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Embodied Terror Management: Interpersonal Touch Alleviates Existential Concerns Among Individuals With Low Self-Esteem

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Abstract

Individuals with low (rather than high) self-esteem often struggle with existential concerns. In the present research, we examined whether these existential concerns may be alleviated by seemingly trivial experiences of both real and simulated interpersonal touch. A brief touch on the shoulder by a female experimenter led individuals with low self-esteem to experience less death anxiety (Study 1) and more social connectedness after a death reminder (Study 2). Reminding individuals with low self-esteem of death increased their desire for touch, as indicated by higher value estimates of a teddy bear, a toy animal that simulates interpersonal touch (Study 3). Finally, holding a teddy bear (vs. a cardboard box) led individuals with low self-esteem to respond to a death reminder with less defensive ethnocentrism (Study 4). Individuals with high self-esteem were unaffected by touch (Studies 1–4). These findings highlight the existential significance of embodied touch experiences, particularly for individuals with low self-esteem.

Keywords

touch, self-esteem, terror management, mortality salience, fear of death, social connectedness, ethnocentrism, death and dying

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As human beings, we live our lives knowing that we are going to die and that our death could happen at any time and for any number of reasons. Many of us handle this existential predicament fairly smoothly by convincing ourselves that our individual lives, though finite, are endowed with meaning that lasts beyond the grave (Pyszczynski, Greenberg, Solomon, & Koole, 2010). However, not everyone is equally successful at this task. Particularly, individuals with low (rather than high) self-esteem often find themselves struggling with existential concerns. For instance, individuals with low self-esteem find it hard to suppress death thoughts (Harmon-Jones et al., 1997), and they respond to death reminders with increased anxiety (Routledge et al., 2010). Their increased existential concerns may put individuals with low self-esteem at risk for psychological disturbances, such as depression or social anxiety. It is therefore important to learn how individuals with low self-esteem might cope more constructively with the problem of death.

The psychological confrontation with death has traditionally been the province of poets, prophets, and philosophers. In recent years, however, psychologists have developed rigorous experimental approaches for studying people's existential struggles (Koole, Greenberg, & Pyszczynski, 2006). Most experimental-existential psychological research to date has been guided by terror management theory (TMT; Greenberg, Solomon, & Pyszczynski, 1997). Inspired by the work of cultural anthropologist Ernest Becker (1973), TMT proposes that people's awareness of the inevitability of death creates a potential for overwhelming anxiety, which people can manage by adopting cultural worldviews that assure

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people of their literal or symbolic immortality. Upholding cultural worldviews affirms self-esteem, which shields people psychologically against the notion that their lives are fleeting and insignificant. TMT has been supported by many experiments showing that death reminders lead to cultural-worldview defense (e.g., ethnocentrism) and enhanced self-esteem strivings (e.g., seeking fame; Pyszczynski et al., 2010).

From the perspective of TMT, individuals with low self-esteem lack a vital buffer against existential anxiety, because they have a lower sense of meaning in life than individuals with higher self-esteem do (Harmon-Jones et al., 1997; Routledge et al., 2010). Individuals with low self-esteem may therefore look for sources of existential security that do not rely on symbolic meaning. One such source may be interpersonal touch. The connection between touch and security develops during infancy, when caregivers' gentle touch assures children that they are safe from harm (Hertenstein, Verkamp, Kerestes, & Holmes, 2006). The soothing effects of touch remain in adulthood (Hertenstein et al., 2006). Among adults, even being briefly patted on the shoulder by a stranger (Levav & Argo, 2010) or holding a teddy bear (Tai, Zheng, & Narayanan, 2011) can be psychologically comforting. Experiments indicate that people prefer more physical closeness when reminded of death (Wisman & Koole, 2003). Such observations suggest, albeit indirectly, that people manage existential anxiety through interpersonal touch.

