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Perceived injustice is associated with pain and functional outcomes in children and adolescents with chronic pain: a preliminary examination

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Running Title: Injustice and functioning in pediatric chronic pain

Disclosures:

Preliminary results from this study were presented in a poster session at the 2015 meeting of the American Pain Society. We confirm that there have been no closely related manuscripts that have been submitted for simultaneous consideration to this or another journal. There are no conflicts of interest that might be seen as influencing or prejudicing the research. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

This is the author's manuscript of the article published in final edited form as:

Miller, M. M., Scott, E. L., Trost, Z., & Hirsh, A. T. (2016). Perceived Injustice Is Associated With Pain and Functional Outcomes in Children and Adolescents With Chronic Pain: A Preliminary Examination. The Journal of Pain, 17(11), 1217-1226. http://doi.org/10.1016/j.jpain.2016.08.002

Abstract

Chronic pain is prevalent in children/adolescents and contributes to high healthcare utilization. Research suggests injustice perceptions about pain are important in adult patients and a possible treatment focus. We conducted a preliminary evaluation of the psychometric properties of the Injustice Experiences Questionnaire (IEQ) and the relationship between injustice perceptions, pain, and functioning in chronic pain patients (N=139, mean age=15 years, 72% female) presenting to a pediatric pain clinic. Patients completed measures assessing pain intensity, injustice perceptions about pain, catastrophizing, overall functional disability, emotional functioning, social functioning, and school functioning. The IEQ demonstrated good reliability and validity. Higher levels of perceived injustice were associated with higher levels of pain intensity, catastrophizing, and functional disability, and with poorer emotional, social, and school functioning. Additionally, perceived injustice remained significantly associated with pain intensity, functional disability, emotional functioning, social functioning, and school functioning after accounting for relevant demographic and clinical factors. This is the first study to suggest that injustice perceptions are important in the experience of pediatric chronic pain patients. Future studies should more thoroughly examine the psychometric properties of the IEQ in children/adolescents and elucidate the causal nature of these relationships, which will inform treatment efforts to improve pediatric pain care.

Perspective: This initial investigation suggests that injustice perceptions about pain can be reliably and validly measured and are tied to important clinical outcomes in children/adolescents. Future studies that replicate and extend these preliminary results are necessary to determine the extent to which injustice perceptions are an important target for intervention.

Keywords: injustice, chronic pain, functioning, children, adolescents

Introduction

Chronic pain is highly prevalent in children/adolescents and contributes to high healthcare utilization [16,25]. This impact is likewise reflected in emotional and financial costs for caregivers [33]. The annual burden is estimated at $19 billion in healthcare costs and lost productivity for caregivers of children/adolescents with moderate to severe chronic pain [16]. Among children/adolescents, chronic pain is associated with several negative outcomes such as disability, depression, and poor social and school functioning [4,12,13,21,22,27,32,33,34,36]. Pain and its associated disability can negatively affect children/adolescents' social functioning through missed school days [18]. Indeed, children/adolescents with chronic pain frequently struggle with academic performance and peer relations [3,12,18,22].

Expectations and beliefs about the self and the environment may influence the pain experience. Pain catastrophizing, a coping/appraisal style characterized by rumination, magnification, and helplessness in the face of pain, is associated with negative outcomes in children/adolescents including increased disability, depressive symptoms, pain behaviors, and decreased overall functioning [2,8,29]. In addition to catastrophizing, beliefs about the fairness of one's pain may play a role in the pain experience. The belief that the world is a just and fair place is normative in many cultures; when that belief is violated, feelings of injustice can emerge [30,31,43]. Though related to catastrophizing, injustice perceptions incorporate feelings of unfairness and blame and may be differentially associated with pain outcomes. Sullivan and colleagues [54] found that injustice perceptions about one's pain were associated with higher pain intensity, depression, and catastrophizing among individuals with whiplash injury. Controlling for catastrophizing, a subsequent study of individuals with persistent musculoskeletal pain found pain intensity and depressive symptoms were positively related at high but not low injustice perceptions about one's pain, suggesting that perceived injustice negatively affects emotional reactions to pain [44]. Perceived injustice was also associated with poor physical and mental health recovery trajectories [56] and with long-term work disability following whiplash injury [55]. Similar relationships have been found in fibromyalgia and total knee arthroplasty samples [42,66]. Collectively, these studies suggest that injustice perceptions about one's pain are an important focal point for intervention in adult patients.

