Georgia State University
ScholarWorks @ Georgia State University

Psychology Theses | Department of Psychology

5-10-2014

The Application of A Risk-Resilience Model in Pediatric Chronic Pain

Laura Ann Cousins
Georgia State University

Follow this and additional works at: http://scholarworks.gsu.edu/psych_theses

Recommended Citation
Cousins, Laura Ann, "The Application of A Risk-Resilience Model in Pediatric Chronic Pain." Thesis, Georgia State University, 2014.
http://scholarworks.gsu.edu/psych_theses/115

This Thesis is brought to you for free and open access by the Department of Psychology at ScholarWorks @ Georgia State University. It has been accepted for inclusion in Psychology Theses by an authorized administrator of ScholarWorks @ Georgia State University. For more information, please contact scholarworks@gsu.edu.

THE APPLICATION OF A RISK-RESILIENCE MODEL IN PEDIATRIC CHRONIC PAIN

by

LAURA A. COUSINS

Under the Direction of Dr. Lindsey L. Cohen

ABSTRACT

Children with chronic pain are vulnerable to adverse outcomes, such as impaired quality of life and poor functioning. Recent risk and resilience models for adult chronic pain have aimed to conceptualize the complexity of pain, which may prove useful for pediatric populations. The purpose of this study was to examine the unique predictive value of prominent pain-related risk factors, investigate optimism's role as a resilience factor, and explore protective mechanisms through which optimism exerts its benefits. Participants included 58 8-17 year-old children and adolescents with chronic pain. Pain intensity remained the best predictor of disability, but pain-related fear and optimism were unique predictors of well-being. Optimism contributed to adaptation by reducing pain-related fear and catastrophizing. Findings suggest that the predictive value

of related risk factors is inconsistent across functioning outcomes, and optimism is an applicable resilience factor in pediatric pain through its minimization of pain-related risk factors.

INDEX WORDS: Pediatric chronic pain, Fear of pain, Catastrophizing, Optimism, Resilience

THE APPLICATION OF A RISK-RESILIENCE MODEL IN PEDIATRIC CHRONIC PAIN

by

LAURA A. COUSINS

A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of

Master of Arts

in the College of Arts and Sciences

Georgia State University

2014

Copyright by
Laura Ann Cousins
2014

THE APPLICATION OF A RISK-RESILIENCE MODEL IN PEDIATRIC CHRONIC PAIN

by

LAURA A. COUSINS

Committee Chair: Lindsey L. Cohen

Committee: Lisa Armistead

Gabriel Kuperminc

Electronic Version Approved:

Office of Graduate Studies

College of Arts and Sciences

Georgia State University

May 2014

DEDICATION

I would like to dedicate this work to children and adolescents with chronic pain and their families for their courage, strength, and continued perseverance.

ACKNOWLEDGEMENTS

First, I would like to thank my advisor, Lindsey L. Cohen, for his invaluable guidance and mentorship throughout this project and my graduate career thus far. Thank you for always providing such positive support and encouragement. I would also like to thank my committee members, Lisa Armistead and Gabriel Kuperminc, for their thoughtful suggestions and feedback. I would like to acknowledge Dr. Lonnie Zeltzer and Dr. Subhadra Evans from the UCLA Pediatric Pain Program for igniting my interest in pediatric pain research. Additionally, I would like to thank Dr. Venable and the pain team at Children's Healthcare of Atlanta for embracing this project and providing support throughout the data collection process. I would also like to express my gratitude to the children and families who participated in this research. Furthermore, I would like to thank my CHAMP (Child Health and Medical Pain) lab mates, Don Bearden, Meredith Bishop, Amanda Feinstein, Sarah Martin, Effie Mougianis, Nikita Rodrigues, and Alvina Rosales, for their endless support and encouragement.

Finally, I would like to thank my incredible parents, who have always believed in me and provided immeasurable love, dedication, and support over the years. I am forever grateful for everything you have allowed me to achieve. I would also like to thank Chris Wright, my eternal optimist, for his laughter, understanding, and support. Thank you to all of my GSU colleagues and friends who have enriched my graduate school experience.

This project was supported by the Society of Pediatric Psychology (SPP, Division 54) Mary Jo Kupst Trainee Grant for Research in Resilience. I wish to thank SPP for financially supporting my research.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS ..... **v**

LIST OF TABLES ..... **viii**

LIST OF FIGURES ..... **ix**

1 INTRODUCTION **1**

Overview of Pediatric Chronic Pain **1**

The Impact of Pediatric Chronic Pain on Health-Related Quality of Life **2**

Risk and Resilience in Pediatric Chronic Pain **3**

1.1.1 Pain catastrophizing as a risk factor ***7***

1.1.2 Fear of pain as a risk factor ***10***

1.1.3 Optimism as a resilience factor ***12***

Current Study **17**

Primary Aims and Hypotheses **18**

2 METHOD **19**

Participants **19**

Measures **21**

Procedures **23**

3 DATA ANALYSES **25**

Preliminary Analyses **25**

Primary Analyses **25**

Exploratory Analyses **26**

4 RESULTS **26**

Preliminary and Descriptive Analyses **26**

Primary Analyses **27**

Exploratory Analyses **29**

5 DISCUSSION **44**

REFERENCES **51**

APPENDICES **67**

Appendix A. Background Information Form **67**

Appendix B. Pain Intensity Visual Analog Scale (VAS) **71**

Appendix C. Fear of Pain Questionnaire, child report (FOPQ-C) **72**

Appendix D. Youth Life Orientation Test (YLOT) **74**

LIST OF TABLES

Table 1: Participant Demographic Information (N = 58) 31

Table 2: Descriptives of Pain and Outcome Study Variables 32

Table 3: Intercorrelations Among Study Variables 33

Table 4: Hierarchical Regression Analyses of Fear of Pain and Pain Catastrophizing as Predictors of Functional Disability 34

Table 5: Hierarchical Regression Analyses of Fear of Pain and Pain Catastrophizing as Predictors of Quality of Life 35

Table 6: Linear Regression Analyses of Optimism as a Predictor of Functional Disability 36

Table 7: Linear Regression Analyses of Optimism as a Predictor of Quality of Life 37

LIST OF FIGURES

Figure 1: Stable-modifiable model of vulnerability and resilience processes 38

Figure 2: Pathways to resilience for those in chronic pain 39

Figure 3: Fear of pain as a mediator of optimism and quality of life 40

Figure 4: Fear of pain as a mediator of optimism and functional disability 41

Figure 5: Pain catastrophizing as a mediator of optimism and quality of life 42

Figure 6: Pain catastrophizing as a mediator of optimism and functional disability..... 43

1 INTRODUCTION

Overview of Pediatric Chronic Pain

Chronic pain has been defined as pain that persists beyond the expected time span of healing (Turk & Okifuji, 2001) or as pain experienced longer than three to six months (Merskey & Bogduk, 1994; Task Force on Taxonomy, 1994). Chronic pain can be described as recurrent or persistent and may also co-occur with a primary medical condition such as cancer, sickle cell disease, or arthritis (Hunfeld et al., 2001; Malleson, Connell, Bennett, & Eccleston, 2001; Sporrer, Jackson, Agner, Laver, & Abboud, 1994). Recurrent pain is frequently defined as a minimum of three pain episodes that restrict functioning within a time frame of three months (Robbins, Smith, Glutting, & Bishop, 2005), and persistent pain is daily pain that exceeds six months.

Prior literature has estimated that chronic pain affects between 25-40% of the pediatric population (Goodman & McGrath, 1991; Huguet & Miró, 2008; Perquin et al., 2000). King et al. (2011) conducted a systematic review of prior research and found the following reported prevalence rates of pediatric chronic pain conditions: headaches, 8-83%, multiple pains, 4-49%, abdominal pain, 4-53%, musculoskeletal pain, 4-40%, back pain, 14-24%, and other pains, 5-88%. King et al. reported that pain is more prevalent in females and in older children, with the exception of abdominal pain, which tends to be more common in younger children. Higher pain prevalence rates are positively associated with anxiety, depression, low self-esteem, other chronic health problems, and low socioeconomic status (King et al.). Although there is variability in prevalence data, it is evident that chronic pain affects a significant number of children and adolescents and is a public health concern, particularly due to the high risk of chronic pain in childhood developing into chronic pain in adulthood (Campo, Jansen-McWilliams, Comer, & Kelleher, 1999; Walker, Garber, Van Slyke, & Greene, 1995).

The Impact of Pediatric Chronic Pain on Health-Related Quality of Life

In addition to physical symptomatology, chronic pain impairs health-related quality of life (HRQOL), an individual's perception of his or her physical, emotional, social, and academic functioning, and how his or her chronic illness may impact such functioning (Gold et al., 2009). It has been proposed that the uncontrollable, unpredictable, and incessant nature of chronic pain evokes considerable distress, which in turn diminishes overall well-being (Zautra, 2003). Impairment in pediatric chronic pain is particularly noted in physical functioning, psychological functioning, school functioning, social functioning, life satisfaction, and self-perceived health status (Merlijn et al., 2006; Palermo, 2000; Palermo & Chambers, 2005).

According to epidemiological studies, about 5% of children in the general population endure moderate or severe chronic pain-related disability (e.g., Huguet & Miró, 2008; Roth-Isigkeit, Thyen, Stoven, Schwarzenberger, & Schmucker, 2005), more specifically defined as an impairment in the performance of routine activities due to health status (Walker & Greene, 1991). Adolescents' pain intensity and frequency is associated with low quality of life, impaired functioning, and functional disability (Claar & Walker, 2006; Gauntlett-Gilbert & Eccleston, 2007; Hunfeld et al., 2001; Logan & Scharff, 2005; Peterson & Palermo, 2004). In a sample of adolescents with chronic pain, Gauntlett-Gilbert and Eccleston (2007) found that depression predicted functional disability and poor social/adaptive functioning and parent-child dysfunctional interactions were associated with impaired social/adaptive functioning. In summary, data suggest that children and adolescents with chronic pain have low HRQOL (Connelly & Rapoff, 2006; Hunfeld et al., 2001; Youssef, Murphy, Langseder, & Rosh, 2006); indeed, Gold et al. (2009) found that these patients had lower HRQOL than children and adolescents with other chronic medical conditions. A clinically significant subset of pediatric chronic pain patients also suffers

from emotional distress and disability in addition to their pain (Eccleston & Malleson, 2003; Malleson, Connell, Bennett, & Eccleston, 2001).

Risk and Resilience in Pediatric Chronic Pain

The complexity of pediatric chronic pain is best conceptualized using a biopsychosocial framework, including the physiological, psychological, and social factors that influence pain-related experiences and outcomes (Gatchel, Peng, Peters, Fuchs, & Turk, 2007). This biopsychosocial approach emerged from the influential Gate Control theory of pain (Melzack & Wall, 1965), which proposed that pain is a central nervous system phenomenon where ascending, peripheral neural inputs from the sensory system are modulated by descending motivational-affective and cognitive-evaluative influences. In other words, biological, psychological, and social factors interact to influence the etiology, experience, and maintenance of chronic pain.

Despite the biopsychosocial model's prevalence in the pediatric chronic pain literature, it fails to incorporate or explain potential mechanisms through which these factors interact (Huguet, McGrath, Stinson, Chambers, & Míro, 2011). The model also exclusively focuses on risk factors contributing to the development of chronic pain and pain-related disability without considering factors that promote resilience and lead to adaptive outcomes. Currently, the biopsychosocial model guides the majority of research in pediatric chronic pain with minimal acknowledgment that alternative, more specific theoretical models may be useful in exploring mechanisms related to the pediatric pain experience (Huguet et al., 2011). Further troubling is the atheoretical approach frequently adopted, particularly given that few pediatric pain researchers attempt to understand chronic pain through theory formulation and testing. The field's reliance on cross-sectional data collection and minimal attention devoted to building upon and testing theory has contributed to a lack of knowledge concerning potential pain pathways and mech-

anisms for chronic pain (Huguet et al., 2011). The dearth of theories and models for pediatric chronic pain is not unexpected given that research in and attention to chronic pain in youth is a relatively recent phenomenon (Palermo, 2000; Stanford et al., 2008).

Despite the recent application of resilience theory in several pediatric chronic illness populations, resilience theory has been a primary area of study for decades among developmental psychologists. To help simplify the construct of resilience, given its complexity and numerous definitions, Luthar et al. (2000) defined "resilience" as a dynamic and multisystemic developmental process that emphasizes the interaction between personal attributes and environmental contexts, while "resiliency" (Block & Block, 1980) refers to an individual personality characteristic. As chronic pain is best conceptualized within multiple domains and contexts, we will exclusively use the term "resilience" to indicate that multiple sources and mechanisms interact to produce adaptive outcomes. Thus, resilience is commonly defined as the experience of positive outcomes despite exposure to significant risk or adversity (Masten, 2001). Youth achieve resilience through protective resources or processes that neutralize or minimize the negative impact of risk factors (Rutter, 2012). Given chronic pain's frequent association with poor functioning, the burden of managing a chronic medical condition, such as chronic pain, can be considered a significant adversity.

In the last several years, risk and resilience models specific to chronic pain in adults have been developed to depict factors predictive of both adaptive and maladaptive functioning, including the potential pathways through which these factors interact (Smith & Zautra, 2008; Sturgeon & Zautra, 2010; Yeung, Arewasikpron, & Zautra, 2012). Although pediatric pain researchers have recognized the need for attention to youth resilience factors, there is a dearth of data in this area (Huguet et al., 2011). Given that the pediatric chronic pain literature lacks both theoretical

models and studies of resilience in youth, the adult chronic pain risk and resilience models may provide a starting point to organize research in vulnerability and protective factors in youth with chronic pain.

Within the risk and resilience models for chronic pain, resilience is defined as a set of adaptive responses to pain and pain-related events according to three distinct components: recovery, sustainability, or growth (Sturgeon & Zautra, 2010). Recovery occurs if an individual resumes typical functioning, whether it is physiological, emotional, or cognitive, after experiencing an adverse event (e.g., recover from a pain flare). Resilience in the form of sustainability represents an individual's continuation of valued activities that enhance well-being and quality of life, assessing to what degree individuals persevere with such activities (e.g., sustain satisfaction and positive functioning despite pain). Finally, growth refers to a newfound discovery or way of thinking, often related to a better understanding of one's abilities, which emerges as a result of the adverse experience (e.g., growth as a result of experiencing chronic pain). Benefit finding is one of the most commonly studied examples of growth, defined as a way of construing advantages resulting from a stressful event (Reich, Zautra, & Hall, 2010). Studies of benefit finding and post-traumatic growth have been applied to the pediatric cancer population given the traumatic nature of the diagnosis and course of treatment (Barakat, Alderfer, & Kazak, 2006; Phipps, Long, & Ogden, 2007). A systematic review on post-traumatic growth in children and adolescents revealed that, similar to the adult literature, post-traumatic growth is associated with subjective stress, physiological distress, social support, religious involvement, coping, and positive mental health outcomes (Meyerson, Grant, Smith Carter, & Kilmer, 2011). Given that the term "resilience" covers multiple domains, it may be more beneficial to assess resilient functioning with measures that specifically target one of the three domains as opposed to a broader outcome

(Yeung, Arewasikpron, & Zautra, 2012). Using an adult chronic pain sample, Karoly and Ruehlman (2006) characterized resilient individuals as those reporting high pain severity with low emotional distress and low pain-related impairment. Compared to the non-resilient individuals, resilient individuals with comparable pain severity exhibited better pain coping strategies, pain-related attitudes, and healthcare and medication use.

