categories (e.g., self-reference singular pronoun, article, emotion, social process, etc.). To illustrate, we use an example of a participant's essay. One participant wrote: "I feel that \$5 is a fair deal because the respondent knows that I have been given \$10. If he chooses not to accept the amount I have offered, I wouldn't feel that I have lost out much in any sense." LIWC reflects this text as 2.38% of positive emotions. Another participant wrote: "There is no urgent need for myself to have the money and it is always comforting to be pleasantly surprised by others, even if it's from a stranger. So I just hope the money can be useful for the person who receives it." LIWC reflects this text as 9.09% of positive emotions. As is evident from these two examples, LIWC captures the degree of positive emotions.

Research suggests that LIWC reliably identifies emotion in language use. For example, more negative emotion words are used in writing about a negative event while more positive emotion words are used in writing about a positive event (Kahn, Tobin, Massey, & Anderson, 2007). After completing the study, participants received course credit and were also paid actual money based on their allocation decision. All participants were thoroughly debriefed before they were dismissed. None of them expressed any suspicion regarding any aspect of the study.

Results and Discussion

A 2 (exclusion vs. inclusion) x 2 (touch vs. no touch) ANOVA on the amount offered revealed a significant interaction between social feedback and touch, $F(1, 94) = 7.85, p < .01$ (see Figure 1b). Furthermore, simple effects analysis showed that the excluded–touch group ($M = \$4.50, SD = 1.85$) offered more money than the excluded–no touch group ($M = \$3.33, SD = 1.86$), $t(44) = -2.15, p = .04$. The amount offered, however, did not differ significantly between the included–touch group ($M = \$4.02, SD = 1.53$) and the included–no touch group ($M = \$4.72, SD = 1.19$), $t(91) = 1.50, p = .14$.

Positive Emotion and Prosocial Behavior

We predicted that the excluded–touch group would express more positive emotion in their essays than the excluded–no touch group. In contrast, we expect no differences in positive emotion for both the included–touch group and included–no touch group. To test this hypothesis, we conducted a 2 (exclusion vs. inclusion) x 2 (touch vs. no-touch) ANOVA on the percentage of positive emotion words. The predicted two-way interaction was significant, $F(1, 94) = 4.08, p = .05$. Simple effects analysis showed that the excluded–group ($M = 4.68\%, SD = 2.91$) expressed more positive emotions than the excluded–no touch group ($M = 2.83\%, SD = 2.12$), $t(44) = 2.46, p = .02$. There was no significant difference in the percentage of positive emotion words between the included–touch group ($M = 3.53\%, SD = 5.03$) and the included–no touch group ($M = 4.72\%, SD = 3.71$), $t(47) = .93, p = .36$.

We next performed mediation analyses to test whether positive emotion mediates the relationship between touch and amount offered. We did not test for mediation for the inclusion group because the effects of touch on amount offered was not significant. We regressed both touch and positive emotion on amount offered. Positive emotion predicted amount offered ($b = .23, SE = .11, p = .04$), and the relationship between touch and amount offered was no longer significant ($b = .76, SE = .56, p = .18$, see Figure 2).

To confirm that positive emotion mediates the effect of touch on amount offered, bootstrap confidence intervals for this indirect effect were obtained (Preacher & Hayes, 2008; SPSS macro). This procedure gives an unbiased inference of the mediation effects with small samples (Preacher & Hayes, 2008). We used a bootstrap procedure with 5,000 bootstrap samples and the analysis yielded a bootstrap 95% bias-corrected interval of (.05, 1.08). This interval does not contain zero, suggesting that positive emotion mediates the link between touch and amount offered for the exclusion group.

Using a behavioral dependent measure, Study 2 replicated the result from Study 1. Furthermore, the results support the theoretical argument that positive emotion mediates the link between touch and amount offered for the exclusion group.