The comfort of touch derives, at least in part, from physiological processes such as the bodily release of endorphins and hormones, including oxytocin (Dunbar, 2010). These physiological systems operate similarly across all mammalian species. Because most mammals lack the capacity for symbolic thought, the comforting effects of touch seem largely independent of symbolic meanings. Thus, the intriguing possibility arises that people use tactile experiences with little or no cultural meaning to alleviate existential concerns that arise only because of people's capacity for meaningful thought. By bypassing symbolic meaning, the comfort of interpersonal touch may be especially welcome among individuals with low self-esteem, who struggle to find meaning in life.

In the present research, we investigated whether interpersonal touch helps individuals with low (rather than high) self-esteem to deal with existential concerns. In Studies 1 and 2, we manipulated whether participants were briefly touched on the shoulder by an experimenter. We predicted that participants with low self-esteem would respond to touch with lower death anxiety (Study 1) and less social alienation in response to death reminders (Study 2) than participants with high self-esteem would. In Studies 3 and 4, we examined whether even an object that simulates interpersonal touch could provide existential comfort to individuals with low self-esteem. We predicted that a death reminder would lead participants with low self-esteem to attach a higher value to a teddy bear, a toy animal that simulates interpersonal touch (Study 3). Finally, we predicted that holding a teddy bear would reduce defense of cultural worldviews among participants with low self-esteem (Study 4). Throughout our studies, we expected few effects of touch among participants with high self-esteem, whose positive self-views already provide psychological protection against existential concerns.

Study 1

Method

Participants and design. Sixty-one paid volunteers (26 women, 35 men; average age = 23 years) were randomly allocated to touch and no-touch conditions.[1]

Procedure and materials. Participants were approached on the campus of the VU University Amsterdam by a female experimenter, who asked participants to fill out some questionnaires. In the touch condition (n = 30), the experimenter accompanied the questionnaire with a light, open-palmed touch for about 1 s on the shoulder blade, right below the deltoid. In the no-touch condition (n = 31), the experimenter provided the questionnaire without any form of touch. This touch manipulation was based on procedures of Levav and Argo (2010).

Participants rated their death anxiety on 7 items (e.g., "I am afraid of death, because it is so final") using 5-point scales (1 = *not at all*; 5 = *very much*). The items were averaged into a single index (Cronbach's α = .69). Next, participants answered the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965). The RSES consisted of 10 items (e.g., "On the whole, I am satisfied with myself") that participants answered on 4-point scales (1 = *not at all*; 5 = *very much*). RSES items were averaged into a single index (Cronbach's α = .84). A one-way analysis of variance (ANOVA) indicated that RSES scores were not influenced by the touch manipulation, $F < 1$. Finally, participants answered some biographical questions and were debriefed and thanked.

Results and discussion

We coded touch condition (no touch = −1, touch = 1), standardized self-esteem, computed an interaction term between these variables, and simultaneously entered these factors into a multiple regression analysis predicting self-reported death anxiety. Only an interaction between touch and self-esteem emerged, $\beta = 0.39$, $t(57) = 2.17$, $p = .034$. To interpret this interaction, we obtained predicted means for the four cells crossing self-esteem (low = 1 *SD* below

the mean; high = 1 *SD* above the mean) with touch condition (Aiken & West, 1991). As shown in Figure 1, individuals with low self-esteem experienced less death anxiety in the touch condition than in the no-touch condition, $\beta = -0.46$, $t(57) = -2.60$, $p = .012$. This is consistent with the hypothesis that touch provides a form of existential security to individuals with low self-esteem. Touch had no effect among individuals with high self-esteem, $\beta = 0.09$, $t(57) = 0.49$, $p = .626$.

Study 2

In Study 2, we used the mortality-salience paradigm to examine people's responses to a subtle death reminder (Greenberg et al., 1997). Prior research has shown that mortality salience promotes feelings of social alienation among individuals with low self-esteem (Routledge et al., 2010, Study 8). We hypothesized that interpersonal touch would protect individuals with low self-esteem against such socially alienating effects of mortality salience.

Method

Participants and design. One hundred and twenty paid volunteers (53 women, 67 men; average age = 23 years) participated in the study. Four participants were discarded because of missing values. Participants were randomly allocated to experimental conditions. All participants from Study 1 participated in the high-mortality-salience condition of Study 2.