According to the Stable-Modifiable Model of Vulnerability and Resilience Processes applied to chronic pain (Figure 1), individuals achieve resilience through the utilization of resilience resources, which promote adaptive coping techniques (Smith & Zautra, 2008; Sturgeon & Zautra, 2010; Yeung, Arewasikpron, & Zautra, 2012). Smith and Zautra initially developed a two-factor model incorporating vulnerability factors and resilience factors, consisting of both maladaptive personality and emotionality attributes and adaptive personality and emotionality attributes, respectively. Sturgeon and Zautra expanded this two-factor model by distinguishing stable resilience resources from modifiable resilience resources, as well as stable vulnerability resources from modifiable vulnerability resources (Figure 2). Both stable resources and situational contexts (current pain, stress, etc.) contribute to modifiable resources. Hence, stable resilience resources indirectly and directly lead to resilient outcomes by influencing mechanisms of resilience, whereas stable vulnerability resources indirectly and directly lead to maladaptive outcomes by influencing vulnerability mechanisms. Resilience resources, including stable factors such as optimism and supportive social relationships, lead to resilient outcomes (recovery, sustainability, growth) by promoting modifiable resilient responses to stress (state positive affect, positive social interactions), which in turn enhance adaptive coping responses and resilience mechanisms. Mechanisms of resilience include cognitions, affects, and behaviors utilized during stressful events (i.e., pain episodes) that maintain well-being. Similarly, vulnerability resources,

including stable factors such as pessimism, depression, and prior trauma lead to maladaptive outcomes by increasing modifiable vulnerable responses to stress (catastrophizing, state negative affect, negative social interactions), which in turn augment detrimental coping responses and vulnerability mechanisms (Sturgeon & Zautra, 2010).

In these instances of resilience or vulnerability, resilience or vulnerability mechanisms moderate the relation between pain and outcome by strengthening or weakening adaptive pain-related coping responses. Thus, when determining ways to enhance resilience to chronic pain, it is essential to consider both resilience resources and mechanisms, which are distinct rather than opposite constructs of risk factors or vulnerabilities (Sturgeon & Zautra, 2010). Yeung, Arewasikpron, and Zautra (2012) further specified that modifiable indicators are not only correlated with resilient functioning and fluctuate across time, but also mediate the relation between stable indicators and resilient outcomes. These models – albeit developed with adult samples – might serve as appropriate guides to test mechanisms of resilience and vulnerability within the context of chronic pain in pediatric populations. Given their prominence in the pain literature, pain catastrophizing (e.g., Vervoort, Goubert, Eccleston, Bijttebier, & Crombez, 2006) and fear of pain (e.g., Simons, Sieberg, Carpino, Logan, & Berde, 2011) are likely risk factors contributing to poorer outcomes and maladjustment. Although there are few studies examining resilience factors in chronic pain, dispositional optimism is one of the most studied resilience factors in the field of health psychology (e.g., Carver et al., 2010).

1.1.1 Pain catastrophizing as a risk factor

Despite the importance of pain intensity as it relates to disability in youth, it is evident that other risk factors predict pain maintenance and disability above and beyond pain intensity (Claar & Walker, 2006). One risk factor that has received considerable attention in the recent

pain literature is pain catastrophizing, an exaggerated adverse and fearful appraisal of both present and anticipated pain, comprised of rumination, magnification, and helplessness (Sullivan, Bishop, & Pivik, 1995; Sullivan et al., 2001).

Pain catastrophizing has been found to be a strong predictor of adjustment to pain in adults (Sullivan et al., 2001) as well as children (Vervoort et al., 2006). In adults, catastrophizing is indicative of increased pain intensity, disability, and emotional distress (Sullivan, Rodgers, & Kirsh, 2001), overprediction of pain (Goubert, Crombez, & Van Damme, 2004), more difficulty shifting attention away from pain (Van Damme, Crombez, & Eccleston, 2002), greater pain behavior, heightened healthcare and medication use, and longer hospital visits (Sullivan et al., 2001).

Although only a handful of studies have examined pain catastrophizing in children, results thus far have supported findings from the adult literature. Specifically, increased pediatric pain catastrophizing is associated with greater pain severity and disability (Crombez et al., 2003), reduced pain tolerance in response to laboratory-induced pain (Piira, Taplin, Goodenough, & von Baeyer, 2002), increased anxiety and depression (Eccleston, Crombez, Scotford, Clinch, & Connell, 2004), and greater use of analgesics (Bédard, Reid, McGrath, & Chambers, 1997). Vervoort et al. (2010) examined the predictive value of pain catastrophizing on subsequent pain and disability reported six months later in school children and found that pain catastrophizing uniquely predicted later pain and disability when controlling for both initial pain and disability. Furthermore, the authors proposed that trait anxiety might serve as a precursor to developing catastrophic thinking, as trait anxiety did not uniquely predict variations in pain or disability, and children who reported greater trait anxiety at baseline were more likely to exhibit higher levels of catastrophizing at follow-up.

In both a sample of school children and a sample of children with recurrent or chronic pain, Vervoort et al. (2006) found that pain catastrophizing uniquely predicted somatic complaints, pain severity, and disability, even when negative affect was included in the model. Additionally, pain catastrophizing mediated the relation between negative affect and somatic complaints for both groups of children and the relation between negative affect and disability for school children.

When controlling for age and sex, catastrophizing has also been shown to predict higher pain intensity as well as greater cold pain unpleasantness among healthy children and adolescents exposed to three laboratory pain tasks (cold, heat, pressure) (Lu, Tsao, Myers, Kim, & Zeltzer, 2007). Although this study confirmed that catastrophizing serves as a pain-prone coping strategy in a controlled acute pain laboratory paradigm, it is unknown whether these results generalize to clinical acute and chronic pain.

As adaptive coping skills are instrumental in order to effectively manage pain and pain-related disability, catastrophizing, a maladaptive emotion-focused coping technique, additionally enhances child emotional distress and diminishes QOL. More specifically, emotion-focused coping techniques are highly correlated with adolescent depression and disability among patients with musculoskeletal pain, headaches, back pain, and fibromyalgia (Kashikar-Zuck, Goldschneider, Powers, Vaught, & Hershey, 2001; Kashikar-Zuck, Vaught, Goldschneider, Graham, & Miller, 2002). Thomsen et al. (2002) also revealed that emotional coping was correlated with increases in anxiety and depression among children with recurrent abdominal pain. Eccleston et al. (2004) replicated and extended these findings by showing that catastrophizing uniquely predicts higher levels of emotional distress, both anxiety and depression, above and beyond pain and demographic factors, among adolescents with chronic pain and elevated emotional

distress. Among a sample of children and adolescents with juvenile primary fibromyalgia syndrome (JPFS), a type of chronic pain condition, level of catastrophizing predicted poorer self-reported quality of life (Libby & Glenwick, 2010). Higher catastrophizing was also associated with greater self-reported pain and depression. These findings are consistent with a study conducted by Schanberg et al. (1996) using a much smaller sample of children with JPFS, which revealed that children who relied less on catastrophizing as a coping strategy reported lower levels of pain in addition to physical and psychological disability.

Overall, catastrophizing represents a significant risk factor that impedes resilient adaptation to chronic pain. Recent research found that individuals with greater resilience resources exhibit less daily trait catastrophizing and more positive emotionality relative to individuals with minimal trait resilience resources. Additionally, among resilient individuals, positive emotionality mediated the relation between catastrophizing and recovery (Ong, Zautra, & Reid, 2010). Whereas substantial evidence supports the maladaptive nature of pain catastrophizing, it is still important to assess distinct, but related constructs that also predict poor adjustment to chronic pain.

1.1.2 Fear of pain as a risk factor

In the adult chronic pain literature, pain-related fear, resulting from the perception of pain-related stimuli as threatening, is another construct that has been shown to predict chronic pain and pain-related disability (Leeuw et al., 2007; Vlaeyen & Linton, 2000). The Fear-Avoidance Model of Pain (Lethem, Slade, Troup, & Bentley, 1983) suggests that perceiving pain as threatening produces pain-related fear, which in turn instigates behavioral avoidance and hypervigilance. This avoidance and hypervigilance leads to disability, disengagement, and emotional distress, which all perpetuate and enhance future fear and avoidance. In contrast, individuals who do not experience pain-related fear confront their pain adaptively through continued en-

gagement in daily activities (Lethem et al., 1983). Despite the development of numerous scales in the adult chronic pain population to assess the complex construct of fear of pain (Lang, 1968), this construct has only recently received attention in the pediatric chronic pain literature (Simons et al., 2011). However, research thus far provides initial evidence that fear of pain may be equally as important in youth with pain (Martin, McGrath, Brown, & Katz, 2007; Miró, Huguet, & Nieto, 2007).

In order to study fear of pain in the pediatric chronic pain population, two scales have been developed. Huguet et al. (2011) confirmed the reliability and validity of the Pediatric Pain Fear Scale, a measure developed to assess fear of pain in the pediatric chronic pain population, however, this scale has yet to be translated into English as it was tested on Catalan-speaking children and adolescents. Simons et al. (2011) developed and documented support for the psychometrics of the Fear of Pain Questionnaire (both child report and parent proxy report), designed to assess pain-related fear in children with chronic pain. Through the initial validation of this measure, they demonstrated that fear of pain is correlated with pain catastrophizing, pain ratings, pain-related disability, and healthcare utilization, which parallels the adult literature.

Most recently, the previously mentioned adult Fear-Avoidance Model of Pain was successfully applied to pediatric chronic pain patients with the Fear of Pain Questionnaire and through structural equation modeling (Simons & Kaczynski, 2012). Despite its overall applicability, particularly in predicting functional disability, pain-related fears appeared to be more prominent for adolescents as compared to younger children. As this is the first study to examine both fear of pain and pain catastrophizing in pathways contributing to functional disability among youth with chronic pain, further research is needed to compare the predictive value of these constructs on pain-related outcomes.

Given that pain catastrophizing and fear of pain represent very similar yet conceptually distinct negative pain-related constructs (Tsao et al., 2009), it is imperative to examine both constructs simultaneously and determine the unique contributions of each construct on pain outcomes. To date, there has been conflicting evidence in the adult literature, using both healthy participants and patients with pain, as to whether pain catastrophizing or fear of pain is more predictive of pain intensity (George, Dannecker, & Robinson, 2006; Sullivan, Thorn, Rodgers, & Ward, 2004). Clearly, such comparisons should also be assessed in pediatric pain populations, as findings will reveal which construct is most clinically meaningful and important to target in multidisciplinary pain management programs.

1.1.3 Optimism as a resilience factor

Dispositional optimism, labeled as a stable intrapersonal resilience resource (Sturgeon & Zautra, 2010), is a heritable personality trait, defined as the extent to which an individual upholds generalized favorable expectancies for the future (Scheier & Carver, 1985). Furthermore, studies have established that dispositional optimism represents a distinct construct, accounting for unique variance in outcomes, and has been specifically differentiated from self-efficacy, neuroticism, trait anxiety, self-mastery, and self-esteem (Karademas, Konstantinos, & Sideridis, 2007; Scheier, Carver, & Bridges, 1994; Wimberly, Carver, & Antoni, 2008). This construct directly applies to expectancy-value models of motivation, which posit that the pursuit of goals is driven by behavior, with a greater value attributed to more important goals (Austin & Vancouver, 1996; Carver & Scheier, 1998; Higgins, 2006). The second component of this model, expectancy, refers to how confident an individual is in reaching their goal. Within the framework of this model, optimists maintain confidence in achieving an outcome and persevere even when confronted with adversity, suggesting that an optimistic outlook not only influences the completion of goal-

directed behavior, but also dictates how individuals adaptively cope with stress (Carver, Scheier, & Segerstrom, 2010).

Data suggest that optimists exhibit more adaptive and flexible coping techniques when exposed to stressful situations. In a meta-analysis of optimism and coping conducted by Solberg Nes, and Segerstrom (2006), optimistic individuals utilized more adaptive coping. Optimists also demonstrate flexibility by accommodating coping responses based on the type of stressor encountered. Optimists additionally rely on approach coping, active confrontation of the stressor (Roth & Cohen, 1986; Skinner et al., 2003), when their health is at risk or brought to their attention (Geers, Wellman, Helfer, Fowler, & France, 2008). For example, in the context of chronic pain, approach coping includes continuing routine activities and engaging in strategies to minimize pain, adaptive responses that enhance psychological and physical well-being, as opposed to activity restriction or avoidance (Jensen, Turner, Romano, & Karoly, 1991). Such flexibility in adapting coping responses to the context of stressful situations implies that optimists employ acceptance and a realistic appraisal of the situation as opposed to rejecting the reality of the situation (i.e., denial) (Carver et al., 2010). Not surprisingly, the meta-analysis found that these adaptive coping strategies mediate the relation between dispositional optimism and health, providing a mechanism to explain how optimism predicts superior emotional and physical functioning (Solberg Nes & Segerstrom, 2006).

Given the extensive research reporting the benefits of dispositional optimism in regards to physical well-being, Rasmussen et al. (2009) performed a meta-analysis to assess the strength of the association between dispositional optimism and physical health. Optimism predicted health outcomes in all studies included in the meta-analysis, although a stronger association emerged with health outcomes measured subjectively. More specifically, the health outcome of

pain, assessed cross-sectionally and longitudinally, produced one of the highest weighted mean effect sizes (0.25) relative to other outcomes. Additionally, optimism remained a significant predictor of physical health after accounting for specific risk factors and other psychosocial factors, such as negative affectivity. This study confirmed that optimism is a valuable construct and serves as an adaptive response for individuals confronted with health-related stress.

With regard to the health-promoting effects of optimism, recent research has also illustrated the protective role of optimism on the trajectory and experience of pain in healthy adults and adults with chronic pain. Among healthy college students, dispositional optimism was associated with reduced pain ratings when exposed to a placebo-expectation condition during a cold pressor task (Geers, Wellman, Fowler, Helfer, & France, 2010). Optimism's relation to placebo analgesia in response to laboratory pain suggests that future research should examine whether dispositional optimism similarly alters patient responsivity to treatments for clinical pain. In addition, Morton et al. (2009) found that healthy adults with high optimism also exhibited a subsequent placebo response in a repeat laser heat session after receiving ambiguous instructions regarding whether or not they would receive a placebo. In another heat and cold laboratory pain study, optimism predicted greater habituation to cold pain when assessed separately from other resilience constructs among healthy adult females (Smith et al., 2009). Habituation to painful stimuli may play a very important role in the context of chronic pain as it may protect against the development of a chronic pain condition (Bingel, Schoell, Herken, Buchel, & May, 2007) or reduce distress and enhance functioning among individuals with chronic pain (Smith et al., 2009). Geers et al. (2008) found that optimism predicted reduced pain sensitivity, distress, and cardiovascular reactivity when healthy college students were exposed to a neutral prime condition during a cold pressor task. However, no differences in outcome measures emerged during a health

prime condition, where participants were primed with thoughts of health and well-being. These results suggest that optimists may utilize more flexible coping strategies when confronted with pain by adjusting their level of engagement towards painful stimuli based on the degree to which it is perceived as threatening.