Little is known about perceived injustice and its relationship to pain and function among children/adolescents with pain. In children, beliefs about justice begin developing early, with children as young as 6 months showing sensitivity to violations of distributive justice [17]. By age 5, children begin utilizing distributive justice rules in their interactions with others, as evident by the increase in sharing of resources [41]. These beliefs about justice are similarly held by children and adults across cultures [41].

Given that general injustice concepts are salient to both adults and children/adolescents, and that injustice perceptions about pain are associated with negative outcomes in adults, it is plausible that injustice perceptions about pain are also relevant to the pain experience of children/adolescents. The aims of the current study were to: 1) conduct a preliminary evaluation of the psychometric properties of the Injustice Experiences Questionnaire (IEQ) in a sample of pediatric pain patients and 2) examine the relationship between injustice perceptions about one's pain and pain-related outcomes among children/adolescents with chronic pain. We hypothesized that: 1) the psychometric analyses would provide initial support for the reliability and validity of the IEQ in a pediatric sample, 2) in bivariate analyses, higher levels of perceived injustice would be associated with higher levels of pain intensity, catastrophizing, and overall functional disability, and with poorer emotional, social, and school functioning, and 3) in multivariate analyses, perceived injustice would be uniquely associated with pain intensity, functional disability, and emotional, social, and school functioning.

Materials and Methods

Sample

Participants were children and adolescents with chronic pain presenting to a Midwestern tertiary care interdisciplinary pediatric pain management clinic with their parent or guardian between January 2014 and May 2015. Patients seen at the clinic have persistent pain related to chronic disease, injury, sports activity, or surgery. Patients are referred to the clinic by a primary care provider or specialist for comprehensive chronic pain management services including anesthesiology, physical therapy, nutrition, and psychology. To be included in this study, patients had to be between the ages of 8 and 18 (see Measures section below regarding IEQ reading level), attend the clinic for at least one appointment, speak and read English, and be

without developmental delay. Because this is the first study of perceived injustice in a pediatric pain sample and because we did not have a priori reason to expect the associations to systematically differ across conditions, children/adolescents with varying pain conditions were included and combined into one sample. A total of 139 children/adolescents completed measures during an initial (N=45) or follow-up (N=94) appointment.

Procedure

This study is a retrospective analysis of clinical data. Patients completed forms electronically at the beginning and, if necessary, end of their clinic appointment as a routine part of the clinic's pain assessment program. Prior to conducting analyses, all data were de-identified by clinic personnel to ensure compliance with HIPAA and PHI standards. All study procedures were approved by the Indiana University Institutional Review Board.

Measures

Perceptions of Injustice

Perceptions of injustice were assessed using the Injustice Experiences Questionnaire (IEQ) [53]. The IEQ is a 12-item measure assessing feelings of injustice related to one's pain or physical condition. The measure has shown good reliability and validity across several adult chronic pain samples [42,53]. Patients rate how frequently they identify with statements such as "it all seems so unfair" on a 5-point Likert scale ranging from 0 ("never") to 4 ("all the time"). The original instructions for the IEQ have patients answer questions in regards to their "injury." For this study, patients were asked to focus on their pain when responding to each item. The total score is calculated by summing the Likert ratings for all questions. In addition to an overall score, the IEQ can be scored along two subscales: 1) severity/irreparability of loss and 2) blame/unfairness. However, due to the large overlap in item loadings on these two scales in the adult validation study, Sullivan and colleagues [53] suggested the IEQ may be best considered as measuring a unitary construct.

The IEQ is written at a 2nd grade reading level, which was determined by the Flesch Kincaid Grade Level Formula [11]. Therefore, the form was only administered to children who were ages 8 years and older, able to read and write English, and without developmental delay.

Additionally, a clinic staff member was available to address any questions about questionnaire items.

Numeric Pain Rating Scale

Patients indicated their current pain on a numeric rating scale ranging from 0 (“no pain at all”) to 10 (“most pain ever”).

Pain Catastrophizing

Pain catastrophizing was assessed using the Pain Catastrophizing Scale for Children (PCS-C) [8]. The PCS-C is a 13-item questionnaire adapted from the Pain Catastrophizing Scale (PCS), which measures the degree to which individuals engage in rumination, magnification, and feelings of helplessness when in pain [51]. Questions are rated on a 5-point Likert type scale ranging from 0 (“not at all”) to 4 (“extremely”). The total score is calculated by summing all items, with higher scores indicating greater catastrophizing. Previous studies found the child form to be reliable and valid [8,15]. The PCS-C total score was used for this study and had good internal consistency (α=0.93).