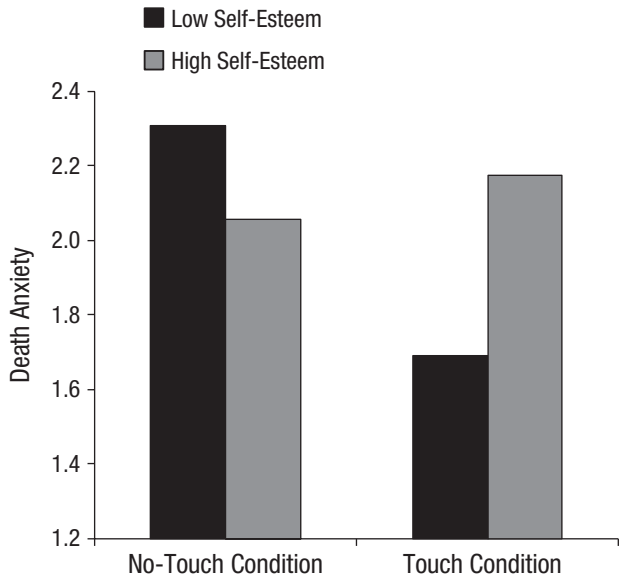

Fig. 1. Results from Study 1: self-reported death anxiety as a function of touch condition and self-esteem (low = 1 *SD* below the mean; high = 1 *SD* above the mean). Death anxiety was rated from 1, *not at all*, to 5, *very much*.

Procedure and materials. The setting, touch manipulation, and use of the RSES (Cronbach's $\alpha = .81$) were the same as in Study 1. However, in Study 2, we also manipulated mortality salience. Under high mortality salience ($n = 61$), participants answered seven questions about their fear of death (see Study 1). Under low mortality salience ($n = 55$), participants answered parallel questions about their fear of dentists. Next, participants completed word puzzles for 5 min, because mortality-salience effects are strongest after a brief distraction (Greenberg et al., 1997). Next, participants listed the names of 7 to 10 persons they knew[2] and rated how much they felt connected with them (1 = *not at all*; 9 = *very much*). Ratings were averaged and combined into a social-connectedness index. As in Study 1, a one-way ANOVA indicated that RSES scores were not influenced by the touch manipulation, $F < 1$.

Results and discussion

We first established whether, in the absence of interpersonal touch, mortality salience weakened social connectedness among individuals with low self-esteem but not among individuals with high self-esteem. Accordingly, we regressed the effects of mortality salience and self-esteem, and their interaction (computed as in Study 1), on perceived social connectedness in the no-touch condition. This analysis yielded the expected interaction between mortality salience and self-esteem, $\beta = 0.27$, $t(107) = 2.35$, $p = .021$. Simple-slopes analyses showed that mortality salience weakened perceived social connectedness among participants with low self-esteem, $\beta = -0.47$, $t(107) = -2.71$, $p = .008$, but not among participants with high self-esteem, $\beta = 0.08$, $t(107) = 0.49$, $p = .627$. We thus replicated the socially alienating influence of mortality salience among individuals with low self-esteem (Routledge et al., 2010).

Proceeding with our main analysis, we coded mortality-salience condition (low = 1 *SD* below the mean; high = 1 *SD* above the mean) and then coded touch condition, standardized self-esteem, and computed their interaction terms as in Study 1. We simultaneously entered these factors into a multiple regression analysis predicting perceived social connectedness. The analysis yielded an effect of touch, $\beta = 0.22$, $t(107) = 2.53$, $p = .011$, and the predicted interaction among mortality salience, touch, and self-esteem, $\beta = -0.25$, $t(107) = -2.87$, $p = .005$.