Individuals with higher dispositional optimism may experience reduced pain sensitivity through the enhancement of endogenous pain-inhibitory pathways (Goodin et al., 2012). A previous fMRI study supported this hypothesis by showing that increased dispositional optimism and induced optimistic bias were positively associated with brain activity located in regions involved in endogenous pain-inhibitory processes (Sharot, Riccardi, Raio, & Phelps, 2007). Contrastingly, Goodin et al. (2009) found that catastrophizing inhibited the effectiveness of endogenous pain-inhibitory pathways. Recent research found that optimism significantly predicted enhanced conditioned pain modulation (Goodin et al., 2012), a model used to assess endogenous pain inhibition by inhibiting pain resulting from a painful test-stimulus through the application of a second painful conditioning stimulus (Price & McHaffie, 1988). Goodin et al. (2012) propose that optimism may augment the endogenous inhibition of pain by activating cortical regions associated with adaptive coping mechanisms, ultimately interacting directly or indirectly with the neural processing of painful stimuli.

The beneficial role of dispositional optimism in the course and experience of pain has also been studied in adult chronic pain patient samples. Greater optimism was associated with lower pain reports among adults with a variety of chronic pain conditions including fibromyalgia, temporomandibular disorder, osteoarthritis, and facial pain, as well as adolescents with sickle cell disease (Affleck et al., 2001; Costello et al., 2002; Ferreira & Sherman, 2007; Pence, Valrie, Gil, Redding-Lallinger, & Daeschner, 2007; Sipila, Ylöstalo, Ek, Zitting, & Knuuttila,

2006). Higher optimism was also associated with lower rates of pain intensity among individuals in the early or intermediate stages of rheumatoid arthritis (Treharne, Kitas, Lyons, & Booth, 2005). Osteoarthritis patients who were more optimistic also reported that they attended less to perceived pain (Benyamini, 2005).

In addition to self-reported pain, dispositional optimism also substantially influences mechanisms of coping with chronic pain. Specifically, optimism is positively associated with internal locus of pain control, declared coping with pain, diverting attention, and behavioral activity, and negatively associated with pain catastrophizing (Bargiel-Matusiewicz & Krzyszkowska, 2009). As found in healthy adults, optimism predicted less pain catastrophizing in a sample of women with rheumatoid arthritis (Sinclair, 2001).

Using the cold pressor task, Hood et al. (2012) not only confirmed that healthy adults with lower optimism reported higher pain catastrophizing and pain, but also found that pain catastrophizing mediated the relation between optimism and self-reported pain. Another recent study provided preliminary evidence that induced optimism is causally related to experimental pain sensitivity (Hanssen, Peters, Vlaeyen, Meevissen, & Vancleef, 2012). Compared to a group of university students who received a control manipulation, consisting of writing about and visualizing a typical day, students who received a temporary optimism manipulation, consisting of writing about and visualizing an ideal future self, reported lower pain intensity ratings during a cold pressor task. Furthermore, situational pain catastrophizing seemed to mediate the relation between optimism and pain. Although these results should be replicated in a chronic pain sample, they suggest that in the context of pain perception, optimism represents a construct of psychological resilience through its ability to minimize pain catastrophizing.

Despite the extent to which dispositional optimism has been examined in the adult population, this construct has only recently started to receive attention in the pediatric literature. A crucial advancement in the field of pediatric positive psychology was the revision of a gold standard measure of optimism, the Life Orientation Test-Revised (LOT-R; Scheier, Carver, & Bridges, 1994), in order to create a developmentally appropriate tool, the Youth Life Orientation Test (YLOT), to assess optimism in children (Ey et al., 2005). Williams et al. (2010) confirmed the stability of the YLOT's two-factor structure (optimism and pessimism) as well as the measure's validity within a sample of healthy controls and children with cancer; greater optimism was associated with lower self-reported pain and increased behavioral and emotional functioning. Mannix et al. (2009) also found that higher optimism correlated with decreases in pain reports, greater communication with physicians, increased psychological functioning, and better overall QOL among adolescents with cancer. Despite the gradual increase in research applying dispositional optimism and resilience to the context of child health and chronic illness, no studies known to date have examined these constructs in a pediatric chronic pain sample. Assessing the construct of dispositional optimism is particularly important as research supports its ability to be learned through cognitive techniques (Seligman, 1991) and experimentally manipulated using a writing and visualization exercise (Hanssen et al., 2013). Furthermore, incorporating optimism into future pain management interventions may enhance resilience and also mitigate the impact of pain-specific negative appraisals and emotions, such as catastrophizing and fear of pain.

Current Study

In summary, despite the prominence of risk-resilience models as theory-driven frameworks in the health psychology literature, such models have not yet been applied to pediatric pain research. Consistent with recommendations that future studies in pediatric pain incorporate

theory-driven hypotheses to better understand the mechanisms through which pain-related factors operate, components of a risk-resilience model for adult chronic pain were tested in youth with chronic pain. This study specifically assessed sustainability as a resilience outcome since this construct is commonly examined in pediatric psychology research using validated measures. Furthermore, given the extensive literature assessing psychosocial risk factors predictive of maladaptive pain-related outcomes, it is essential to begin investigating positive psychological constructs that promote resilience, such as dispositional optimism, particularly within the understudied field of pediatric chronic pain. As mentioned previously, it is also imperative to determine the predictive value of related vulnerability constructs by simultaneously assessing their unique variance in pain outcomes. Therefore, this study aimed to examine the applicability of prominent risk factors, including pain catastrophizing and fear of pain, as well as the resilience factor of dispositional optimism, on pain-related disability and quality of life in a sample of pediatric chronic pain patients. Findings will provide implications for methods of decreasing risk factors and enhancing resilient functioning through pain management interventions.

Primary Aims and Hypotheses

The purpose of the current study was to determine the applicability of the adult risk-resilience framework for youth with chronic pain. Specifically, the first aim was to assess the unique contributions of two prominent vulnerability factors, fear of pain and pain catastrophizing, on pain-related disability and quality of life in youth with chronic pain. It was hypothesized that fear of pain and pain catastrophizing would each uniquely predict increased functional limitations and decreased quality of life, as reflected in prior studies (e.g., Simons & Kaczynski, 2012). The second aim was to examine whether, and to what extent the stable resilience resource of dispositional optimism significantly predicted pain-related disability and quality

of life. It was hypothesized that greater dispositional optimism would significantly predict decreased functional disability and increased quality of life.

Finally, exploratory analyses were conducted to determine whether pain catastrophizing and/or fear of pain mediated the relation between dispositional optimism and functioning (functional disability and quality of life). As pain catastrophizing and fear of pain are often highly correlated, and prior research has shown a significant mediation of pain catastrophizing on dispositional optimism and pain report in healthy adults (Hood et al., 2012), it was hypothesized that each of these risk factors would serve as mediators of the optimism-functional disability and optimism-quality of life relations.

2 METHOD

Participants

A power analysis was conducted using G*Power 3.1.3 (Faul, Erdfelder, Buchner, & Lang, 2009). Prior research has found small effect sizes (Cohen, 1988) when assessing self-report pain outcomes in relation to constructs of resilience, specifically dispositional optimism (Rasmussen & Scheier, 2009). The power analysis revealed that 48 participants would provide 80% power to detect a small effect size (.25) using a regression with three predictors.

Participants included 58 children and adolescents between the ages of 8 and 17 (M = 14.60 years, SD = 2.27 years) who were scheduled for a multidisciplinary outpatient pain clinic appointment and their caregivers. Participants were recruited from the outpatient pain clinic that meets once a week at the Children's Healthcare of Atlanta, Egleston (n = 36, 60.0%) and Scottish Rite (n = 24, 40.0%) hospitals. Forty-six (79.3%) youth were female and twelve (20.7%) were male. In terms of race, 34 (59.6%) participants were "White," 18 (31.6%) were "Black or

African American," 5 (8.8%) were "Multiracial," and one participant's race was not reported. With regard to ethnicity, 55 (94.8%) participants identified as "Not Hispanic or Latino" and 3 (5.2%) identified as "Hispanic or Latino." The majority of children and adolescents were accompanied by their mother (*n* = 50, 86.2%), and the remaining children and adolescents were accompanied by their father (*n* = 6, 10.3%) or a grandparent (*n* = 2, 3.4%). The most prevalent chronic pain diagnoses included fibromyalgia and abdominal pain. Forty-three (74.1%) children and adolescents did not report having a diagnosis of a psychological disorder, while 15 (25.9%) did report a diagnosis. Of these fifteen participants, six reported "anxiety", four "depression", one "ADHD", and four multiple psychological diagnoses. Eleven (19.0%) caregivers reported an annual income at or below $20,000.00, 16 (27.6%) ranged between $20,001.00 and $50,000.00, 12 (20.7%) ranged between $50,001,00 and $80,000.00, and 13 (22.4%) reported an annual income that exceeded $80,000.00. Six (10.3%) caregivers did not report income. Sixty-five children and their families were approached to participate in the current study. Five families (7.7%) declined to participate. The reasons for non-participation included not being interested in participating in research (3), preoccupation with other activities (1), and having a child that was experiencing significant distress (1). Therefore, 60 participants were enrolled in the study, however two families (3.3%) were unable to complete any study measures. Thus, the final sample consisted of 58 children and adolescents with chronic pain and their caregivers. Within this final sample, five parents (8.6%) and two children (3.4%) did not complete all study measures.

Additional inclusion criteria for the proposed study included patients who experienced chronic pain consistently for a minimum of 3 months with pain episodes occurring at a frequency of at least three days per week, exhibited proficiency in English, and complied with the requirements of the study protocol. Exclusion criteria for the proposed study included severe develop-

mental delays that prevented the participant from understanding study procedures and completing questionnaires or the diagnosis of another chronic medical condition. Both inclusion and exclusion criteria were confirmed by a member of the clinic team through a review of the patient's medical record.

Measures

Background information. Parents completed the Background Information Form. This questionnaire includes questions about the parent (e.g., relation to child, gender, age, ethnicity, race, education, occupation, family income, and health status) and the child (e.g., gender, age, ethnicity, race, and health status).

Pain intensity. Pain intensity was assessed using a 10cm visual analog scale (VAS), asking participants to rate their typical pain over the last week from 0 (no pain) to 10 (the worst pain possible). VAS's have demonstrated reliability and validity and are classified as well-established instruments for pain assessment (Cohen et al., 2008; Varni, Thompson, & Hanson, 1987) with children as young as six years of age (von Baeyer, 2006).

Pain catastrophizing. The Pain Catastrophizing Scale for Children (PCS-C; Crombez et al., 2003), an adaptation of the Pain Catastrophizing Scale (PCS; Sullivan et al., 1995), consists of 13 items assessing negative thinking in the context of pain (e.g., "When I am in pain, I keep thinking about how much it hurts"). Children report how frequently they experience each thought or feeling using a 5-point scale ranging from 0 (not at all) to 4 (extremely), with higher scores representing greater catastrophic thinking. The total score, ranging from 0 to 52, is derived from the sum of three subscale scores for rumination, magnification, and helplessness. The PCS-C has demonstrated construct, internal, and predictive validity in 8 to 17 year-old community and chronic pain samples (Crombez et al., 2003). Internal consistency in the current sample was good

with a Cronbach's alpha of .90.

Pain-related fear. The Fear of Pain Questionnaire, child report (FOPQ-C; Simons, Sieberg, Carpino, Logan, & Berde, 2011) is a 24-item measure with 2 subscales, Fear of Pain and Avoidance of Activities, assessing child perceptions of pain-related fears and avoidance behaviors. This instrument uses a 5-point Likert scale from 0 (strongly disagree) to 4 (strongly agree) with higher scores indicating higher levels of pain-related fear. The FOPQ-C has been shown to have good internal consistency, acceptable one-month stability estimates, and construct validity among a sample of 8 to 17 year-olds with chronic pain (Simons et al., 2011). In the current sample, Cronbach's alpha was .94 indicating good reliability.

Optimism. The Youth Life Orientation Test (YLOT; Ey et al., 2005) is a developmentally appropriate measure of dispositional optimism in children, created as a downward extension of the Life Orientation Test (Scheier & Carver, 1985), a well-established measure of dispositional optimism in adults. Children rate their agreement on seven optimism items, seven pessimism items, and two filler items using a 4-point Likert scale format (3 - true for me, 2 - sort of true for me, 1 - sort of not true for me, 0 - not true for me). The test-retest reliability of the YLOT has ranged from .68 to .70 over a one-month period and intraclass correlations of .65 to .75 across 7 months have been found (Ey et al., 2005), and the two-factor structure and validity of the YLOT has been demonstrated with children with cancer and healthy controls between the ages of 7 and 18 (Williams et al., 2010). Internal consistency in the current sample was good with a Cronbach's alpha of .87.

Functional limitations. The Functional Disability Inventory (FDI; Walker & Greene, 1991) is a 15-item self-report measure that assesses children's perceived difficulty in physical and psychosocial functioning due to their physical health (e.g., "Doing chores at home"). Chil-

dren are asked to rate their perceptions of activity limitations during the past 2 weeks on a 5-point scale ranging from 0 (no trouble) to 4 (impossible). The FDI has demonstrated reliability and validity in children and adolescents (Claar & Walker, 2006; Walker & Green, 1991) and was selected for this study given its frequent administration to youth with a range of chronic pain conditions (Palermo & Kiska, 2005; Kashikar-Zuck et al., 2002; Eccleston et al., 2004; Reid et al., 2005; Peterson & Palermo, 2004; Robins et al., 2002; Walker, Smith, Garber, & Claar, 2005; Claar & Walker, 2006; Tojek et al., 2002), as well as its use as an outcome measure in treatment intervention studies for pediatric pain (Robins et al., 2005; Eccleston et al., 2003; Campo et al., 2004). Internal consistency in the current sample was good with a Cronbach's alpha of .78.

Quality of life. Participants completed the Pediatric Quality of Life Inventory (PedsQL 4.0 Generic Core Scale) (Varni, Seid, & Kurtin, 2001), which has four subscales assessing physical, emotional, social, and school functioning that have been validated with children and adolescents between the ages of 5 and 18 (e.g., "I cannot do things that other kids my age can do"). Respondents report the extent to which each item has been problematic over the past month using a Likert 5-point scale (0 = never a problem, 1 = almost never a problem, 2 = sometimes a problem, 3 = often a problem, 4 = almost always a problem). Raw scores are transformed into standard scores ranging from 0 to 100, with higher scores indicating better functioning. The PedsQL has well-established reliability and validity in pediatric pain samples (e.g., Connelly & Rapoff, 2006) as well as pediatric samples with other acute and chronic health conditions (Berrin et al., 2007; Varni, Burwinkle, Seid, & Skarr, 2003). In the current study, Cronbach's alpha was .93 indicating good reliability.

