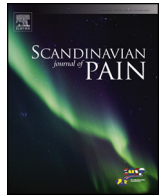




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Scandinavian Journal of Pain

journal homepage: www.ScandinavianJournalPain.com



Observational study

Pain catastrophizing, perceived injustice, and pain intensity impair life satisfaction through differential patterns of physical and psychological disruption

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HIGHLIGHTS

- Pain intensity and cognitive factors contribute to reduced life satisfaction.
- These effects were fully mediated by pain interference and depressive symptoms.
- Perceived injustice predicted life satisfaction, above and beyond other variables.

ARTICLE INFO

Article history:

Received 17 August 2017
Received in revised form
25 September 2017
Accepted 26 September 2017
Available online xxx

Keywords:

Pain catastrophizing
Perceived injustice
Life satisfaction
Pain interference
Depression

ABSTRACT

Background and purpose: Previous research has highlighted the importance of cognitive appraisal processes in determining the nature and effectiveness of coping with chronic pain. Two of the key variables implicated in appraisal of pain are catastrophizing and perceived injustice, which exacerbate the severity of pain-related distress and increase the risk of long-term disability through maladaptive behavioural responses. However, to date, the influences of these phenomena have not been examined concurrently, nor have they been related specifically to quality of life measures, such as life satisfaction.

Methods: Using data from an online survey of 330 individuals with chronic pain, structural path modelling techniques were used to examine the independent effects of pain catastrophizing, perceived injustice, and average pain intensity on life satisfaction. Two potential mediators of these relationships were examined: depressive symptoms and pain-related interference.

Results: Results indicated that depressive symptoms fully mediated the relationship between pain catastrophizing and life satisfaction, and pain interference fully mediated the relationship between pain intensity and life satisfaction. Both depressive symptoms and pain interference were found to significantly mediate the relationship between perceived injustice and life satisfaction, but perceived injustice continued to demonstrate a significant and negative relationship with life satisfaction, above and beyond the other study variables.

Conclusions: The current findings highlight the distinct affective and behavioural mediators of pain and maladaptive cognitive appraisal processes in chronic pain, and highlight their importance in both perceptions of pain-related interference and longer-term quality of life.

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1. Introduction

The role of cognitive appraisals in coping and overall adjustment to chronic pain has been well-documented [1,2]. Appraisals

typically develop in a milieu of cultural orientations and justice principles [3], rendering socially-constructed justice principles of the pain experience (e.g. fairness of the experience), an emerging area of study. Perception of injustice, defined as an appraisal reflecting the severity and irreparability of injury- or disability-related loss, blame, and unfairness, has been identified as a significant barrier to effective recovery after acute injury [4–7], and predicts poorer outcomes in both acute pain and chronic pain populations

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[4,6]. For example, individuals who view their pain as unjust tend to report greater pain [8,9] and depressive symptoms [10–12] and show greater susceptibility to maladaptive pain behaviours [13,14]. Perceived injustice may bias an individual's appraisal process to loss and blame-related cues, thus limiting their coping repertoire.

In addition to injustice appraisals, other cognitive processes can complicate effective adaptation to chronic pain, most notably viewing pain as a catastrophic personal experience. Pain catastrophizing is a pattern of negative key appraisal process, defined as “exaggerated cognitive and affective reaction to an expected or actual pain experience” [15]. It plays an important role in chronic pain and appears to be directly related to pain intensity, disability, emotional distress, and physical dysfunction [16–19]. Pain catastrophizing narrows an individual's cognitive focus to threat-related cues, which subsequently contributes to rigid and less effective coping styles [20,21].

Variability in appraisal processes has been shown to be related to adjustment and recovery outcomes [22]; however, the degree of overlap between these processes, as well as the mechanisms of effect, remain unclear. Of interest are mechanisms related to emotional distress and perceptions of daily life function, as they can facilitate targeted interventions and influence broader life outcomes. For example, depression in chronic pain may occur because pain impedes an individual's motivation to achieve goals and engage in valued pursuits [23,24] thereby reducing quality of life. Similarly, pain-related interference shows a longitudinal relationship with emotional distress [25] and low life satisfaction in some pain populations [26], highlighting the possibility that broader perceptions of pain as a barrier to function might mediate the relationship between appraisals of pain and quality of life outcomes.