To interpret these effects, we derived predicted means for the eight cells crossing self-esteem (coded as in Study 1) with mortality salience and touch conditions (Aiken & West, 1991). As shown in Figure 2, there were no effects of mortality salience and touch among participants with high self-esteem, ts < 1.16, ps > .24. By contrast, among participants with low self-esteem, there was a main effect

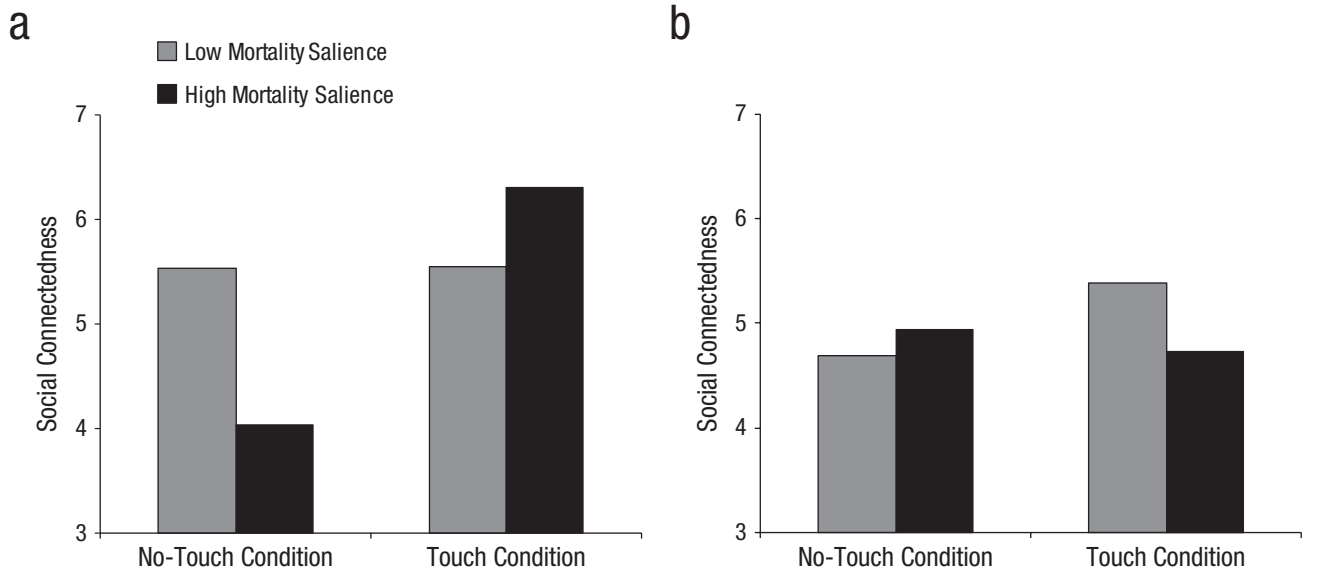

Fig. 2. Results from Study 2: social connectedness as a function of touch condition and mortality salience. Results are shown separately for participants with (a) low self-esteem and (b) high self-esteem. Low and high levels of mortality salience and self-esteem were coded as 1 *SD* below and above the mean, respectively. Social connectedness was rated on a scale from 1, *not at all*, to 9, *very much*.

of touch, $\beta = 0.36$, $t(107) = 2.98$, $p = .004$, qualified by a mortality-salience-by-touch interaction, $\beta = 0.35$, $t(107) = 2.91$, $p = .004$. Simple-slopes analyses showed that under high mortality salience, touch increased social connectedness among individuals with low self-esteem, $\beta = 0.71$, $t(107) = 3.91$, $p < .001$. Under low mortality salience, individuals with low self-esteem were not influenced by touch, $\beta = 0.01$, $t(107) = 0.05$, $p = .961$. Interpersonal touch thus buffered the socially alienating effects of mortality salience among individuals with low self-esteem.

Study 3

If individuals with low self-esteem gain existential security through interpersonal touch, then salient existential concerns may increase their desire for touch. In Study 3, we tested this idea. Because participants might find it awkward to directly report their desire for touch, we devised an indirect method to assess this variable. People particularly value what matches their motivational orientation. Desire for touch should hence increase the value of touch-providing agents. We thus hypothesized that mortality salience may lead individuals with low self-esteem to exaggerate the value of a teddy bear, a toy animal that simulates interpersonal touch.

