UnilaSalle Editora Revista Saúde e Desenvolvimento Humano - ISSN 2317-8582

http://revistas.unilasalle.edu.br/index.php/saude_desenvolvimento

Canoas, v. 4, n. 1, 2016

*Artigo Original*

# Perceived Injustice and Chronic Pain Acceptance: Are We Measuring Two Separate Constructs or Opposite Poles of the Same Dimension?

*Injustiça e aceitação da dor crônica: estamos medindo duas construções separadas ou pólos opostos da mesma dimensão?*

http://dx.doi.org/10.18316/2317-8582.16.14

Joel Gagnon[1,2], Marie-Eve Martel[1,2], Frédérick Dionne[1,2], Whitney Scott, Marcos Alencar Abaide Balbinotti[1,2*]

**Abstract:** Perceived injustice has recently emerged as an important construct in the chronic pain literature. Perceived injustice has been shown to be a risk factor for various problematic pain outcomes, such as increased pain severity, depressive symptoms, and pain-related disability. At present, research on perceived injustice in chronic pain is lacking a theoretical model to facilitate understanding of its influence on chronic pain outcomes. It has been suggested that it might be useful to conceptualize perceived injustice within the psychological flexibility model of chronic pain. Indeed, there is preliminary evidence that perceived injustice is negatively related to chronic pain acceptance, which is an important process within this model; however, the nature of this association is uncertain at present. In particular, it is unclear whether current measures of perceived injustice and chronic acceptance simplyreflect different poles of the same dimension, or theoretically separate, but related, constructs. This study aims to further examine the relation between perceived injustice and pain acceptance. The sample consisted of 847adults who suffer from chronic pain. Several competing measurement models were tested by means of confirmatory factor analysis. Results indicate that these two constructs appear to be two closely related constructs rather than two opposite poles of the same dimension. Implications of these findings for future research will be discussed.

**Keywords:** Chronic Pain; Perceived Injustice; Pain Acceptance

**Resumo:** A injustiça surgiu recentemente como um construto importante na literatura sobre dor crônica. Injustiça foi mostrada por ser um fator de risco para vários resultados problemáticos de dor, como o aumento da intensidade da dor, sintomas depressivos e incapacidade relacionada à dor. Atualmente, na investigação sobre a injustiça percebida na dor crônica está faltando um modelo teórico para facilitar a compreensão de sua influência sobre os resultados de dor crônica. Sugeriu-se que ele pode ser útil para conceituar injustiça dentro do modelo de flexibilidade psicológica das dores. De fato, há evidente injustiça preliminar é negativamente relacionada à aceitação dor crônica, que é um processo importante dentro deste modelo. No entanto, a natureza desta associação é incerta, atualmente. Em particular, não está claro se as medidas atuais de injustiça e aceitação crônica simplesmente refletem diferentes pólos da mesma dimensão, ou teoricamente separada, mas relacionada, constrói. Este estudo tem por objetivo analisar ainda mais a relação entre injustiça e aceitação da dor. A amostra consistiu de 847 adultos que sofrem de dor crônica. Vários modelos de mensuração concorrentes foram testadas por meio de análise fatorial confirmatória.

[1] Université du Québec à Trois-Rivières - Canadá

[2] Université du Québec à Trois-Rivières - Department of Psychology – Canadá

**Endereço de correspondência**: 1685, René-Gagnier. Trois-Rivières, Québec, Canada. G9C 0A4

**E-mail**: marcos.balbinotti@uqtr.ca

**Post time**: 01/03/2016

**Accepted**: 08/04/2016

Os resultados indicam que estas duas construções parecem ser duas construções estreitamente relacionados, em vez de dois pólos opostos da mesma dimensão. Serão discutidas as implicações destes resultados para pesquisas futuras.

**Palavras-chave:** Dor crônica; Injustiça; Aceitação da dor

## INTRODUCTION

Perceived injustice has recently emerged as an important construct in the chronic pain literature. As defined by Sullivan and colleagues (2008)[1], perceived injustice refers to "a negative appraisal regarding irreparability and severity of loss associated to pain, and feelings of blame and injustice." Perceived injustice has been described as an important risk factor for various problematic pain outcomes, such as greater pain severity, depressive symptoms, post-traumatic stress symptoms, heightened protective pain behaviors, pain-related disability, narcotic use, and lower probability of returning to work[2,3,4,5,6]. Despite evidence for the adverse impact of perceived injustice on chronic pain outcomes, a theoretical model for understanding this impact is needed.