Functional Disability

Functional disability was assessed using the Functional Disability Inventory (FDI) [63]. The FDI is a 15-item self-report measure assessing functional limitations among children and adolescents. It has demonstrated reliability in several different pediatric chronic pain populations [5,23,39,61]. On a scale ranging from 0 (“no trouble at all”) to 4 (“impossible”), patients indicate how much trouble they have performing normal physical and daily activities such as walking up stairs or sitting in class for a full day. The total score is calculated by summing endorsed items, with higher scores reflecting greater functional disability. The FDI showed good internal consistency (α=0.91) in the current sample.

Emotional, Social, and School Functioning

Participants’ emotional, social, and school functioning were assessed using the Pediatric Quality of Life Inventory (PedsQL) - Generic Core Scales [60], which is a 23-item self-report measure that evaluates respondents’ quality of life over the past month. The PedsQL is a reliable and valid measure frequently used in pediatric chronic health conditions [38]. Using a 5-point

Likert scale ranging from 0 (“never”) to 4 (“always”), individuals answer questions about physical (“It is hard for me to run”), emotional (“I feel sad or blue”), social (“I have trouble getting along with other kids”), and school (“It is hard for me to pay attention in class”) functioning. The PedsQL is reversed scored and transformed to a 0 to 100 scale. The mean of all items within each subscale is calculated, with higher scores indicating better quality of life. The emotional, social, and school functioning subscales were examined for the current study. All subscales had good internal consistency in the current sample (Emotional α=0.81, Social α=0.81, School α=0.85).

Statistical Analyses

Assumptions of normality were assessed prior to conducting the analyses, and no violations were indicated. A principal components analysis with oblique rotation was used to examine the underlying structure of the IEQ. Factors with eigenvalues greater than 1 were retained. Individual items were evaluated based on their factor loading and cross-loading coefficients. Recommendations for factor loading thresholds vary in the literature. Factor loadings greater than 0.3 or 0.4 are often used and reported [6,50,61]. In the initial psychometric analysis of the IEQ in adults, Sullivan and colleagues (2008) used a factor loading of 0.40 or higher as the threshold, and they suppressed factor loadings less than 0.40. We took a more conservative approach by using a factor loading threshold of 0.50. Reliability of the IEQ was assessed using coefficient alpha [9]. For the current study, perceived injustice, pain catastrophizing, and pain intensity were conceptualized as predictor variables, whereas functional disability and emotional, social, and school functioning were conceptualized as outcome variables. Zero-order correlations were calculated to assess the bivariate relationship between perceived injustice, pain catastrophizing, and outcomes variables (pain intensity, functional disability, and emotional, social, and school functioning subscales). Hierarchical regressions were used to examine the multivariate relationship between perceived injustice and pain outcomes after accounting for relevant demographic (sex and age) factors, pain intensity, and pain catastrophizing. Both standardized beta weights and squared structure coefficients were assessed to determine the strongest predictor in each regression. Squared structure coefficients were calculated for predictor variables that were significant in the final step of each regression model to quantify the influence of each predictor while controlling for other predictors in the

equation. Squared structure coefficients quantify the amount of variance each individual predictor variable shares with the observed R^2 effect (i.e., the total variance accounted for by the entire model). They are calculated by dividing the bivariate correlation between the predictor and the outcome variable by the total R of the final regression model, and then squaring the resulting value. Compared to beta weights, they are less susceptible to inaccurate estimates due to multicollinearity [26].

Results

Sample descriptives are summarized in Table 1. The sample was predominately female (71.9%) and White (92%). The majority of patients had multiple pain conditions (41%) or musculoskeletal pain (26.6%). Average age of the sample was approximately 15 years (*SD*=2.07). At the time of assessment all participants were receiving care (baseline or follow-up) for a pain condition. Descriptive information for measures is detailed in Table 2. Preliminary analyses indicated that baseline and follow-up patients did not significantly differ on the measures of injustice, pain, or functioning, except for school functioning. Follow-up patients reported significantly better school functioning than did baseline patients ($t(137)=2.48$, $p<.05$, $d=.45$). To control for this difference, visit type (baseline or follow-up) was included in the regression analysis predicting school functioning. Additionally, IEQ scores differed across patient sex, with girls scoring higher than boys ($t(137)=2.23$, $p<.05$, $d=.46$). As such, we included sex in the subsequent regression analyses. Although age was not significantly correlated with IEQ scores ($p>.05$), given that this was the first study of injustice perceptions and pain outcomes in a pediatric sample, we included age in the regression analyses to account for any developmental differences in the relationships examined herein. IEQ scores did not significantly differ by race or pain diagnosis.

