

Parental Responses to Children's Chronic Pain:  
A Developmental Perspective on  
Parental Protectiveness, Minimization and Monitoring of Pain  
A thesis submitted by  
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In partial fulfillment of the requirements for the degree of  
Master of Arts  
in  
*Child Study and Human Development*

TUFTS UNIVERSITY

May 2015

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### Abstract

Parental responses to children's pain are related to how children and adolescents cope with and manage chronic pain. However, research is needed to fully understand pediatric chronic pain from a developmental perspective. This study examined the effect of age on parents' responses to children's pain in a sample of 1,509 pediatric chronic pain patients. Pain characteristics were examined as possible moderators of the relations between child characteristics and parental responses to children's pain. Age was related to parental encouragement and monitoring with parents of older children being less encouraging and monitoring. Pain characteristics did not moderate relations between child's age and parental responses to children's pain. Findings regarding other child demographics, family demographics, child pain characteristics, and child functional disability and emotional distress are also reviewed. Implications for future research and chronic pain management interventions are discussed.

### Acknowledgements

I would like to express my special appreciation and thanks to my advisor Dr. Ellen Pinderhughes for her guidance and support. Without her supervision and constant help, this Master's Thesis would not have been possible. I would also like to thank my committee members Dr. Deirdre Logan and Dr. Kerri Modry-Mandell for their valuable suggestions and encouragement throughout this process. I would like to thank my parents, grandparents, Farah El-Behadli and Ben Lopez for their endless love and support. Furthermore, I would like to thank Patricia Gansert for her invaluable assistance with data analysis. Thanks also to the staff, patients and families of the Pain Treatment Service at Boston Children's Hospital. Last but not least, thank you to the faculty and students of Tufts University's Eliot-Pearson Department of Child Study and Human Development for their constant support during the past two years.

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Parental Responses to Children's Chronic Pain:

A Child Development Perspective on

Parental Protectiveness, Minimization and Monitoring of Pain

Chronic pain is defined as pain that lasts for longer than six months (Cohen, Maclaren, & Lim, 2008). Chronic pain conditions are “illnesses where the cause of pain is dysfunctional pain signaling” triggered in the nervous system (Cohen et al., 2008). Additionally, chronic or recurrent pain can be a secondary complication of a specific illness such as cancer. The most common types of chronic pain conditions in children are headache, recurrent abdominal pain, and musculoskeletal pain (Cohen et al., 2008; Palermo, Eccleston, & Goldschneider, 2013). Chronic pain in children is common, with estimates indicating that 15% to 20% of children suffer from some type of chronic or recurrent pain during childhood (Cohen et al., 2008). It is extremely important to attend to pain in children because it relates to quality of life and functional status, including school attendance, sleep, family functioning, and children's mood (Cohen et al., 2008; Palermo, Eccleston, Lewandowski, de C. Williams, & Morley, 2010; Schwartz, Radcliffe, & Barakat, 2007).

Parental responses to children's pain are related to how children and adolescents cope with and manage chronic pain (Claar, Simons, & Logan, 2008). For example, research has shown that maladaptive parental responses may exacerbate pain-related functional disability in children with chronic pain (Achiam-Montal & Lipsitz, 2014; Claar, Guite, Kaczynski, & Logan, 2010). On the other hand, parental encouragement and monitoring responses have been associated with better adaptive outcomes for pediatric

chronic pain patients (Claar et al., 2008). However, there is a lack of research on these associations from a developmental perspective.

Research is needed to fully understand pediatric chronic pain from a developmental perspective, including knowledge of how child development processes affect parent's perception of and responses to children's pain (Palermo, Valrie, & Karlson, 2014). Understanding pediatric chronic pain from a developmental and family perspective not only is important from an empirical standpoint, but it will also serve to improve interventions for pediatric chronic pain patients and their families. Consequently, the goal of the proposed study is to examine parental responses to children's pain across children of different ages.

The literature review that follows provides the review of a conceptual framework developed by Palermo et al. (2014) for understanding pediatric chronic pain in the context of development and parent and family influences. For the purposes of this study, the discussion of this conceptual framework focuses on the developmental period of adolescence. Though a comprehensive analysis of developmental processes during adolescence is beyond the scope of this review, key milestones and goals of adolescents are highlighted in relation to the experience of chronic pain.

### **Children and Families with Chronic Pain**

The experience of pain in children involves a dynamic interaction among physiological, sensory, affective, behavioral, cognitive and sociocultural components within a developmental framework (Chiaretti et al., 2013; Palermo et al., 2013). Moreover, pediatric chronic pain not only affects the child, but also impacts the family as a whole. Research has shown that families with children and adolescents with chronic or

recurrent pain experience psychosocial consequences as a result of pain and the functional disability associated with it (Palermo et al., 2013). This is consistent with Family Systems Theory (Bowen, 1978), which proposes that the family is an emotional unit in which all members are interrelated and interdependent parts of a whole. The family system, and thus the nature of the parent-child relationship, impacts the experience of chronic pain. Consequently, the impact of pediatric chronic pain cannot be understood outside the context of the family or the parent-child relationship.

A review of the pediatric chronic pain literature conducted by Palermo et al. (2014) concluded that there is a lack of longitudinal data on family relations and adjustment processes to understand changes that might occur in parent-child relations over the course of the child's pain experience. Consequently, Palermo, Valrie, & Karlson (2014) developed a conceptual framework (See Figure 1) for understanding pediatric chronic pain in the context of development and parent and family influences. This conceptual framework integrates a systems perspective with ecological models, such as Bronfenbrenner's (1997), within a developmental context. The focus of the model developed by Palermo et al. (2014) is on the bidirectional influences of children's pain and disability and parental and family influences from a developmental perspective.

According to Palermo et al. (2014), the child's perception of and response to pain is shaped by the interaction of his/her physiology/biology, emotional state, behaviors, and functional disability. The developmental trajectory of a child – and thus the physiological, emotional and psychosocial changes that characterize the child's stage of development – impacts the interaction of these factors (Palermo et al., 2014). Additionally, parental factors (e.g., emotions, behaviors) and family variables (e.g., environment, family

functioning) shape the child's pain experience and development, which in turn, exert an influence on parental and family factors.

The model created by Palermo et al. (2014) serves to represent the dynamic and bidirectional nature of the interactions between parent factors (including parental responses to children's pain), family factors and developmental factors of the child (Palermo et al., 2014). The interaction between parent, family and the child's developmental factors shapes the child's perception and response to pain (Palermo et al., 2014). The development of this conceptual framework by Palermo et al. (2014), represents a step in the right direction in an effort to apply a developmental perspective to family and parent influences on children's experience of chronic pain. However, this conceptual model is fairly new and has yet to be applied to research concerning pediatric chronic pain. The application of this conceptual model, to frame research inquiries regarding pediatric chronic pain, would enhance the understanding of the experience of pain in children from a developmental and family systems perspective.

**Parental responses to children's pain.** Parental responses to the child's pain include cognitions, emotions and behaviors that serve to encourage the child's adaptive or maladaptive pain behavior (Logan, Simons, & Carpino, 2012; Lynn S. Walker & Zeman, 1992). Parental cognitive responses include those thoughts, whether positive or negative, related to the child's pain. Cognitive responses such as parental pain catastrophizing, which involves exaggerated and irrational thoughts related to negative pain appraisals, influence parental emotional responses to pain as well as pain-related child outcomes such as functional disability (Goubert, Eccleston, Vervoort, Jordan, &

Crombez, 2006). Parental responses to children's pain also include observable or behavioral responses, which are the focus of this paper.

The literature classifies parental behavioral responses to children's pain into three categories: (1) *Protectiveness*, which involves giving the child special attention and allowing the child to avoid normal activities and responsibilities; (2) *Minimization of pain*, which refers to responses that discount or criticize the child's pain; (3) *Encouraging and monitoring*, which involve reassuring the child to engage in activities, while regularly monitoring the child's pain (Claar et al., 2010; Claar et al., 2008; Lynn S. Walker & Zeman, 1992). Across the literature, parental responses to children's pain have been consistently measured using the Adult Responses to Children's Symptoms (ARCS) scale (Claar et al., 2010; Logan et al., 2012)

Social learning theory (Bandura, 1977; Craig, 1982), in the context of chronic and recurrent pain, can provide a theoretical framework for understanding how parental responses to pain influence pain-related outcomes in children. Parental responses to pain, such as increased attention or support, can act as social rewards for certain illness behaviors or pain responses (Claar et al., 2008; Palermo et al., 2014; Lynn S. Walker & Zeman, 1992). Children who portray such behaviors, and consequently elicit social rewards from their parents, learn to maintain and strengthen the rewarded behaviors.

Walker and Zeman (1992) conducted one of the earliest studies that looked at parental protective responses to children's pain and termed these responses as illness behavior encouragement. These researchers suggest that parental responses that might serve to encourage illness behavior serve as social reinforcement of pain behaviors (e.g. allowing a child to avoid regular activities due to pain). It is understandable that a parent

may occasionally grant a child special attention or permission to avoid a certain activity due to pain. However, when pain is chronic or recurrent, and these types of parental responses become the norm, the parent is at risk of encouraging illness behavior in the child.

A recent study by Achiam-Montal and Lipsitz (2014), of parental responses to children's non-cardiac chest pain, determined that parental protective and encouraging/monitoring responses moderate the relationship between child's pain intensity and frequency and pain-related functional disability. Children ages 8-18 years presenting with non-cardiac chest pain and their parents completed self-reported measures assessing pain rating, child functioning and parental responses (Achiam-Montal & Lipsitz, 2014). Results showed that pain severity was positively associated with child functional disability (Achiam-Montal & Lipsitz, 2014). However, this association was moderated by parental responses, with the association being stronger for children whose parents scored high in protectiveness as measured by the ARCS (Achiam-Montal & Lipsitz, 2014).

Findings across the literature highlight the importance of understanding and assessing parental and family factors to better comprehend the association between chronic pain and functional disability in children and adolescents. The reviewed studies suggest that parental responses to pain can impact pain-related outcomes, such as functional disability, in children with chronic pain. However, it is unclear how children's developmental factors may play a role in the association between parent behavior and pain-related child outcomes.

**Chronic pain within a child development context.** For children with chronic illnesses, such as chronic or recurrent pain, specific developmental stages have particular implications for balancing psychosocial developmental needs and disease management (Wood, 1995). Chronic pain presents an added challenge during adolescence since pain and pain-related disability tend to peak during these period of development (Roth-Isigkeit, Thyen, Stoven, Schwarzenberger, & Schmucker, 2005). For adolescents with chronic pain, physical, cognitive, emotional and social changes experienced during their teenage years might be associated with increased pain during this developmental period (Palermo et al., 2014).

***Psychosocial Considerations.*** According to Erikson's theory of personality development, an individual's personality is shaped by the way he or she deals with a series of psychosocial crises (Erikson, 1985). A psychosocial crisis is a developmental obstacle that occurs when a psychological need conflicts with societal pressures or demands (Erikson, 1985). A developmental goal that characterizes preadolescence involves achieving autonomy from parents emotionally and intellectually (Palermo et al., 2014). According to Erikson's theory of psychosocial development, children and preadolescents between the ages of 7-12 years, are dealing with the fourth psychosocial crisis – industry vs. inferiority (Erikson, 1985). During this stage of psychosocial development, children start to develop a sense of competence and to acquire knowledge and skills to be a productive individuals (Erikson, 1985). For a child with chronic pain, achieving autonomy and industry involves, in part, transitioning towards self-management of his or her pain. Additionally, during this developmental stage, most individuals begin to make sustained personal commitments. As children with chronic

pain enter adolescence, commitments can take the form of behaviors related to illness self-management, thus self-management of chronic pain becomes an important developmental goal (Palermo et al., 2014; Wood, 1995). Adolescents with chronic pain who lack autonomy and illness self-management might be at increased risk of pain-related functional disability.