Procedures

Healthcare providers and staff in the pain clinics were provided information from the

study coordinator about the proposed project to assist in identifying eligible patients. For each patient appointment, clinic personnel informed the child or adolescent and their parent of the study and directed interested families to receive additional information from the study coordinator. The study coordinator explained the nature of the study in greater detail and obtained parent consent and child/adolescent assent if the family wished to participate. During the consent/assent process, the study coordinator reviewed the content of the consent/assent forms with participants to ensure comprehension and informed participants of the potential benefits and risks of study participation. Participants were also reminded that study participation was voluntary and they could discontinue participation at any time. The study coordinator reviewed the ways in which privacy and confidentiality of personal or identifying information will be maintained and encouraged honesty in questionnaire responses from both the parent and child/adolescent.

Each family completed questionnaire packets in separate, quiet, private rooms in the clinic while waiting to see a healthcare professional, with instructions for the child/adolescent and parent to complete items independently. Parents completed a demographic questionnaire and children/adolescents answered questions about their general and pain-specific expectancies as well as their functioning. The study coordinator was seated adjacent to the private room so as not to distract participants, but maintained enough proximity to answer any questions. Families completed the questionnaire battery in approximately 20 minutes during the typical 60-minute waiting period prior to being seen for their appointment.

3 DATA ANALYSES

Preliminary Analyses

Initially, descriptive statistics, including means, standard deviations, and frequencies, were performed to characterize the sample. Data were tested for normality and statistical assumptions were inspected, including regression diagnostics to confirm that all regression assumptions were met (Field, 2009). Correlations, *t* tests, and one-way analyses of variance (ANOVAs) were conducted to examine associations among demographic, pain, and outcome variables to determine whether any covariates should be accounted for in primary analyses and to examine associations among study variables. Finally, one-way ANOVAs were performed to ensure that no differences in demographic or outcome variables emerged between the two data collection sites.

Primary Analyses

In order to test the unique predictive value of pain-related fear and pain catastrophizing on functional disability and quality of life, hierarchical multiple linear regression analyses were conducted. In the first hierarchical regression, covariates were entered into block 1 and both pain-related fear and pain catastrophizing were entered simultaneously into block 2 predicting functional disability. In the second hierarchical regression, covariates were entered into block 1 and both pain-related fear and pain catastrophizing were entered simultaneously into block 2 predicting quality of life. To examine whether the construct of dispositional optimism serves as an applicable resilience resource in pediatric chronic pain, linear regression analyses were performed to determine whether dispositional optimism predicted functional disability and quality of life. Covariates were accounted for in the first step of the regression.

Exploratory Analyses

Given the small sample size of the current study and low power to perform complex analyses, the following analyses were strictly exploratory in nature. In order to determine whether pain catastrophizing and/or fear of pain mediated the relation between dispositional optimism and pain-related disability and/or quality of life, bootstrapping, a non-parametric resampling technique to assess indirect effects, was performed using published SPSS macros (Preacher & Hayes, 2004). A bootstrapping approach is recommended for smaller sample sizes that may not be normally distributed, rectifying the impact of asymmetrical sampling distributions on statistical power (Preacher & Hayes, 2004, 2008). The indirect effect was considered to be significantly different from zero at $p < .05$ when zero did not fall within the 95% confidence interval (Preacher & Hayes, 2004).

4 RESULTS

Preliminary and Descriptive Analyses

Descriptive statistics, including means, standard deviations, and frequencies, were first determined to characterize the participant sample (Table 1). Next, means and standard deviations of study variables (i.e., pain catastrophizing, fear of pain, dispositional optimism, functional disability, and quality of life) were obtained (Table 2). Pearson's correlations of study variables (Table 3) revealed that average pain intensity was positively correlated with fear of pain, pain catastrophizing, and functional disability, while negatively correlated with quality of life. Worst pain intensity was similarly positively correlated with fear of pain, pain catastrophizing, and functional disability, while negatively correlated with dispositional optimism and quality of life. Current pain intensity was also positively correlated with pain catastrophizing and functional

disability, while negatively correlated with dispositional optimism and quality of life. However, current pain intensity was not correlated with fear of pain. Given these significant findings, these pain intensity variables were entered as covariates in primary analyses.

In terms of correlations among predictor and outcome variables (Table 3), significant positive associations emerged between pain catastrophizing and fear of pain, pain catastrophizing and functional disability, fear of pain and functional disability, and dispositional optimism and quality of life. Significant negative correlations emerged between pain catastrophizing and dispositional optimism, pain catastrophizing and quality of life, fear of pain and dispositional optimism, fear of pain and quality of life, dispositional optimism and functional disability, and functional disability and quality of life.

Analyses of variance (ANOVAs) and *t* tests were conducted to examine differences among demographic and outcome variables and determine whether there were any differences in demographic or outcome variables between the two clinics where data was collected. No significant differences emerged across demographic, predictor, and outcome variables. Similarly, there were no significant differences between data collection sites across demographic, predictor, and outcome variables. Thus, given the lack of confounding variables that emerged, no additional variables were controlled for in subsequent analyses. Regression diagnostics indicated that all regression assumptions were met. Variance inflation factors (VIFs) ranged from 1.1 to 4.3. Previous literature has suggested that VIF values approaching or exceeding 10 indicate severe multicollinearity that requires correction (Hair, Anderson, Tatham, & Black, 1995).

Primary Analyses

One primary goal of this study was to investigate the unique predictive values of Fear of Pain and Pain Catastrophizing, given their high correlation (see preliminary analyses above), on

Functional Disability and Quality of Life. To examine this aim, hierarchical regression analyses were conducted. Pain intensity variables (Current Pain Intensity, Average Pain Intensity, and Worst Pain Intensity) were entered in the first step of each regression. Next, both Fear of Pain and Pain Catastrophizing were entered simultaneously into the second step for each regression. The dependent variable for the regression analysis was either Functional Disability or Quality of Life.

Results from the hierarchical regression analyses revealed that the model including the pain intensity variables was a significant predictor of Functional Disability, $R = .646$, $R^2 = .418$, $F\ (3,52) = 12.44$, $p < .001$ (Table 4). The addition of Fear of Pain, $\beta = .241$, $t\ (50) = 1.41$, $p = .164$, and Pain Catastrophizing, $\beta = .054$, $t\ (50) = .329$, $p = .744$, did not significantly predict Functional Disability. The overall model with the pain variables, Fear of Pain, and Pain Catastrophizing accounted for 47.7 percent of the variance in Functional Disability, $R = .691$, $R^2 = .477$, $F\ (5,50) = 9.11$, $p < .001$. Although not significant, Fear of Pain and Pain Catastrophizing accounted for 5.9 percent of the variance in Functional Disability, $F\Delta\ (2, 50) = 2.82$, $p = .069$.

When entering Quality of Life as the outcome variable, hierarchical regression analyses revealed that the model including pain intensity variables was a significant predictor of Quality of Life, $R = .558$, $R^2 = .311$, $F\ (3,52) = 7.84$, $p < .001$ (Table 5). The addition of Fear of Pain significantly predicted Quality of Life, $\beta = -.611$, $t\ (50) = -4.09$, $p < .001$, but Pain Catastrophizing was not a significant predictor, $\beta = -.014$, $t\ (50) = -.099$, $p = .922$. The overall model accounted for 59.6 percent of the variance in Quality of Life, $R = .772$, $R^2 = .596$, $F\ (2,50) = 14.76$, $p < .001$. Fear of Pain and Pain Catastrophizing accounted for an additional 28.5 percent of the variance in Quality of Life, $F\Delta\ (2, 50) = 17.63$, $p < .001$.

A second primary goal of this study was to examine whether Dispositional Optimism predicted reduced Functionality Disability and increased Quality of Life. To examine this aim,

hierarchical regression analyses were performed. As Current and Worst Pain Intensity were significantly correlated with Dispositional Optimism, Functional Disability, and Quality of Life, these variables were accounted for in the first step of each regression. When entering Functional Disability as the outcome variable, after controlling for pain intensity variables, the addition of Dispositional Optimism was not a significant predictor of Functional Disability, $\beta = -.094$, t (52) = -.844, $p = .403$ (Table 6). The overall model accounted for 41.8 percent of the variance in Functional Disability, $R = .647$, $R^2 = .418$, F (1,52) = 12.47, $p < .001$. Dispositional Optimism only accounted for .8 percent of the variance in Functional Disability, $F\Delta$ (1, 52) = .712, $p = .403$.

When entering Quality of Life as the outcome variable, after controlling for pain intensity variables, the addition of Dispositional Optimism significantly predicted Quality of Life, $\beta = .443$, t (52) = 4.27, $p < .001$ (Table 7). The overall model accounted for 49 percent of the variance in Quality of Life, $R = .700$, $R^2 = .490$, F (1,52) = 16.64, $p < .001$. Dispositional Optimism specifically accounted for 17.8 percent of the variance in Quality of Life, $F\Delta$ (1, 52) = 18.19, $p < .001$.

Exploratory Analyses

Finally, to determine whether Fear of Pain and Pain Catastrophizing mediated the relation between Dispositional Optimism and functioning outcomes (i.e., Functional Disability and Quality of Life), four mediation analyses were conducted using nonparametric bootstrapping with 5,000 samples to generate 95% bias corrected confidence intervals for indirect effects. All mediation analyses were performed while controlling for current-, average-, and worst-pain intensity. Results indicated that Fear of Pain mediated the effect of Dispositional Optimism on Quality of Life (95% CI: .55, 1.91) and Functional Disability (95% CI: -.81, -.12), such that youths with

higher Dispositional Optimism reported heightened Quality of Life and reduced Functional Disability through decreased Fear of Pain (Figures 3, 4). Pain Catastrophizing (Figures 5, 6) produced a similar mediated effect on the relation between Dispositional Optimism and Quality of Life (95% CI: .11, 1.07), but did not mediate the relation between Dispositional Optimism and Functional Disability (95% CI: -.55, .01).

Table 1: Participant Demographic Information (N = 58)

	M (*SD*)
Age	14.60 (2.27)
	N (%)
Gender	
Male	12 (20.7)
Female	46 (79.3)
Ethnicity	
Hispanic/Latino	3 (5.2)
Not Hispanic/Latino	55 (94.8)
Race	
Black or African American	18 (31.0)
White	34 (58.6)
Multi-racial	5 (8.6)
Missing	1 (1.7)
Psychological disorder	
Yes	15 (25.9)
Anxiety	6 (40)
Depression	4 (26.7)
ADHD	1 (6.7)
Multiple diagnoses	4 (26.7)
No	43 (74.1)
Caregiver relation to child	
Mother	50 (86.2)
Father	6 (10.3)
Grandparent	2 (3.4)
Approximate annual family income	
Up to $10,000	6 (10.3)
$10,001-$20,000	5 (8.6)
$20,001-$30,000	6 (10.3)
$30,001-$40,000	6 (10.3)
$40,001-$50,000	4 (6.9)
$50,001-$60,000	5 (8.6)
$60,001-$70,000	4 (6.9)
$70,001-$80,000	3 (5.2)
$80,001-$90,000	1 (1.7)
$90,000 and above	12 (20.7)
Missing	6 (10.3)

Table 2: Descriptives of Pain and Outcome Study Variables

Variables (Measures)	*M* (*SD*)	Minimum	Maximum
Number of pain episodes in one week	5.42 (2.35)	0	10
Days of school missed due to chronic pain in past school year	24.22 (53.11)	0	365
General pain experienced over past week	6.38 (2.29)	0	10
Worst pain experienced over past week	8.02 (1.98)	1.10	10
Current pain	5.12 (2.50)	0	9.60
Pain catastrophizing (PCS)[a]	28.14 (9.71)	0	47
Fear of pain (FOPQ)[b]	48.68 (19.69)	0	88
Optimism (YLOT)[c]	11.04 (4.42)	2.00	18
Functional disability (FDI)[d]	25.47 (12.28)	2.00	56
Quality of life (PedsQL)[e]	51.32 (21.07)	7.61	93.48

Note. [a] PCS scores range from 0 to 52, with higher scores indicative of more catastrophizing. [b] FOPQ scores range from 0 to 96, with higher scores indicative of greater fear of pain. [c] YLOT optimism scores range from 0 to 18 [healthy sample mean (standard deviation) = 14.40 (3.59)], with higher scores indicative of greater optimism. [d] FDI scores range from 0 to 60, with higher scores indicative of worse daily functioning. [e] PedsQL total scores range from 0 to 100, with higher scores indicative of greater overall quality of life.

Table 3: Intercorrelations Among Study Variables

Variable	1	2	3	4	5	6	7
1. Average pain intensity	-						
2. Worst pain intensity	.85**	-					
3. Current pain intensity	.74**	.68**	-				
4. Pain catastrophizing	.41*	.45**	.42*	-			
5. Fear of pain	.40*	.50**	.25	.74**	-		
6. Optimism	-.21	-.28*	-.26	-.42*	-.54**	-	
7. Functional disability	.51**	.58**	.59**	.47**	.47**	-.28*	-
8. Quality of life	-.49**	-.53**	-.49**	-.60**	-.71**	.57**	-.73**

Note. * $p < .05$. ** $p < .001$.

Table 4: Hierarchical Regression Analyses of Fear of Pain and Pain Catastrophizing as Predictors of Functional Disability

Step	R	R^2	β	SE	t	$F\Delta$	ΔR^2
Block 1	.646	.418**				12.439**	.418
Average pain intensity			-.178	1.183	-.815		
Current pain intensity			.415	.778	2.685*		
Worst pain intensity			.451	1.274	2.177*		
Block 2	.691	.477**				2.820	.059
Average pain intensity			-.182	1.145	-.860		
Current pain intensity			.440	.802	2.760*		
Worst pain intensity			.293	1.308	1.377		
Fear of pain			.241	.105	1.413		
Pain catastrophizing			.054	.207	.329		

Note. * $p < .05$. ** $p < .001$.

Table 5: Hierarchical Regression Analyses of Fear of Pain and Pain Catastrophizing as Predictors of Quality of Life

Step	R	R^2	β	SE	t	$F\Delta$	ΔR^2
Block 1	.558	.311**				7.838**	.311
Average pain intensity			.006	2.207	.027		
Current pain intensity			-.233	1.451	-1.385		
Worst pain intensity			-.379	2.377	-1.681		
Block 2	.772	.596**				17.627**	.285
Average pain intensity			.021	1.726	.114		
Current pain intensity			-.322	1.209	-2.297*		
Worst pain intensity			-.018	1.971	-.094		
Fear of pain			-.611	.159	-4.088**		
Pain catastrophizing			-.014	.311	-.099		

Note. * $p < .05$. ** $p < .001$.

Table 6: Linear Regression Analyses of Optimism as a Predictor of Functional Disability

Step	*R*	R^2		SE	*t*	*F*Δ	ΔR^2
Block 1	.641	.410**				18.442**	.410
Current pain intensity			.369	.722	2.572*		
Worst pain intensity			.330	.883	2.295*		
Block 2	.647	.418**				.712	.008
Current pain intensity			.355	.729	2.446*		
Worst pain intensity			.313	.893	2.156*		
Optimism			-.094	.306	-.844		

Note. * $p < .05$. ** $p < .001$.

Table 7: Linear Regression Analyses of Optimism as a Predictor of Quality of Life

Step	R	R^2		SE	t	$F\Delta$	ΔR^2
Block 1	.558	.311**				11.983**	.311
Current pain intensity			-.231	1.339	-1.490		
Worst pain intensity			-.375	1.637	-2.414*		
Block 2	.700	.490**				18.191**	.178
Current pain intensity			-.162	1.172	-1.193		
Worst pain intensity			.297	1.435	-2.185*		
Optimism			.443	.492	4.265**		

Note. * $p < .05$. ** $p < .001$.