It has recently been suggested that the psychological flexibility model[7] might be useful for understanding the role of perceived injustice in chronic pain[8]. The psychological flexibility model suggests that individuals with chronic pain may, naturally, become "stuck" trying to control or avoid pain and pain-related thoughts and feelings and this avoidance may become problematic when it takes people away from engaging in chosen[9]. Pain acceptance, a central component of the psychological flexibility model, reflects the ability to get "unstuck" and pursue meaningful life activities, even in the presence of pain, without having to control or avoid it[10]. Research has shown that pain acceptance is associated with better functioning and mental health in individuals with chronic pain[11,12].

Applying the psychological flexibility model to perceived injustice, individuals may become entangled in thoughts about losses blame, unfairness, and retribution in relation to their pain condition[8]. To the extent that these understandable responses to pain-related injustice perceptions do not work to restore justice and prevent the person from participating in meaningful life activities, such responses might reflect the quality of ineffective avoidance and disengagement that characterize low levels of pain acceptance[8].

Despite the growing interest in research on perceived injustice and chronic pain acceptance in the pain literature, the nature of the relationship between these constructs is not presently clear. Some authors have suggested that injustice and acceptance could represent different poles of the same dimension[1]. However, others have argued that these variables are related but distinct[13]. Preliminary results from one cross-sectional study of people with fibromyalgia suggest that perceived injustice and chronic pain acceptance are significantly negatively correlated ($r$ = -.62, $p$< .001), *and* that both variables might make significant unique contributions to chronic pain outcomes[13]. However, replication of this finding is needed in samples of people with other types of chronic pain. Given the potential overlap in these constructs, research is also needed to test the underlying factor structure of their corresponding questionnaires. Greater understanding of the factor structure of these measures will facilitate understanding of the nature of the relationship between these constructs.

The current study aimed to examine the nature of the relation between perceived injustice and chronic pain acceptance variables

by investigating the factor structure of two questionnaires that assess these constructs. People with chronic pain completed the Injustice Experiences Questionnaire and Chronic Pain Acceptance Questionnaire at one time point. A number of competing lower-order and higher-order confirmatory factor models were tested to investigate the optimal measurement model of items from these questionnaires.

## METHOD

### Participants and procedures

Participants were recruited with the help of an association for people who live with chronic pain (*l'Association québécoise de la douleur chronique*) in the province of Quebec (Canada). Recruitment e-mails were sent to members of this association and study information was posted on their website. Participants completed self-report questionnaires using a secure website. Before completing the questionnaires, people were informed of the voluntary nature of their participation and received an information letter including a list of community resources and signed an informed consent form. Individuals were entered in a draw and had a chance to win one of ten gift cards of a $40 value. All information was kept confidential and anonymous. Participants were asked to answer screening questions online before accessing the questionnaires to ensure eligibility. Eligibility criteria included: a) being at least 18 years of age; b) being able to complete study questionnaires in French; and c) having received a diagnosis of chronic pain or reporting pain in one or more body location every day or almost every day for at least 3 months. The Research Ethics and Integrity Committee of the Université du Québec à Trois-Rivières (Canada) approved this study.

Demographic characteristics of the sample are presented in Table 1. The initial sample consisted of 847 participants. Examination of the demographic information revealed that 57 participants did not provide information on their gender. Of participants that did provide information on gender (*n* = 790), 78.4% were women. Seventy-seven participants did not give information on their ethnicity, but from the information available (*n* = 770), 98.1% were Caucasian. The mean age of participants was 52 years (*n* = 792; range = 19 to 82; *SD* = 12.04). The majority of participants (98.7%; *n* = 841) had formally received a diagnosis of chronic pain, while the remaining 1.3% reported pain everyday or almost every day for at least three months, thus meeting the criteria of chronic pain established by the *International Association for the Study of Pain*[14]. The majority of participants had been living daily with pain for over 7 years (60%; *n* = 780). The most common pain diagnosis was fibromyalgia (40.3%).The majority of participants (68.7%) were not working at the time of completing the questionnaires.