An individual's fifth psychosocial crisis, which occurs during adolescence (ages 13-19), revolves around establishing an identity vs. identity confusion. During this stage, the adolescent is challenged by defining his or her identity and role in society. For adolescents with chronic pain, there is the added challenge of defining their identity as a person apart from the illness. The family, as well as other systems in which the child exists (e.g., school, peer group and health care system), should help the child develop his or her identity apart from the illness (Wood, 1995). In particular, parents can promote healthy identity formation in their child by providing nurture while establishing limits, as well as encouraging the adolescent to function as "normally" as possible despite the chronic pain (Wood, 1995). Since parents play a major role in a child's development, it is important to examine the relationship between parental responses to pain in children with chronic pain.

***Cognitive Considerations.*** In addition to the psychosocial factors that affect a child's experience of pain, there are cognitive factors that evolve with development and may impact the way children understand pain. Piaget (1929) highlighted developmental differences in children in regards to cognition. Health psychology research with children of different ages presenting a variety of acute and chronic illnesses has shown that age is significantly related to children's understanding of the specific illness (Kato, Lyon, &



Rasco, 1998; Myant & Williams, 2005; Perrin & Gerrity, 1981). According to Piaget's theory of cognitive development, children's intellect develops in a series of four stages (Piaget, 1929). By the time children reach preadolescence, they are in the "concrete operational" stage (ages 7-12), during which children begin to use logic thought related to physical or concrete objects and to understand more than one concrete dimension of a situation (Perrin & Gerrity, 1981; Piaget, 1929). In relation to illness, a child in the concrete operational stage can differentiate illness phenomena as internal or external to him or herself, but still remains more focused on external events (Perrin & Gerrity, 1981). Around the age of 12, children start to develop "formal operational" thinking and are able to think abstractly about a situation (Perrin & Gerrity, 1981; Piaget, 1929). During this last stage, children have the ability to think hypothetically about an illness, and understand a disease in terms of internal factors that can manifest themselves as external symptoms when out of balance (Perrin & Gerrity, 1981). It is during the "formal operational" stage that children begin to understand the concept of illness prevention (Perrin & Gerrity, 1981). Formal operational thinking continues to become more sophisticated through late adolescence and young adulthood. Children with chronic pain likely vary in their understanding of the experience of pain and pain-related adaptive or maladaptive behaviors depending on their age, with their understanding becoming more sophisticated with development.

***Coping Considerations.*** Recent research with pediatric chronic pain patients suggests that children and adolescents differ in the strategies they access to cope with their pain. For example, Hechler et al. (2010) evaluated treatment outcomes for children and adolescents with disabling chronic pain who attended a multimodal inpatient pain

treatment. Thirty-three children (7-10 years) and 167 adolescents (11-18 years) completed the treatment. At admission, children and adolescents presented similar pain characteristics (i.e., high pain intensity and long pain duration) and pain-related school outcomes (i.e., more than 50% absent from school). However, adolescents reported higher pain-related disability and passive pain coping, while children relied more on others while in pain (Hechler et al., 2010). This difference suggests that age and/or other developmental factors might play a role in children and adolescent's pain coping strategies. In turn, age-related differences in coping may elicit different pain-related responses from parents. As mentioned before, no research has examined differences in parental responses to pain in relation to children's age. Variables that may impact the experience of pain in children, and thus parental responses to pain, might be related not only to age but also to child (i.e., sex/gender and race/ethnicity), family (i.e., socioeconomic status), and pain characteristics (i.e., diagnosis and duration), as well as psycho-emotional factors (i.e., children's emotional distress) that play a role in the experience of pain.

### **Child & Family Demographic Disparities in Pediatric Pain**

**Sex and gender.** The terms sex and gender are differentiated in the literature with the former referring to biological aspects and the latter to socially and culturally constructed roles attributed to men and women (Owen Blakemore, Berenbaum, & Liben, 2009) Empirical findings reporting sex and gender differences in the experience of pain are inconsistent. A trend in the findings of studies suggests that gender roles encourage different expressions of pain in both children and adults. The feminine gender role encourages the overt expression of pain whereas the masculine gender role encourages

stoicism in response to pain (Unruh, 1996; LeResche, & Von Korff, 1999; Robinson et al., 2001). For example, women have been shown to catastrophize about pain more than men (Edwards, Haythornthwaite, Sullivan, & Fillingim, 2004; Jensen, Nygren, Gamberale, Goldie, & Westerholm, 1994; Keefe et al., 2000).

In regards to sex differences, research has begun to consider the contributions of biological factors, in particular sex hormones, and their role in men's and women's responses to pain. Research involving experimental pain has identified certain sex hormones, specifically progesterone, testosterone and estradiol, as particularly important. The impact of these hormones on pain responses can be seen during biological cycles such as the menstrual cycle in girls (Unruh, 1996). Unruh and Campbell (1999) reviewed a number of studies regarding gender variation in children's pain experience. The authors concluded that cultural and social mechanisms that shape gender role expectations regarding pain begin early in childhood. After these gender roles have been assimilated, it is in puberty that biological factors give onset to physiological mechanisms that contribute to sex differences in pain (Unruh and Campbell, 1999).

Studies with pediatric and adult populations with pain have shown that there are gender differences in pain-related coping strategies. Like women, girls between the ages of 8 and 18 years use more social support to cope with pain compared to boys (Keogh and Eccleston, 2006; Lynch, Kashikar-Zuck, Goldschneider, & Jones, 2007). Boys of similar age employ more behavioral coping strategies, such as engaging in enjoyable activities to take their mind off the pain (Lynch et al., 2007). The need for social support might elicit more protective responses from parents of girls with chronic pain. On the

contrary, fewer overt expressions of pain from boys might lead parents to encourage boys to engage in activities that serve as behavioral distraction from the pain.

Findings regarding the prevalence of pediatric chronic pain in relation to gender vary across the literature. A study conducted with a sample of children (ages 8-17) with a pain diagnosis of Inflammatory Bowel Disease reported a fairly even distribution of gender with 47% of the participants being female and 53% male (Langer, Romano, Mancl, & Levy, 2014). However, studies conducted in tertiary care clinical settings with children ages 8-17 years presenting a variety of pain diagnoses (e.g., Complex Regional Pain Syndrome, musculoskeletal pain, chronic abdominal pain, headache, back/neck pain) reported that the clinical population of pediatric chronic pain patients is predominantly female, with estimates of approximately 85% of patients being girls (Levy et al., 2010; Logan et al., 2012; Sieberg, Williams, & Simons, 2011).

The higher prevalence of chronic pain in females compared to males is not well understood. A plausible explanation is that boys might be socialized to display tougher ways of coping and thus provide fewer verbal and behavioral responses to pain, decreasing the likelihood of receiving treatment for chronic pain in a clinical setting. Similarly, there might be gender discrepancies in who seeks treatment for chronic pain. Discrepancies in the prevalence of chronic pain among boys and girls across the literature might also be related to different representations of males and females across different pain diagnosis.

Few studies have examined the impact of child gender on parental responses to pain. Logan et al. (2012) found no gender differences in parental protectiveness in a study examining parental influences on school functioning among children ages 8-17 with

chronic pain. In their study assessing the moderating effect of parental responses to pain on the relationship between child's pain severity and functional disability, Achiam-Montal and Lipsitz (2014) noted no differences in parental responses based on child gender. The dearth of studies in this area suggests a lack of understanding about the possible impact of child gender on parental responses to pain. When gender has been examined, it is often in regards to the parents' gender. Overall, the inconsistent findings regarding chronic pain in children warrant attention and suggest that gender differences in the experience of pain are not yet fully understood.

**Race and ethnicity.** Pain and culture are complex phenomena involving several factors, mainly biological, psychological and social, impacting children and families. Due to the theoretical and methodological difficulties of examining constructs such as culture and ethnicity, research regarding culture and pain in children are inconclusive (Edwards, Fillingim, & Keefe, 2001; Green et al., 2003). The concepts of culture, race and ethnicity are often misused or employed interchangeably (Kagawa-Singer, 2001). Kagawa-Singer (2001, p. 228) defined culture as “the collection of malleable, adaptive strategies that groups of people have developed to survive in their ecological niche”. In regards to race, Kagawa-Singer (2001) suggests that it is an ideological construct, and thus not a scientific category, resulting from colonialism, inequality, and hierarchical constructions imposed by dominant groups. Finally, ethnicity encompasses differences related to history, ancestry, nationality, culture, language, religion, and beliefs (Kagawa-Singer, 2001).

When thinking about pediatric populations, we must take into consideration that population growth projections suggest the increasing need for culturally sensitive

interventions for children. Currently, ethnic minorities account for 44% of children in the United States (Tucker, 2002). Additionally, according to the U.S. Census (2008), minority children are expected to account for 50% of children in 2023, and 62% in 2050. In order to create more effective interventions, we must identify unique aspects of pediatric pain experiences among ethnically and socioeconomically diverse populations, and include culturally sensitive components into the design and implementation of chronic pain interventions for children.

A systematic review of studies conducted by Kristjánsdóttir et al. (2012) analyzed pain-related outcomes in children from different cultural groups and concluded that cultural factors may be related to certain aspects of children's pain experience. Among the main findings, the authors reported that no significant differences have been found in children's self-reported pain intensity when using self-reported measurement tools such as the Wong-Baker FACES Pain Rating Scale (Bohannon, 1995; Jimenez, Seidel, Martin, Rivara, & Lynn, 2010; Wong, 1996). In fact, self-report is considered the gold standard for assessment of pain in children (Cohen et al., 2008; Kristjánsdóttir et al., 2012).

Even though cross-cultural differences were not found in children's self-reported pain intensity, significant differences were found across cultures in other pediatric pain-related outcomes. For example, it has been shown that African American children provide fewer verbal responses when reporting pain than do European American children (Neuman, 1996). African American children might be socialized to display tougher ways of coping because they live in a predominantly white society, and thus provide fewer verbal responses to pain (Kristjánsdóttir et al., 2012). Additionally, significant cultural differences have been reported regarding pain behavior in children. For example,

Caucasian American children display more pain-related behavioral responses compared to children of ethnic minorities (Boonen & Petry, 2012; van Aken, van Lieshout, Katz, & Heezen, 1989). Caucasian American children might be encouraged to be more expressive, whereas ethnic minorities might value stoicism when related to pain experience. Finally, a study by McCarty et al. (1999) comparing coping strategies of children living in Thailand and children living in the U.S. showed cultural differences in coping strategies used by children. In particular, Thai children relied significantly more on covert coping methods such as thinking about their favorite things when in distress. On the contrary, American children used more overt or explicit coping strategies such as screaming. Cultural differences in children's expression of pain might elicit different parental responses to pain.

In addition to cultural differences seen in children's experience of pain, Kristjánsdóttir et al. (2012) reviewed cultural differences in parental experience of children's pain. For example, Hispanic parents have shown to express higher levels of anxiety regarding their child's pain-related medical procedure compared to Anglo parents (Pfefferbaum, Adams, & Aceves, 1990). Additionally, it has been shown that nonimmigrant parents significantly differ in their stress coping mechanisms compared to immigrant parents (Jimenez et al., 2010). Similarly, nonimmigrant and immigrant parents differ in the type of care they access for the treatment of their child's pain (Jimenez et al., 2010). For example, immigrant parents are more likely to utilize complementary or alternative medicine such as acupuncture, or other culturally relevant treatments, for their child's pain management. Finally, a study conducted by Batista et al. (2012) found that Spanish-speaking parents endorse misconceptions about their children's expression of

pain to a greater degree than English-speaking parents. Findings regarding cross-cultural differences in parental experience of children's pain are important because they present differences that might influence parental ability to detect pain and might determine preferred responses to pain and treatment methods.

Cultural differences have also been reported in relation to health professionals' management of children's pain. Jimenez et al. (2010) found significant differences in opioid administration between Spanish-speaking Latino and English-speaking Caucasian children. Latino children received 30% lower doses of pharmacological analgesics than Caucasian children regardless of their pain scores (Jimenez et al., 2010). Moreover, a study conducted by Hostetler, Auinger, and Szilagyi (2002) found that children, African Americans, and individuals covered by Medicaid insurance are at a significantly higher risk of receiving fewer analgesics and sedatives compared to adults, Caucasians, and those covered by private insurance. Thus, minority children covered by Medicaid might be at a greater risk for undertreatment of pain compared to white children covered by private insurance. Overall, cross-cultural findings regarding children and chronic pain reinforce the need to account for potential cultural differences in research as well as provide culturally sensitive interventions for pediatric pain patients and their families.