Structure of the IEQ

A principal components analysis with oblique rotation yielded two factors with eigenvalues greater than 1 and explaining 65% of the total variance. Factor loadings from the pattern matrix are presented in Table 3. The loadings closely mirrored those of the original validation study in adults with chronic pain [53]. The first component, representing

severity/irreparability of loss, accounted for 56% of the total variance. The second component, representing blame/unfairness, accounted for 9% of the total variance. The two components were significantly correlated (r = .50). Compared to the adult study [53], our results indicated a cleaner division between the two factors (severity/irreparability of loss & blame/unfairness). With the exception of item 5, all items demonstrated a primary loading on one factor (primary loading >.50; difference between primary and secondary loadings >.20). The coefficient alphas indicated good internal consistency for the total scale (α = .93), severity/irreparability of loss subscale (α = .89), and blame/unfairness subscale (α = .88).

Bivariate relationships between perceived injustice and pain-related factors/outcomes

The results of bivariate correlation analyses are presented in Table 4. Higher levels of perceived injustice were significantly associated with higher levels of pain intensity, pain catastrophizing, and functional disability and with poorer emotional, social, and school functioning.

Hierarchical regressions predicting pain intensity, disability, and emotional, social, and school functioning

Pain intensity. In step 1 of the analysis, patient age and sex accounted for 6% of the variance in pain intensity ($F(3,136)=4.21$, $p<.05$, Table 5). In step 2, catastrophizing accounted for an additional 4% of the variance in pain intensity ($F(1,135)=4.92$, $p<.05$). In step 3, perceived injustice accounted for an additional 3% of the variance in pain intensity, above and beyond that accounted for by age, sex, and catastrophizing ($F(1,134)=5.31$, $p<.05$). Examination of the standardized beta weights and squared structure coefficients indicated that perceived injustice was the strongest predictor and shared 70% of the variance in the observed effect; the only other significant predictor was age, which shared 35% of the variance in the observed effect (overall $R^2=.13$).

Functional disability. In step 1 of the analysis, patient age, sex, and pain intensity, accounted for 41% of the variance in functional disability ($F(5,135)=31.24$, $p<.05$, Table 5), and catastrophizing accounted for an additional 4% in step 2 ($F(1,134)=26.91$, $p<.05$). In step 3, perceived injustice accounted for an additional 2% of the variance in functional disability, above and beyond that accounted for by age, sex, pain intensity, and catastrophizing ($F(1,133)=23.17$,

$p<.05$). Perceived injustice, pain intensity, and sex were significant predictors in the final model. Standardized beta weights and squared structure coefficients indicated that pain intensity was the strongest predictor of functional disability and shared 80% of the variance in the observed effect, whereas perceived injustice shared 40% of the variance in the observed effect (overall $R^2=.47$).

Emotional functioning. Patient age, sex, and pain intensity accounted for 14% of the variance in emotional functioning ($F(5, 135)=7.27$, $p<.05$, Table 5), and catastrophizing accounted for an additional 4% ($F(1,134)=7.47$, $p<.05$). In step 3 of the model, perceived injustice accounted for an additional 10% of the variance in emotional functioning ($F(1,133)=10.47$, $p<.05$). In addition to sex, perceived injustice was the only significant predictor of emotional functioning in the final model. The standardized beta weights and squared structure coefficients indicated that perceived injustice was the strongest predictor and shared 82% of the variance in the observed effect (overall $R^2=.28$).