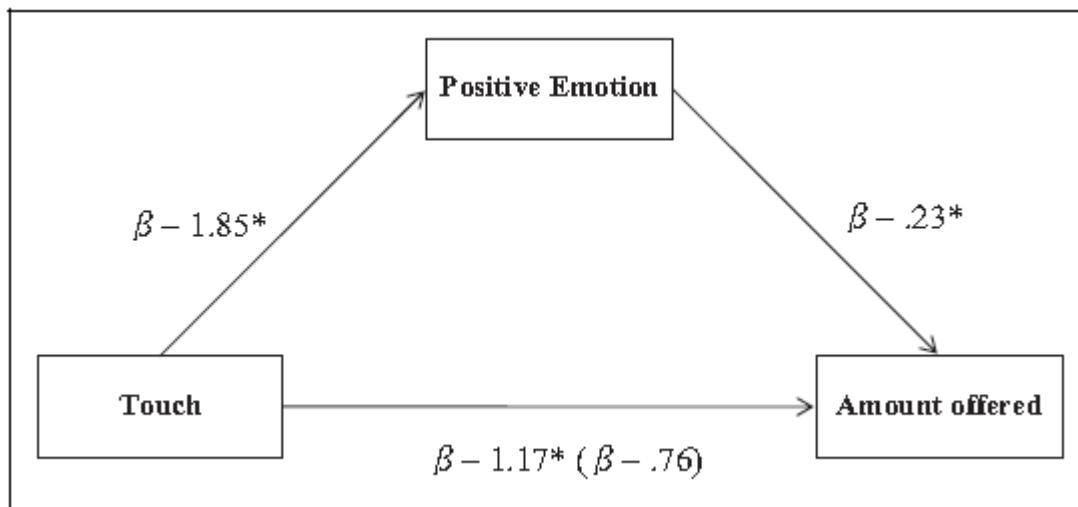


Figure 2. Positive emotion mediates the effects of touch on amount offered in Study 2. Coefficients are standardized and coefficients in parentheses control for the other predictor variable. * $p < .05$.

General Discussion

Across two studies, we found that excluded individuals who touched a teddy bear behaved more prosocially in comparison to excluded individuals who did not touch a teddy bear. Compared to excluded participants, touching a teddy bear did not significantly increase prosocial behavior across included and control participants. Taken together, the two studies provide converging evidence that touching a teddy bear mitigates the negative effects of exclusion to increase prosocial behavior. Furthermore in Study 2, we found that positive emotion mediates the relationship between touch and prosocial behaviour for the exclusion group.

Our research may have several theoretical implications. Our findings add to the growing literature on the overlap between the physical and social pain systems (Eisenberger et al., 2003; Way, Taylor, & Eisenberger, 2009). Recently, DeWall and colleagues (2010) find that acetaminophen, a physical pain reliever, can reduce the pain of exclusion. Similarly, our results suggest that touch, as a physical pain reliever, may also alleviate the pain of exclusion. Thus, our finding lends further credence to the idea that the physical world and the social world are inextricably connected.

Past research on human–pet interactions finds that petting a dog reduces people’s blood pressure (Vormbrock & Grossberg, 1988), and even the mere presence of pet dogs can reduce stress in women (Allen, Blaskovich, Tomaka, & Kelsey, 1991). A recent study shows that the mere gaze of a dog increases urinary oxytocin levels of their owners—a physiological indication of bonding that we elaborate on later in this section (Nagasawa, Kikusui, Onaka, & Ohta, 2009). We think that the effects obtained in these studies could extend to inanimate objects such as a teddy bear.

Touch may alter people’s physiological state that in turn may drive subsequent behavior. A recent study finds that touch, in the form of a 15-min massage, increases people’s oxytocin levels that in turn lead people to offer more money to a stranger (Morhenn, Park, Piper, & Zak, 2008). Oxytocin is a hormone that is associated with pair bonding, maternal behaviors (Lee, Macbeth, Pagani, & Young, 2009), and trust (Kosfeld, Heinrich, Zak, Fischbacher, & Fehr, 2005). Thus, one interesting implication could be that touching an inanimate object such as a teddy bear may potentially increase oxytocin levels. The elevated levels of oxytocin may in turn lead to increased prosocial behaviors. Besides oxytocin, another hormone that may be implicated in touch is cortisol—a hormone associated with stress (Newcomer et al., 1999). Since touch may be effective in reducing stress (Burgoon et al., 1996) and that exclusion is associated with increased cortisol levels (Blackhart et al., 2007), we think that touching a teddy bear may potentially decrease cortisol levels of excluded individuals, and in turn alleviate the stress of exclusion.

