



# The Effect of Perceived Injustice on Appraisals of Physical Activity: An Examination of the Mediating Role of Attention Bias to Pain in a Chronic Low Back Pain Sample

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**Abstract:** The current study examined the relationship between perceived injustice and attentional bias (AB) toward pain among individuals with chronic low back pain asked to perform and appraise the pain and difficulty of a standardized set of common physical activities. A pictorial dot-probe task assessed AB toward pain stimuli (ie, pain faces cueing pain), after which participants performed the physical tasks. Participants also rated face stimuli in terms of pain, sadness, and anger expression. As hypothesized, perceived injustice was positively associated with AB toward pain stimuli; additionally, perceived injustice and AB were positively associated with appraisals of pain and difficulty. Counter to expectations, AB did not mediate the relationship between perceived injustice and task appraisals, suggesting that AB is insufficient to explain this relationship. Exploratory analyses indicated that participants with higher levels of perceived injustice rated stimulus faces as sadder and angrier; no such differences emerged for pain ratings. To our knowledge, this is the first study to examine the association between perceived injustice and AB toward pain, as well as perceived injustice and in vivo appraisals of common physical activity. Results extend existing literature and suggest that attentional and potential interpretive bias should be considered in future research.

**Perspective:** This article identifies significant associations between perceived injustice, biased attention to pain, and appraisals of common physical activities among individuals with chronic low back pain. These findings suggest targets for intervention as well as directions for future research regarding individuals with high perceptions of injustice related to pain.

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**Key words:** Perceived injustice, selective attention, pain, anger, chronic low back pain.

A growing body of research suggests that perceptions of injustice contribute to detrimental physical and psychological outcomes both among individuals with recent injury<sup>42</sup> and chronic pain conditions.<sup>13,26,30,35</sup> Pain-related injustice perception has been conceptualized as a cognitive appraisal reflecting the severity and irreparability of pain- or injury-related loss, externalized blame, and unfairness.<sup>35,39</sup>

Outcomes associated with elevated injustice perception have included greater self-reported pain and disability,<sup>31,39</sup> greater pain behavior,<sup>37</sup> and poorer outcomes after rehabilitation treatment<sup>35</sup> and surgery.<sup>54</sup> Elevated perceptions of injustice are likewise associated with greater self-reported depressive symptoms<sup>26,29,30,35,37,40</sup> and the persistence of post-traumatic symptoms after injury.<sup>40</sup>

A number of mechanisms have been proposed to explain the negative effect of injustice perception. Previous studies have explored and found partial support for the role of emotional distress,<sup>39</sup> pain behavior,<sup>37</sup> and anger.<sup>30</sup> Recent reviews have suggested that attentional bias (AB) to pain might comprise another potential mechanism by which injustice perceptions systematically affect pain-related outcomes.<sup>35,36</sup> In the context of perceived injustice, the explanatory role of AB is

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supported by the positive relationship between perceived injustice and other risk factors for problematic pain outcomes, namely pain-related fear and catastrophic thinking<sup>35,39</sup>; both have been associated with AB to pain.<sup>1,18,44,49-51,55</sup> Further, the role of attention in pain outcomes is central within leading cognitive-affective models of pain (eg, the fear-avoidance model<sup>11,53</sup>) and supported by findings linking biased attention to pain to increased levels of pain severity, chronicity, and disability<sup>4,32,47</sup> (but see Crombez et al<sup>5</sup>), potentially by promoting avoidance behavior. For example, a recent study by Van Ryckeghem and colleagues further supported the role of attention in functional outcomes by showing that elevated levels of AB to pain strengthened the relationship between daily pain severity and distractibility from ongoing daily activity.<sup>47</sup> However, the role of attention in injustice-related outcomes has not yet been empirically examined. Moreover, previous studies have largely focused on the relationship of injustice with global retrospective and prospective reports of pain intensity and disability with respect to various domains of daily living.<sup>31,50</sup> To date, no study has examined the effect of injustice perception on pain and disability appraisal during actual performance of everyday physical activity. Identification of mechanisms active in daily life is vital to inform the development of interventions to mitigate the effect of perceived injustice in people with chronic pain. Additionally, investigation of mechanisms linking perceived injustice to pain outcomes stands to improve theoretical understanding regarding the role of perceived injustice in pain as well as inform clinical interventions.