### Instruments

#### Injustice Experience Questionnaire (IEQ)

The French version of the IEQ[1,15] is a 12-item questionnaire that assesses the degree to which individuals perceive their painful condition as unjust. It is comprised of two subscales: severity/irreparability of loss and blame/unfairness. Specific items include, "I feel as if I have been robbed of something very precious" and "It all seems so unfair." Items are rated on a Likert scale ranging from 0 (*never*) to 4 (*all the time*). A total score is calculated by summing the items. A higher score reflects greater perceptions of injustice. Additionally, scores above the cut-off of 19 help identify individuals at risk for occupational disability[5] This questionnaire has good construct validity and discriminant validity, as well as good test-retest reliability (*r* = .90). The Cronbach's alpha coefficient obtained for the current study was

.90 for the total scale compared to .92 for the original version[1]. Alpha coefficients of.87 and .81 were obtained for the blame/unfairness and the severity/irreparability subscales, respectively.

**Table 1**
*Sample Demographics and Descriptive Statistics*

| Variable | *M* (*SD*) or *N* (%) |
|---|---|
| Age | 52 (12.04) |
| Education | |
| High school or Primary school | 141 (17.7%) |
| Professional studies diploma | 132 (16.6%) |
| College | 184 (23.1%) |
| University | 339 (42.6%) |
| Daily occupation | |
| Full-time work | 174 (21.8%) |
| Part-time work | 76 (9.5%) |
| Unemployed | 324 (40.7%) |
| Disabled | 223 (28%) |
| Annual revenue | |
| Less than $20,000 | 161 (20.7%) |
| Between $20,000 and $39,999 | 155 (20%) |
| Between $40,000 and $59,999 | 163 (21%) |
| Between $60,000 and $79,999 | 119 (15.3%) |
| Between $80,000 and $99,999 | 81 (10.4%) |
| $100,000 and more | 97 (12.5%) |
| Pain Diagnosis | |
| Fibromyalgia | 280 (40.3%) |
| Back pain | 142 (20.4%) |
| Neck pain | 55 (7.9%) |
| Neuropathic pain | 104 (15%) |
| Arthritis | 51 (7.3%) |
| Migraines or headaches | 37 (5.3%) |
| Use of pain relief medication | 681 (88.7%) |
| Psychotherapy for treatment of pain | 117 (15.1%) |
| IEQ | 29.1 (10.3) |
| CPAQ-8 | 21.0 (6.8) |

*Note.M* = Mean; *SD* = Standard Deviation; IEQ = Injustice Experience Questionnaire; CPAQ-8 = Chronic Pain Acceptance Questionnaire.

**Chronic Pain Acceptance Questionnaire (CPAQ-8).**

The CPAQ-8[16] is a shorter version of the original 20-item CPAQ[10,17]. This questionnaire assesses a person's acceptance of the experience of pain according to two subscales: activity engagement, which assesses the degree to which individuals continue to engage in personally meaningful activities despite pain; and pain willingness, which evaluates the degree or effort directed at controlling pain. Specific items include, "I am getting on with the business of living no matter what my level of pain is" and "Keeping my pain level under control takes first priority whenever I am doing something." Items are scored on a 7-point Likert scale ranging from 0 (*never true*) to 6 (*always true*). Scores for the pain willingness subscale must be reversed before calculating a total score so that higher total

scores reflect greater levels of pain acceptance. The validity of the CPAQ has been tested among different samples of chronic pain patients, such as patients from an interdisciplinary pain management program[10,17], individuals recruited online through chronic pain discussion groups and websites[18], as well as members of a chronic pain association, and individuals in pain and physiotherapy clinics[16]. The CPAQ-8 is frequently used in research and the short version has good psychometric properties. The test-retest reliability of the CPAQ-8 is good, with coefficients after 4-6 weeks ranging from .68and .86[18]. The Cronbach's alpha coefficient obtained for the current study was .75 for the total scale compared to coefficients ranging between .69 and .89 in other studies[16,17,18]. Cronbach's alpha coefficients of .82 and .72 were obtained for the activity engagement and the pain willingness subscales, respectively.