**Family socioeconomic status.** Since the family constitutes an important social context that shapes children's pain, it is important to acknowledge the possible impact of family factors such as socioeconomic status (SES) on parents and children's experience of pain. The management of chronic pain places a financial burden on families dealing with pediatric chronic pain. Family SES can determine the resources and access to care that parents and children have in regards to pain management. Additionally, low SES can



pose significant stress on a family and thus might shape the way parents cope with and respond to children's health issues.

Grøholt, Stigum, Nordhagen, and Köhler (2003) found a slight difference in the prevalence of pain among families of different SES. The authors examined parent-reported child pain in 6,230 Nordic families of children ages 7-17 years. Pain reports among children were provided by either the biological mother or father of the child. Findings suggest that children from low-educated, low-income families report higher pain (Grøholt et al., 2003). Specifically, children from these families had a 1.4-fold odds of having headaches, abdominal pain, or back pain (Grøholt et al., 2003). Additionally, parent reports from the lowest income group suggested that the prevalence of headaches and abdominal pain are 30% and 86% respectively higher in this SES group compared to the highest income group.

A review of the chronic pain literature did not identify any studies specifically examining family SES and its impact on parental responses to children's pain. A reason for the lack of research in this area might be that the majority of studies conducted with clinical pediatric populations with chronic pain have samples with middle or relatively high SES and occupational status of families (e.g., (Achiam-Montal & Lipsitz, 2014; Claar et al., 2008; Logan et al., 2012)). However, a study by Lynn S Walker, Levy, and Whitehead (2006) assessing the validity of the Protect Scale of the ARCS questionnaire in a sample of mothers of children with abdominal pain did find that highly protective mothers tended to be of minority ethnicity, younger and less educated than mothers who scored low in protectiveness. Although these findings are not generalizable, it is

important to note that ethnic minority status and low education have traditionally been correlated with lower SES in the literature (Bradley & Corwyn, 2002).

### **Epidemiology of Pediatric Chronic Pain**

**Variations in pain diagnosis and duration.** The experience of pain during childhood and adolescence is a relatively common experience. As already mentioned, pain lasting longer than 6 months is considered to be chronic (Cohen et al., 2008). A study assessing pain in a community-sample of 5,424 Dutch children and adolescents, between the ages of 0 and 18 years, reports that the prevalence of chronic pain increases with age and is significantly higher for girls (Perquin et al., 2000). Overall, 25% of the sample reported chronic pain (Perquin et al., 2000). It is important to note that these authors conceptualized chronic pain as recurrent or continuous pain for more than 3 months. Headache, abdominal pain and limb pain constituted the most commonly reported pain complaints (Perquin et al., 2000). Half of the respondents with pain complaints reported experiencing multiple pains (Perqui et al., 2000). In particular, girls between the ages of 12 and 14 years reported a marked increase in pain complaints as well as experiencing pain in multiple sites (Perquin et al., 2000).

The co-occurrence of pain in multiple sites has been recognized in a number of studies. A study conducted by Ostkirchen and colleagues (2006) examined the prevalence of headache and functional abdominal pain in a sample of 555 German preschool children (ages 5-7; 54% boys and 46% girls) and their parents. Data regarding pain symptoms, health-related quality of life, and socio-demographic variables were collected. Forty-nine percent of children self-reported experiencing both headache and abdominal pains (Ostkirchen et al., 2006). Parents reported combined pain for 46% of the children.

Findings suggest that having multiple pain complaints might be related with increased pain. Specifically, children with comorbid headache and abdominal pain reported higher intensities for abdominal pain than children with isolated complaints of abdominal pain (Ostkirchen et al., 2006). Similarly, a study examining multiple recurrent pains in American sample of 20,745 children and adolescents ages 11-18 years found that over 33% of respondents reported multiple pain symptoms (Rhee et al., 2004). As previously reported in other studies, girls were more likely to report multiple pain symptoms than boys (Rhee et al., 2004).

Different pain diagnoses and durations in children, as well as the experience of coexisting pain complaints, can take a significant toll on children and parents. The challenge that comes with managing different pain complaints, and in cases multiple pain complaints, may impact the way parents respond to a child's pain.

### **Psycho-Social Dimensions of Pain**

Child and parent pain-related thoughts and feelings play a role in the development and maintenance of chronic pain in childhood. Empirical evidence suggests that when children and parents perceive pain as highly threatening, they have fearful reactions to pain and avoid activity, putting children at risk for increased disability (Goubert and Simons, 2013). Pain-related functional disability involves a physical and/or psychosocial impairment that limits the ability of an individual to take care of him or herself and live independently in a community (Walker & Greene, 1991). For children with chronic pain, functional disability involves the impact of the illness on the child's daily functioning, as well as the degree to which the pain poses a caretaking burden for the family (Walker & Greene, 1991). Specifically, a parent's catastrophic thinking about child pain, mediated

by parental protective responses, is related to higher levels of child pain-related disability (Goubert et al., 2006).

Most of the research on pain-specific cognitive processes focuses on the role of catastrophizing in children and parents. Few studies have examined other aspects of emotional distress, such as anxiety and depression, in pediatric pain patients in relation to parental responses to pain (e.g., (Peterson & Palermo, 2004), (Claar et al., 2008)). However, findings indicate that child anxiety and depression may elicit and exacerbate the impact of parental maladaptive responses to child pain. For example, Claar et al. (2008) studied the moderating impact of children's emotional distress, in particular anxiety and depression, on the relation between the three types of parental responses (i.e., protectiveness, minimization of pain, and encouraging and monitoring) and child functional disability scores and somatic pain symptoms. Participants included 327 pediatric chronic pain patients ages 8-17 years. (Claar & Walker, 2006; Kovacs, 1981; Reynolds & Richmond, 1978) Results showed that for children with higher levels of emotional distress, parental protectiveness and parental minimization of pain were associated with higher functional disability scores. Claar et al. (2008) suggest that anxious or depressed children might have fewer resources to cope with their pain, making them more vulnerable to maladaptive parental responses such as protectiveness and minimization of pain.

A similar study conducted by (Peterson & Palermo, 2004) examined how children's anxiety and depressive symptoms moderated the relation between parental protective responses to children's pain and child pain-related functional disability. The study sample included 215 children and adolescents between the ages of 8 and 16 years.

Participants presented chronic pain diagnoses of headaches, juvenile idiopathic arthritis, or sickle cell disease. The authors reported that for children exhibiting greater anxiety and depression symptoms, parental protective responses were associated with higher levels of child functional disability (Peterson & Palermo, 2004). This finding was significant even after controlling for children's pain intensity (Peterson & Palermo, 2004). It is important to note that anxiety and depression symptoms may vary depending on the type of pain the child is experiencing. For example, Peterson and Palermo (2004) found that children with chronic headaches reported more depressive symptoms compared to children with juvenile idiopathic arthritis or sickle cells disease.

Findings by Peterson and Palermo (2004) and Claar et al. (2008) suggested that higher levels of emotional distress in children may be related to specific parental responses, in particular solicitous responses. Additionally children's emotional distress seems to exacerbate the maladaptive effect of parental protectiveness in response to child pain. A limitation of these studies, also seen in other studies regarding parental responses to children's pain, is the lack of a developmentally appropriate analysis that takes into consideration the child's age and/or developmental goals.

### **Gap in the Literature**

Empirical evidence suggests that interventions aimed at changing parental responses to child pain can be successful (Levy et al., 2010). However, as shown by the previous review of the literature, current data provide limited information to determine the effectiveness of different types of parental responses at different developmental stages of the child. Additionally, inconsistent findings regarding gender and cultural differences in parental responses to children's pain make it difficult to understand pain

from a family systems perspective. Without this information, it is difficult to tailor interventions to the developmental level of the child and the family context. The lack of research examining parental responses to pain depending on family factors and on the age and/or developmental stage of the child represents a gap in the literature that should be addressed.

### **The Proposed Study**

The proposed study will examine differences in parental responses to pain due to children's age. Specifically, I am interested in three types of behavioral parental responses to pain (i.e., protectiveness, minimization of pain, and encouragement and response monitoring). In addition, I will examine how different child and family demographics, child pain characteristics, and children's emotional distress may relate to parental responses to children's pain. More specifically, child demographics will include age, gender and race. Family demographics will include parental marital status and family socioeconomic status. Pain characteristics will include pain diagnosis and pain duration. Finally, factors related to children's disability and emotional distress will include children's functional disability, anxiety and depression.

### **Research Questions and Hypotheses**

Based on the theoretical and empirical literature described, the following research questions are formulated. Where guided by the extant literature, hypotheses are offered.

1. How do child and family demographics, child pain characteristics and child emotional distress relate to parental responses to children's pain?

**Child demographics.** I hypothesize that child gender will be significantly related to parental protectiveness with parents of girls having higher protectiveness

scores. Similarly, I hypothesize that child age will be significantly related to parental protectiveness with parents of younger children having higher protectiveness scores. There are no predictions about relations between other child characteristics and parental minimization and encouraging/monitoring responses to pain because there is not enough support in the literature to develop hypotheses.

**Family demographics.** Higher SES and married parents will likely have more resources to respond to pain in an adaptive way. Thus, I hypothesize that higher SES and married marital status will be significantly related to parental encouraging and monitoring of pain. There are no predictions about relations between other family characteristics and parental protectiveness and minimization responses to pain because there is not enough evidence in the extant literature to guide the hypotheses.

**Child pain characteristics.** There are no hypotheses driving the analyses; analyses will be exploratory.

**Children's emotional distress.** There are no hypotheses driving the analyses; analyses will be exploratory.

2. How are the relations between child's characteristics (i.e., age, gender, race, functional disability, emotional distress) and parental responses to pain moderated by pain characteristics?

- 2a. Do parental responses to pain vary due to children's age?

- There are no hypotheses driving the analyses; analyses will be exploratory.

2b. Do parental responses to pain vary due to children's gender?

There are no hypotheses driving the analyses; analyses will be exploratory.

2c. Do parental responses to pain vary due to children's race?

There are no hypotheses driving the analyses; analyses will be exploratory.

2d. Do parental responses to pain vary due to children's disability and emotional distress?

There are no hypotheses driving the analyses; analyses will be exploratory.

### **Contributions to the Field**

Understanding the effect of developmental factors on children's experience of chronic pain may facilitate an explanation of how parental responses might affect pain-related outcomes. Findings from this research have the potential not only to inform clinical interventions but also to improve the understanding of pain related outcomes in other domains of children's lives such as school functioning. For example, a study by Logan et al. (2012) showed that parental catastrophizing and protective behaviors independently predicted school outcomes, including school absence rates and school functioning scores, even after controlling for the impact of pain and child depression scores. Understanding the potential impact of the child's age or developmental level on the association between parental responses and pain-related school outcomes can help professionals better design school reentry interventions for pediatric pain patients.



Overall, interventions directed at children with chronic pain and their parents warrant an analysis of their efficacy from a developmental perspective. Tailoring interventions in order to take into account the influence of children's age would further benefit children with chronic pain and their parents. Developmental factors and age might interact with children's resources to cope with pain when faced with different types of parental responses. Further research is warranted to better understand developmental factors that affect children's experience of pain and pain-related functional disability.

## **Methods**

### **Participants**

**Eligibility criteria.** Patients between the ages of 8 and 17 years who underwent a multidisciplinary pain evaluation at the Pain Treatment Service at Boston Children's Hospital were eligible to be included in the proposed study. Patients were excluded if their reported pain duration was less than three months. This cutoff point was determined based on commonly used definitions of chronic pain in the literature that regard 3 months as the minimum amount of duration necessary to categorize a pain complaint as chronic.