Method

Participants and design. Fifty paid volunteers (30 women, 20 men; average age = 21 years) were randomly allocated to a high- and low-mortality-salience conditions.

Procedure and materials. Participants were received in a laboratory and escorted to cubicles. Instructions were computer-administered. The investigation allegedly consisted of unrelated studies conducted together for efficiency reasons. Participants began by answering some questionnaires, which included the RSES (Cronbach's $\alpha = .89$). Next, mortality salience was manipulated as in Study 2. Participants then moved on to a purported consumer test. Participants were asked to evaluate a 100-cm tall teddy bear in a cardboard box. Participants were instructed to look at the bear through a Plexiglas window for 3 min and estimate the bear's retail value in euros. Finally, participants answered some biographical questions and were debriefed, rewarded, and thanked.

Results and discussion

We entered mortality salience and self-esteem and their interaction terms (computed as in Study 1) into a multiple regression analysis predicting the average estimated euro value of the teddy bear. The only significant effect was an interaction between mortality salience and self-esteem, $\beta = -0.31$, $t(45) = 2.03$, $p = .048$.[3] To investigate this interaction, we obtained predicted means for the four cells crossing self-esteem (coded as in Study 1) with mortality-salience condition (Aiken & West, 1991; see Fig. 3). Simple-slope analyses indicated that for individuals with low self-esteem, mortality salience increased estimated teddy bear value, $\beta = 0.58$, $t(45) = -2.65$, $p = .011$. Participants with low self-esteem under high mortality salience estimated the teddy bear's value around €23, whereas the other

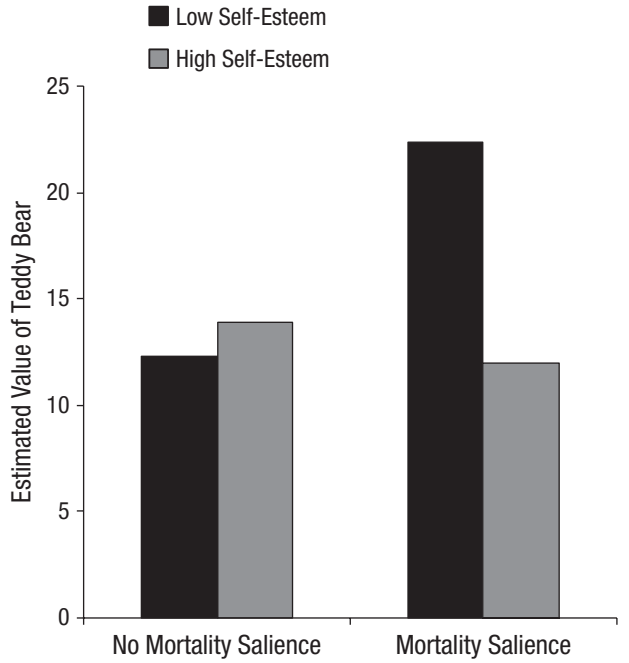

Fig. 3. Results from Study 3: estimated value of a teddy bear (in euros) as a function of mortality salience and self-esteem (low = 1 *SD* below the mean; high = 1 *SD* above the mean).

groups estimated its value around €13. Mortality salience had no effect on estimated teddy bear value among individuals with high self-esteem, $\beta = -0.11$, $t(45) < 1$. Study 3 thus shows that mortality salience increased the desire for touch among individuals with low self-esteem, as indicated by higher value estimates of a teddy bear.

Study 4

Were participants with low self-esteem in Study 3 right to place more value on a teddy bear? After all, holding a teddy bear might provide them with existential comfort. To investigate this possibility, we varied in Study 4 whether participants held a teddy bear or a cardboard box. A robust TMT finding is that mortality salience promotes claims of the superiority of one's own culture, especially among individuals with low self-esteem (Harmon-Jones et al., 1997). In Study 4, we examined whether holding a teddy bear might reduce the need among individuals with low self-esteem to engage in such cultural-worldview defense under mortality salience.