Social functioning. Patient age, sex, and pain intensity accounted for 12% of the variance in social functioning ($F(5, 135)=5.96$, $p<.05$). In step 2 of the model, catastrophizing accounted for an additional 28% of the variance in social functioning ($F(1,134)=21.57$, $p<.05$, Table 5). In step 3, perceived injustice accounted for an additional 10% of the variance in social functioning above and beyond that accounted for by age, sex, pain intensity, and catastrophizing ($F(1,133)=25.91$, $p<.05$). In the final model, perceived injustice and catastrophizing were the only significant, unique predictors of social functioning, with perceived injustice sharing 81% and catastrophizing sharing 73% of the variance in the observed effect (overall $R^2=.49$).

School functioning. Visit type, patient age, sex, and pain intensity accounted for 15% of the variance in school functioning ($F(4, 134)=5.88$, $p<.05$, Table 5). Catastrophizing accounted for an additional 6% of the variance in step 2 ($F(1, 133)=7.10$, $p<.05$). In step 3 of the analysis, perceived injustice accounted for an additional 9% of the variance in school functioning ($F(1,132)=9.46$, $p<.05$). In addition to visit type and pain intensity, perceived injustice was a significant predictor of school functioning in the final model. The standardized beta weights and squared structure coefficients indicated that perceived injustice was the strongest predictor and shared 76% of the variance in the observed effect (overall $R^2=.30$).

Discussion

The purpose of this study was to examine the psychometric properties of the IEQ in a sample of pediatric pain patients and examine the relationship between injustice perceptions and pain-related outcomes among children/adolescents with chronic pain. Our results provide initial support for the reliability and factor structure of the IEQ in children/adolescents with chronic pain. Greater perceived injustice was associated with higher pain intensity, pain catastrophizing, and functional disability, as well as poorer emotional, social, and school functioning. In fact, perceived injustice had the strongest relationship with all of these outcomes, with the exception of functional disability, for which it had the second strongest relationship after pain intensity. Collectively, these findings suggest that injustice perceptions about pain can be reliably and validly measured in children/adolescents, and that they are important contributors to the pain experience of these patients.

This is the first psychometric examination of the IEQ in children/adolescents with chronic pain. Larger, more sophisticated studies are needed to replicate our findings and further characterize the measurement properties of the IEQ in this population. Nevertheless, our results should allay measurement-related concerns that might otherwise deter research in this area. The adult literature has benefitted from a recent surge of studies on injustice and its relationship to pain, and we hope the current findings will kindle a similar response among child/adolescent researchers. In fact, in our sample, the IEQ demonstrated a factor structure that closely aligned with the two proposed dimensions of injustice – severity/irreparability and blame/unfairness. Although conceptually distinct, separate measurement of these two dimensions has not been supported in adult samples, leading the developers of the IEQ to caution against using the subscales [53]. Additional research in pediatric and adult samples will help clarify whether pain-related injustice is best considered a uni- or multi-dimensional contract.

Regarding our second aim, perceived injustice had the strongest association with pain intensity. These findings are in line with research in adults with osteoarthritis and musculoskeletal pain resulting from an occupational or motor vehicle accident [53,66]. Mechanisms underlying the relationship between injustice and pain intensity remain unclear [57]. Attentional processes may play a role, as suggested by evidence that adults with chronic pain who endorse higher injustice perceptions demonstrate an excessive focus on pain stimuli

(Trost, Ryckegem, Scott, Guck, & Vervoot, 2013, unpublished results). It is also possible that perceived injustice exacerbates pain through mechanisms associated with emotional distress [24,40]. Adolescence is a period of emotional vulnerability and adjustment, reflected in increased risk for depression and other mental health conditions [49]. Indeed, children and adolescents with chronic pain have higher rates of depression than healthy peers, which may negatively impact both pain [25] and function [21].

In line with the above hypothesis, our findings suggest that injustice perceptions are closely tied to emotional functioning in children/adolescents with pain. Perceived injustice accounted for an additional 10% of the variance in emotional functioning and had the single strongest relationship with emotional functioning in the model – stronger than pain intensity and catastrophizing. This finding aligns with research indicating that unjust situations elicit strong negative emotional reactions [10]. Appraising one's pain as irreparable, a component measured by the IEQ, may foster feelings of helplessness. Consequently, feelings of helplessness may give way to a helpless attributional style, which is strongly associated with depression [1,14,46].

