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The impact of attachment insecurity on pain and pain behaviors in experimental pain

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ABSTRACT

Objectives: Pain perception and pain behaviors are distinct phenomena with different functions. Pain behaviors are protective in their functions, which include eliciting empathy or caring behaviors from others. Moreover, pain behaviors are intertwined with interpersonal relationships with significant others, which is why attachment orientations have been suggested as interpersonal schemas moderating the association between pain and pain behaviors. The aim of the current study was to assess the impact of insecure attachment dimensions on pain behaviors in laboratory-induced pain.

Methods: This experimental study included a sample of 60 patients with low back pain recruited from a large spine center in a hospital in Region of Southern Denmark. Patients were recorded on video during a cold pressor procedure and asked to rate their level of pain. Prior to the procedure, attachment orientations were assessed by the Revised Adult Attachment Scale. Two assessors independently coded the recorded video material for protective and communicative pain behaviors.

Results: A positive correlation of moderate size was found between pain intensity and pain communication. As hypothesized, attachment anxiety moderated the association between pain and pain behaviors. A high level of attachment anxiety was associated with at weaker association between pain and pain behaviors. None of the attachment dimensions correlated with pain intensity or pain behaviors.

Conclusion: The results indicate that patients with high levels of attachment anxiety may downplay pain and communication thereof. This finding is of potential clinical importance, since pain communication, among others, serves the function of eliciting caring behavior from healthcare personnel.

1. Introduction

Since the pain gate control theory was put forward > 50 years ago [1], a large number of studies have demonstrated that painful stimuli are modulated extensively in the peripheral and central nervous system, making the pain experience a complex and dynamic phenomenon where psychosocial factors play a large role. However, less is known about the impact of psychological factors on pain behaviors [2]. Pain behaviors can be defined as "specific body movements enacted during the experience of pain" [2]. Pain behaviors are both communicative and protective in their function and they may serve to elicit empathy or caring behaviors from observers [2]. In particular, the communicative function of pain behaviors resembles attachment behaviors. Kolb [3] was the first to directly compare pain behaviors with attachment behaviors. He suggested that sustained pain behaviors, such as complaints, serve as attachment behaviors or a cry for security [3]. Hence, correctly interpreting the pain behaviors of others has important implications for clinical practice [4]. However, pain behaviors may not be straightforward to interpret, since a number of psychosocial factors have an impact on their expression. Currently, little is known about the impact of attachment orientations on the expression of pain behaviors.

While pain behaviors may serve as a means to evoke sympathetic attention or help from others, pain behaviors can also lead to adverse reactions. For instance, pain-catastrophizing appears to elicit initial positive responses from others [5]; however, persistent pain behaviors and persistent catastrophizing may become a burden for significant others and healthcare personnel leading to negative responses [6–8]. Hence, depending on the perceived social consequences, the person in pain may suppress or exaggerate pain behaviors. Sullivan et al. [9] found that pain-catastrophizing was associated with more pain behaviors, leading to higher observer ratings of pain. Burns et al. [10] further emphasized that pain, pain-catastrophizing, and pain behaviors are

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intertwined with interpersonal relationships with significant others. For these reasons, attachment orientations [11] have been suggested as interpersonal schemas moderating the relationship between the experience of pain and pain behaviors [12–14].