Method

Participants and design. Eighty paid volunteers (52 women, 28 men; average age = 20 years) were randomly allocated to high- and low-mortality-salience and boxed- and unboxed-bear conditions. Two non-Western participants were excluded because they were not expected to display Dutch ethnocentrism.

Procedure and materials. The setting and procedure, including the self-esteem measure (Cronbach's $\alpha = .89$) and mortality-salience manipulation were similar to those used in Study 3. However, this time, we manipulated whether participants could touch the teddy bear (see Tai et al., 2011). To allow participants to hold the bear on their lap, we used a smaller bear 34 cm in height. In the unboxed condition, participants were instructed to take the bear out of the box, place it on their lap, and touch the bear. In the boxed condition, participants were instructed to look at the bear through a Plexiglas window while leaving the bear inside the box. After 3 min, participants answered some questions about the bear to bolster the cover story. Next, participants completed word puzzles for 5 min as in Study 2.

Participants rated how much six negative emotions (e.g., pain, contempt) and six positive emotions (e.g., pleasure, hope) were applicable to a typical Dutch person and a typical Muslim (1 = *not at all*; 9 = *very much*). We focused on Dutch and Muslims because this comparison elicits ethnocentrism among native Dutch people (De Dreu, Greer, Van Kleef, Shalvi, & Handgraaf, 2011). Ratings were averaged separately by valence for the Dutch and Muslim targets (Cronbach's αs = .60–.81). Ethnocentrism was indicated when participants attributed (a) more positive emotions and less negative emotions to Dutch persons or (b) less positive emotions and more negative emotions to Muslims. After the task, participants answered some biographical questions and were debriefed, rewarded, and thanked.

Results and discussion

We first checked whether, in the absence of touch, self-esteem buffered the effects of mortality salience on ethnocentrism. Among participants with low self-esteem, mortality salience led to more ethnocentrism $\beta = 0.42$, $t(69) = 1.64$, $p = .053$ (one-tailed). Mortality salience had no effect among participants with high self-esteem, $\beta = -0.02$, $t(68) = -.07$, $p = .944$. This pattern confirms prior findings that self-esteem buffers the effects of mortality salience on cultural-worldview defense (Harmon-Jones et al., 1997).

We hypothesized that touching a teddy bear would reduce defensive ethnocentrism among participants with low self-esteem. To test this, we simultaneously entered the effects of mortality salience, touch, self-esteem, and their interaction terms (computed as in Study 2) into a multiple regression analysis predicting ethnocentrism. The only significant effect was the predicted interaction

between mortality salience, touch, and self-esteem, β = 0.28, $t(68) = 2.43$, $p = .018$.[4] To interpret this effect, we obtained predicted means for the eight cells crossing self-esteem (coded as in Study 1) with mortality salience and touch conditions (Aiken & West, 1991). As Figure 4 shows, there were no effects among participants with high self-esteem. By contrast, among participants with low self-esteem, the predicted interaction between mortality salience and touch was marginally significant, β = −0.34, $t(68) = -1.96$, $p = .054$. Simple-slopes analyses showed that under low mortality salience, ethnocentrism among individuals with low self-esteem was not influenced by touch, β = 0.21, $t(68) = 0.77$, $p = .443$. By contrast, under high mortality salience, touch reduced ethnocentrism among individuals with low self-esteem, β = −0.46, $t(68) = -2.16$, $p = .034$.[5]

General Discussion

The present research demonstrates that, compared with individuals with high self-esteem, individuals with low self-esteem benefit from seemingly trivial instances of interpersonal touch (both simulated and real) while coping with existential concerns. A brief touch on the shoulder by a female experimenter led individuals with low self-esteem to experience less death anxiety (Study 1) and more social connectedness when death concerns had been made salient (Study 2). A death reminder led individuals with low self-esteem to experience a greater desire for touch, as indicated by higher estimated value of a teddy bear (Study 3). Finally, individuals with low self-esteem responded with less ethnocentrism to a death reminder after holding a teddy bear (Study 4). Together, these findings indicate that individuals with low self-esteem derive important existential benefits from both simulated and unsimulated interpersonal touch. Notably, individuals with high self-esteem were not significantly influenced by interpersonal touch manipulations throughout the present research.