**Analytic plan**

A series of Confirmatory Factor Analyses (CFA) were performed to study the measurement model of the CPAQ-8 and the IEQ, to better understand the relationship between these two measures. Six competing models were tested (see Table 2). To examine whether the CPAQ-8 and IEQ measure the same construct, we first tested a one-factor model (model 1). As recommended by Kline (2005)[19], when testing competing CFA models, it should be first determined whether the fit of a simpler model is comparable. The second model (model 2) consisted of an oblique two-factor model with all the items from the CPAQ-8 loading on one latent factor, and all the items of the IEQ loading on another latent factor. The third model (model 3) tested an oblique four-factor model replicating the two-factor structure for both the CPAQ-8 and IEQ found in previous studies[1,10,13,16,17]. The fourth model introduced a second-order factor to model 3, whereby a single higher-order factor explains variance in the 4 lower-order factors reflected by the 2 subscales of both the IEQ and CPAQ-8. By comparing model 3 and model 4, it is possible to examine whether the variance not accounted for by the first-order factors (model 3) can be explained by an overarching second-order factor. The fifth and sixth models (models 5 and 6) were bifactor models. Bifactor models test whether a general factor can reflect the common variance across all scale items, where the general factor represents the broader construct of an instrument, and where the group factors represent subdomain constructs[20]. Bifactor models thus enable investigation of both the uni-and multidimensionality of a set of items. Based on the measurement model of model 3, model 5 added a general factor loading on all scale items. Finally, model 6 tested whether a measurement model with two general factors, one 'pain acceptance' general factor for CPAQ-8 items, and a 'perceived injustice' general factor for IEQ items, better explained the variance of all scale items.

The adequacy of each model tested was evaluated based on several fit indices. First, the chi-squared statistic was computed as a measure of model fit. Given the sensitivity of the chi-squared to large sample sizes, we evaluated the normed chi-squared obtained by dividing the chi-square by its degree of freedom. For the normed chi-square, a value below 5 is considered an acceptable fit[19,21,22]. In addition to the normed chi-squared, two goodness-of-fit indices were evaluated: the Comparative Fit Index (CFI) and the Non-normed Fit Index (NNFI). For these indices, values above .90 are considered as a reasonably good fit of the model, whereas values above .95 are considered favourable[22]. Two badness-of-fit indices were also evaluated: the Root Mean Square Error of Approximation (RMSEA) and the Standardized Root Mean Square Residual (SRMR). For the RMSEA, some authors argue that values between .05 and .08 represent reasonable

errors of adjustment[23], whereas others argue that values for the RMSEA should not be higher than .06[22]. For the SRMR, values below .10 are considered acceptable and values below .05 are considered favourable[24]. Finally, the Akaike Information Criterion (AIC) was evaluated because it enables the comparison between competing non-hierarchical models estimated with the same data. It is a parsimony-adjusted index as it favours simpler models. The model with the smallest AIC is chosen as the most likely to replicate the model in the population[19].

All CFA analyses were conducted using the lavaan package[25] included in *R*[26].The estimation method used was Robust Maximum Likelihood (MLR) as it gives a robust correction to the chi-squared when data are not normally distributed. Moreover, past research has found that MLR gives precise estimates for categorical data when there are more than five categories of responses. Finally, missing data were handled using Full Information Maximum Likelihood in all CFA analyses.

## RESULTS

### Confirmatory Factor Analysis

Assessments of fit for each model tested are presented in Table 2. The first model grouping all the items of CPAQ-8 and IEQ into one latent factor displayed poor fit ($X^2/df$ = 9.97, $p$< .001; CFI = .711; NNFI = .677; RMSEA = .109; SRMR = .089; AIC = 45399.12). Evaluation of standardized estimates revealed that CPAQ-8 and IEQ items were of opposite sign (β ranging from .29 to .49 for the CPAQ-8, and from -.41 to -.77 for the IEQ).Thus, a single factor does not appear to best explain variance across IEQ and CPAQ items.