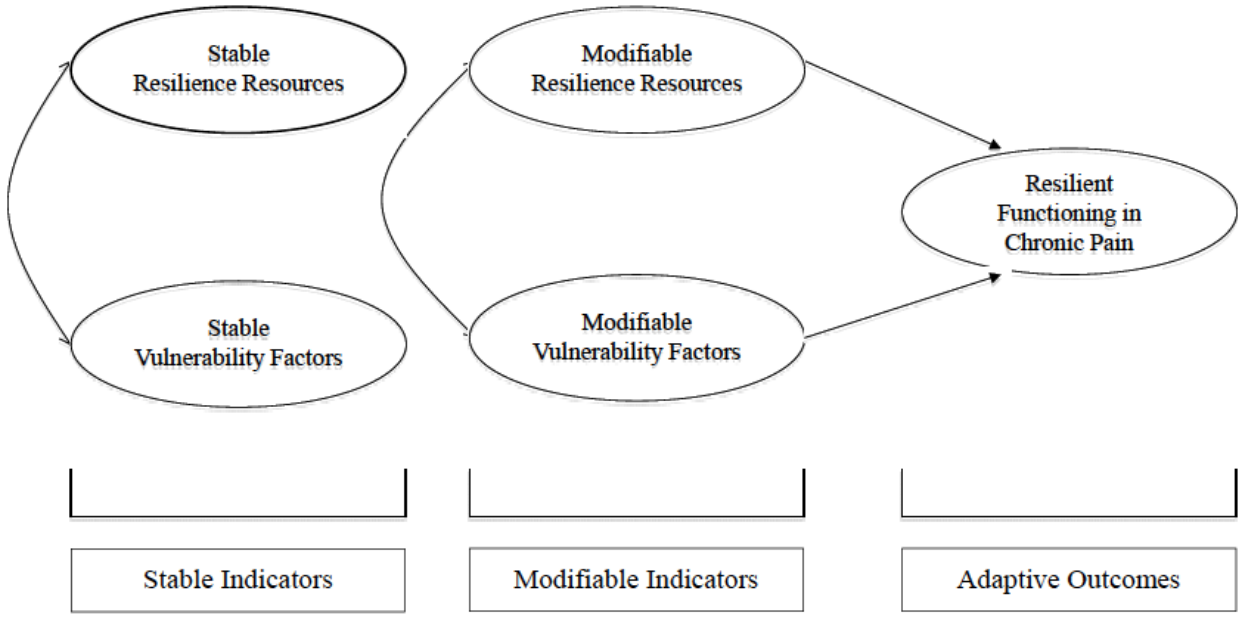


Figure 1: Stable-modifiable model of vulnerability and resilience processes

Adapted from "Resilience and Chronic Pain," by E. W. Yeung, A. Arewasikporn, and A. J. Zautra, 2012, *Journal of Social and Clinical Psychology, 31*, p. 595. Copyright 2012 by Guilford Publications, Inc.

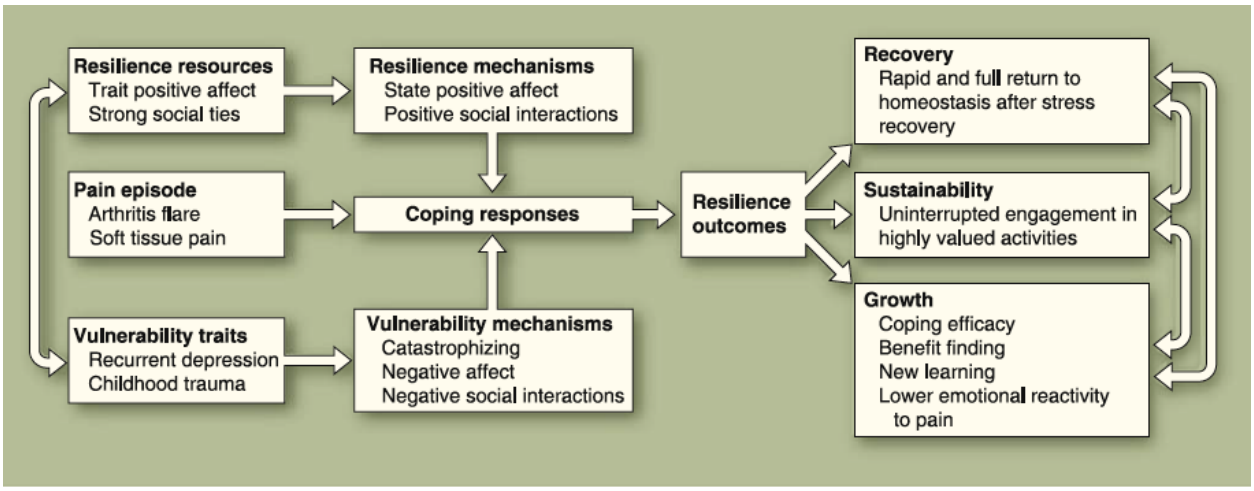
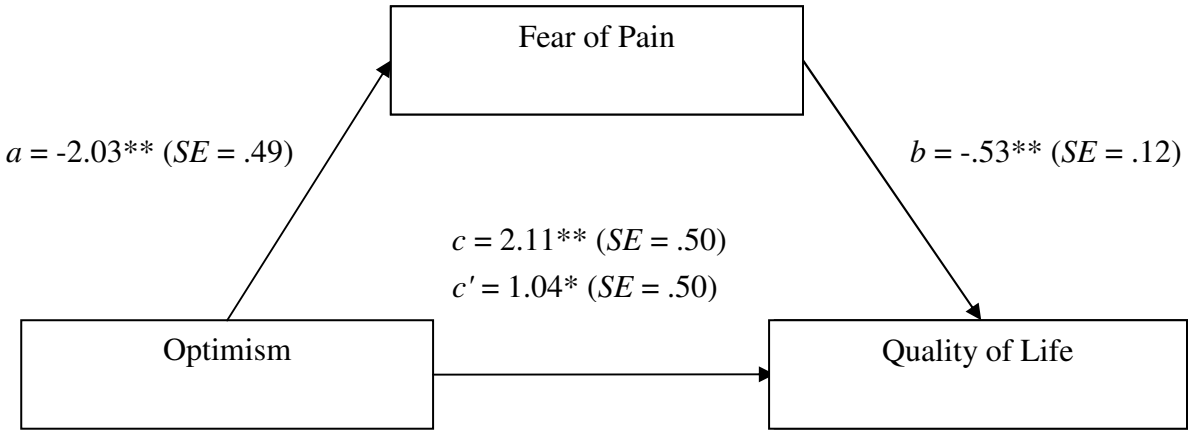


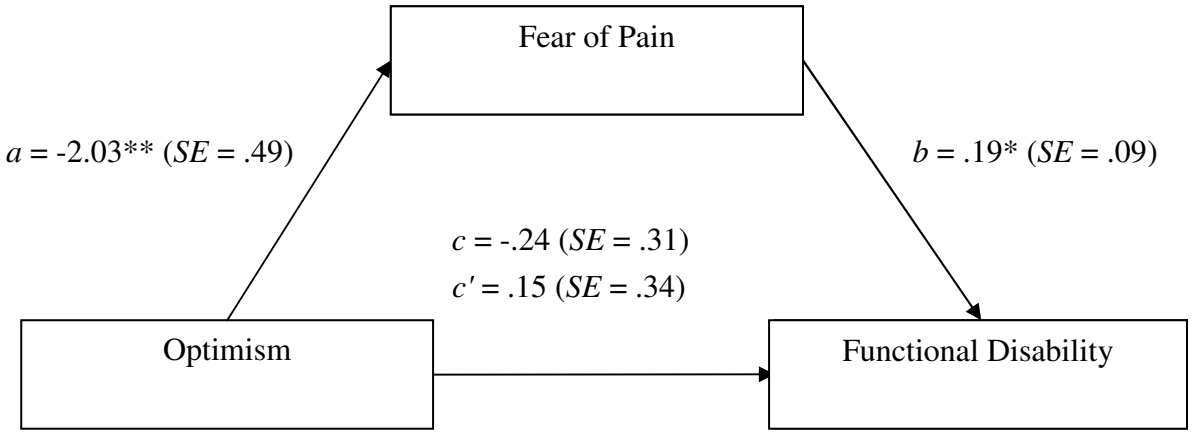
Figure 2: Pathways to resilience for those in chronic pain

All items listed below the pathways are examples. Adapted from "Resilience: A New Paradigm for Adaptation to Chronic Pain," by J. A. Sturgeon and A. J. Zautra, 2010, *Current Pain and Headache Reports, 14*, p. 107. Copyright 2010 by Springer.



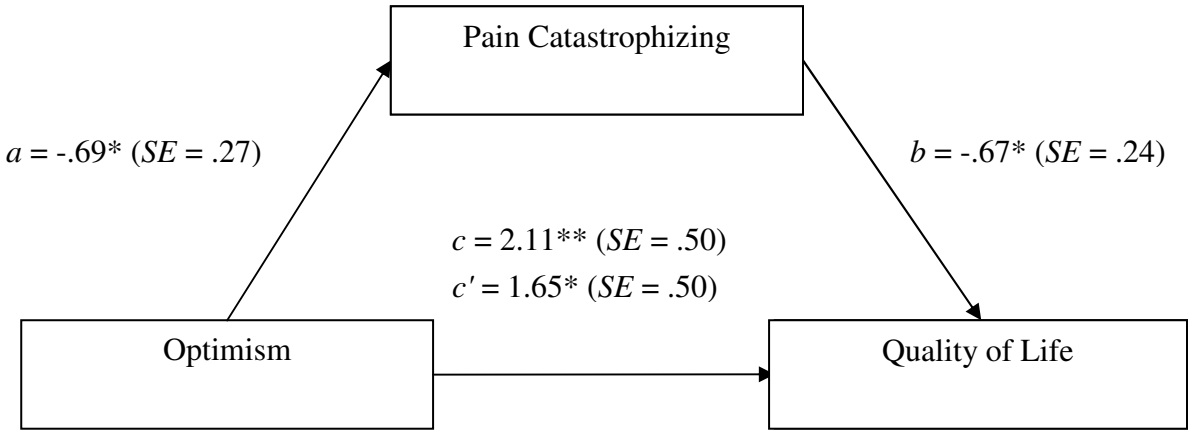
*$p < .05$
**$p < .001$

Figure 3: Fear of pain as a mediator of optimism and quality of life



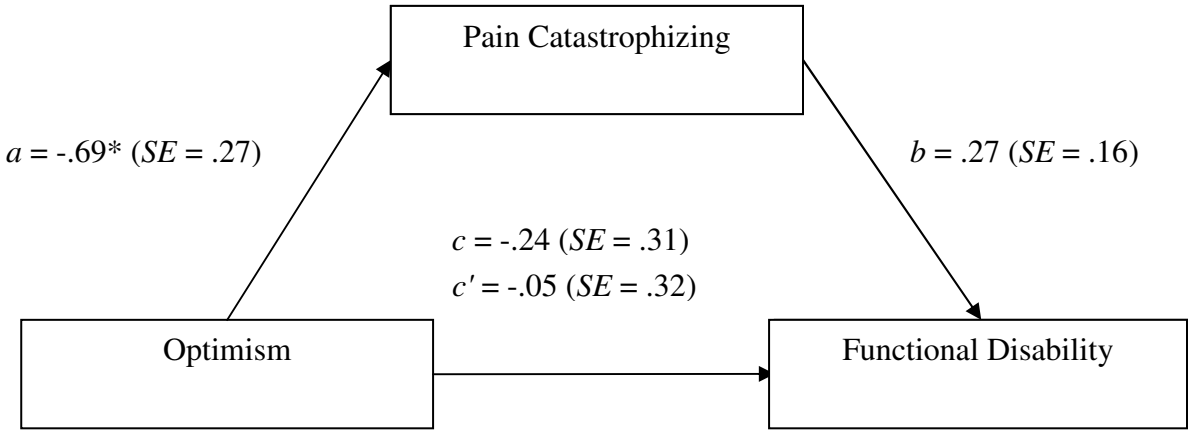
*$p < .05$
**$p < .001$

Figure 4: Fear of pain as a mediator of optimism and functional disability



*$p < .05$
**$p < .001$

Figure 5: Pain catastrophizing as a mediator of optimism and quality of life



*$p < .05$
**$p < .001$

Figure 6: Pain catastrophizing as a mediator of optimism and functional disability

5 DISCUSSION

Despite the recent emergence of risk-resilience models in the adult pain literature as well as within several pediatric chronic illness populations (Hilliard, Harris, & Weissberg-Benchell, 2012; Koinis-Mitchell et al., 2012; Sturgeon & Zautra, 2013; Yeung, Arewasikpron, & Zautra, 2012), such models have not yet been applied to pediatric pain. An extensive literature currently exists for psychosocial risk factors that predict poor pain-related outcomes (Simons et al., 2011; Vervoort et al., 2006). However, these risk factors are highly correlated and it is important to determine the unique predictive value of each of these constructs. Such comparisons have yet to be assessed in pediatric pain populations and findings will differentiate which constructs are most clinically meaningful when accounting for specific outcomes. Furthermore, there remains a growing need to study protective processes that lead to resilient outcomes for youth with pain (Huguet et al., 2011). Incorporating mechanisms of resilience to current conceptual models may provide implications for future research and clinic practice.

To provide a starting point to further work in this area, the primary aims of this study were to (a) assess the unique predictive value of two related prominent risk factors, pain-related fear and catastrophizing, on pain-related functioning and quality of life, and (b) to investigate whether optimism is an applicable resilience construct in predicting pain-related functioning and quality of life. To explore potential mechanisms of change, exploratory aims examined the mediating effect of pain-related fear and/or catastrophizing on the optimism-pain-related disability and/or optimism-quality of life relation.

Comparable to the extant literature, the sample consisted primarily of White, Not Hispanic/Latino, adolescent females with chronic pain accompanied by their mothers. However, the sample included more racial diversity relative to prior research, with almost one third of youth

identifying as Black or African-American, which is reflective of the multidisciplinary pain clinics' patient populations within the greater Atlanta area. The sample also exhibited mean values of independent and outcome variables that approximate those found in previous studies using patients from chronic pain clinics (Crombez et al., 2003; Gold et al., 2009; Simons et al., 2011). Compared to a sample of healthy school children (Ey et al., 2005), mean optimism scores were lower.

Consistent with prior research (Crombez et al., 2003; Gold et al., 2009; Goodin & Bulls, 2013; Simons et al., 2011; Walker & Greene, 1991), preliminary results revealed that pain intensity variables were positively associated with pain-related fear, catastrophizing, and disability, and negatively associated with optimism and quality of life. However, average pain intensity was not correlated with optimism and current pain intensity was not correlated with pain-related fear. Since most studies solely report average pain intensity ratings, it is difficult to hypothesize why these correlations remained non-significant, but these findings indicate that it is important to assess multiple domains of pain intensity. As expected, pain-related fear and catastrophizing were highly correlated as shown in prior research (Simons & Kaczynski, 2012) and both were negatively associated with quality of life and positively associated with disability. Optimism was positively associated with quality of life and negatively associated with pain-related fear, catastrophizing, and disability. Given optimism's positive impact on physical health and functioning in adult populations (Carver et al., 2010), as well as literature revealing optimism's positive association with quality of life among children and adolescents with cancer (Mannix et al., 2009; Williams et al., 2010), these findings were anticipated. No significant differences emerged across demographic variables or between data collection sites.