Embodiment theories suggest that when people recall, think, read, or talk about abstract mental representations, it will reenact people’s similar states based on stored sensory, motor, and introspective states that accompanied with the experience of those concepts (Barsalou, 1999; Barsalou, Niedenthal, Barbey, & Ruppert, 2003; Gallese & Lakoff, 2005). For example, Williams and Bargh (2008) suggest that the mere tactile sensations of physical warmth can activate concepts or feelings of interpersonal warmth. Interestingly, the experience of exclusion is associated with an actual state of coldness. Specifically, recent research finds that socially excluded participants gave lower estimates of room temperature than socially included participants (Zhong & Leonardelli, 2008). Thus, from an embodiment perspective, excluded individuals may initially feel cold but may subsequently experience a bodily sensation of tactile warmth after touching a teddy bear.

Lastly, the current findings are consistent with recent research which finds that excluded individuals are motivated to acquire social reconnection (Derfler-Rozin, Pillutla, & Thau, 2010; Maner, DeWall, Baumeister, & Schaller, 2007), and those who lack social connection with other humans may try to compensate by creating a human connection with inanimate objects (Epley et al., 2008). We further elaborate on this point in the following section on future research directions.

Limitations and Future Research

Our studies have several limitations and further research could address some of these limitations. First, although our theory applies to inanimate objects in general, the stimulus we used in both studies was a teddy bear. Much like teddy bears in our study, other inanimate objects such as religious agents, parasocial objects such as television characters, and social robots may all serve a similar function. In fact, a group of researchers are working on creating

robots that can serve a social function in people's lives (Breazeal, 2011). In other words, future research needs to establish the class of objects and their definitive properties that lead people to use these objects to alleviate the pain of exclusion.

A key factor that determines whether an object can serve as a substitute for human social connection may be based on the extent to which people are able to anthropomorphize the object. This might be an attribute of the object or people's tendency to anthropomorphize. Future work could examine anthropomorphizable objects versus nonanthropomorphizable objects that possess the same tactile qualities. For instance, one can examine the effects of a blanket with tactile qualities similar to that of a soft furry teddy bear. Furthermore, when people are high in their tendency to anthropomorphize, they are more likely to attribute emotions and mental capacities to nonhuman agents (Waytz, Cacioppo, & Epley, 2010). Therefore, excluded individuals who have a higher tendency to anthropomorphize may find it easier to seek social reconnection with nonhuman agents (see Epley et al., 2008).

Somewhat related to the aforementioned, future studies should clarify and test the effects of inanimate objects with different tactile qualities. For example, a hard, nonfurry plastic bear as opposed to a soft furry teddy bear may not evoke the tactile sensations necessary to elicit the effect. We speculate that this might be so because softness and furriness are tactile qualities people naturally perceive as comforting and warm, and that in turn generates more positive feelings.

Culture has been argued to affect people's tendency to anthropomorphize (Epley, Waytz, & Cacioppo, 2007). Specifically, people in industrialized countries are more likely to anthropomorphize nonhuman animals as they lack an understanding of the workings of the natural world (Ross, Medin, Coley, & Atran, 2003). Our studies were conducted in an industrialized context and this may have inflated some of our effects. Thus, our results need to be replicated in other cultural contexts in order to establish the generalizability of our findings.

Often times, it may be hard to renew affiliative bonds with other people when one has been socially excluded by others. During situations that may be hard for people to regain social reconnection with others after being rejected, one can choose to seek solace in the comfort of a teddy bear.

Declaration of Conflicting Interests

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