**Study sample.** The data used in this study were part of standard clinical assessment data collected at Boston Children's Hospital's Pain Treatment Service. The sample consisted of 1,509 pediatric patients, along with their accompanying parent, who had received care at a tertiary pain clinical in a large, urban northeast pediatric hospital. The mean age for patients was 13.91 years ( $SD = 2.38$ ). Children and adolescents were primarily White (90.2%), and female (76.5%). Other races represented among this sample were Black (2.4%), Hispanic or Latino (3.3%), Asian (1.1%), and Multiracial (2.2%). This sample was consistent with the population of pediatric patients with chronic

pain seen in this tertiary care clinic setting (Logan et al., 2012; Simons, Sieberg, Carpino, Logan, & Berde, 2011).

Accompanying parents who completed the questionnaire were primarily mothers (90.8%) and married (71.8%). Family socioeconomic status, calculated using a 4-factor index of social status (Hollingshead, 1975), ranged from 15 (unskilled laborers; menial service workers) to 66 (business owner; professional), with a mean of 48.45 (medium business owner; minor professional; technical;  $SD = 11.17$ ).

### **Materials**

Data for constructs came from self-reported questionnaires completed by children and parents prior to multidisciplinary pain evaluations. The parent and child measures selected for this study have been consistently used in studies throughout the literature regarding pediatric pain patients and their parents. The measures were carefully selected to assess the constructs of interest in this clinical population. All selected scales have been validated in children and adolescents of different ages, thus allowing for an analysis of data from a developmental perspective.

**Demographic questionnaire.** A demographic questionnaire was used to collect information about parents' occupations, education and marital status; child's race, ethnicity, age and gender; child's primary pain diagnosis and pain duration, among other information (See Appendix A). Note that family socioeconomic status was calculated using a 4-factor index of social status taking into consideration parental education and occupation (Hollingshead, 1975).

**Parent – Adult Responses to Children's Symptoms.** Parent responses to children's pain were assessed using the Adult Responses to Children's Symptoms scale

(Van Slyke & Walker, 2006) (See Appendix B). This measure is divided into three subscales: parent protectiveness, minimization of pain, and encouraging and monitoring. For all subscales, responses are rated on a 5-point scale ranging from never (0) to always (4), and subscale scores are calculated by using the mean ratings for items on each subscale. Higher scores indicate more frequent use of a specific type of parental response. The question stem for each item is, "When your child has pain, how often do you...?". Protective parental behavior involves giving the child special attention and allowing the child to avoid normal activities and responsibilities. Items in the protective scale include: "let your child stay home from school". Minimization of pain refers to parental responses that discount or criticize the child's pain. Examples include: "express irritation or frustration with your child". Parental responses related to encouraging and monitoring of pain involve reassuring the child to engage in activities, while regularly monitoring the child's pain. Items in this subscale include: "try to involve your child in some activity". For all three scales, internal consistency was adequate and Pearson correlation coefficients between the scales suggest that they are relatively independent (Van Slyke & Walker, 2006). The Adult Responses to Children's Symptoms scale has been validated in parents of children ages 8-18 (Van Slyke & Walker, 2006). Alpha reliabilities in this sample were .82, .74, and 0.78, for Protectiveness, Minimization and Encouraging & Monitoring, respectively.

**Children's disability and emotional distress.** Children's pain-related disability was measured using the Child – Functional Disability Inventory (FDI). Children's emotional distress was assessed using the Physiological Anxiety subscale of the Revised

Children's Manifest Anxiety Scale (RCMAS), to measure anxiety, and the Children's Depression Inventory, 2<sup>nd</sup> Ed. (CDI-2), to measure depression.

***Functional Disability Inventory.*** Children's self-reported difficulty in physical and psychosocial functioning due to pain was assessed using the Functional Disability Inventory (Claar & Walker, 2006) (See Appendix C). This measure presents 15 items related to perceptions of activity limitations during the past two weeks. Sample items include "doing chores at home" and "being up all day without a nap". Response options range from Never to Always. Total score is calculated by summing the items; higher scores indicate greater disability. The Functional Disability Inventory has demonstrated validity and reliability in children and adolescents ages 8-17 (Claar & Walker, 2006). Alpha reliability in this sample was .90.

***Revised Children's Manifest Anxiety Scale.*** The Revised Children's Manifest Anxiety Scale (RCMAS), a 37-item self-report questionnaire, was used to assess the presence or absence (i.e., yes/no) symptoms of anxiety in children (Reynolds & Richmond, 1978, 1985)(See Appendix D). Total anxiety scores are calculated by summing all items with the exclusion of the lie scale. Higher scores represent higher levels of anxiety. The RCMAS has been shown to be a valid and reliable measure of anxiety for children ages 7-17 (Reynolds & Richmond, 1978, 1985). For the purpose of this study, only the physiological anxiety subscale was used. Alpha reliability in this sample was .85.

***Children's Depression Inventory (2<sup>nd</sup> Ed.)*** The Children's Depression Inventory, 2<sup>nd</sup> Ed. (CDI-2) is a 27-item self-report questionnaire that was used to assess depressive symptoms in children (Kovacs, 1981)(See Appendix E). Items are rated on a 3-point

scale and summed to yield a total depression score. Higher levels of depression are indicated by higher scores on the CDI. The CDI is a well-validated and reliable measure of depression for children between 7 and 17 years of age (Saylor, Finch, Spirito, & Bennett, 1984). The alpha coefficient for this sample was .91.

### **Procedure**

Consent and minor assent forms, as well as measures were administered as part of standard clinical assessment and were mailed to families prior to the child's multidisciplinary pain evaluation. All patients, along with their accompanying parent, were asked to complete the measures independently and to return them on the day of their appointment (Simons et al., 2011). If parents or children had not completed these questionnaires upon arrival at the clinic, they were asked to do so before the start of their appointment. Eligible families were approached by a research assistant at the clinic prior to their evaluation. Consent and assent were obtained from parents and minors respectively for the use of the data from the clinical assessment measures (Logan et al., 2012). IRB approval was obtained from Boston Children's Hospital.

### **Data Analysis Plan**

This study had a cross-sectional design. Prior to performing the primary and secondary analyses, sample demographic information, as well as descriptive statistics and bivariate correlations, were computed for child and family variables, pain characteristics, disability and emotional distress variables and parental responses to pain. Analyses of variance and follow-up pairwise comparisons were conducted to assess for differences between race/ethnic and pain diagnosis groups and parental responses to pain. Paired *t* tests were used to examine differences between participants who had an Individualized

Education Plan (IEP) or a 504 Plan and those who did not report receiving specialized instruction or accommodations at school. Similarly, paired *t* tests were used to examine differences between participants who were held back in school and those who had not reported grade retention. Due to this large number of tests, alpha was controlled using a Bonferroni correction starting with a nominal alpha of .10; the nominal alpha of .10 was chosen to counteract the overly conservative nature of the Bonferroni correction.

To answer primary and secondary questions, separate regression models were computed for each parental response. Before performing these analyses, tests were run to check that assumptions for regression were met. All variables behaved appropriately and no problems were found. For each research question, the performed analysis follows.

1. How do child and family demographics, child pain characteristics and child emotional distress relate to parental responses to children's pain?

To assess the relation between child (i.e., age, gender) and family (i.e., marital status) demographics, child pain characteristics (i.e., intensity, duration) and child functional disability and emotional distress (i.e., anxiety, depression) to parental responses to children's pain, a multiple regression model was computed with Mplus (Muthen & Muthen, 2008). The following variables were excluded from the model due to elevated missingness and low covariance coverage: SES and pain diagnosis. For the final model, maximum likelihood analysis was used to provide unbiased estimates in the presence of missing data. Three multiple regression models, one for each outcome variable (i.e., protectiveness, minimization of pain, encouraging and monitoring) were performed.

2. How are the relations between child's characteristics (i.e., age, gender, race, functional disability, emotional distress) and parental responses to pain moderated by pain characteristics?

To answer the following questions, data were analyzed using IBM SPSS Statistics for Windows, Version 21.0 (IBM, 2012). Listwise deletion was used to deal with missing data.

- a. Do parental responses to pain vary due to children's age?

Hierarchical regression models were developed for each parental response as the outcome variable. Variables were entered in the following order: (1) child's gender, (2) child's gender and age, (3) child's gender, age and pain characteristics (i.e., pain duration and pain intensity), (4) child's age, gender, pain characteristics and variables created to test for age moderation (i.e., age x pain duration; age x pain diagnosis).

- b. Do parental responses to pain vary due to children's gender?

Hierarchical regression models were developed for each parental response as the outcome variable. Variables were entered in the following order: (1) child's age, (2) child's age and gender, (3) child's age, gender and pain characteristics (i.e., pain duration and pain intensity), (4) child's age, gender, pain characteristics and variables created to test for gender moderation (i.e., gender x pain duration; gender x pain diagnosis).

- c. Do parental responses to pain vary due to children's race?

Hierarchical regression models were developed for each parental response as the outcome variable. Separate models were run on

subsamples of each pair of race/ethnicity group (e.g., a model containing only White and Black participants). In each analysis Race or ethnicity was dummy coded to compare each minority group (i.e., Black, Hispanic, Multiracial) relative to White (score of 1 and 0, respectively). In each analysis comparing Hispanic and Multiracial to Black, the comparison group was Black and thus received a score of 0. Finally, when comparing Hispanic to Multiracial, the variables were dummy coded and received a score of 0 and 1, respectively.

Variables were entered in the following order: (1) child's age and gender, (2) child's age, gender and race (the comparison group in each case was the other race/ethnicity group present in the model), (3) child's age, gender, race and pain characteristics (i.e., pain duration and pain intensity), (4) child's age, gender, race, pain characteristics and variables created to test for race moderation (i.e., race x pain duration; race x pain diagnosis).

- d. Do parental responses to pain vary due to children's disability or emotional distress?
  - i. Hierarchical regression models were developed for each parental response as the outcome variable. Variables were entered in the following order: (1) child's age, (2) child's age, gender and functional disability, (3) child's age, gender, functional disability and pain characteristics (i.e., pain duration and pain intensity), (4) child's age, gender, functional disability, pain characteristics and



- variables created to test for pain-related functional disability moderation (i.e., functional disability x pain duration; functional disability x pain diagnosis).
- ii. Hierarchical regression models were developed for each parental response as the outcome variable. Variables were entered in the following order: (1) child's age, (2) child's age, gender and anxiety, (3) child's age, gender, anxiety and pain characteristics (i.e., pain duration and pain intensity), (4) child's age, gender, anxiety, pain characteristics and variables created to test for anxiety moderation (i.e., anxiety x pain duration; anxiety x pain diagnosis).
  - iii. Hierarchical regression models were developed for each parental response as the outcome variable. Variables were entered in the following order: (1) child's age, (2) child's age, gender and depression, (3) child's age, gender, depression and pain characteristics (i.e., pain duration and pain intensity), (4) child's age, gender, depression, pain characteristics and variables created to test for depression moderation (i.e., depression x pain duration; depression x pain diagnosis).

### **Results**

The results of all analyses are presented below. Initial descriptive statistics, correlations and results of the regression models are also detailed in Tables 1 – 4.

### **Descriptive Findings and Bivariate Cross-Sectional Correlations**

Duration of pain varied from 3 months to 209 months, with a mean duration of pain of 27.49 months (SD = 33.34). Primary pain diagnoses included musculoskeletal pain (47.3%), neuropathic pain (e.g. Complex Regional Pain Syndrome; 23.2%), chronic abdominal pain (8.0%), headache (6.8%), gynecological or genitourinary pain (5.5%), and other pain (e.g., chest, ear; 9.3%). These categories of pain diagnoses were chosen to resemble studies conducted at this clinic with the same population (e.g., Simons et al., 2011; Logan et al., 2012). The most commonly reported pain locations were back (16.0%), abdomen (12.1%), leg (9.9%), ankle (9.3%), foot (9.3%), and head (7.8%) (See Table 1 for a complete list of pain locations). Average pain intensity rating on a 0 to 10 scale was 5.99 (SD = 2.14). Based on child self report, pain-related functional disability in this sample ranged from 0 to 53 with a mean of 22.58 (SD = 11.62). Based on this mean, children in this sample were in the Moderately Disabled range. Youth reported a mean depression score of 51.34 (SD = 12.31; Range = 34–100). Regarding physiological anxiety, participants reported a mean score of 48.91 (SD = 10.20; Range = 19–80). Anxiety and depression scores in this sample were in the normative range.