**Table 2**

*Summary of Confirmatory Factor Analysis Results*

| Model | Number of free parameters | *X2* | *df* | CFI | NNFI | RMSEA [90% CI] | SRMR | AIC |
|---|---|---|---|---|---|---|---|---|
| 1. One factor | 70 | 1694.36* | 170 | .711 | .677 | .109 [.105 - .114] | .089 | 45399.12 |
| 2. Two factor (oblique) | 61 | 1332.39* | 169 | .780 | .752 | .096 [.091 - .100] | .102 | 44953.41 |
| 3. Four factor (oblique) | 66 | 682.94* | 164 | .902 | .886 | .065 [.060- .070] | .051 | 44212.18 |
| 4. Higher-order factor | 64 | 683.56* | 166 | .902 | .888 | .065 [.060 - .069] | .051 | 44208.94 |
| 5. Bifactor (all items) | 78 | 1112.11* | 152 | .818 | .773 | .092 [.087 - .097] | .174 | 44687.89 |
| 6. Pain acceptance bifactor and injustice bifactor | 80 | 1184.82* | 150 | .804 | .752 | .096 [.091-.101] | .200 | 44726.53 |

*Note.n* = 749; CFI = Comparative Fit Index; NNFI = Non-Normed Fit Index; RMSEA = Root Mean Square Error of Approximation; CI = Confidence Interval; SRMR = Standardized Root Mean Residual; AIC = Akaike Information Criterion.
**p*< .05

Overall, model 2showed better fit than model 1 except for the SRMR, which indicated high residuals between the observed and predicted correlations of the model($X^2/df$ = 7.88, $p$< .001; CFI = .780; NNFI = .752; RMSEA = .096; SRMR = .102; AIC = 44953.41). Evaluation of standardized estimates revealed that the variances of the all scale items were general

lywell predicted by the latent factors: CPAQ-8 (β ranging from .21 to .79), IEQ (β ranging from .41 to .79). The inter-factor correlation was moderate and negative (*r* = -.56).

Model 3 exhibited better fit than the first two models and, overall, adjusted reasonably well to the data ($X^2/df$ = 4.16, *p*< .001; CFI = .902; NNFI = .889; RMSEA = .065; SRMR = .051; AIC = 44212.18). The two lower order factors of the CPAQ-8 correlated positively and moderately with each other (*r* = .29), and negatively and moderately with the two lower-order factors of the IEQ (*r* = -.45, -.47, -.55, -.60 respectively). The correlation between the two lower-order factors of the IEQ was high (*r* = .84). Evaluation of the standardized estimates revealed that each factor predicted a good amount of variance in the items for both the CPAQ-8 (factor 1: β ranging from .62 to .79; factor 2: β ranging from .53 to .72), and the IEQ (factor 1: β ranging from .42 to .80; factor 2: β ranging from .58 to .77).

Model 4displayeda similar fit to model 3 ($X^2/df$ = 4.12, *p*< .001; CFI = 902; NNFI = .888; RMSEA = .065; SRMR = .051; AIC = 44208.94). Standardized parameters estimates for the second-order factor on the lower-order factors are as follow: -.51 and -.62 for factor 1 and factor 2 of the CPAQ-8, respectively; .87 and .96 for factor 1 and factor 2 of the IEQ, respectively. Evaluation of the standardized estimates revealed similar results to model 3: for both the CPAQ-8 (factor 1: β ranging from .62 to .79; factor 2: β ranging from .53 to .72), and the IEQ (factor 1: β ranging from .42 to .80; factor 2: β ranging from .58 to .77). Model 3 and model 4 displayed similar fit to the data, indicating that further evaluation of these two models is warranted. Because model 4 is nested under model 3 (i.e., model 4 is a restricted version of model 3), a chi-square test difference can be performed to test whether model 4 statistically fit the data better than model 3. The chi-square test adjusted using the Satorra-Bentler scaling correction was not statistically significant ($X^2_{\text{Satorra-Bentler}}$ = .62,*df*= 2,*p*= .73) indicating that the covariation between the lower-order factors is uni-dimensional.