It is notable that beyond the initial validation study that demonstrated some incremental predictive validity of a measure of perceived injustice above and beyond the effects of pain catastrophizing [6], perceived injustice and pain catastrophizing are rarely examined together in predictive models. The current study examined the direct effects of pain intensity, perceived injustice, and pain catastrophizing on life satisfaction in an Internet-based sample of 330 individuals with chronic pain. Based on the expectation that the effects of chronic pain-specific factors may influence life satisfaction through indicators of broader physical and psychosocial function, we expected that a significant degree of the effects of pain intensity, pain catastrophizing and perceived injustice on life satisfaction would be explained by the presence of depressive symptoms and pain-related interference.

2. Methods

2.1. Procedure

The current study constitutes a secondary data analysis of a questionnaire validation study (manuscript in preparation; results not reported here). Participants were asked to complete a set of Internet-based questionnaires. Participants were recruited via e-mails sent to prior participants from the Stanford Neuroscience and Pain Laboratory, and via an open recruitment link posted by the National Pain Report (www.nationalpainreport.com). Study measures were administered using the REDCap online survey system [27]. All responses were anonymous, and participants were not compensated for their participation. As a result, the study was approved by the Stanford University Institutional Review Board as an exempt protocol. Participant consent was obtained through the REDCap system by clicking a link after being provided an information sheet on the online study; participants could not advance to completing study questionnaires without completing the online

Table 1
Pain diagnosis information.

Pain group	N (% of sample)
Central	6 (1.8%)
Complex Regional Pain Syndrome	17 (5.2%)
Ehlers–Danlos/mixed connective tissue disorder	11 (3.3%)
Fibromyalgia	155 (47.0%)
Gastrointestinal/pelvic pain	20 (6.1%)
Headaches/orofacial pain	35 (10.6%)
Musculoskeletal pain	76 (23.0%)
Myofascial pain	12 (3.6%)
Nerve pain	80 (24.2%)
Neurological condition	6 (1.2%)
Rheumatic/autoimmune condition	39 (11.8%)
Vascular condition	3 (0.9%)
Unsure about diagnosis	7 (2.1%)

informed consent. Eligibility criteria were minimal: being 18 years of age or older, being able to read and write in English, and the presence of a chronic pain condition. As the initial target of the study was validation of a self-report measure containing an item pool of 35 items, a sample of at least 350 was considered optimal.

2.2. Participants

The initial online data collection included 497 people who completed the online consent; of these, 330 participants provided sufficient data to be included in the current analysis, which constituted the sample for analysis. The sample was 90% female and predominantly Caucasian (92.7% of the overall sample). Median age, which was assessed using a categorical variable reflecting 10-year increments, was between 40 and 49 years. Regarding marital status, 54.8% of the sample reported being married at the time of data collection. Median education level was a completed Associate's Degree. Mean average pain intensity over the previous 30 days was 6.42 (SD = 1.53) out of 10, and mean pain duration was 15 years (SD = 6.42, range: 1 year to 60 years). Regarding psychological history, 43.6% of the sample reported a previous mental health diagnosis, 50.3% of the sample reported no prior mental health diagnosis, and 6.1% declined to answer this question. Pain diagnosis information was obtained via self-report, and was broadly categorized according to common causes of pain (e.g., nerve pain) or common pain diagnoses (e.g., fibromyalgia). Participants reported their prior pain diagnoses using a free-text entry, which was then coded by the lead author into 12 pain categories. Pain diagnosis categories were not mutually exclusive: 138 participants endorsed a single pain category, 103 participants endorsed 2 pain categories, 30 participants endorsed 3 or more pain categories, and 8 participants endorsed 4 or more pain categories. Full diagnosis information can be found in Table 1. The most commonly endorsed pain categories were fibromyalgia, musculoskeletal pain, nerve pain, pain associated with a rheumatic or autoimmune disease, and headaches or orofacial pain.

2.3. Measures

PROMIS depression and pain interference. Depression and pain interference were assessed using 6-item short-form versions of the Patient-Reported Outcome Measurement Information System (PROMIS) Depression and Pain Interference instruments [28]. PROMIS Depression items assess negative mood, negative views of the self, negative cognitions, and decreased positive emotion and engagement. PROMIS pain interference items assess the severity of pain-related interference in multiple domains of life, including social, recreational, cognitive, emotional, and overall physical functioning domains. All PROMIS assessments were converted from raw scores to t-scores, consistent with their initial publications. Higher

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