With regard to the outcome variables, the mean and standard deviations for each one of the three parental responses were computed. The mean for parental protectiveness was 1.49 (SD = .60; Range = 0–3.64); the average score for parental minimization of pain was .73 (SD = .67; Range = 0–4); and for parental encouragement and monitoring the mean was 2.82 (SD = .62; Range = 0–4).

Correlations among child and family demographics, child pain characteristics, child functional disability and emotional distress, and parental responses to children's

pain can be found in Table 2. With regard to child demographics, child's gender was only correlated with parental protectiveness ( $r = -.09, p < .01$ ). Child's age was only correlated to parental encouragement and monitoring ( $r = -.12, p < .001$ ). No child demographics were correlated to parental minimization. With regard to family demographics, parents' marital status was correlated to both parental protectiveness and encouragement and monitoring ( $r = -.12, p < .001$ ;  $r = -.11, p < .001$ , respectively). Furthermore, family SES was correlated to both parental minimization and encouragement and monitoring ( $r = -.13, p < .01$ ;  $r = -.18, p < .001$ , respectively). Pain characteristics did not tend to be correlated to parental responses to pain. Only pain intensity was correlated to parental minimization of pain ( $r = .15, p < .001$ ). Child's functional disability and emotional distress (i.e., anxiety, depression) were correlated to both protectiveness and minimization. Specifically, correlation coefficients for functional disability, anxiety and depression with regard to protectiveness were ( $r = .27, p < .001$ ;  $r = .12, p < .001$ ;  $r = .12, p < .001$ , respectively). Similarly, correlation coefficients for functional disability, anxiety and depression with regard to minimization were ( $r = .12, p < .001$ ;  $r = .12, p < .001$ ;  $r = .14, p < .001$ , respectively). Only functional disability was correlated to encouragement and monitoring ( $r = .11, p < .01$ ).

Although not included in the main analysis, additional descriptive analyses were performed to explore variables related to school. Youth's year in school ranged from 1 to 13 with a mean of 8.55 (SD = 2.39). With regard to learning disabilities, 15.3 % of the adolescents reported having an Individualized Learning Plan (IEP) or a 504 Plan. Additionally, 8.4% of the youth reported having been held back in school. Overall,

participants reported an average of 10.21 school days missed per academic year due to pain (SD = 16.56; Range = 0–180).

I examined potential differences in children's age, pain characteristics (i.e., intensity, duration), functional disability and emotional distress (i.e., anxiety, depression), and parental responses to pain based on grade level status (Not Held Back vs. Held Back) and presence of learning disability (No IEP/504 vs. IEP/504). I conducted a series of *t*-tests to compare the mean scores of students who were and were not held back on each of the continuous variables (Table 3). With regard to children's grade level status, children who were held back were significantly older than children who did not experience grade retention ( $p < .001$ ) by a small difference of .89 years. Parents of children who were held back were more minimizing of pain than parents of children who were not held back ( $p < .05$ ). Again, the difference was small (.19) and no other differences were found.

Similar *t*-tests were conducted for students who reported having an IEP/504 and those who did not report an IEP or receiving special accommodations at school (Table 4). As shown Table 3, parents of children who reported having an IEP/504 scored significantly higher in protectiveness ( $p < .01$ ). However, the difference was small (0.16). Additionally, children with an IEP/504 reported having greater pain intensity ( $p < .05$ ) and physiological anxiety ( $p < .05$ ). No other differences were found.

### **Multiple Linear Regression Model**

The following results pertain to the study's primary question: how do child and family demographics, child pain characteristics and child emotional distress relate to parental responses to children's pain? To understand how child (i.e., age, gender, race) and family demographics (i.e., marital status), child pain characteristics (i.e., intensity,

duration) and child functional disability and emotional distress (i.e., depression, anxiety) relate to parental responses to children's pain, I conducted a multiple regression model for each parental response variable (See Table 5).

With regard to protectiveness, I hypothesized that parents would be more protective of girls than of boys, and of younger children than of older children. Neither hypothesis was supported. In fact, parents were significantly more protective of boys than of girls ( $\beta = -.09, p < .01$ ). Age was not significantly related to protectiveness. In the case of the exploratory variables, child's race and functional disability were significantly positively related to protectiveness, but parents' marital status, pain characteristics and child's emotional distress were not related to parental protectiveness. Parents of Black, Hispanic, Asian and Multiracial children were more protective compared to parents of White children ( $\beta = .16, p < .001$ ;  $\beta = .12, p < .001$ ;  $\beta = .07, p < .05$ ;  $\beta = .07, p < .05$ , respectively). Parents were more protective of children with higher levels of functional disability ( $\beta = .24, p < .001$ ). The  $R^2$  for the protectiveness model was .13 ( $p < .001$ )

With regard to minimization, parents were significantly more minimizing of pain for children with higher pain intensity ( $\beta = .14, p < .01$ ). No other variable in this model was significantly related to minimization. The  $R^2$  for the minimization model was .05 ( $p < .01$ ).

With regard to parental encouragement and monitoring, I hypothesized that married parents would be more encouraging and monitoring than non-married parents. This hypothesis was not supported; in fact, single parents were significantly more encouraging and monitoring than married parents ( $\beta = -.08, p < .01$ ). In the case of the exploratory variables, child's age and race were significantly related to encouraging and monitoring,

but child's gender, pain characteristics, functional disability and emotional distress were not related to this parental response. Parents were more encouraging and monitoring of younger children than older children ( $\beta = -.14, p < .001$ ). Parents of Black children were more encouraging and monitoring compared to parents of White children ( $\beta = .09, p < .01$ ). The  $R^2$  for the encouragement and monitoring model was  $.05 (p < .001)$

### **Hierarchical Linear Regression Models**

The following results pertain to the study's secondary question: how are the relations between child's characteristics (i.e., age, gender, race, functional disability, emotional distress) and parental responses to pain moderated by pain characteristics? Results are organized by sub-question.

#### **2.a. Do parental responses to pain vary due to children's age?**

I investigated the moderating effect of child's age on the relation between pain characteristics and parental responses using a series of hierarchical multiple regression models (See Table 6). In each model I investigated the relationship between the parental response and child's age and gender, pain characteristics, and the interaction of child's age and the two pain characteristics variables. Child's gender was entered in step one; child's age added in step two; child's pain characteristics were added in step three; and the interaction effects were added in the last step.

With regard to parental protectiveness, child's gender was significant in every model such that parents were more protective of girls than of boys ( $\beta = -.14, p < .001$ , in final model). No other variable was significant in any model. The initial model explained a significant amount of variance in the outcome, but although subsequent models

remained significant,  $R^2$  change was not significant. The final model explained a significant amount of variance in the outcome,  $F(3.20), p < .01, R^2 = .03$ .

With regard to parental minimization, child's pain intensity was significant only in model three such that parents were more minimizing of pain for children who had higher pain intensity ( $\beta = .14, p < .001$ ). No other variable was significant in any model. The first two models did not explain a significant amount of variance in the outcome, but adding pain characteristics in model three produced a significant  $R^2$  change ( $R^2$  change =  $.02, p < .001$ ), such that the model became significant. The final model remained significant,  $F(3.35), p < .01, R^2 = .03$ .

With regard to parental encouragement and monitoring, adding age in model two significantly increased the model fit ( $R^2$  change =  $.01, p < .01$ ), and age remained significantly negatively related to the outcome in all subsequent models ( $\beta = -.28, p < .05$ , final model). No other variable was significant in any model. The final model explained a significant amount of variance in the outcome,  $F(2.54), p < .05, R^2 = .03$ .

#### 2.b. Do parental responses to pain vary due to children's gender?

I investigated the moderating effect of child's gender on the relation between pain characteristics and parental responses using a series of hierarchical multiple regression models (See Table 7). In each model I investigated the relationship between the parental response and child's age and gender, pain characteristics, and the interaction of child's gender and the two pain characteristics variables. Child's age was entered in step one; child's gender added in step two; child's pain characteristics were added in step three; and the interaction effects were added in the last step.

With regard to parental protectiveness, adding gender in model two significantly increased the model fit ( $R^2$  change = .02,  $p < .001$ ), and gender remained significant in model three ( $\beta = -.14$ ,  $p < .001$ ). However, gender was no longer significant in the final model. No other variable was significant in any model. The final model explained a significant amount of variance in the outcome,  $F(2.51)$ ,  $p < .05$ ,  $R^2 = .03$ .

With regard to parental minimization, the first two models did not explain a significant amount of variance in the outcome, but adding pain characteristics in model three produced a significant  $R^2$  change ( $R^2$  change = .02,  $p < .001$ ). Child's pain intensity was significantly positively related to parental minimization ( $\beta = .19$ ,  $p < .05$ , in final model). No other variable was significant in any model. The final model explained a significant amount of variance in the outcome,  $F(3.37)$ ,  $p < .01$ ,  $R^2 = .03$ .

With regard to parental encouragement and monitoring, age was significantly negatively related to the outcome in all models ( $\beta = -.13$ ,  $p < .01$ , in final model). No other variable was significant in any model. The first model explained a significant amount of variance in the outcome, but adding variables in subsequent steps did not improve model fit. The final model explained a significant amount of variance in the outcome,  $F(2.21)$ ,  $p < .05$ ,  $R^2 = .02$ .

### 2.c. Do parental responses to pain vary due to children's race?

I investigated the moderating effect of child's race on the relation between pain characteristics and parental responses using a series of hierarchical multiple regression models (See Tables 8 – 13). Each model used a subsample containing only participants of two of the race groups, such that every pair of race/ethnicity group was compared. In each model I investigated the relationship between the parental response and child's age,



gender, race, pain characteristics, and the interaction of child's race and the two pain characteristics variables. Child's age and gender were entered in step one; child's race added in step two; child's pain characteristics were added in step three; and the interaction effects were added in the last step.

**Comparisons of White and Black participants.** As seen in Table 8, with regard to parental protectiveness, child's gender was significantly related to the outcome in all models such that parents were more protective of girls than of boys ( $\beta = -.14, p < .01$ , in final model). The first model explained a significant amount of variance, and adding race in model two significantly improved the model fit ( $R^2$  change = .02,  $p < .001$ ). Race remained significant in all subsequent models, such that parents of Black children were significantly more protective than parents of White children ( $\beta = .21, p < .05$ , in final model). No other variable was significant in any model. The final model explained a significant amount of variance in the outcome,  $F(3.88), p < .001, R^2 = .05$ .

With regard to parental minimization, child's age was significantly negatively related to the outcome in the first two models ( $\beta = -0.9, p < .05$ , in final two). The first model explained a significant amount of variance, and adding pain characteristics in step three significantly improved the model fit ( $R^2$  change = .02,  $p < .01$ ). Pain intensity was significantly positively related to parental minimization in models three and four ( $\beta = .13, p < .01$ , in final model). No other variable was significant in any model. The final model explained a significant amount of variance in the outcome,  $F(2.40), p < .05, R^2 = .03$ .

With regard to encouragement and monitoring, child's age was significantly related to the outcome in all models such that parents were more encouraging and monitoring of younger children than of older children ( $\beta = -.12, p < .01$ , in final model).

The first model explained a significant amount of variance, and adding race in model two significantly improved the model fit ( $R^2$  change = .02,  $p < .01$ ). Race remained significant in model three, such that parents of Black children were significantly more encouraging and monitoring than parents of White children ( $\beta = .12$ ,  $p < .01$ , in model three). However, race was no longer significant in the final model. No other variable was significant in any model. The final model explained a significant amount of variance in the outcome,  $F(2.90)$ ,  $p < .01$ ,  $R^2 = .04$ .

**Comparisons of White and Hispanic participants.** As seen in Table 9, with regard to parental protectiveness, child's gender was significantly related to the outcome in all models such that parents were more protective of girls than of boys ( $\beta = -.15$ ,  $p < .001$ , in final model). The first model explained a significant amount of variance, and when race was added in model two it significantly improved the model fit ( $R^2$  change = .03,  $p < .001$ ). Race remained significant in model three, such that parents of Hispanic children were significantly more protective than parents of White children ( $\beta = .16$ ,  $p < .001$ , in model three). However, race was no longer significant in the final model. No other variable was significant in any model. The final model explained a significant amount of variance in the outcome,  $F(4.39)$ ,  $p < .001$ ,  $R^2 = .05$ .