The first attempt to run model 5 did not work because the theta matrix was not positive definite, indicating the presence of negative residual variance. Inspection of the theta matrix revealed that IEQ items 2 and 12 were problematic. We decided to constrain the paths from the general factor to these two items to zero. Model 5 with the additional constraints converged. Results showed that model 5did not fit well with the data ($X^2/df$ = 7.32, *p*< .001; CFI = 818; NNFI = .773; RMSEA = .092; SRMR = .174; AIC = 44687.89). Evaluation of the standardized estimates on the general factor revealed that items of the IEQ were slightly better explained by the general factor (β ranging from -.27 to -.58) compared to CPAQ-8 items (β ranging from .20 to .43).

Similar to model 5, the first attempt to run model 6 did not work, so we also constrained IEQ items 2 and 12 on the general 'injustice' factor to zero. The second attempt to run model 6did not work again due to a non-positive definite theta matrix. Based on the problem that occurred with model 5, we had evidence that IEQ items 2 and 12 may have overlapping content withCPAQ-8 items, thus we decided to add paths from the general factor of 'pain acceptance' to items 2 and 12 of the IEQ. The third attempt to run the model worked. Model 6displayed even worst fit than model 5 ($X^2/df$ = 7.90, *p*< .001; CFI = 804; NNFI = .752; RMSEA = .096; SRMR = .200; AIC = 44726.53). Evaluation of the standardized estimates of the general 'pain acceptance' factor revealed that items of the CPAQ-8 were slightly better explained by this general factor in comparison to model 5 (β ranging from .27 to .57). IEQ's items 2 (β = -.19) and item12 (β = -.56) had estimates of moderate size indicating that these items may indeed overlap content from the CPAQ-8.

Standardized estimates of the general 'injustice' factor on the IEQ items were similar to those of model 5 except that they were of positive value (β ranging from .29 to .60).

## DISCUSSION

The purpose of this study was to investigate the factorial structure of current measures assessing pain acceptance and perceived injustice in individuals who suffer from chronic pain. The association between the CPAQ-8 and IEQ in this study is consistent with one previous study showing that chronic pain acceptance and perceived injustice are significantly associated in people with fibromyalgia[13]. This study extends previous work by examining the association between perceived injustice and chronic pain acceptance in a mixed sample of people with chronic pain. This is the first study to investigate the lower-order, higher-order, bifactor structure of items on the CPAQ-8 and IEQ.

By means of CFA, six competing factorial models were tested. Results revealed that model fits were acceptable for model 3 (oblique four-factor model), and model 4 (higher-order model), but not for model 1 (one-factor model), model 2 (oblique two-factor model), model 5 (general bifactor model), and model 6 (model with a bifactor each for 'pain acceptance' and 'perceived injustice' items).Results from a chi-square difference test adjusted using the Satorra-Bentler scaling correction between model 3 and model 4 revealed that the difference was not statistically significant. Thus, it appears that a higher-order structure does not better represent the data for the CPAQ-8 and the IEQ than a more parsimonious lower-order structure. Moreover, while the fit of model 4 is acceptable, it is not clear how to best interpret the higher-order factor especially given that this higher-order factor seems to be mostly accounted for by the IEQ's lower-order factor. The lower-order structure found in model 3 is also consistent with the independent development of these measures from different theoretical orientations[1,10,16].

Results from model 1, model 2, and model 3 are in line with past research and add further evidence for the two-factor structure of the CPAQ-8 and the IEQ [1,10,13,16,17]. By testing these three models, we were able to reject model 1 and model 2 as possible alternative models to explain the factorial structure of these two questionnaires. The moderate negative ($r$ = -.56) inter-factor correlation found in model 2 adds further evidence to suggest that, while these two measures are closely related to one another, they seem to assess two separate but related constructs rather than opposite poles of the same dimension.