In terms of primary analyses, contrary to initial hypotheses and inconsistent with previ-

ous findings, neither pain-related fear nor catastrophizing predicted disability when controlling for pain intensity variables and only uniquely accounted for approximately 6% of the variance in disability. Previous research has shown that catastrophizing predicts disability beyond age, gender, and pain intensity (Crombez et al., 2003). One potential explanation for this discrepant finding is that previous research obtained one index of pain intensity by averaging average and worst pain intensity scores and did not simultaneously compare pain-related fear. Other studies have also found catastrophizing to be a unique predictor of disability, but failed to account for pain intensity (e.g., Vervoort et al., 2006). In fact, in the current study, when using an average pain index score or when not controlling for pain intensity, catastrophizing does significantly predict disability, p's $< .05$.

In a prior study, pain-related fear was significantly related to disability at three different time points after controlling for pain intensity among children and adolescents with neuropathic pain enrolled in an intensive pain rehabilitation program (Simons, Kaczynski, Conroy, & Logan, 2012). It is important to note that we included a variety of chronic pain conditions in the current study and we examined both pain catastrophizing and pain-related fear. An earlier study (Martin, McGrath, Brown, & Katz, 2007) using a different measure to assess pain-related fear found that pain-related fear was not a significant predictor of disability after controlling for anxiety, depression, sex, age, and pain intensity. Thus, it is possible that anxiety sensitivity, a trait factor that contributes to fear of pain, may be a more consistent initial predictor of disability. Recent literature has applied the fear-avoidance model of chronic pain to pediatric populations (Asmundson, Noel, Petter, & Parkerson, 2012; Simons et al., 2012), proposing that negative thoughts and emotions (e.g., catastrophizing, pain-related fear) contribute to avoidance behaviors that sustain disability. However, the current findings suggest that when simultaneously examined,

catastrophizing and pain-related fear do not provide any additional unique or combined value beyond pain intensity in explaining disability.

When controlling for pain intensity variables and simultaneously comparing catastrophizing, pain-related fear still emerged as a significant predictor of quality of life. Given that pain intensity has consistently been found to predict lower quality of life in youth with pain (e.g., Hunfeld et al., 2001), this finding suggests that psychosocial factors, such as pain-related fear, are even more valuable to consider when assessing well-being in pediatric pain. No studies to date have examined the impact of pain-related fear on quality of life. As catastrophizing and pain-related fear are highly correlated, this finding also suggests that the emotional component of pain-related fear might be more comprehensive and pervasive in impact compared to the cognitive domain of catastrophizing. The discrepancy in pain-related fear's predictive value of quality of life relative to disability illustrates the importance in measuring multiple domains of functioning (i.e., emotional, academic, social) rather than strictly assessing physical outcomes. Furthermore, the connection between pain intensity, disability, and adaptive functioning may not be as intuitive as assumed.

Similarly, optimism did not predict disability when controlling for pain intensity variables, but as hypothesized, was a significant predictor of quality of life. This significant finding is consistent with theories and data in the extant literature suggesting that optimism is related to greater psychological and physical well-being (Alarcon, Bowling, & Khazon, 2013; Goodin & Bulls, 2013; Ramírez-Maestre & Esteve, 2013). These results suggest that optimism may also be an important resilience factor for youth with chronic pain. Optimism may have emerged as a predictor of quality of life and not disability because optimism and quality of life are not pain-specific constructs. Thus, generalized positive expectancies are not sufficient in counteracting

the adverse impact of pain intensity on disability, but do contribute to greater well-being regardless of pain intensity experienced. Selecting resilience constructs that are pain-specific, such as positive pain expectancies, may have produced alternative findings. Furthermore, disability merely captures physical functioning and limitations, while quality of life encompasses broad domains of functioning, including physical, academic, social, and emotional. Therefore, it is possible that an optimistic outlook only serves a protective role for aspects of well-being that are unrelated to physical ability.

Finally, in terms of exploratory analyses, pain-related fear was found to mediate the optimism-quality of life and optimism-disability relations. A similar effect was found for catastrophizing, but only on the relation between optimism and quality of life. As prior research has primarily utilized healthy adult samples (Hanssen et al., 2013; Hood et al., 2012), it is important to begin testing similar mechanisms through which optimism exerts beneficial effects on pain-related outcomes in clinical pediatric samples. Consistent with prior research (Pulvers & Hood, 2013), results showed that optimism contributes to better pain-related outcomes (greater well-being and reduced disability) through lower pain-related fear and catastrophizing.

One distinct difference between the current study and prior research is that previous studies have only established catastrophizing as a mediator in the relation between optimism and pain perception. The current study uniquely examined the mediating effect of both pain-related fear and catastrophizing on the relation between optimism and prominent pediatric pain outcomes that assess functioning. Theoretically, resilience mechanisms that enhance well-being or pain adaptation are suggested to counteract the limited cognitive and emotional focus on threat-relevant cues, as a result of catastrophizing and pain-related fear, by broadening identification of potential resources and more effective coping strategies (Sturgeon & Zautra, 2013). Optimism

may indeed provide individuals with flexible coping resources that facilitate better adjustment to pain (Ramírez-Maestre & Esteve, 2013). It remains unclear why catastrophizing did not mediate the relation between optimism and disability, particularly given that optimism and catastrophizing are expectancies or cognitive processes. As catastrophizing is the cognitive antecedent to pain-related fear, perhaps minimizing pain-related fear is more crucial in order for optimism to improve functional capacity.

Limitations in the current study should be noted. First, it is impossible to determine any causal relations or the direction of influence between optimism, pain-related fear, catastrophizing, and functioning given the cross-sectional design. Longitudinal or experimental studies are needed to better understand the mechanisms and causal links associated with these variables. As optimism has not previously been explored in the pediatric pain population, it will be particularly important to determine the consistency and stability of optimism self-report responses across time as the pain experience changes. Recent research with adults has provided support for the causal link between optimism and experimental pain perception, and the meditational effect of situational pain catastrophizing, through the experimental manipulation of optimism (Hanssen et al., 2013). This potential modifiability of optimism proves promising for future work with chronic pain patients.

Second, this study solely relied on self-report data. It will be imperative for future studies to decrease potential response biases by including parent reports, healthcare professional perceptions, and incorporating behavioral measures, if possible. Additionally, this study did not use a counterbalanced design. Thus, the order of completing measures may have influenced self-report responses. While the sample size is comparable to most pediatric psychology research, a larger sample size would have enabled more advanced statistical analyses. With the current sample

size, it was not possible to examine differences based on pain diagnosis and mediation analyses were strictly exploratory in nature. In addition to pain intensity, duration of pain should have also been assessed, as it may have been a likely covariate to control for in analyses.

Furthermore, given the definition of resilience, future resilience research in pediatric pain would benefit from the incorporation of culture and diversity and the utilization of a developmental framework. Culture-specific protective factors that may contribute to enhanced resilience include racial and ethnic identification, allocentrism or membership within a cultural community, familial cohesion, religiosity, and spirituality (Gallo, Penedo, Espinosa de los Monteros, & Arguelles, 2009; Keyes, 2009; Koinis-Mitchell et al., 2012). Integrating cultural models from community psychology would enable advancement in this area (Arrington & Wilson, 2000).

Although the most prominent risk factors studied in chronic pain are arguably fear of pain and pain catastrophizing, this study did not account for other factors that might influence these constructs, such as anxiety, anxiety sensitivity, and depression. Similarly, although optimism has been most prevalently explored in health psychology as well as adult pain sensitivity models, future research should examine other potential resilience factors in pediatric chronic pain, such as acceptance, mindfulness, self-efficacy, and positive affect (Goodin & Bulls, 2013; Pulvers & Hood, 2013; Ramírez-Maestre & Esteve, 2013; Sturgeon & Zautra, 2013). Such research will provide the foundation to explore how resilience factors impact coping strategies, cognitive processes, cortical involvement, and ultimately, adjustment to pediatric pain. Better understanding of these resilience mechanisms will be useful in developing more effective treatment approaches to chronic pain. In closing, the current study is the first to examine resilience in pediatric chronic pain; these findings will hopefully inform future research in new avenues for improving functioning and quality of life in youth with chronic pain.

REFERENCES

Affleck, G., Tennen, H., Zautra, A. J., Urrows, S., Abeles, M., & Karoly, P. (2001). Women's pursuit of personal goals in daily life with fibromyalgia: A value-expectancy analysis. *Journal of Consulting and Clinical Psychology, 69*, 587-596.

Alarcon, G. M., Bowling, N. A., & Khazon, S. (2013). Great expectations: A meta-analytic examination of optimism and hope. *Personality and Individual Differences, 54*, 821-827.

Arrington, E. G., & Wilson, M. N. (2000). A re-examination of risk and resilience during adoles cence: Incorporating culture and diversity. *Journal of Child and Family Studies, 9*, 221-230.

Asmundson, G. J., Noel, M., Petter, M., & Parkerson, H. A. (2011). Pediatric fear-avoidance model of chronic pain: Foundation, application and future directions. *Pain Research & Management, 17*, 397-405.

Austin, J. T., & Vancouver, J. B. (1996). Goal constructs in psychology: Structure, process, and content. *Psychological Bulletin, 120*, 338-375.

Barakat, L. P., Alderfer, M. A., & Kazak, A. E. (2006). Posttraumatic growth in adolescent survivors of cancer and their mothers and fathers. *Journal of Pediatric Psychology, 31*, 413-419.

Bargiel-Matusiewicz, K., & Krzyszkowska, A. (2009). Dispositional optimism and coping with pain. *European Journal of Medical Research, 14*, 271-274.

Bédard, G. B. V., Reid, G. J., McGrath, P. J., & Chambers, C. T. (1997). Coping and self-medication in a community sample of junior high school students. *Pain Research Management, 2*, 151–156.

Benyamini, Y. (2005). Can high optimism and high pessimism co-exist?: Findings from arthritis

patients coping with pain. *Personality and Individual Differences, 38*, 1463-1473.

Berrin, S. J., Malcarne, V. L., Varni, J. W., Burwinkle, T. M., Sherman, S. A., Artavia, K., & Chambers, H. G. (2007). Pain, fatigue, and school functioning in children with cerebral palsy: A path-analytic model. *Journal of Pediatric Psychology, 32*, 330-337.

Bingel, U., Schoell, E., Herken, W., Buchel, C., & May, A. (2007). Habituation to painful stimulation involves the antinociceptive system. *Pain, 131*, 21-30.

Block, J. H., & Block, J. (1980). The role of ego-control and ego-resiliency in the organization of behavior. In W. A. Collins (Ed.), *Development of cognition, affect, and social relations. The Minnesota symposia on child psychology* (Vol. 13, pp. 39-101). Hillsdale: Lawrence Erlbaum.

Campo, J. V., Jansen-McWilliams, L., Comer, D. M., & Kelleher, K. J. (1999). Somatization in pediatric primary care: Association with psychopathology, functional impairment, and use of services. *Journal of the American Academy of Child & Adolescent Psychiatry, 38*, 1093-1101.

Campo, J. V., Perel, J., Lucas, A., Bridge, J., Ehmann, M., Kalas, C., et al. (2004). Citalopram treatment of pediatric recurrent abdominal pain and comorbid internalizing disorders: An exploratory study. *Journal of the American Academy of Child and Adolescent Psychiatry, 43*, 1234-1242.

Carver, C. S., & Scheier, M. F. (1998). *On the self-regulation of behavior*. New York: Cambridge University Press.

Carver, C. S., Scheier, M. F., & Segerstrom, S. C. (2010). Optimism. *Clinical Psychology Review, 30*, 879-889.

Claar, R. L., & Walker, L. S. (2006). Functional assessment of pediatric pain patients:

Psychometric properties of the Functional Disability Inventory. *Pain, 121*, 77-84.

Cohen, J. (1988). Statistical power analysis for the behavioral sciences (2nd ed.). Hillsdale, NJ: Erlbaum.

Cohen, L. L., Lemanek, K., Blount, R. L., Dahlquist, L. M., Lim, C. S., Palermo, T. M., et al. (2008). Evidence-based assessment of pediatric pain. *Journal of Pediatric Psychology, 33*, 939-955.

Connelly, M., & Rapoff, M. A. (2006). Assessing health-related quality of life in children with recurrent headache: Reliability and validity of the PedsQL 4.0 in a pediatric headache sample. *Journal of Pediatric Psychology, 31*, 698–702.

Costello, N. L., Bradgon, E. E., Light, K. C., Sigurdsson, A., Bunting, S., Grewen, K., et al. (2002). Temporomandibular disorder and optimism: Relationships to ischemic pain sensitivity and interleukin-6. *Pain, 100*, 99-110.

Crombez, G., Bijttebier, P., Eccleston, C., Mascagni, T., Mertens, G., Goubert, L., et al. (2003). The Child version of the Pain Catastrophizing Scale (PCS-C): A preliminary validation. *Pain, 104*, 639–646.

Eccleston, C., Crombez, G., Scotford, A., Clinch, J., & Connell, H. (2004). Adolescent chronic pain: Patterns and predictors of emotional distress in adolescents with chronic pain and their parents. *Pain, 108*, 221-229.

Eccleston, C., & Malleson, P. (2003). Management of chronic pain in children and adolescents. *British Medical Journal, 326*, 1408-1409.

Ey, S., Hadley, W., Allen, D. N., Palmer, S., Klosky, J., Deptula, D., et al. (2005). A new measure of children's optimism and pessimism: The youth life orientation test. *Journal of Child Psychology and Psychiatry, 46*, 548-558.

Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods, 41*, 1149-1160.

Ferreira, V. M., & Sherman, A. M. (2007). The relationship of optimism, pain, and social support to well-being in older adults with osteoarthritis. *Aging & Mental Health, 11*, 89-98.

Field, A. P. (2009). Discovering statistics with SPSS (3rd ed.). London: Sage.

Gallo, L. C., Penedo, F. J., Espinosa de los Monteros, K., & Arguelles, W. (2009). Resilience in the face of disadvantage: Do Hispanic cultural characteristics protect health outcomes? *Journal of Personality, 77*, 1707-1746.

Gatchel, R. J., Peng, Y. B., Peters, M. L., Fuchs, P. N., & Turk, D. C. (2007). The biopsychosocial approach to chronic pain: Scientific advances and future directions. *Psychological Bulletin, 133*, 581.

Gauntlett-Gilbert, J., & Eccleston, C. (2007). Disability in adolescents with chronic pain: Patterns and predictors across different domains of functioning. *Pain, 131*, 132-141.

Geers, A. L., Wellman, J. A., Fowler, S. L., Helfer, S. G., & France, C. R. (2010). Dispositional optimism predicts placebo analgesia. *The Journal of Pain, 11*, 1165-1171.

Geers, A. L., Wellman, J. A., Helfer, S. G., Fowler, S. L., & France, C. R. (2008). Dispositional optimism and thoughts of well-being determine sensitivity to an experimental pain task. *Annals of Behavioral Medicine, 36*, 304-313.