With regard to parental minimization, the initial model explained a significant amount of variance, although child age and gender were not significant. Adding pain characteristics in step three significantly improved the model fit ( $R^2$  change = .03,  $p < .01$ ). Pain intensity was significantly positively related to parental minimization in model three and remained significant in the final model ( $\beta = .13$ ,  $p < .01$ , in final model). No

other variable was significant in any model. The final model explained a significant amount of variance in the outcome,  $F(2.40), p < .01, R^2 = .04$ .

With regard to encouragement and monitoring, child's age was significantly related to the outcome in all models such that parents were more encouraging and monitoring of younger children than of older children ( $\beta = -.12, p < .01$ , in final model). The first model explained a significant amount of variance, and adding race in model two significantly improved the model fit ( $R^2$  change =  $.01, p < .05$ ). Race remained significant in model three, such that parents of Hispanic children were significantly more encouraging and monitoring than parents of White children ( $\beta = .11, p < .05$ , in model three). However, race was no longer significant in the final model. None of the other variables were significant in any model. The final model explained a significant amount of variance in the outcome,  $F(2.94), p < .01, R^2 = .03$ .

**Comparisons of White and Multiracial participants.** As seen in Table 10, with regard to parental protectiveness, child's gender was significantly related to the outcome in all models such that parents were more protective of girls than of boys ( $\beta = -.13, p < .001$ , in final model). The first model explained a significant amount of variance, and adding race in model two significantly improved the model fit ( $R^2$  change =  $.02, p < .01$ ). Race remained significant in model three, such that parents of Multiracial children were significantly more protective than parents of White children ( $\beta = .13, p < .01$ , in model three). However, race was no longer significant in the final model. No other variable was significant in any model. The final model explained a significant amount of variance in the outcome,  $F(3.37), p < .01, R^2 = .04$ .

With regard to parental minimization, child's age was significantly negatively related to the outcome in the first and second models ( $\beta = -.09, p < .05$ , in model two). The first model explained a significant amount of variance, and adding pain characteristics in step three significantly improved the model fit ( $R^2$  change =  $.02, p < .01$ ). Pain intensity was significantly positively related to parental minimization in model three and remained significant in the final model ( $\beta = .13, p < .01$ , in final model). No other variable was significant in any model. The final model explained a significant amount of variance in the outcome,  $F(2.86), p < .01, R^2 = .04$ .

With regard to encouragement and monitoring, child's age was significantly negatively related to the outcome in all models such that parents were more encouraging and monitoring of younger children than of older children ( $\beta = -.13, p < .01$ , in final model). No other variable was significant in any model. The first model explained a significant amount of variance in the outcome, but adding variables in subsequent steps did not improve model fit. The final model explained a significant amount of variance in the outcome,  $F(2.30), p < .05, R^2 = .03$ .

**Comparisons of Black and Hispanic participants.** As seen in Table 11 with regard to parental protectiveness, gender was significantly related to the outcome such that parents were more protective of boys than of girls, but only in the first model ( $\beta = -.33, p < .05$ ). No other variable was significant in any model. No model explained a significant amount of variance in the outcome.

With regard to parental minimization, pain intensity is significantly positively related to the outcome, but only in the third model ( $\beta = .41, p < .05$ ). No other variable

was significant in any model. No model explained a significant amount of variance in the outcome.

With regard to parental encouragement and monitoring, no variable was significant in any model. No model explained a significant amount of variance in the outcome.

**Comparisons of Black and Multiracial participants.** As seen in Table 12 for all three parental responses, no variable was significant in any model. No model explained a significant amount of variance in the outcome.

**Comparisons of Hispanic and Multiracial participants.** As seen in Table 13, for all three parental responses, no variable was significant in any model. No model explained a significant amount of variance in the outcome.

2.d. Do parental responses to pain vary due to children's disability and emotional distress?

I investigated the moderating effect of child's functional disability and emotional distress (i.e., depression, anxiety) on the relation between pain characteristics and parental responses using a series of hierarchical multiple regression models (See Tables 14-16). In order to explore these relations, for each variable of interest (i.e., functional disability, depression, anxiety), I conducted models that tested the relations of child's age, gender, pain characteristics, and the interaction of the variable of interest and pain characteristics on the parental responses.

**Functional Disability.** As seen in Table 14, with regard to parental protectiveness, child's gender was significant in every model such that parents were more protective of girls than of boys ( $\beta = -.16, p < .001$ , in final model). The first model

explained a significant amount of variance, and adding child's functional disability in model two significantly improved the model fit ( $R^2$  change = .07,  $p < .001$ ). Child's functional disability was significantly positively related to parental protectiveness in model two and remained significant in all subsequent models ( $\beta = .51$ ,  $p < .001$ , in final model). Finally, when the interaction terms were added in the final step they significantly improved the model fit ( $R^2$  change = .02,  $p < .05$ ). Pain duration significantly moderated the relationship between child's functional disability and parental protectiveness, such that the positive relation between functional disability and parental protectiveness is weaker for children with longer pain duration compared to children with shorter pain duration ( $\beta = -.19$ ,  $p < .05$ ). No other variable was significant in any model. The final model explained a significant amount of variance in the outcome,  $F(9.36)$ ,  $p < .001$ ,  $R^2 = .11$ .

With regard to parental minimization, child's functional disability was significantly positively related to the outcome only in step two ( $\beta = .10$ ,  $p < .05$ ). Adding child's functional disability in model two significantly improved model fit ( $R^2$  change = .01,  $p < .05$ ). Furthermore, adding pain characteristics in model three additionally improved the model fit ( $R^2$  change = .02,  $p < .01$ ). Pain intensity was significantly positively related to parental minimization ( $\beta = .14$ ,  $p < .01$ ), but did not remain significant in the final model. No other variable was significant in any model. The final model explained a significant amount of variance in the outcome,  $F(3.11)$ ,  $p < .01$ ,  $R^2 = .04$ .

With regard to parental encouragement and monitoring, child's age was significant in every model such that parents were more protective of younger children

than of older children ( $\beta = -.14, p < .001$ , in final model). The first model explained a significant amount of variance, and adding child's functional disability in model two significantly improved the model fit ( $R^2$  change =  $.01, p < .01$ ). Child's functional disability was significantly positively related to parental encouragement and monitoring in model two and remained significant only in model three ( $\beta = .13, p < .01$ , in model three). In the final model, pain duration was significantly positively related to the outcome ( $\beta = .16, p < .05$ ). No other variable was significant in any model. The final model explained a significant amount of variance in the outcome,  $F(3.32), p < .01, R^2 = .04$ .

**Depression.** Results of these models are presented in Table 15. With regard to parental protectiveness, child's gender was not significant in model one but it became significant in model two and remained so in all subsequent models. Specifically, parents were more protective of boys than of girls ( $\beta = -.12, p < .05$ , in final model). The first model did not explain a significant amount of variance, but adding child's depression in model two significantly improved the model fit ( $R^2$  change =  $.03, p < .001$ ). Child's depression was significantly positively related to parental protectiveness in model two and remained significant in all subsequent models ( $\beta = .34, p < .05$ , in final model). No other variable was significant in any model. The final model explained a significant amount of variance in the outcome,  $F(3.48), p < .01, R^2 = .06$ .

With regard to parental minimization, child's age was not significant in model one but it became significant in model two and remained so in all subsequent models. Specifically, parents were more minimizing of pain for younger children than for older children ( $\beta = -.11, p < .05$ , in final model). The first model did not explain a significant

amount of variance, but adding child's depression in model two significantly improved the model fit ( $R^2$  change = .05,  $p < .001$ ). Child's depression was significantly positively related to parental protectiveness in model two and remained significant only in model three ( $\beta = .19$ ,  $p < .001$ , in model three). Furthermore, adding pain characteristics in model three significantly improved the model fit ( $R^2$  change = .02,  $p < .05$ ). Specifically, pain intensity was significant ( $\beta = .11$ ,  $p < .05$ ), although only in model three. No other variable was significant in any model. The final model explained a significant amount of variance in the outcome,  $F(5.08)$ ,  $p < .001$ ,  $R^2 = .08$ .

With regard to parental encouragement and monitoring, child's age and gender were significant in all models such that both parents of younger children and of boys were more encouraging and monitoring than parents of older children and of girls, respectively ( $\beta = -.14$ ,  $p < .01$ ,  $\beta = -.11$ ,  $p < .05$ , in final model). The first model explained a significant amount of variance, and adding child's depression in model two significantly improved the model fit ( $R^2$  change = .02,  $p < .05$ ). Child's depression was significantly positively related to the outcome in model two and remained significant only in model three ( $\beta = .13$ ,  $p < .01$ , in model three). No other variable was significant in any model. The final model explained a significant amount of variance in the outcome,  $F(2.67)$ ,  $p < .01$ ,  $R^2 = .04$ .

**Anxiety.** See Table 16 for results of the following models. With regard to parental protectiveness, child's gender was significant in all models such that parents were more protective of boys than of girls ( $\beta = -.10$ ,  $p < .05$ , in final model). The first model explained a significant amount of variance, and adding child's anxiety in model two significantly improved the model fit ( $R^2$  change = .05,  $p < .001$ ). Child's anxiety was



significantly positively related to the outcome in model two and remained significant in all subsequent models ( $\beta = .41, p < .01$ , in final model). Although not significant in the first model, child's age was significant in the second model and remained so in all subsequent models. Specifically, parents were more protective of younger children than of older children ( $\beta = -.12, p < .01$ , in final model). No other variable was significant in any model. The final model explained a significant amount of variance in the outcome,  $F(4.46), p < .001, R^2 = .07$ .

With regard to parental minimization, child's age was significantly negatively related to the outcome in all models ( $\beta = -.13, p < .01$ , in final model). The first model did not explain a significant amount of variance, but adding child's anxiety in model two significantly improved the model fit ( $R^2$  change =  $.03, p < .01$ ). Child's anxiety was significantly positively related to parental minimization in model two and remained significant only in model three ( $\beta = .16, p < .01$ , in model three). Furthermore, adding pain characteristics in model three significantly improved the model fit ( $R^2$  change =  $.03, p < .01$ ). Specifically, pain intensity was significant ( $\beta = .14, p < .01$ ), although only in model three. No other variable was significant in any model. The final model explained a significant amount of variance in the outcome,  $F(3.97), p < .001, R^2 = .06$ .

With regard to parental encouragement and monitoring, child's age was significantly negatively related to the outcome in all models ( $\beta = -.14, p < .01$ , in final model). Similarly, child's gender was also significantly related to the outcome in all models such that parents were more encouraging and monitoring for boys than for girls ( $\beta = -.11, p < .05$ , in final model). The first model explained a significant amount of variance, and adding child's anxiety in model two significantly improved the model fit

( $R^2$  change = .02,  $p < .05$ ). Child's anxiety was significantly positively related to parental encouragement and monitoring in model two and remained significant only in model three ( $\beta = .13$ ,  $p < .05$ , in model three). No other variable was significant in any model. The final model explained a significant amount of variance in the outcome,  $F(2.69)$ ,  $p < .05$ ,  $R^2 = .05$ .

### **Summary of Findings.**

Giving the large number of analyses conducted, a summary of the main findings is provided. Child's age was significantly negatively related to parental encouragement and monitoring but to no other parental response. Child's gender was also related to only one parental response; specifically, male gender was significantly positively related to parental protectiveness. With regard to race, parents of Black, Hispanic or Multiracial children were more likely than parents of White children to display high levels of parental protectiveness. Similarly, parents of Black or Hispanic children were more likely than parents of White children to show parental encouragement and monitoring. No child demographics were related to parental minimization. With regard to family demographics, when all the variables were included in the models, single parents showed more parental encouragement and monitoring. Child's functional disability, anxiety and depression were significantly positively related to all three parental responses. With regard to pain characteristics, when all the variables were included in the models, only pain intensity was significantly positively related to parental minimization. Overall, pain characteristics did not have moderating effects, with the exception of pain duration, which moderated the relation between child functional disability and parental

protectiveness. Finally, based on the standardized regression coefficients, the effect sizes for all variables in these models are small.