The finding that measures of perceived injustice and pain acceptance are significantly, but only moderately, related would appear to make sense within the conceptualisation of perceived injustice within the ACT psychological flexibility model[4]. The psychological flexibility model would suggest that people have the capacity to choose how they respond to thoughts concerning pain-related injustice. One very naturally response to pain-related injustice might be to ruminatively focus on past losses and retribution motivations[27,28]. When these natural behaviour patterns do not function to restore justice or they prevent someone from engaging in personally meaningful activities, such behaviours might share similarities with the qualities reflected by low pain acceptance. On the other hand, another response option might reflect the qualities of openness toward difficult thoughts and engagement in values-based and goal-directed behaviour that characterize pain acceptance. Thus, differences in these capacities for 'response-ability' to the same levels of perceived injustice[29] might explain

why perceived injustice and pain acceptance are only moderately related.

The partial distinctiveness between perceived injustice and pain acceptance shown in this study suggests that the relation between perceived injustice and chronic pain outcomes is not solely a function of its relation with pain acceptance. Therefore, additional processes linking perceived injustice and adverse pain outcomes require investigation. It might be useful for future research to include both measures in research to examine their incremental predictive utility to chronic pain outcomes. One study[13] suggests that both acceptance and IEQ make unique contributions to pain outcomes, but this requires replication. Research is also needed to empirically test the nature of the relationship between these two variables in predicting pain outcomes. Clinically, the results suggest that administering both questionnaires could be useful to understand factors potentially influencing patient functioning.

This study has some limitations that must be acknowledged. Firstly, there may be a sampling bias. Participants were recruited with the help of an association for individuals with chronic pain, but members of this association may not reflect the reality of the population of individuals who live with chronic pain. Generalizability to individuals who are not members of this association needs to be examined. Secondly, the exclusive reliance on self-reported measures could have contributed to some extent to the magnitude of the relations obtained due to shared method variance. Thirdly, because this study aimed at evaluating the measurement models of the CPAQ-8 and the IEQ, no formal hypothesis was tested. Finally, although there are emerging psychometric data to support the French version of the CPAQ-8 (Scott et al., 2013c), this has not yet been extensively validated, and to our knowledge, the psychometric properties of the French version of the IEQ have yet to be examined.

Despite these limitations, this study is the first to investigate the relation between the CPAQ-8 and the IEQ in terms of their factorial structure by comparing results from alternative CFA models. The data provide initial support to suggest that while some items may overlap between the questionnaires, these two measures evaluate related but distinct constructs rather than opposite poles of the same dimension. Therefore, it remains justified to continue to use both measures in research and clinical practice.

**Acknowledgments**

The authors would like to thank l'*Associationquébécoise de la douleurchronique* for their help with the recruitment of participants

**Conflict of interest**

None.

**REFERENCES**

1. Sullivan MJL, Adams H, Horan S, Maher, D, Boland D, Gross R. The role of perceived injustice in the experience of chronic pain and disability: Scale development and validation. Journal of Occupational Rehabilitation. 2008; 18(3): 249-261.
2. Sullivan MJL, Scott W, Trost Z. Perceived injustice: A risk factor for problematic pain outcomes. The Clinical Journal of Pain. 2012; 28(6): 484-488.
3. Scott W, Sullivan M. Perceived injustice moderates the relationship between pain and depressive symptoms among

individuals with persistent musculoskeletal pain. Pain Research & Management. 2012; 17(5): 335-340.

