Romantic Partner Handholding Decreases Perception of Pain

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The current study focuses on the effect of holding a long-term romantic partner’s hand during a pain task on the perception of pain. We hypothesized that participants who held the hand of their partner would perceive less pain than those who were alone during the task. Participants were 30 (15 women and 15 men) undergraduates at a Rocky Mountain University in the U.S. recruited via flyers posted in town and an online participant recruitment pool. A between-subjects design was incorporated in which participants were randomly assigned to undergo a pain task while either holding their partner’s hand or being alone during the task. The task involved participants holding their nondominant hand in a bucket of ice water for one minute. Immediately thereafter, participants rated their pain level. Our hypothesis was supported, such that participants who held their partner’s hand during the pain task rated their pain as significantly lower (*M* = 5.8667, *SD* = 1.41) than those who were alone during the pain task (*M* = 8.4, *SD* = 1.12). Regarding limitations, this study included only 30 White, healthy participants, a more diverse sample may be beneficial for future studies. Our results suggest that holding the hand of a long-term partner is a simple, inexpensive, and effective analgesic for pain.

*Keywords:* pain perception, handholding, long-term partner

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The analgesic and therapeutic effects of touch are a topic worthy of further research. Meaningful implications can be drawn and implemented in real-world settings, such as hospitals and personal relationships. Touch also has personal relevance for many, as it plays a large role in human life; interpersonal touch is critical in communication, development throughout life, attachment, emotional control, and more (Casico et al., 2019). Interpersonal touch can be displayed in multiple ways, one being handholding, which will be a primary aspect of the current study as we investigate the analgesic effect of romantic partner handholding during a painful task. The current study will also seek to add to the body of knowledge and literature that exists in this field.

A physiological basis as to why touch could be involved in the reduction of pain may be explained by the Gate Control Theory, which proposes the idea that nonpainful input stimuli interfere with and inhibit painful input stimuli, thus crowding the “gate” painful stimuli enter and reducing one’s perception of pain (Melzack & Wall, 1965). Handholding serves as the nonpainful, additional input stimuli during the painful experience. The gate control theory seeks to explain the physical and psychological facets affecting pain perception. Cognitive factors such as attention, anxiety, and expectation, or for the current research, emotional distraction and tactile stimulation provide additional input to physical factors to further close the “gate.” This may explain why holding the hand of a romantic partner or mother decreases pain more effectively than holding an inanimate object, a nurse’s hand, or simply tactile stimulation (Lopez-Sola et al., 2019; Weekes et al., 1993; Krahe, et al., 2016).

A body of findings suggests that interpersonal touch has pain-alleviating effects (Shu et al., 2014; Weekes et al., 1993; Gray et al., 2000; Field, T., 2011; Goldstein et al., 2016) Kwon and colleagues (2017) found with measures of blood pressure, heart rate, respiratory rate, and a visual analog scale that during cystoscopies, had decreased feelings of pain, anxiety, discomfort, and dissatisfaction when holding a nurse’s hand. Weekes, Moore, and James (1993) arrived at similar conclusions in a study including adolescent participants with cancer or renal disease, stating that handholding was very effective in ameliorating pain and as a coping strategy during treatment, especially if it was with the mother. Along with serving as an analgesic, handholding is a simple source of distraction and security, it reduces anticipatory stress, and increases emotional comfort, which correlates with the perception of higher relationship quality and closeness (Lopez-Sola et al., 2019).

Much research in the study of pain perception reduction has focused on patient populations and handholding with parents or nurses (Weekes et al., 1993; Kwon et al., 2017), nonetheless, there has been a handful of studies involving personal relationships. Goldstein and colleagues (2016) included romantic partners in a within-subjects design in which each subject underwent pain familiarization before female participants engaged in the four conditions: pain–alone (the control condition), partner – touch, partner – no touch, and stranger–touch. The hypothesis focused on empathy as a predictor of lower pain levels in the partner–touch condition. Results confirmed this hypothesis, participants did have diminished pain levels compared to the other three conditions. Similar research that includes long-term romantic partners in a within-subjects design investigated fMRI scans of thirty women who underwent a painful heat stimulus while first holding their romantic partners' hand and then a rubber device (Lopez-Sola et al., 2019). Brain scans showed distinct disparities between the two conditions; in the handholding condition, the brain’s neurologic pain signature was reduced, along with activity in areas of the brain associated with defensive behavior and stress, whereas in the rubber device condition, this was not seen. Other studies including romantic partners have found similar results, tactile and emotional engagement together serve as analgesics (Goldstein et al., 2017; Goldstein et al., 2018; Coan et al., 2006).

However, there have been a few studies suggesting tactile stimulation does not decrease pain which we would like to address. In a study including participants with Complex Regional Pain Syndrome (CRPS), Moseley, Zalucki, & Wiech (2008) found that tactile stimulation alone did not decrease pain, however tactile discrimination and stimulation together did, suggesting that for those with this illness, the stimulation alone is not a sufficient source of pain alleviation. In another study, Taddio and colleagues (2014) measured infant pain during vaccinations, during which infants either had tactile stimulation or not. Findings suggest that scores did not differ between the two conditions, and tactile stimulation could be recommended as an effective analgesic for vaccination pain. These studies show the limited controversy in this area and give reason for the continuation of research.

The purpose of the present study is to add to the current field of knowledge of handholding as an effect on pain perception using different methods and designs, while also providing more certainty on this issue, considering the few studies that do provide contrary results. In this study, we focused only on heterosexual couples who had been in a relationship for a minimum of one year, dating or married. Participants were randomly assigned to one of two conditions: holding a partner’s hand during the pain task or being alone during the pain task. After subjects underwent the pain task, they immediately rated their pain on a scale of one to ten. Based on the aforementioned research, it was hypothesized that participants who held the hand of their partner would experience less pain compared to those who were alone experiencing pain. A one-way ANOVA was used to analyze the effect of the independent variable on the dependent variable.