Perceived injustice was also positively related to social and school functioning. Chronic pain is associated with frequent missed school days, poor academic performance, and poor peer relations - factors that may result in social ostracism [3,12,18,22]. Much like rejection on the basis of a demographic characteristic (e.g. race or sex) over which a person has little control, social rejection due to chronic pain (the cause of which a child may also have little control) may further exacerbate the experience of injustice. Research indicates that rejection perceived as unjust is most likely to elicit anger and antisocial behavior [47]. Such emotional and behavioral responses may be particularly detrimental for children who have yet to fully develop socially appropriate strategies to manage such responses [67]. On a practical level, these responses may result in disciplinary actions such as suspension and expulsion [7], which may further reinforce poor academic achievement and social isolation.

Although not as strong of a relationship as pain intensity, perceived injustice was significantly and uniquely associated with functional disability. This relationship aligns with adult findings that perceptions of injustice are related to greater self-reported disability [53,54]. The link between injustice and disability may be explained in part by pain behaviors, as suggested by Sullivan and colleagues [54] who found that such behaviors mediated the

relationship between injustice and disability in adults. Further, injustice perceptions can include the belief that others do not understand the seriousness of one's condition; indeed, two items on the IEQ specifically address such beliefs. In this sense, pain behaviors may serve a communicative function to help others appreciate the severity of the patients' pain [52]. Unfortunately, such behaviors can exacerbate pain and disability in children/adolescents [28]. Finally, although not examined in the current investigation, the association between injustice perceptions and disability may be driven by treatment response. Previous findings suggest that adults with elevated perceptions of injustice show poorer outcomes following rehabilitation treatment for chronic pain/injury [45,53].

Future research is needed to replicate these results and determine the mechanisms by which injustice perceptions impact the pain experience of children/adolescents. Although our results suggested a cleaner delineation of the two IEQ subscales than has been reported in adults, studies with larger samples are needed to examine their utility in research and clinical care in children/adolescents with chronic pain. As research supports the developmental nature of justice conceptualizations and beliefs [20], the effect of age and developmental level should be considered in future studies. For example, injustice perceptions may intensify as age-related milestones (i.e. development of friendships, educational advancement, and independence from parents) are impeded by pain. Additionally, while the current study only assessed cross-sectional relationships, longitudinal investigations would elucidate the long-term effects of injustice perceptions on pain outcomes in pediatric samples. Such work could also clarify the extent to which injustice relates to disability through pain behaviors. A potentially important factor in the pediatric context is parental perceptions of injustice, as research shows that parental coping is related, both behaviorally and genetically, to children/adolescents pain experience and appraisal [59,64]. For example, parental pain catastrophizing has been positively associated with adolescent catastrophizing, pain-related disability, and somatic complaints [14,37,62,65]. Research on the association between child and parent perceptions of injustice will likely inform treatment strategies for children/adolescents and their parents.

The adult literature has begun to consider the clinical implications of findings linking injustice perceptions with negative outcomes. Increased focus on treatment is supported by observations that, relative to other physical and psychosocial variables, perceived injustice is less

responsive to typical multidisciplinary intervention [57]. To our knowledge, this is the first study to suggest that perceived injustice is a risk factor for worse pain and function in children/adolescents with chronic pain. As such, it is premature to make strong clinical recommendations. Nevertheless, it is reasonable to speculate that intervening on children/adolescents' injustice perceptions may enhance pain outcomes. Cognitive frameworks related to judgment and reason undergo considerable developmental changes [19,48], thus, children and adolescents may be particularly responsive to interventions aimed at modifying cognitive appraisals of pain. Cognitive behavioral therapy has demonstrated effectiveness for children/adolescents with chronic pain [35] and seems well-suited to address maladaptive cognitions about the injustice of one's pain. Addressing injustice perceptions before they become a concrete part of an established belief system could have major positive implications for future functioning.

Several limitations should be considered when interpreting these findings. Firstly, though the initial results are promising, we did not conduct a comprehensive examination of the psychometric properties of the IEQ. This measure was developed for adults with chronic pain and was administered to children in the current study without alteration. More sophisticated methods such as cognitive interviewing and comprehensive item analysis are needed to determine the extent to which the IEQ adequately measures injustice perceptions in children/adolescents. The results of such analyses might indicate a need for more formative, instrument development work as opposed to refining the IEQ in its current form. Further analyses might also yield different versions of the IEQ that are dependent on the age/developmental level of the respondent. Second, all constructs were assessed using self-report measures, which are susceptible to the problems associated with common method variance and negative response set. Self-report measures also are predicated on the assumption that participants can think about and accurately report on their psychosocial experiences. Third, patients were predominately white and female and were from a single Midwestern clinic, which may limit the generalizability of these findings. Lastly, we did not collect information about parents/guardians, such as their medical history, caregiver status (primary vs. secondary), or socioeconomic status, which may be relevant in this context.