4. Scott W, Trost Z, Bernier E, Sullivan MJL. Anger differentially mediates the relationship between perceived injustice and chronic pain outcomes. Pain. 2013a; 154(9): 1691-1698.
5. Scott W, Trost Z, Milioto M, Sullivan MJL. Further Validation of a Measure of Injury-Related Injustice Perceptions to Identify Risk for Occupational Disability: A Prospective Study of Individuals with Whiplash Injury. Journal of Occupational Rehabilitation. 2013b; 23(4): 557-565.
6. Scott W, Trost Z, Milioto M, Sullivan MJL. Barriers to change in depressive symptoms after multidisciplinary rehabilitation for whiplash: The role of perceived injustice. The Clinical Journal of Pain. 2015; 31(2): 145-151.
7. Hayes SC, Strosahl KD, Wilson KG. Acceptance and commitment therapy: The process and practice of mindful change (2nd ed). New York, NY: Guilford Press; 2012.
8. Scott W, McCracken L, Trost Z. A psychological flexibility conceptualisation of the experience of injustice among individuals with chronic pain. British Journal of Pain. 2013; 8(2): 62-71.
9. McCracken L, Morley S. The psychological flexibility model: A basis for integration and progress in psychological approaches to chronic pain management. The Journal of Pain. 2014; 15(3): 221-234.
10. McCracken LM, Vowles KE, Eccleston C. Acceptance of chronic pain: Component analysis and a revised assessment method. Pain. 2004; 107(1-2): 159-166.
11. Reneman MF, Dijkstra A, Geertzen JHB, Dijkstra PU. Psychometric properties of Chronic Pain Acceptance Questionnaires: A systematic review. European Journal of Pain. 2010; 14(5): 457-465.
12. Costa J, Pinto-Gouveia J, Marôco J. Pain related catastrophizing on physical limitation in rheumatoid arthritis patients. Is acceptance important? The Spanish journal of psychology. 2014; 17:E31.
13. Rodero B, Luciano JV, Montero-Marín J, Casanueva B, Palacin JC, Gili M, LópezdelHoyo Y, Serrano Blanco A, Garcia-Campayo J. Perceived injustice in fibromyalgia: Psychometric characteristics of the Injustice Experience Questionnaire and relationship with pain catastrophising and pain acceptance. Journal of Psychosomatic Research. 2012; 73(2): 86-91.
14. Merskey H, Bogduk N. Classification of chronic pain: descriptions of chronic pain syndromes and definitions of pain terms(2nded). Seattle, US: IASP Press; 1994.
15. Sullivan M. The Injustice Experience Questionnaire [version française]. Dr. Michael Sullivan Centre for Research on Pain, Disability and Social Integration. 2015. Retrieved from http://sullivan-painresearch.mcgill.ca/ieq.php
16. Fish RA, McGuire B, Hogan M, Morrison TG, Stewart I. Validation of the Chronic Pain Acceptance Questionnaire (CPAQ) in an Internet sample and development and preliminary validation of the CPAQ-8. Pain. 2010; 149(3): 435-443.
17. Scott W, Bernier E, Garland R, Sullivan MJL. Preliminary validation of a French version of the Chronic Pain Acceptance Questionnaire. Poster presented at theAnnual Meeting of the Canadian Pain Society, Winnipeg, MB. 2013c.
18. Fish RA, Hogan MJ, Morrison TG, Stewart I, McGuire BE. Willing and able: A closer look at pain willingness and activity engagement on the chronic pain acceptance

questionnaire (CPAQ-8). The Journal of Pain. 2013; 14(3): 233-245.

19. Kline RB. Principles and Practice of Structural Equation Modeling(2nded). New York, NY: Guilford Press; 2005.
20. Reise SP. The rediscovery of bifactor measurement models.Multivariate Behavioral Research. 2012; 47(5): 667-696.
21. Bollen KA. Structural equations with latent variables. New York, NY: Wiley. 1989.
22. Hu LT, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Structural equation modeling: a multidisciplinary journal. 1999; 6(1): 1-55.
23. Browne MW, Cudeck R. Alternative ways of assessing model fit. Sage Focus Editions. 1993; 154: 136-136.
24. Hu LT, Bentler PM. Evaluating model fit. Structural equation modeling: concepts, issues, and applications. Thousand Oaks, Sage Publications. 1995; 76-99.
25. Rosseel Y. lavaan: An R Package for Structural Equation Modeling. Journal of Statistical Software. 2012; 48(2): 1-36.
26. R Core Team. R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria; 2015.
27. Sullivan MJL, Davidson N, Garfinkel B, Siriapaipant N, Scott W. Perceived injustice is associated with heightened pain behavior and disability in individuals with whiplash injuries. Psychological Injury and Law. 2009a; 2(3-4): 238-247.
28. Sullivan MJL, Thibault P, Simmonds MJ, Milioto M, Cantin A, Velly AM. Pain, perceived injustice and the persistence of post-traumatic stress symptoms during the course of rehabilitation for whiplash injuries. Pain. 2009b; 145(3): 325 331.
29. McCracken LM. Anger, injustice, and the continuing search for psychological mechanisms of pain, suffering, and disability. Pain. 2013; 154(9): 1495-1496.