George, S. Z., Dannecker, E. A., & Robinson, M. E. (2006). Fear of pain, not pain catastrophizing, predicts actue pain intensity, but neither factor predicts tolerance or blood pressure reactivity: An experimental investigation in pain-free individuals.

European Journal of Pain, 10, 457-465.

Gold, J. I., Yetwin, A. K, Mahrer, N. E., Carson, M. C., Griffin, A. T., Palmer, S. N., et al. (2009). Pediatric chronic pain and health-related quality of life. *Journal of Pediatric Nursing, 24(2)*, 141-150.

Goodin, B. R., & Bulls, H. W. (2013). Optimism and the experience of pain: Benefits of seeing the glass as half full. *Current Pain and Headache Reports, 17*, 1-9.

Goodin, B. R., Kronfli, T., King, C. D., Glover, T. L., Sibille, K., & Fillingim, R. B. (2012). Testing the relation between dispositional optimism and conditioned pain modulation: Does ethnicity matter? *Journal of Behavioral Medicine*.

Goodin, B. R., McGuire, L., Allshouse, M., Stapleton, L., Haythornthwaite, J. A., Burns, N., et al. (2009). Associations between catastrophizing and endogenous pain-inhibitory processes: Sex differences. *Journal of Pain, 10*, 180-190.

Goodman, J. E., & McGrath, P. J. (1991). The epidemiology of pain in children and adolescents: A review. *Pain, 46*, 247-264.

Goubert, L., Crombez, G., & Van Damme, S. (2004). The role of negative affectivity, pain catastrophizing and pain-related fear in vigilance to pain: A structural equations approach. *Pain, 107*, 234–241.

Hair, J. F. Jr., Anderson, R. E., Tatham, R. L., & Black, W. C. (1995). Multivariate Data Analy sis (3rd ed). New York: Macmillan.

Hanssen, M. M., Peters, M. L., Vlaeyen, J. W. S., Meevissen, Y. M. C., & Vancleef, L. M. G. (2013). Optimism lowers pain: Evidence of the causal status and underlying mechanisms. *Pain, 154,* 53-58.

Higgins, E. T. (2006). Value from hedonic experience and engagement. *Psychological Review,*

113, 439–460.

Hilliard, M. E., Harris, M. A., & Weissberg-Benchell, J. (2012). Diabetes resilience: A model of risk and protection in type 1 diabetes. *Current Diabetes Reports, 12*, 739-748.

Hood, A., Pulvers, K., Carrillo, J., Merchant, G., & Thomas, M. D. (2012). Positive traits linked to less pain through lower pain catastrophizing. *Personality and Individual Differences, 52*, 401-405.

Huguet, A., McGrath, P. J., & Pardos, J. (2011). Development and preliminary testing of a scale to assess pain-related fear in children and adolescents. *The Journal of Pain, 12*, 840-848.

Huguet, A., McGrath, P. J., Stinson, J., Chambers, C. T., & Míro, J. (2011). Commentary: Shaping the future of research on chronic pain in children. *Pediatric Pain Letter, 13*, 7-12.

Huguet, A., & Míro, J. (2008). The severity of chronic pediatric pain: An epidemiological study. *Journal of Pain, 9*, 226-236.

Hunfeld, J. A., Perquin, C. W., Duivenvoorden, H. J., Hazebroek-Kampschreur, A. A., Passchier, J., van Suijlekom-Smit, L. W., et al. (2001). Chronic pain and its impact on quality of life in adolescents and their families. *Journal of Pediatric Psychology, 26*, 145-153.

Jensen, M. P., Turner, J. A., Romano, J. M., & Karoly, P. (1991). Coping with chronic pain: A critical review of the literature. *Pain, 47*, 249-283.

Karademas, E. C., Konstantinos, K., & Sideridis, G. D. (2007). Optimism, self-efficacy, and information processing of threat- and well-being-related stimuli. *Stress and Health, 23*, 285–294.

Karoly, P., & Ruehlman, L. S. (2006). Psychological “resilience” and its correlates in chronic pain: Findings from a national community sample. *Pain, 123*, 90-97.

Kashikar-Zuck, S., Goldschneider, K. R., Powers, S. W., Vaught, M. H., & Hershey, A. D. (2001). Depression and functional disability in chronic pediatric pain. *Clinical Journal of Pain, 17*, 341-349.

Kashikar-Zuck, S., Vaught, M. H., Goldschneider, K. R., Graham, T. B., & Miller, J. C. (2002). Depression, coping, and functional disability in juvenile primary fibromyalgia syndrome. *Journal of Pain, 3*, 412-419.

Keyes, C. L. (2009). The black-white paradox in health: Flourishing in the face of social inequal ity and discrimination. *Journal of Personality, 77*, 1677-1706.

King, S., Chambers, C. T., Huguet, A., MacNevin, R. C., McGrath, P. J., Parker, L., & MacDonald, A. J. (2011). The epidemiology of chronic pain in children and adolescents revisited: A systematic review. *Pain, 152*, 2729-2738.

Koinis-Mitchell, D., McQuaid, E. L., Jandasek, B., Kopel, S. J., Seifer, R., Klein, R. B., et al. (2012). Identifying individual, cultural and asthma-related risk and protective factors associated with resilient asthma outcomes in urban children and families. *Journal of Pediatric Psychology, 37*, 424-437.

Lang, P. (1968). Fear reduction and fear behavior: Problems in treating a construct. In J. M. Shlien (Ed.), *Research in Psychotherapy* (pp. 90-102). Washington DC: American Psychology Association.

Leeuw, M., Goossens, M. E., Linton, S. J., Crombez, G., Boersma, K., & Vlaeyen, J. W. (2007). The fear-avoidance model of musculoskeletal pain: Current state of scientific evidence. *Journal of Behavioral Medicine, 30*, 77-94.

Lethem, J., Slade, P. D., Troup, J. D., & Bentley, G. (1983). Outline of a fear-avoidance model of exaggerated pain perception-I. *Behavior Research and Therapy, 21*, 401-408.

Libby, C. J., & Glenwick, D. S. (2010). Protective and exacerbating factors in children and adolescents with fibromyalgia. *Rehabilitation Psychology, 55(2)*, 151-158.

Logan, D. E., & Scharff, L. (2005). Relationships between family and parent characteristics and functional abilities in children with recurrent pain syndromes: An investigation of moderating effects on the pathway from pain to disability. *Journal of Pediatric Psychology, 30*, 698-707.

Lu, Q., Tsao, J. C. I., Myers, C. D., Kim, S. C., & Zeltzer, L. K. (2007). Coping predictors of children's laboratory-induced pain tolerance, intensity, and unpleasantness. *The Journal of Pain, 8(9)*, 708-717.

Luthar, S. S., Cicchetti, D., & Becker, B. (2000). The construct of resilience: A critical evaluation and guidelines for future work. *Child Development, 71*, 543-562.

Malleson, P. N., Connell, H., Bennett, S. M., & Eccleston, C. (2001). Chronic musculoskeletal and other idiopathic pain syndromes. *Archives of Disease in Childhood, 84*, 189-192.

Mannix, M. M., Feldman, J. M., & Moody, K. (2009). Optimism and health-related quality of life in adolescents with cancer. *Child: Care, Health and Development, 35*, 482-488.

Martin, A. L., McGrath, P. A., Brown, S. C., & Katz, J. (2007). Anxiety sensitivity, fear of pain and pain-related disability in children and adolescents with chronic pain. *Pain Research & Management, 12*, 267-272.

Masten, A. S. (2001). Ordinary magic: Resilience processes in development. *American Psychologist, 56*, 227-238.

Melzack, R., & Wall, P. D. (1965). Pain mechanisms: A new theory. *Science, 150*, 971-979.

Merlijn, V. P. B. M., Hunfeld, J. A. M., van der Wouden, J. C., Hazebroek-Kampschreur, A. A. J. M., Passchier, J., & Koes, B. W. (2006). Factors related to the quality of life in

adolescents with chronic pain. *Clinical Journal of Pain, 22*, 306-315.

Merskey, H., & Bogduk, N. (1994). *Classification of chronic pain: Descriptions of chronic pain syndromes and definitions of pain terms* (2nd ed.). Seattle, WA: International Association for the Study of Pain.

Meyerson, D. A., Grant, K. E., Smith Carter, J., & Kilmer, R. P. (2011). Posttraumatic growth among children and adolescents: A systematic review. *Clinical Psychology Review, 31*, 949-964.

Miró, J., Huguet, A., & Nieto, R. (2007). Predictive factors of chronic pediatric pain and disability: A Delphi poll. *Journal of Pain, 10*, 774-792.

Morton, D. L., Watson, A., El-Deredy, W., & Jones, A. K. P. (2009). Reproducibility of placebo analgesia: Effect of dispositional optimism. *Pain, 146*, 194-198.

Ong, A. D., Zautra, A. J., & Reid, M. C. (2010). Psychological resilience predicts decreases in pain catastrophizing through positive emotions. *Psychology and Aging, 25(3)*, 516-523.

Palermo, T. M. (2000). Impact of recurrent and chronic pain on child and family daily functioning: A critical review of the literature. *Journal of Developmental and Behavioral Pediatrics, 21(1)*, 58-69.

Palermo, T. M., & Chambers, C. T. (2005). Parent and family factors in pediatric chronic pain and disability: An integrative approach. *Pain, 119*, 1-4.

Palermo, T. M., & Kiska, R. (2005). Subjective sleep disturbances in adolescents with chronic pain: Relationship to daily functioning and quality of life. *The Journal of Pain, 6*, 201-207.

Pence, L., Valrie, C. R., Gil, K. M., Redding-Lallinger, R., & Daeschner, C. (2007). Optimism predicting daily pain medication use in adolescents with sickle cell disease. *Journal of*

Pain and Symptom Management, 33, 302-309.

Perquin, C. W., Hazebroek-Kampschreur, A. A., Hunfeld, J. A., Bohnen, A. M., van Suijlekom-Smit, L. W., Passchier, J., et al. (2000). Pain in children and adolescents: A common experience. *Pain, 87*, 51-58.

Peterson, C. C., & Palermo, T. M. (2004). Parental reinforcement of recurrent pain: The moderating impact of child depression and anxiety on functional disability. *Journal of Pediatric Psychology, 29*, 331-341.

Phipps, S., Long, A. M., & Ogden, J. (2007). Benefit finding scale for children: Preliminary findings from a childhood cancer population. *Journal of Pediatric Psychology, 32*, 1264-1271.

Piira, T., Taplin, J. E., Goodenough, B., & von Baeyer, C. L. (2002). Cognitive-behavioural predictors of children's tolerance of laboratory-induced pain: Implications for clinical assessment and future directions. *Behaviour Research and Therapy, 40*, 571–584.

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments & Computers, 36*, 717–731.

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods, 40*, 879–891.

Price, D. D., & McHaffie, J. G. (1988). Effects of heterotopic conditioning stimuli on first and second pain: A psychophysical evaluation in humans. *Pain, 34*, 245-252.

Pulvers, K., & Hood, A. (2013). The role of positive traits and pain catastrophizing in pain perception. *Current Pain and Headache Reports, 17*, 1-11.

Ramírez-Maestre, C., & Esteve, R. (2013). Disposition and adjustment to chronic pain. *Current Pain and Headache Reports, 17*, 1-11.

Rasmussen, H. N., & Scheier, M. F. (2009). Optimism and physical health: A meta-analytic review. *Annals of Behavioral Medicine, 37*, 239-256.

Reich, J. W., Zautra, A. J., & Hall, J. S. (Eds.). (2010). *Handbook of Adult Resilience*. New York: Guildford Press.

Reid, G. J., McGrath, P. J., & Lang, B. A. (2005). Parent-child interactions among children with juvenile fibromyalgia, arthritis, and healthy controls. *Pain, 113*, 201-210.

Robins, P. M., Smith, S. M., Glutting, J. J., & Bishop, C. T. (2005). A randomized controlled trial of a cognitive-behavioral family intervention for pediatric recurrent abdominal pain. *Journal of Pediatric Psychology, 30*, 397-408.

Robins, P. M., Smith, S. M., & Proujansky, R. (2002). Children with recurrent abdominal pain: Comparison of community and tertiary care samples. *Child Health Care, 31*, 93-106.

Roth, S., & Cohen, L. J. (1986). Approach, avoidance, and coping with stress. *American Psychologist, 41*, 813–819.

Roth-Isigkeit, A., Thyen, U., Stoven, H., Schwarzenberger, J., & Schmucker, P. (2005). Pain among children and adolescents: Restrictions in daily living and triggering factors. *Pediatrics, 115*, e152-e162.

Rutter, M. (2012). Resilience as a dynamic concept. *Developmental Psychopathology, 24*, 335-344.

Schanberg, L. E., Keefe, F. J., Lefebvre, J. C., Kredich, D. W., & Gil, K. M. (1996). Pain coping strategies in children with juvenile primary fibromyalgia syndrome: Correlation with pain, physical function, and psychological distress. Arthritis Care & Research, 9, 89–96.

Scheier, M. F., & Carver, C. S. (1985). Optimism, coping, and health: Assessment and implications of generalized outcome expectancies. *Health Psychology, 4*, 219-247.

Scheier, M. F., Carver, C. S., & Bridges, M. W. (1994). Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): A re-evaluation of the Life Orientation Test. *Journal of Personality and Social Psychology*, *67*, 1063-1078.

Seligman, M. E. P. (1991). Learned optimism. New York, NY: Knopf.

Sharot, T., Riccardi, A. M., Raio, C. M., & Phelps, E. A. (2007). Neural mechanisms mediating optimism bias. *Nature, 450*, 102-105.

Simons, L. E., & Kaczynski, K. J. (2012). The fear avoidance model of chronic pain: Examination for pediatric application. *The Journal of Pain*, 1-9.

Simons, L. E., Kaczynski, K. J., Conroy, C., & Logan, D. E. (2012). Fear of pain in the context of intensive pain rehabilitation among children and adolescents with neuropathic pain: Associations with treatment response. *The Journal of Pain, 13*, 1151-1161.

Simons, L. E., Sieberg, C. B., Carpino, E., Logan, D., & Berde, C. (2011). The fear of pain questionnaire (FOPQ): Assessment of pain-related fear among children and adolescents with chronic pain. *The Journal of Pain, 12*, 677-686.

Sinclair, V. G. (2001). Predictors of pain catastrophizing in women with rheumatoid arthritis. *Archives of Psychiatric Nursing, 15*, 279-288.

Sipila, K., Ylöstalo, P. V., Ek, E., Zitting, P., & Knuuttila, M. L. (2006). Association between optimism and self-reported facial pain. *Acta Odontologica Scandinavica, 64*, 177-182.

Skinner, E. A., Edge, K., Altman, J., & Sherwood, H. (2003). Searching for the structure of coping: A review and critique of category systems for classifying ways of coping. *Psychological Bulletin, 129*, 216–269.

Smith, B. W., Tooley, E. M., Montague, E. Q., Robinson, A. E., Cosper, C. J., & Mullins, P. G. (2009). The role of resilience and purpose in life in habituation to heat and cold pain. *The Journal of Pain, 10*, 493-500.