This is the first investigation to assess perceptions of injustice and their relationship to pain and function in children/adolescents with chronic pain. Results suggest that injustice perceptions about pain can be reliably and validly measured in children/adolescents, and that they are closely tied to important clinical outcomes in children/adolescents. The scientific study of injustice perceptions about pain is still in its infancy; thus, much remains to be known, especially in children/adolescents. Among the most important questions to be answered, research is needed to elucidate the temporal relationships between injustice and function in children/adolescents with pain, as well as the role of parental perceptions of injustice in this context. Such research will significantly advance our understanding and treatment of pediatric pain.

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Tables

Table 1. Demographic Characteristics

N=139	n (%)
Sex	
Male	39 (28.1)
Female	100 (71.9)
Race	
Caucasian	128 (92)
African-American	7 (5)
Hispanic	1 (1)
Refused to report	3 (2)
Age	
8-10 years	8 (5.7)
11-13 years	29 (20.9)
14-16 years	72 (51.8)
17-18 years	30 (21.6)
Pain Condition	
Complex regional pain syndrome	13 (9.4)
Migraine/headache	4 (2.9)
Neuropathic	1 (0.7)
Musculoskeletal	37 (26.6)
Visceral	21 (15.1)
Multiple pain diagnoses	57 (41.0)
Other	6 (4.3)
(Pancreatitis, endometriosis, chronic fatigue syndrome)	

Table 2. Descriptive information for measures.

Measures	Mean (SD)	Possible Range
Injustice Experience Questionnaire	19.11 (12.29)	0-48
Pain intensity	4.51 (2.81)	0-10
Pain Catastrophizing Scale - Child Report	25.78 (11.74)	0-52
Functional Disability Inventory	22.75 (12.02)	0-60
PedsQL Emotional Functioning	67.27 (22.0)	0-100
PedsQL Social Functioning	54.82 (24.91)	0-100
PedsQL School Functioning	47.27 (25.88)	0-100

Abbreviations: PedsQL, Pediatric Quality of Life Inventory

Table 3. IEQ Rotated factor loadings (pattern matrix)

Item		Severity/irreparability	Blame/unfairness
3	I am suffering because of someone else's negligence	-0.23	**0.76**
7	It all seems so unfair	0.36	**0.58**
9	Nothing will ever make up for what I have gone through	0.25	**0.72**
10	I feel as if I have been robbed of something very precious	0.29	**0.70**
11	I am troubled by fears that I may never achieve my dreams	0.31	**0.55**
12	I can't believe this has happened to me	0.37	**0.57**
1	Most people don't understand how severe my condition is	**0.91**	-0.17
2	My life will never be the same	**0.76**	0.13
4	No one should have to live this way	**0.74**	0.17
5	I just want my life back	**0.50**	0.39
6	I feel that this has affected me in a permanent way	**0.78**	0.07
8	I worry that my condition is not being taken seriously	**0.73**	0.00

Table 4. Zero-order correlations among study variables.

	1	2	3	4	5	6
1. IEQ Total	1					
2. Pain intensity	.31**	1				
3. PedsQL Emot. Functioning Scale	-.48**	-.24**	1			
4. PedsQL Social Functioning Scale	-.63**	-.28**	.58**	1		
5. PedsQL School Functioning Scale	-.48**	-.33**	.56**	.56**	1	
6. PCS-C Total	.58**	.22**	-.29**	-.60**	-.33**	1
7. FDI	.43**	.61**	-.49**	-.46**	-.53**	.34**

Abbreviations: IEQ, Injustice Experiences Questionnaire, PedsQL, Pediatric Quality of Life Inventory, PCS, Pain Catastrophizing Scale, FDI, Functional Disability Scale.