Adult attachment orientations can be described as complex interpersonal schemas of the self and others, which affect the way we perceive threats, regulate emotions, and respond to stressors such as pain [15]. Researchers agree on two attachment dimensions: Attachment anxiety (worry over the availability of others and availability of their positive regard) and attachment avoidance (discomfort with closeness and dependence on others). The anxiety dimension is associated with hyper-activating strategies such as catastrophizing, hypervigilance, and prolonged emotional distress, while the avoidance dimension is associated with underestimation of threats and threat related cues [15, 16]. Applying Bowlby's attachment theory to the field of pain, both Mikael et al. [17] and Meredith et al. [12] have outlined how attachment theory can by utilized to explain the development and adaptation to chronic pain. Meredith et al. [12] presented a heuristic model suggesting attachment insecurity as a diathesis for chronic pain. Within the model, it is suggested that the relationship between appraisals of pain, responses to appraisals, and pain outcomes is moderated by attachment insecurity. Theoretically, it is proposed that the anxious attachment dimension is associated with more negative pain appraisals and more explicit displaying of pain as a result of emotional under-regulation, while individuals with a more avoidant attachment orientation are characterized by a tendency to downplay threats and under-report pain. In particular, patients with both high levels of attachment anxiety and avoidance (fearful attachment) are described as vulnerable in coping with chronic pain because their attachment strategy is characterized by a disorganized way of shifting between approach- and avoidance behaviors leading to contradictory behaviors [12, 17]. Unfortunately, most empirical studies of the associations between attachment dimensions and pain are of a correlational nature, and only a small number of studies have assessed the impact of attachment on experimental pain. To the best of our knowledge, fewer than ten studies have assessed the impact of attachment dimensions on experimentally induced pain (for a review, see [19]), and only one study has included a measure of pain behaviors in the form of observer ratings of facial expressions [20]. Although a number of studies support the association between attachment insecurity and a negative experience of pain, evidence indicates that the associations between attachment insecurity and pain may not be as straightforward as originally suggested by attachment theory [17]. Assessing the impact of attachment styles on cold pressor induced pain, both Meredith et al. [18] and Andrews et al. [21] found that attachment insecurity, with the exception of fearful attachment, was linked to lower pain threshold and tolerance as well as higher pain intensity. Furthermore, Andrews et al. [21] found that pain ratings differed as a function of whether the assessor was known to the participants or not known. Among participants with a fearful attachment style, it was found that pain tolerance was higher and pain intensity lower when the assessor was unknown to the participant. In a similar vein, Sambo et al. [22] found that participants with high levels of attachment anxiety reported lower levels of heat pain in high empathy settings compared to a low empathy setting. Using cold-pressor induced pain, Hurter et al. [20] also showed that pain intensity and pain expression were influenced by the experience of empathy. In a high empathy condition, participants with an avoidant attachment orientation both reported less pain and showed less facial expressions of pain compared to participants with a secure or anxious attachment orientation. Interestingly, there were no group effects in the low empathy condition. Somewhat contradictory, Rowe et al. [23] found that both secure and anxious attachment primes positively moderated the experience of pain.

Taken together, these findings suggest that there are indeed mixed findings on the specific role of attachment within the experience and expression of pain. Although a number of studies have assessed the impact of attachment insecurity on health behaviors, outcomes, and treatment adherence [23–26], no study has to our knowledge specifically assessed the impact of attachment orientations on pain behaviors in experimental pain.

1.1. Hypotheses

Firstly, we hypothesized that attachment insecurity (high levels of attachment anxiety and/or attachment avoidance) would be associated with higher levels of pain during the cold pressor test. Secondly, we hypothesized that the attachment dimensions (attachment anxiety and attachment avoidance) would moderate the association between pain and pain behaviors. Although empirical findings are mixed, in accordance with attachment theory, it was expected that attachment anxiety would be associated with higher levels of pain behaviors compared to attachment avoidance.

2. Materials and methods

2.1. Participants and setting

The present experimental study included a convenience sample of 60 patients with low back pain recruited from a large spine center located in a hospital in the Region of Southern Denmark. Patients were considered eligible for inclusion if they were between 18 and 65 years of age and proficient in written and spoken Danish. Ethics approval was obtained from the local science ethics committee (trial number S-20130045), and all participants gave written informed consent before participating in the study. All study procedures followed the Declaration of Helsinki. The spine center is a department in a government-funded facility where patients can be referred from anywhere within a catchment area of 1.2 million people. Department personnel perform multidisciplinary assessments of approximately 15,000 patients with spinal pain each year on referral from general practitioners, chiropractors, and other hospital departments. Study participants were recruited consecutively as part of the standard clinical screening procedure at their first visit to the spine center. To avoid burdening the patients, they were invited to participate in the cold pressor test while waiting for their MR-scan. < 10% of the patients approached declined to participate. The sample included in the study resembles the total patient cohort referred to the spine center (for a detailed description of the cohort, see Kent et al. [27]).

3. Procedures and materials

Prior to assessment, participants were introduced to the pain testing procedure with the cold pressor test. Furthermore, participants were instructed in the use of Visual Analogue Pain Scales (VAS) to assess pain intensity, which were 100 mm long scales on paper marked ‘No pain’ and ‘Worst pain imaginable’ at either end [28]. All participants also answered the Revised Adult Attachment Scale [29]. This is an 18-item self-report measure for assessing the closeness of relationship and attachment to significant others. Questions are answered on a 5-point Likert scale (1 = not at all; 5 = very characteristic). Twelve items measure attachment avoidance ($\alpha = 0.66$), while six items measure attachment anxiety ($\alpha = 0.81$). All participants answered the attachment scale prior to their pain inducement.

For the cold pressor test, a 25-l water tub was kept refrigerated at 0–2 °C (Dometic Waeco Mobicool C40, Dubai, United Arab Emirates), and the temperature was monitored throughout the testing with a thermometer. Participants were instructed to submerge their non-clenched hand in the circulating water up to their wrist (Submersible pump, model Reich, Arnhem, Netherlands, 10 l/min, 0.5 bar) and to keep it there for 2 min or until the pain became unbearable. Immediately after the test, patients were asked to rate their level of pain on the VAS. All participants were recorded on video during the cold