The existential benefits of touch for individuals with low self-esteem may be subject to important boundary conditions. For instance, touch might have less beneficial effects when people are touched by a potentially threatening person (see Levav & Argo, 2010) or someone of a stigmatized social group (though see Smith, 2008). Moreover, the existential comfort from touch may be more fleeting than the security that people derive from adopting death-transcending worldviews. More research is needed to address these possibilities.

Though preliminary, the present findings could have important applied implications. Maladaptive coping with existential concerns among individuals with low self-esteem may contribute to the onset of depression and anxiety disorders (Routledge et al., 2010). Consequently, by dampening existential concerns among individuals with low self-esteem, interpersonal touch could play an important role in preventing mental illness. Although legal and ethical restrictions may bar psychotherapists from touching clients, the present research suggests that simulated interpersonal touch may already have significant existential

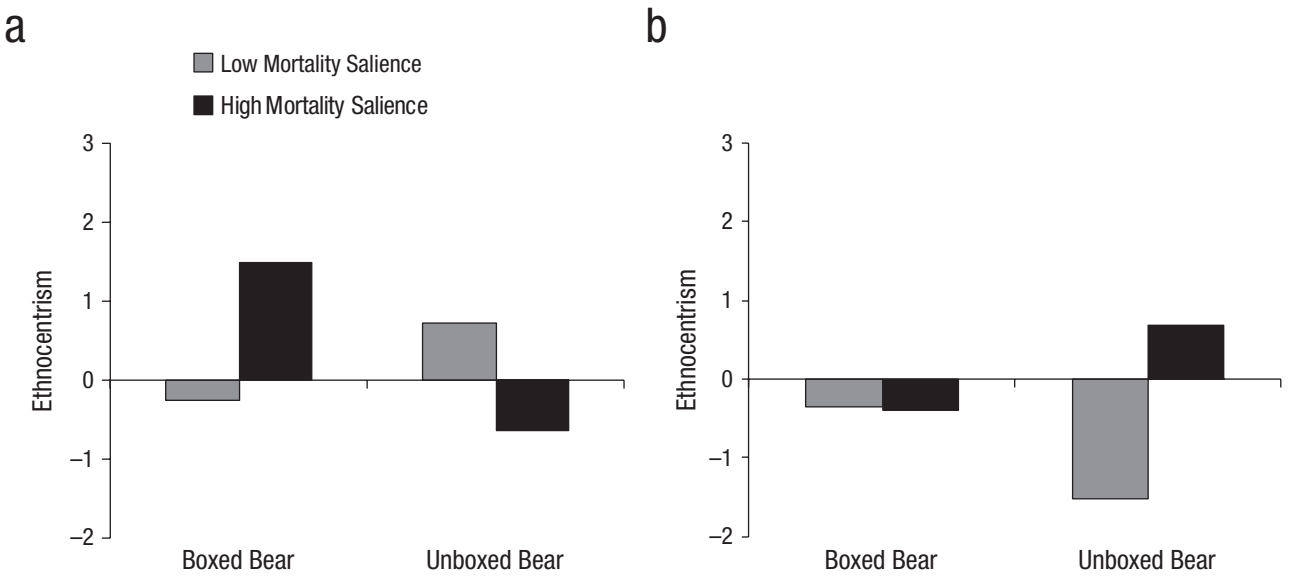

Fig. 4. Results from Study 4: ethnocentrism as a function of whether a teddy bear was boxed or unboxed and mortality salience. Results are shown separately for individuals with (a) low self-esteem and (b) high self-esteem. Low and high levels of mortality salience and self-esteem were coded as 1 *SD* below and above the mean, respectively. The ethnocentrism index could theoretically range from −16 (maximum anti-Dutch/pro-Muslim bias) to +16 (maximum pro-Dutch/anti-Muslim bias).

benefits for individuals with low self-esteem. Recent technological advances have yielded so-called "haptic jackets" that can simulate an affectionate embrace (Tjew A Sin & Koole, 2013). These and other tactile interventions may supplement traditional psychotherapy, which has emphasized cognitive treatments for psychological disorders.