* $p<0.05$

** $p< 0.01$

Table 5. Regression models

	B	*β*	SE	*t*	R^2	Δ R^2
Regression 1: Dependent = Pain intensity						
Step 1					0.06*	-
Age	0.29	0.22	0.11	2.59*		
Sex	0.57	0.09	0.52	1.11		
Step 2					0.10**	0.04*
Age	0.29	0.21	0.11	2.58*		
Sex	0.37	0.06	0.52	0.71		
Catastrophizing	0.05	0.20	0.02	2.46*		
Step 3					0.13**	0.03*
Age	0.25	0.18	0.11	2.22*		
Sex	0.25	0.04	0.51	0.48		
Catastrophizing	0.02	0.07	0.02	0.72		
Perceived injustice	0.05	0.23	0.02	2.30*		
Regression 2: Dependent = FDI						
Step 1					0.41**	-
Age	0.10	0.02	0.39	0.25		
Sex	5.13	0.19	1.78	2.89*		
Pain intensity	2.51	0.59	0.29	8.60**		
Step 2					0.45**	0.04**
Age	0.12	0.02	0.38	0.32		
Sex	4.38	0.16	1.75	2.51*		
Pain intensity	2.33	0.55	0.29	8.04**		
Catastrophizing	0.20	0.20	0.07	2.94**		
Step 3					0.47*	0.02*
Age	0.02	0.00	0.38	0.06		
Sex	4.01	0.15	1.73	2.32*		
Pain intensity	2.20	0.52	0.29	7.56**		
Catastrophizing	0.10	0.10	0.08	1.26		
Perceived injustice	0.18	0.18	0.08	2.24*		
Regression 3: Dependent = Emot Funct Subscale PedsQL						
Step 1					0.14**	-
Age	-1.38	-0.13	0.87	-1.59		
Sex	-12.15	-0.25	3.93	-3.10**		
Pain intensity	-1.45	-0.19	0.65	-2.26*		

Step 2					0.18**	0.04**
	Age	-1.43	-0.14	0.85	-1.68	
	Sex	-10.64	-0.22	3.88	-2.74**	
	Pain intensity	-1.10	-0.14	0.65	-1.71	
	Catastrophizing	-0.40	-0.22	0.15	-2.66**	
Step 3					0.28**	0.10**
	Age	-1.03	-0.10	0.81	-1.28	
	Sex	-9.15	-0.19	3.67	-2.50*	
	Pain intensity	-0.58	-0.07	0.62	-0.94	
	Catastrophizing	0.00	0.00	0.17	0.00	
	Perceived injustice	-0.73	-0.41	0.17	-4.31**	
Regression 4: Dependent = Social Funct Subscale PedsQL						
Step 1					0.12**	-
	Age	0.46	0.04	0.99	0.47	
	Sex	-10.74	-0.19	4.50	-2.38*	
	Pain intensity	-2.38	-0.27	0.74	-3.22**	
Step 2					0.39**	0.28**
	Age	0.32	0.03	0.83	0.39	
	Sex	-6.43	-0.12	3.79	-1.70	
	Pain intensity	-1.37	-0.15	0.63	-2.18*	
	Catastrophizing	-1.15	-0.54	0.15	-7.78**	
Step 3					0.49**	0.10**
	Age	0.79	0.07	0.77	1.03	
	Sex	-4.73	-0.09	3.49	-1.36	
	Pain intensity	-0.78	-0.09	0.59	-1.32	
	Catastrophizing	-0.69	-0.33	0.16	-4.26**	
	Perceived injustice	-0.83	-0.41	0.16	-5.17**	
Regression 5: Dependent = School Funct Subscale PedsQL						
Step 1					0.15**	
	Visit type	-9.06	-0.16	4.53	-2.00*	
	Age	-0.93	-0.08	1.02	-0.91	
	Sex	-4.01	-0.07	4.72	-0.85	
	Pain intensity	-2.66	-0.29	0.76	-3.50**	
Step 2					0.21**	0.06**
	Visit type	-8.54	-0.16	4.38	-1.95	
	Age	-0.99	-0.08	0.99	-1.00	
	Sex	-2.01	-0.04	4.61	-0.44	

Pain intensity	-2.17	-0.24	0.75	-2.89**		
Catastrophizing	-0.57	-0.26	0.18	-3.21**		
Step 3					0.30**	0.09**
Visit type	-9.74	-0.18	4.15	-2.35*		
Age	-0.56	-0.05	0.94	-0.59		
Sex	-0.07	0.00	4.38	-0.02		
Pain intensity	-1.57	-0.17	0.72	-2.17*		
Catastrophizing	-0.10	-0.05	0.20	-0.56		
Perceived injustice	-0.81	-0.39	0.20	-4.13**		

* $p<0.05$

**$p<0.01$