Accordingly, the current study examined the relationship between perceived injustice and AB for pain in a sample of individuals with chronic low back pain asked to perform common everyday activities. Participants' attention toward personally-relevant pain stimuli (ie, faces cueing different levels of personally relevant pain) was assessed via a pictorial dot-probe methodology,<sup>49,52</sup> followed by completion of a standardized sequence of everyday physical activities during which participants provided ratings of perceived pain and difficulty. Extending and replicating previous research, it was hypothesized that perceived injustice would show a positive association with AB to pain-related stimuli and that perceived injustice and AB to pain would be associated with greater self-reported pain and perceived difficulty in response to physical exertion. In addition, we hypothesized that AB toward pain would mediate the relationship between participants' pain-related injustice perceptions and, respectively, ratings of pain intensity and difficulty during physical task performance. Finally, exploratory analyses examined the association between injustice perception and participants' ratings of pictorial stimuli. Because the previously shown association between perceived injustice, anger,<sup>30,43</sup> and depression,<sup>26,40</sup> participants were asked to not only rate pain but also anger and sadness of pictorial stimuli.

## Methods

### Participants

Participants were recruited from the community through advertisements in local community settings, newspapers, and online classified advertisements. Individuals expressing interest in participation were screened via phone to determine study eligibility. Participants were included in the study if they were between the ages of 18 and 70 years, endorsed the presence of low back pain for at least 6 months, and reported that pain significantly interfered with daily activities (thus, participants self-identified as having chronic low back pain; this was not corroborated by official physician diagnosis). Individuals were excluded from participation if they reported co-occurring medical conditions that affected mobility and/or if they were currently pregnant. Participants were compensated \$60.00 for completion of the full study protocol. All aspects of this protocol were reviewed and approved by the institutional review board of the university where the research was conducted.

### Measures

#### Perceived Injustice

The Injustice Experiences Questionnaire (IEQ<sup>35</sup>) was used to assess pain-related perceptions of injustice. Participants rated the frequency with which they experienced each of 12 pain-related thoughts on a 5-point scale, ranging from 0 (never) to 4 (all the time). Previous findings suggest that the IEQ yields 2 correlated factors, labeled severity/irreparability of loss and blame/unfairness. Severity/irreparability items include "Most people don't understand how severe my condition is," and "My life will never be the same." Blame/unfairness items include, "I am suffering because of someone else's negligence," and "It all seems so unfair." The IEQ has been shown to have strong reliability and validity among individuals with persistent musculoskeletal pain.<sup>31,35</sup> Cronbach  $\alpha$  for IEQ in the current study was .92, indicating good internal consistency.

#### Stimulus Material for the Attentional Bias Task

The stimulus set consisted of 32 pictures of 8 adult faces (4 male and 4 female). All 32 pictures have previously been used by Vervoort and colleagues.<sup>49,52</sup> These pictures are taken from 1-second video clips of simulated facial expressions of pain taken from a larger collection of such stimuli previously created and validated in the laboratory by Simon et al.<sup>34</sup> The stimulus set compiled by Simon et al<sup>34</sup> consists of various emotional expressions simulated by 8 actors, including simulation of various levels of pain. For the previous<sup>49,51,52</sup> and current study, all of the pain stimuli from the Simon et al<sup>34</sup> data set were used. Specifically, 8 actors were videotaped while producing facial displays of pain at 4 different levels—neutral facial expression (NFE), low facial expression (LFE), moderate facial expression (MFE), and high facial

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