In sum, the present findings demonstrate that individuals with low self-esteem who are struggling to find meaning in life may derive considerable benefits from real or simulated interpersonal touch. By highlighting a tactile terror-management tactic, these findings introduce an embodied dimension to existential psychology, a domain that has traditionally emphasized disembodied meanings in coping with existential issues (Heine, Proulx, & Vohs, 2006; Pyszczynski et al., 2010). Although the thought of the body's mortality fuels people's existential concerns (Goldenberg, Pyszczynski, Greenberg, & Solomon, 2000), the body itself may help people come to terms with their deepest fears.

Author Contributions

S. L. Koole developed the study concept. S. L. Koole and M. Tjew A Sin designed the study. S. L. Koole, M. Tjew A Sin, and I. K. Schneider analyzed and interpreted the data. S. L. Koole drafted the manuscript, and M. Tjew A Sin and I. K. Schneider provided critical revisions. All authors approved the final version of the manuscript before submission.

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Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

Supplemental Material

Additional supporting information may be found at http://pss.sagepub.com/content/by/supplemental-data

Notes

1. No reliable effects of gender emerged in Studies 1 through 4, so gender is not further discussed.

2. A first group of participants (n = 61) listed and rated 10 persons (Cronbach's α = .93). However, because participants commented that listing 10 persons was rather difficult, we asked subsequent participants to list only 7 persons (n = 59; Cronbach's α = .86). Participants who listed 10 persons reported less connectedness than those who listed 7 persons (M = 6.27 vs. M = 7.29, respectively), $F(1, 115) = 12.65$, $p < .001$. We hence controlled for the number of listed persons as a covariate in the regression analyses of Study 2. Without this covariate, the interaction between mortality salience and self-esteem was as follows: $\beta = -0.36$, $t(108) = -2.49$, $p = .014$.

3. Prior research has shown that the effects of mortality salience are not mediated by negative mood (Greenberg et al., 2003), but Levav and Argo (2010) found that the effects of touch are mediated by decreases in negative mood. Given these mixed findings, we investigated the role of mood in our studies. Participants in Study 3 completed the brief Profile of Mood Scales (Shacham, 1983) at the start of the experimental session (Cronbach's α = .89) and after the touch manipulation. We found no significant effects of mortality salience or touch on negative mood. Unexpectedly, premanipulation levels of negative mood varied by self-esteem level and mortality salience, $\beta = -0.38$, $t(46) = -3.18$, $p = .003$. Participants with high self-esteem had significantly less negative mood under high than under low mortality salience, whereas mortality salience had no effect on the mood of participants with low self-esteem. Because these mood variations occurred prior to the mortality-salience manipulation, they must have been due to chance. We statistically controlled for the influence of premanipulation mood by including it as a covariate in the analyses of Study 3. Without this covariate, the interaction between mortality salience and self-esteem was as follows: $\beta = -0.25$, $t(108) = -1.50$, $p = .142$.

4. Participants also rated their mood and arousal (Kuhl & Kazén, 1997) before and after the touch manipulation. As in Study 3, we found no effects of the manipulation on negative mood. However, premanipulation arousal (Cronbach's α = .72) interacted with touch, such that more aroused participants became more ethnocentric after touching the teddy bear, $\beta = 0.38$, $t(68) = 2.29$, $p = .025$. We therefore included arousal and its interaction with touch as covariates in the analyses of Study 4. Without these covariates, the interaction between mortality salience, touch, and self-esteem was as follows: $\beta = 0.24$, $t(70) = 2.04$, $p = .045$.

5. Further details about the methodology and analyses in Studies 1 through 4 can be found in the Supplemental Material available online.

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