**Method**

**Participants**

Participants were 30 (15 women and 15 men) undergraduates at a Rocky Mountain University in the U.S. recruited via SONA, an online participant recruitment pool, and flyers posted around the university town. The mean age of the sample was 25.8 (SD = 4.94), participants were primarily White (86.7%), with others describing themselves as Black (3.3%), Hispanic (3.3%), Asian (3.3%), and Other (3.3%), as well as either a Senior (73.3%), Junior (13.3%), Sophomore (10%), or Freshman (3.3%) in college. Fifteen (50%) participants reported they were dating and fifteen (50%) reported they were married, the average length of relationship in the sample was 5.1 years (SD = 3.35). Because we focused on long-term relationships, we restricted eligibility to couples who had been dating or married for a minimum of one year. Participation in this experiment was completely voluntary.

**Materials**

Participants were asked to undergo a pain task, during which they placed their nondominant hand in a bucket of ice water for one minute. They were placed in one of two conditions: holding their partner’s hand during the pain task or being alone during the pain task. Immediately after the task, a pain scale was completed, in which they rated their pain on a scale of one to ten in writing, one representing ‘no pain at all’ and ten representing a ‘great deal of pain.’

**Procedures**

Participants came to the lab at the university with their partners and began by completing an informed consent. A researcher was present for the duration of the study. The experiment was a between-subjects design and participants were randomly assigned to one of the two conditions: holding their partner's hand during the pain task or being alone during the pain task. Which partner completed the task was also randomly assigned prior. The pain task involved participants placing their nondominant hand in a bucket of ice water for one minute. Immediately following the pain task, participants were asked to complete a pain scale where they rated their pain on a scale of one to ten in written form with their dominant hand. They subsequently filled out demographic information. The total time to complete the experiment was 10 to 20 minutes, participants were compensated $10 for their time.

**Results**

A one-way analysis of variance (ANOVA) was used to test the effects of holding a partner’s hand during a pain task on pain perception. Results suggest an effect of handholding (*F* (1,33) = 29.729, *p* < .001) such that participants who held their partner’s hand during the pain task rated their pain as significantly lower (*M* = 5.8667, *SD* = 1.41) than those who were alone during the pain task (*M* = 8.4, *SD* = 1.12).

**Discussion**

The purpose of the present study is to add to previous research within the current field of knowledge of handholding as an effect on pain perception using different methods and designs, while also providing more clarity on this issue considering the few studies that provide contrary results. We hypothesized that participants who held the hand of their partner would experience less pain compared to those who were alone experiencing pain. Our results confirmed this hypothesis. These findings suggest that holding a long-term partner’s hand during a painful experience is an effective, simple, and inexpensive way to reduce pain.

These results are consistent with Coan et al., 2006; Lopez-Sola et al., 2019, Goldstein et al., 2016, Goldstein et al., 2017, Goldstein et al., 2018, Krahe et al., 2016, Weekes et al., 1993, and Kwon et al., 2017, found that handholding as a type of tactile stimulation reduces pain levels, along with finding other specific benefits of handholding and important implications. This again suggests that holding a partner’s hand while experiencing pain elicits analgesia. Results are also consistent with Shu et al., 2000, Goldstein et al., 2016, Lopez-Sola et al., 2019, and Krahe et al., 2016, who found that various forms of tactile stimulation reduce the perception of pain, not merely handholding.

However, these results do contradict the results found by Mosely, Zalucki, & Wiech (2008) whose results suggest participants with Complex Regional Pain Syndrome (CRPS) did not feel lower levels of pain with tactile stimulation only, though what did cause pain reduction was both tactile stimulation and tactile discrimination. Differences in results could be because each participant in the sample had a chronic pain illness, therefore they may experience pain differently than a healthy population. Researchers acknowledged that this finding strayed from common results in this area, and an explanation included a difference in variables and methods: “other paradigms depend on tight temporal relationships” and “require a 3 [hour] continuous stimuli” which was not present in this study. Findings from Taddio, et. al. (2014), suggest that clinician-led tactile stimulation did not appear to help infants receiving vaccinations; there was no difference between those infants who received rubbing or slight pressure near the site of injection compared to infants who did not. Researchers in this study did not control for the amount of pressure applied during the tactile stimulation intervention, thus human error could have caused differences in these contradictory results. Additionally, the sample was not notably diverse as most infants were Asian.

In terms of possible limitations of the current study, there are a few that justify the discussion. First, one variable we controlled was the length of the relationship, however, for married participants, we were not able to confirm whether the number of years they reported was the duration of their marriage or the duration of their relationship in general, including dating. The ambiguity of that question may have altered our results in that regard. Future research should be clearer when stating that question or one similar to it. Next, our sample consisted of 30 healthy participants. While most studies in this area also focus on a specific population, i.e. patients with cancer or a disease, it would be beneficial to study a more diverse sample, considering the contradictory results came from populations different from that which was studied. Few studies incorporate a diverse sample concerning health, and it could grant more information as to why any discrepancies exist. A related limitation would be the lack of a racially diverse sample. Our results could be skewed considering most of the participants were White as other cultures or races may define or tolerate pain differently. The current study provided new insights and a contrasting angle from which to study this phenomenon simply. Our results suggest that handholding with a long-term partner does decrease pain perception, thus providing an inexpensive and effective intervention for painful experiences. There are many real-world implications with this study and others akin to it, most notably and commonly for medical settings. Overall, this research provides more insight into the phenomenon of handholding and pain perception, along with the general concept of tactile stimulation and pain perception.

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