### **Discussion**

With a growing evidence base to support that parental responses to children's pain are related to how children and adolescents cope with and manage chronic pain (Claar et al., 2008), research efforts have highlighted the need to understand chronic pain from family systems and developmental perspectives (Palermo et al., 2014). Given that little is known about chronic pain from a developmental perspective (Palermo et al., 2014), this study sought to examine parental responses to children's pain across children of different ages while taking into account other child characteristics, family demographics, pain characteristics, and children's functional disability and emotional distress. Examining pediatric chronic pain within a developmental framework could provide preliminary findings to better inform future research and interventions for pediatric chronic pain patients and their families. The following discussion is organized in sections that address major themes related to the proposed study questions. Within each section, findings related to each parental response (i.e., protectiveness, minimization, encouraging and monitoring) are discussed.

Since the purpose of this study was to provide a developmental perspective to parental responses to children's chronic pain, developmental characteristics of the sample were important to consider. Given that chronological age might provide limited information about development, I first investigated potential differences due to grade level status and presence of developmental disability that could suggest developmental differences within the study sample. Findings suggest that children who were held back

or had an IEP/504 were not significantly different in most of the variables of interest compared to children who had not experienced grade retention or did not have an IEP/504. Children who were held back were significantly older than their peers, as would be expected in children who experience grade retention. Additionally, a very small difference in parental minimization was found; parents of children who had been held back were more minimizing than parents of children who had not been held back. This result raises the concern that minimization of pain might not be the most adaptive response for children and might negatively impact them in their academic setting as suggested by their grade retention. Another possibility is that parents minimized more because children were retained in grade. The direction of effect is not well understood and thus future research should take a longitudinal approach to explore how differences in parental responses impact school functioning in children with chronic pain.

Descriptive analyses also suggested that parents of children who had an IEP/504 were significantly more protective than parents of children who did not report a learning disability. It is unclear if parents who were more protective were able to acquire special accommodations (i.e., IEP, 504) for their children or if these parents became more protective of their children after they were diagnosed with a learning disability. Furthermore, these children reported higher pain intensity and physiological anxiety. Again, it is unclear if children with higher pain intensity and anxiety subsequently received an IEP and special accommodations or if the learning disability was diagnosed prior to the development of pain and anxiety. Due to the cross-sectional nature of this study this relation could not be examined. However, future research would benefit from longitudinal designs that allow the examination of developmental and family factors that

impact the trajectory of chronic pain and changes in parental responses. Overall, since few differences were found, chronological age was deemed an appropriate proxy for development for the purpose of this study. However, future studies should examine other developmental factors that could impact the experience of chronic pain in children and families.

### **Children's Age**

Overall, the findings did not support the hypothesis that parents would be more protective of younger children than of older children. As with parental protectiveness, age was not significantly related to parental minimization of pain. However, age was related to parental encouragement and monitoring with parents of older children being less encouraging and monitoring. This finding is in line with psychosocial theory of development, which proposes that, as children move into adolescence, they start to develop a sense of competence and to acquire knowledge and skills to be productive individuals (Erikson, 1985). Parents of older children with chronic pain might be less encouraging and monitoring to allow for the adolescent to achieve autonomy and industry by transitioning towards self-management of his or her pain. Finally, the relations between age and the different parental responses were not moderated by pain characteristics. The lack of moderating effects and the non-significant findings related to protectiveness and minimization of pain might be due to this study's use of child's age as the only proxy for development. Future studies should include additional variables (e.g., IQ, learning disability) that can help explain developmental differences.

**Children's Gender**

With regard to gender, the findings did not support the hypothesis that parents would be more protective of girls than of boys. This hypothesis was based on empirical evidence suggesting that girls use more social support to cope with pain compared to boys (Keogh and Eccleston, 2006; Lynch et al., 2007) and thus might elicit more protective responses from parents of girls with chronic pain. However, contrary to this hypothesis, results showed that parents were significantly more protective of boys than of girls. Since the overwhelming majority of responding parents were mothers, these findings should be interpreted with caution as results may vary depending on the caregiver being examined. Differences in the nature of the mother-daughter and mother-son relations might help explain why parents were more protective of boys than of girls. For example, a study examining gendered caregiving strategies of mothers of chronically ill children found that mothers of sons saw their children as sicker, were more likely to restrict their children's activities, and invested more effort in their caregiving than did mothers of daughters (Hill & Zimmerman, 1995). Future research should examine gender-based patterns of caregiving in families with children with chronic pain.

Finally, results showed that gender was unrelated to parental minimization of pain as well as encouragement and monitoring, and that the relation between gender and parental responses was not moderated by pain characteristics. These results should be interpreted with caution because there were a small number of male participants and thus there might not have been enough power to detect gender differences and moderating effects. Furthermore, given the smaller pool of boys, it is not certain that these male participants are a truly representative sample of boys with chronic pain.

**Children's Race**

Overall, when all variables were included in the model, child's race was significantly related to parental protectiveness as well as encouragement and monitoring, but unrelated to minimization of pain. Findings suggest that parents of minority children (i.e., Black, Hispanic and Multiracial) were significantly more protective than were parents of White children. These findings are consistent with a study conducted by Walker et al. (2006) that assessed the validity of the Protect Scale of the ARCS questionnaire. Walker et al. (2006) found that highly protective mothers of children with abdominal pain tended to be of minority ethnicity compared to mothers who scored low in protectiveness.

Differences in parental responses might be related to cross-cultural differences in parental experience of children's pain. For example, Hispanic parents have been shown to express higher levels of anxiety regarding their child's pain-related medical procedure compared to White parents (Pfefferbaum, Adams, & Aceves, 1990). Additionally, racial/ethnic minority families have been shown to have increased challenges and stresses related to their minority status (Meyer, 2003). Consequently, minority parents might be more protective than White parents of their children's pain to protect them from the additional label of "child with a chronic illness". Future research should examine how cultural variables other than race and ethnicity (e.g., acculturation, immigrant status, home language) are related to parental responses to children's pain.

With regard to parental encouragement and monitoring, parents of Black and of Hispanic children were significantly more encouraging and monitoring than were parents of White children. Past research suggests that minority children might be socialized to

display tougher or stronger ways of coping because they live in a predominantly white society (Kristjánsdóttir et al., 2012). These past findings might explain why parents of minority children more strongly encouraged them to remain in their daily activities even in the presence of chronic pain compared to parents of White children. Differences between parents of Multiracial children and of White children might not have been detected due to power issues related to the small number of Multiracial children.

Overall, parents of Black, Hispanic or Multiracial children were not significantly different to each other in regards to parental responses to children's pain. For all three parental responses and for each racial/ethnic group, the relations found were not moderated by pain characteristics. Finally, it is important to note that the very small percentage of non-White participants in the sample, while similar to referral patterns in this type of clinic, limits the generalizability of these findings.

### **Family Demographics**

The only hypothesis regarding family demographics was that married parents would be more encouraging and monitoring than single parents. On the contrary, this study showed that single parents were significantly more encouraging and monitoring than married parents. The original hypothesis was based on the rationale that married parents would have more resources to respond to their children's pain in an adaptive manner. Given the study findings, having a spouse might not be a significant resource in coping with children's pain. Single parents might be accessing other resources (e.g., support from extended family or family resources) that prove to be more valuable in managing children's pain. For example, one study showed that single parents often had the support of an extended network that often included relatives, the ex-spouse and



predivorce friends, as well as new friends, especially other single parents (McLanahan, Wedemeyer, & Adelberg, 1981). Future research should examine which are the best resources and what are the best ways to access a family's extended network to support families manage children's pain.

Additionally, this finding also could reflect differences in the parent-child relationship dyad between families headed by married parents and families headed by a single parent. That is, in a family headed by a single parent, this parent-child dyad might be the only relation in the central family unit that has to be navigated, as compared to parent-child, spousal and potential sibling dyads, among others. Future research should explore the family system more closely by integrating other caregivers and other members of the family unit (e.g., siblings) that could potentially impact the parent-child dyad.

### **Pain Characteristics**

Pain characteristics were not related to parental protectiveness or encouragement and monitoring. The only significant finding related to pain characteristics suggested that higher pain intensity was related to higher minimization of pain. Children with higher pain intensity may be more expressive and provide more verbal responses to pain that may elicit higher minimization of pain from parents. However, it is unclear why parents responded with higher minimization of pain, as opposed to protectiveness or encouragement and monitoring, to children with higher pain intensity. Perhaps parents minimize to reduce their own discomfort with the degree of child's pain. Future research should investigate the relation between pain characteristics and parental emotional responses to children's pain.

Additionally, pain characteristics did not moderate most of the relations examined except for the relation between functional disability and protectiveness, explained in the last discussion section regarding functional disability. The lack of moderating effects of pain characteristics in all the models highlighted the possibility that differences in parental responses may be more related to the parent-child relation than to the pain itself. Further research is needed to examine this hypothesis as well as parent and family variables that may impact the experience of chronic pain in children.

### **Children's Functional Disability and Emotional Distress**

Past studies have suggested that children's functional disability, anxiety and/or depression may elicit maladaptive parental responses to children's pain (i.e., protectiveness, minimization) (Claar, 2008). However, this study found that child's functional disability, anxiety and depression were positively related to all three parental responses, including parental encouragement and monitoring. The positive relation between high functional disability and high parental protectiveness is consistent with past research showing that parents who perceived their child's pain as highly threatening had fearful reactions to pain and restrict their child's activity (Goubert and Simons, 2013).

The relation between functional disability and protectiveness was the only one moderated by pain characteristics. However, only duration of pain, and not pain intensity, had a moderating effect. Specifically, parents of children who had pain for a longer period of time were less protective. Since this was not a longitudinal study this finding should be interpreted with caution. It is unclear if in this sample parents of children with longer pain duration had always been less protective or if they adjusted their responses as the chronicity of the illness increased. Future research should examine how parental

responses change throughout a child's chronic pain experience. Similarly to functional disability, higher levels of anxiety and depression were positively related to parental protectiveness. This is consistent with findings by Peterson and Palermo (2004) and Claar et al. (2008) that suggested that higher levels of emotional distress in children may be related to specific parental responses, in particular solicitous (i.e. protective) responses.

The positive relations between functional disability, anxiety and depression, and the other two parental responses to pain (i.e., minimization, encouragement and monitoring) found in this study are not as well understood. Although protectiveness, minimization and encouraging and monitoring are distinct responses, parents of more functionally disabled children and/or children experiencing high levels of anxiety and/or depression might be accessing all responses as a coping mechanism. It is possible that the stress related to the child's anxiety and depression levels might overwhelm parents, whom without proper support and/or resources, might not know how to respond to their child's pain and thus try strategies somewhat randomly and inconsistently. Parents who provide inconsistent responses to a child with pain may not be fostering the most adaptive environment for that child. Future research should examine contexts in which different parental responses are more appropriate. From an intervention standpoint, families might benefit from parent training that educate parents about coping strategies and different parental responses to pain.

Finally, Van Slyke and Walker (2006) investigated the psychometric properties of the ARCS and found that, based on the Pearson correlation coefficients between the scales, the Protect, Minimize, and Encourage and Monitor scales were relatively independent. However, Pearson correlations showed that, in this study's sample, the three

subscales were correlated to each other. The correlations among the ARCS subscales might help explain why high functional disability and emotional distress scores were related to all three subscales.

### **Effect Sizes**

Overall, although there were some significant relations between the variables of interest and parental responses to pain, based on the effect sizes of these relations, these variables explained very little about the differences between parents' responses. Given the small effect sizes, it is possible that the findings were significant largely due to the sample size. This was surprising because based on the existing literature and on developmental theory, I had expected that parents would respond differently to children of different ages; for example, parents of younger children were expected to be more protective than parents of older children. Since effect sizes were small for the child and family demographics examined, as well as the child functional disability and emotional distress variables, it seems likely that other variables (e.g., parents' emotional distress) may be the driving force behind parents' responses to children with chronic pain. The potential influence of other family variables, such as parental emotional distress, is in line with ecological theory which proposes that the individual develops through interactions with other systems (e.g., family) in the environment (Bronfenbrenner, 1997).