Smith, B. W., & Zautra, A. J. (2008). Vulnerability and resilience in women with arthritis: Test of a two-factor model. *Journal of Consulting and Clinical Psychology, 76*, 799-810.

Solberg Nes, L., & Segerstrom, S. C. (2006). Dispositional optimism and coping: A meta-analytic review. *Personality and Social Psychology Review, 10*, 235–251.

Sporrer, K. A., Jackson, S. M., Agner, S., Laver, J., & Abboud, M. R. (1994). Pain in children and adolescents with sickle cell anemia: A prospective study utilizing self-reporting. *American Journal of Pediatric Hematology/Oncology, 16*, 219–224.

Stanford, E. A., Chambers, C. T., Biesanz, J. C., & Chen, E. (2008). The frequency, trajectories and predictors of adolescent recurrent pain: A population-based approach. *Pain, 138*, 11-21.

Sturgeon, J. A., & Zautra, A. J. (2010). Resilience: A new paradigm for adaptation to chronic pain. *Current Pain and Headache Reports, 14*, 105-112.

Sturgeon, J. A., & Zautra, A. J. (2013). Psychological resilience, pain catastrophizing, and positive emotions: Perspectives on comprehensive modeling of individual pain adaptation. *Current Pain and Headache Reports, 17*, 1-9.

Sullivan, M. J. L., Bishop, S. R., & Pivik, J. (1995). The pain catastrophizing scale: Development and validation. *Psychological Assessment, 7*, 524-532.

Sullivan, M. J. L., Rodgers, W., & Kirsh, I. (2001). Catastrophizing, depression and expectancies for pain and emotional distress. *Pain, 91*, 147-154.

Sullivan, M. J. L., Thorn, B., Haythornthwaite, J. A., Keefe, F., Martin, M., Bradley, L. A., et al.

(2001). Theoretical perspectives on the relation between catastrophizing and pain. *Clinical Journal of Pain, 17*, 52-64.

Sullivan, M. J. L., Thorn, B., Rodgers, W., & Ward, C. (2004). Path model of antecedents to pain experience: Experimental and clinical findings. *Clinical Journal of Pain, 20*, 164-173.

Task Force on Taxonomy. (1994). *Classification of chronic pain: Descriptions of chronic pain syndromes and definitions of pain terms.* Seattle: IASP Press.

Thomsen, A. H., Compas, B. E., Colletti, R. B., Stanger, C., Boyer, M. C., & Konik, B. S. (2002). Parent reports of coping and stress responses in children with recurrent abdominal pain. *Journal of Pediatric Psychology, 27*, 215-226.

Tojek, T. M., Lumley, M. A., Corlis, M., Ondersma, S., & Tolia, V. (2002). Maternal correlates of health status in adolescents with inflammatory bowel disease. *Journal of Psychosomatic Research, 52*, 173-179.

Treharne, G. J., Kitas, G. D., Lyons, A. C., & Booth, D. A. (2005). Well-being in rheumatoid arthritis: The effects of disease duration and psychosocial factors. *Journal of Health Psychology, 10*, 457-474.

Turk, D.C., & Okifuji, A. (2001). Pain terms and taxonomies of pain. In D. Loeser, S. H. Butler, Chapman, J.J., & D. C. Turk (eds.). *Bonica's management of pain* (3rd ed.). Philadelphia: Lippincott Williams & Wilkins (18–25).

Tsao, J. C. I., Allen, L. B., Evans, S., Lu, Q., Myers, C. D., & Zeltzer, L. K. (2009). Anxiety sensitivity and catastrophizing: Associations with pain and somatization in non-clinical children. *Journal of Health Psychology, 14*, 1085-1094.

Van Damme, S., Crombez, G., & Eccleston, C. (2002). Retarded disengagement from pain cues: The effects of pain catastrophizing and pain expectancy. *Pain, 100*, 111–118.

Varni, J. W., Burwinkle, T. M., Seid, M., & Skarr, D. (2003). The PedsQL 4.0 as a pediatric population health measure: Feasibility, reliability, and validity. *Ambulatory Pediatrics, 3*, 329-341.

Varni, J., Seid, M., & Kurtin, P. (2001). PedsQL 4.0: Reliability and validity of the Pediatric Quality of Life Inventory version 4.0 generic core scales in healthy and patient populations. *Medical Care, 39*, 800-812.

Varni, J. W., Thompson, K. L., & Hanson, V. (1987). The Varni/Thompson Pediatric Pain Questionnaire: I. Chronic musculoskeletal pain in juvenile rheumatoid arthritis. *Pain, 28*, 27–38.

Vervoort, T., Eccleston, C., Goubert, L., Buysse, A., & Crombez, G. (2010). Children's catastrophic thinking about their pain predicts pain and disability six months later. *European Journal of Pain, 14(1)*, 90-96.

Vervoort, T., Goubert, L., Eccleston, C., Bijttebier, P., & Crombez, G. (2006). Catastrophic thinking about pain is independently associated with pain severity, disability, and somatic complaints in school children and children with chronic pain. *Journal of Pediatric Psychology, 31(7)*, 674-683.

Vlaeyen, J. W., & Linton, S. J. (2000). Fear-avoidance and its consequences in chronic musculoskeletal pain: A state of the art. *Pain, 85*, 317-332.

von Baeyer, C. L. (2006). Children's self-reports of pain intensity: Scale selection, limitations and interpretation. *Pain Research & Management, 11*, 157-162.

Walker, L. S., Garber, J., Van Slyke, D. A., & Greene, J. W. (1995). Long-term health outcomes in patients with recurrent abdominal pain. *Journal of Pediatric Psychology, 20*, 233-245.

Walker, L. S., & Greene, J. W. (1991). The functional disability inventory: Measuring a

neglected dimension of child health status. *Journal of Pediatric Psychology, 16*, 39-58.

Walker, L. S., Smith, C. A., Garber, J., & Claar, R. L. (2005). Testing a model of pain appraisal and coping in children with chronic abdominal pain. *Health Psychology, 24*, 364-374.

Williams, N. A., Davis, G., Hancock, M., & Phipps, S. (2010). Optimism and pessimism in children with cancer and healthy children: Confirmatory factor analysis of the youth life orientation test and relations with health-related quality of life. *Journal of Pediatric Psychology, 35(6)*, 672-682.

Wimberly, S. R., Carver, C. S., & Antoni, M. H. (2008). Effects of optimism, interpersonal relationships, and distress on psychosexual well-being among women with early stage breast cancer. *Psychology & Health, 23*, 57-72.

Yeung, E. W., Arewasikpron, A., & Zautra, A. J. (2012). Resilience and chronic pain. *Journal of Social and Clinical Psychology, 31(6)*, 593-617.

Youssef, N. N., Murphy, T. G., Langseder, A. L., & Rosh, J. R. (2006). Quality of life for children with functional abdominal pain: A comparison study of patients' and parents' perceptions. *Pediatrics, 117*, 54–59.

Zautra, A.J. (2003). Stress, emotions and health. New York: Oxford University Press.

APPENDICES

Appendix A. Background Information Form

Questions about your family

1. Your Relation to Child: ___Mother ___Father ___Grandparent

If other, describe: _____

2. Your Gender: ___Male ___Female

3. Your Age: ____

4. Your Ethnicity: ___Hispanic or Latino ___Not Hispanic or Latino

5. Your Race: ___American Indian or Alaska Native ___Asian ___Black or African American

___Native Hawaiian or Other Pacific Islander ___White

6. The highest education level you completed (Please write a number. For example, 8 = completed middle school, 10 = completed sophomore year of high school, 12 = graduated high school, 13 = completed freshman year of college, 16 = graduated college): _____

7. Please describe your occupation:

_____

8. Your Marital Status: ___Single ___Married/Partnered ___Separated ___Divorced ___Widowed

If other, please describe: _____

9. The highest education level your spouse/partner completed (Please write a number. For example, 10 = completed sophomore year of high school, 12 = graduated high school, 13 = completed freshman year of college, 16 = graduated college): _____

10. Please describe your spouse/partner's occupation:

_____

11. Please circle your approximate total family income per year:

a. Up to $10,000	f. $50,001 – 60,000
b. $10,001 – 20,000	g. $60,001 – 70,000
c. $20,001 – 30,000	h. $70,001 – 80,000
d. $30,001 – 40,000	i. $80,001 – 90,000
e. $40,001 – 50,000	j. $90,000 and above

12. Do you have a chronic medical condition (e.g., asthma, chronic pain, diabetes, etc.)? YES NO

If so, what kind(s) _____

13. Does your spouse/partner have a chronic medical condition? YES NO

If so, what kind(s) _____

14. Have you been diagnosed with a psychological disorder (i.e., anxiety, depression, etc.)? YES NO

If so, what _____

15. Has your spouse/partner been diagnosed with a psychological disorder? YES NO

If so, what _____

Questions about your child

16. Child's Gender: ___Male ___Female

17. Child's Age: ____ yrs. ____ mos.

18. Child's Ethnicity: ___Hispanic or Latino ___Not Hispanic or Latino

19. Child's Race: ___American Indian or Alaska Native ___Asian ___Black or African American ___Native Hawaiian or Other Pacific Islander ___White

20. How many other children live in the home? ___ What are their ages? _____

How many children in the home have chronic pain? _____ How many do not have chronic pain?_____

21. How many other adults live in the home? _____ What are their ages? _____

22. What type of chronic pain does your child have? _____

23. Does your child have a chronic illness or medical condition besides chronic pain? YES NO

    If so, what? _____

24. Has your child been diagnosed with a psychological disorder (i.e., anxiety, depression, etc.)?

    YES NO

    If so, what _____

25. What medication(s) is your child prescribed?

    _____

26. Who is responsible for making sure your child takes their medication (i.e., you, child)?

    _____

27. When was your child's last chronic pain related clinic visit? _____

28. When was your child's last chronic pain related hospitalization? _____

29. How many pain episodes does your child usually experience in one week?

    _____

30. What major complications has your child experienced related to chronic pain?

    _____

31. How many days of school has your child missed due to chronic pain in the past school year?

_____

32. How many days of work have you missed due to your child's chronic pain in the past year?

_____

33. Would you be willing to allow us to keep you and your child's contact information for follow-up or future research projects? YES NO

If YES, please provide your contact information below:

Your Name: _____ Phone #: _____

Address: _____

_____

Appendix B. Pain Intensity Visual Analog Scale (VAS)

No pain

Worst
Possible
Pain

Appendix C. Fear of Pain Questionnaire, child report (FOPQ-C)

FOPQ-Child Report

These questions ask about how you look at pain ***when you hurt or are in pain for a few hours or days.*** Please read each statement carefully. Circle the number that shows how much you agree or disagree with each statement.

	Strongly Disagree	**Disagree**	**Unsure**	**Agree**	**Strongly Agree**
1. My pain controls my life.	0	1	2	3	4
2. I begin shaking/trembling when doing an activity that increases pain.	0	1	2	3	4
3. I can't do all the things normal people do because it's so easy to hurt my body.	0	1	2	3	4
4. When I feel pain, I am afraid that some-thing terrible will happen.	0	1	2	3	4
5. Pain causes my heart to beat fast or race.	0	1	2	3	4
6. I cancel plans when I am in pain.	0	1	2	3	4
7. Feelings of pain are scary for me.	0	1	2	3	4
8. When I hurt I can't stop thinking about the pain.	0	1	2	3	4
9. I worry when I am in pain.	0	1	2	3	4
10. I cannot go back to school until my pain is treated.	0	1	2	3	4
11. I think that if my pain gets too bad, it will never get better.	0	1	2	3	4
12. I find it difficult to calm my body down when having pain.	0	1	2	3	4
13. I avoid making plans because of my pain.	0	1	2	3	4
14. I'm afraid that when the pain starts it's going to be really bad.	0	1	2	3	4

	Strongly Disagree	**Disagree**	**Unsure**	**Agree**	**Strongly Agree**
15. I walk around in constant fear of hurting.	0	1	2	3	4
16. I put things off because of my pain.	0	1	2	3	4
17. I go immediately to lie down or rest when I feel really bad pain.	0	1	2	3	4
18. I stop any activity if I start to hurt or my pain becomes worse.	0	1	2	3	4
19. I can't think straight when I feel pain.	0	1	2	3	4
20. I choose to miss things that are important to me so that I won't feel my pain.	0	1	2	3	4
21. I do not go to school because it makes my pain worse.	0	1	2	3	4
22. When I am in pain, I stay away from other people.	0	1	2	3	4
23. When I sense pain, I feel dizzy or lightheaded.	0	1	2	3	4
24. I do not think that I will ever be able to go back to a normal school schedule.	0	1	2	3	4

Appendix D. Youth Life Orientation Test (YLOT)

Instructions

Please answer the following questions about yourself by putting how true or not true each statement is for you. Please **COLOR IN** the oval that seems to describe you the best. There are no right or wrong answers. Just describe yourself as best as you can.

1.	It's easy for me to have fun.			
	3 true for me	2 sort of true for me	1 sort of not true for me	0 not true for me
2.	I like to be active.			
	3 true for me	2 sort of true for me	1 sort of not true for me	0 not true for me
3.	I'm always hopeful about my future.			
	3 true for me	2 sort of true for me	1 sort of not true for me	0 not true for me
4.	Things usually go wrong for me.			
	3 true for me	2 sort of true for me	1 sort of not true for me	0 not true for me
5.	When I am not sure what will happen next, I usually expect it to be something good.			
	3 true for me	2 sort of true for me	1 sort of not true for me	0 not true for me
6.	Usually, I don't expect things to go my way.			
	3 true for me	2 sort of true for me	1 sort of not true for me	0 not true for me
7.	Usually, I don't expect good things to happen to me.			
	3 true for me	2 sort of true for me	1 sort of not true for me	0 not true for me
8.	I am a lucky person.			
	3 true for me	2 sort of true for me	1 sort of not true for me	0 not true for me
9.	If something nice happens, chances are it won't be to me.			
	3 true for me	2 sort of true for me	1 sort of not true for me	0 not true for me

10. Each day I look forward to having a lot of fun.

3	2	1	0
true for me	sort of true for me	sort of not true for me	not true for me

11. When things are good, I expect something to go wrong.

3	2	1	0
true for me	sort of true for me	sort of not true for me	not true for me

12. I usually expect to have a good day.

3	2	1	0
true for me	sort of true for me	sort of not true for me	not true for me

13. No matter what I try, I do not believe anything is going to work.

3	2	1	0
true for me	sort of true for me	sort of not true for me	not true for me

14. Overall, I expect more good things to happen to me than bad things.

3	2	1	0
true for me	sort of true for me	sort of not true for me	not true for me

15. Each day I expect bad things to happen.

3	2	1	0
true for me	sort of true for me	sort of not true for me	not true for me

16. When things are bad, I expect them to get better.

3	2	1	0
true for me	sort of true for me	sort of not true for me	not true for me

17. Even when people around me are sick, I expect to be healthy.

3	2	1	0
true for me	sort of true for me	sort of not true for me	not true for me

18. If some illness is going around, I am sure to get it.

3	2	1	0
true for me	sort of true for me	sort of not true for me	not true for me

19. When I do not feel well, I expect that I will feel better soon.

3	2	1	0
true for me	sort of true for me	sort of not true for me	not true for me