### **Limitations and Future Directions**

Due to its cross-sectional design, this study was limited by the presentation of data gathered at a single point in time. It is worth noting that this sample also presented limitations for analyzing results. The families included in this study had already identified that their children had chronic pain, and consequently were under the care of

professionals at Boston Children's Hospital. Children who are receiving care for their chronic pain might present more severe symptoms when compared with children that have chronic or recurrent pain but are not being treated for their condition. Parents who seek care for their children in a specialty pain clinic might perceive their child's pain as more severe and/or disabling when compared with parents of pediatric chronic pain patients that do not seek clinical interventions. Additionally, families in this sample were overwhelmingly White, more educated and of higher SES compared to the general population outside of this tertiary pain clinic.

Only one parent or caregiver completed the parent measures used in this study. The participation of only one parent posed limitations on the interpretation of the data collected from parents. Additionally, it is uncertain if the parent responding was the primary caregiver. Consistent with other studies across the literature involving parents and children with chronic pain (e.g., Claar et al., 2008), mothers were more highly represented in the parent sample. Mothers might have provided information that differed from what fathers or other caregivers would have provided if assessed. Similarly, the nature of the mother-child relationship might have impacted the way mothers responded to child pain.

Data on other child and parent variables, such as child sex differences (as opposed to gender differences) or parental distress, could not be collected since these variables were not assessed during the child's multidisciplinary pain evaluation. Based on the low effect sizes found in this study, such variables may be of importance and future research should consider them. Due to the stated limitations, the results of this study cannot be generalized to the larger population of pediatric chronic pain patients and their parents.

Nonetheless, this sample of children and families represented a valuable resource for assessing children and adolescents with chronic pain and their parents. Data obtained from this sample served to generate findings that can inform future research with larger and more diverse samples.

Despite these limitations, the present study's findings extend previous research and highlight important areas for future research, in particular with regard to age, gender and racial differences in children's chronic pain experience. Understanding pediatric chronic pain from a developmental and family perspective is not only important from an empirical standpoint, but it will also serve to improve interventions for pediatric chronic pain patients and their families. For example, based on the race differences found in parental responses to pain, practitioners should be sensitive to family's cultural context when providing pain management interventions. By making such improvements, pain management interventions can better serve the diverse families that seek chronic pain treatment and management.

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Table 1

*Percentage of children having pain in different body locations (N = 538)*

Variables	%
Head	7.8
Jaw/Facial	1.9
Neck	2.6
Shoulder	1.1
Chest	3.0
Abdomen	12.1
Flank	.7
Back	16.0
Hip	3.7
Pelvis	2.6
Leg	9.9
Knee	6.5
Ankle	9.3
Arm	3.2
Elbow	.9
Wrist	2.2
Hand	3.0
Diffuse	4.3
Foot	9.3

PARENTAL RESPONSES TO CHILDREN'S CHRONIC PAIN

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Table 2

e

Correlations among continuous variables (N=1,509).

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Variables	1	2	3	4	5	6	7	8	9	10	11	12
1. Protectiveness	—											
2. Minimization	.212***	—										
3. Encouraging & Monitoring	.406***	-.083**	—									
4. Child's Age	.004	-.030	-.118***	—								
5. Child's Gender	-.090**	.005	-.037	.109***	—							
6. Marital Status	-.121***	-.004	-.111***	-.062*	.061**	—						
7. Family SES	-.085	-.127**	-.181***	.024	.005	.189***	—					
8. Pain Duration	-.041	-.067	.045	.082*	-.016	-.071	±	—				
9. Pain Intensity	.070	.154***	.011	-.009	.021	-.031	±	-.052	—			
10. Functional Disability	.266***	.135***	.109**	.071	-.022	-.044	±	-.085**	.304***	—		
11. Anxiety	.117***	.117***	.066	0.77**	.017	-.095***	-.121**	.051	.081	.346***	—	
12. Depression	.123***	.143***	.042	.149***	.076**	-.106***	-.077*	-.024	.188***	.381***	.603***	—

\*p<0.05; \*\*p<0.01; \*\*\*p<0.001

±Missing data covariance coverage for this pair is zero.

Table 3.

*Scores on continuous variables based on grade level status.*

Variables	Not Held Back Mean (SD)	Held Back Mean (SD)	Mean Difference
Child's age	13.79 (2.39)	14.69 (2.19)	-.90***
Pain intensity	5.94 (2.15)	6.26 (2.27)	-.32
Pain duration	27.58 (33.59)	29.12 (33.55)	-1.54
Child's FDI	22.44 (11.67)	22.16 (11.10)	.28
Child's CDI	51.06 (12.25)	53.04 (12.58)	-1.98
Child's RCMAS	48.87 (10.30)	50.24 (9.39)	-1.34
Parental Protectiveness	1.49 (.61)	1.49 (.57)	.00
Parental Minimization	.72 (.67)	.91 (.77)	-.19*
Parental Encouragement and Monitoring	2.83 (.62)	2.77 (.68)	.06

\*p&lt;0.05; \*\*p&lt;0.01; \*\*\*p&lt;0.001

Table 4

*Scores on continuous variables based on presence or absence of learning disability.*

Variables	No IEP/504 Mean (SD)	IEP/504 Mean (SD)	Mean Difference
Child's age	13.92 (2.41)	14.19 (2.29)	-.27
Pain intensity	5.81 (2.21)	6.23 (2.15)	-.43*
Pain duration	24.30 (28.32)	29.31 (34.28)	-.50
Child's FDI	21.76 (11.41)	23.50 (12.09)	-1.75
Child's CDI	51.40 (12.61)	53.40 (12.97)	-2.00
Child's RCMAS	49.33 (11.02)	51.94 (12.25)	-2.60*
Parental Protectiveness	1.40 (.61)	1.56 (.55)	-.16**
Parental Minimization	.65 (.58)	.72 (.60)	-.06
Parental Encouragement and Monitoring	2.84 (.60)	2.91 (.62)	-.07

\*p<0.05; \*\*p<0.01; \*\*\*p<0.001

Table 5

*Regression coefficients (N=1,487).*

Variables	B	$\beta$	R <sup>2</sup>
<i>Parental Protectiveness</i>			.13***
Child's age	-.00	-.01	
Child's gender	-.013	-.09**	
Child's race (i.e., Black)	.062	.16***	
Child's race (i.e., Hispanic)	.40	.12***	
Child's race (i.e., Asian)	.39	.07*	
Child's race (i.e., Multiracial)	.28	.07*	
Parents' marital status (i.e., Married)	-.06	-.05	
Pain intensity	.00	.00	
Pain duration	.00	-.03	
Child's FDI	.01	.24***	
Child's CDI	.02	.03	
Child's RCMAS	.00	-.00	
<i>Parental Minimization</i>			.05**
Child's age	-.01	-.04	
Child's gender	.00	.00	
Child's race (i.e., Black)	.15	.04	
Child's race (i.e., Hispanic)	.06	.02	
Child's race (i.e., Asian)	.09	.01	
Child's race (i.e., Multiracial)	.18	.04	
Parents' marital status (i.e., Married)	.04	.03	
Pain intensity	.05	.14**	
Pain duration	-.00	-.04	
Child's FDI	.00	.03	
Child's CDI	.00	.06	
Child's RCMAS	.00	.07	
<i>Parental Encouragement &amp; Monitoring</i>			.05***
Child's age	-.04	-.14***	
Child's gender	-.02	-.01	
Child's race (i.e., Black)	.36	.09**	
Child's race (i.e., Hispanic)	.17	.05	
Child's race (i.e., Asian)	.18	.03	
Child's race (i.e., Multiracial)	.06	.01	
Parents' marital status (i.e., Married)	-.11	-.08**	
Pain intensity	-.00	-.02	
Pain duration	.00	.06	
Child's FDI	.01	.10	
Child's CDI	.00	.02	
Child's RCMAS	.00	.01	

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

Table 6

*Moderating effects of child's age on the relation between child's pain characteristics and parental responses to pain.*

Variables	B	$\beta$	<i>t</i>	R <sup>2</sup> Change
<i>Parental Protectiveness (N=587)</i>				
Model 1				.02***
Child's gender	-.20	-.14	-3.33***	
Model 2				.00
Child's gender	-.20	-.14	-3.34***	
Child's age	-.01	-.05	-1.19	
Model 3				.004
Child's gender	-.21	-.14	-3.42***	
Child's age	-.01	-.05	-1.16	
Pain duration	.00	-.03	-.65	
Pain intensity	.02	.055	1.33	
Model 4				.007
Child's gender	-.21	-.14	-3.48***	
Child's age	-.05	-.21	-1.81	
Pain duration	.00	.19	.70	
Pain intensity	-.10	-.37	-1.60	
Pain duration x Age	.00	-.22	-.81	
Pain intensity x Age	.01	.480	1.87	
<i>Parental Minimization (N=591)</i>				
Model 1				.00
Child's gender	.07	.05	1.19	
Model 2				.01
Child's gender	.07	.05	1.17	
Child's age	-.02	-.08	-.84	
Model 3				.024***
Child's gender	.06	.04	.957	
Child's age	-.02	-.08	-1.83	
Pain duration	.00	-.05	-1.24	
Pain intensity	.04	.14	3.52***	
Model 4				.001
Child's gender	.06	.04	.91	
Child's age	-.03	-.12	-1.04	
Pain duration	.00	.09	.337	
Pain intensity	.00	.00	-.01	
Pain duration x Age	.00	-.15	-.53	
Pain intensity x Age	.00	.16	.64	
<i>Parental Encouragement and Monitoring (N=590)</i>				
Model 1				.00
Child's gender	-.06	-.04	-1.01	
Model 2				.01**

Child's gender	-.07	-.04	-1.07	
Child's age	-.03	-.13	-2.91**	
Model 3				.005
Child's gender	-.07	-.04	-1.08	
Child's age	-.03	-.13	-3.06**	
Pain duration	.00	.07	1.74	
Pain intensity	.01	.02	.52	
Model 4				.004
Child's gender	-.07	-.05	-1.10	
Child's age	-.07	-.28	-2.35*	
Pain duration	.00	.14	.53	
Pain intensity	-.09	-.34	-1.43	
Pain duration x Age	-9.34E-5	-.07	-.26	
Pain intensity x Age	.01	.40	1.55	

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\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

Table 7

*Moderating effects of child's gender on the relation between child's pain characteristics and parental responses to pain.*

Variables	B	$\beta$	<i>t</i>	R <sup>2</sup> Change
<i>Parental Protectiveness (N=587)</i>				
Model 1				.00
Child's age	-.01	-.05	-1.14	
Model 2				.02***
Child's age	-.01	-.05	-1.19	
Child's gender	-.20	-.14	-3.34***	
Model 3				.00
Child's age	-.01	-.05	-1.16	
Child's gender	-.21	-.14	-3.42***	
Pain duration	.00	-.03	-.65	
Pain intensity	.02	.06	1.33	
Model 4				.00
Child's age	-.01	-.05	-1.19	
Child's gender	-.22	-.15	-1.25	
Pain duration	.00	.01	.16	
Pain intensity	.01	.04	.41	
Pain duration x Gender	-.00	-.05	-.52	
Pain intensity x Gender	.01	.03	.22	
<i>Parental Minimization (N=591)</i>				
Model 1				.01
Child's age	-.02	-.08	-1.86	
Model 2				.00
Child's age	-.02	-.08	-1.84	
Child's gender	.07	.05	1.17	
Model 3				.02***
Child's age	-.02	-.08	-1.83	
Child's gender	.06	.04	.96	
Pain duration	-.00	-.05	-1.24	
Pain intensity	.04	.14	3.52***	
Model 4				.00
Child's age	-.02	-.07	-1.78	
Child's gender	.12	.08	.67	
Pain duration	-.00	-.11	-1.22	
Pain intensity	.05	.19	2.20*	
Pain duration x Gender	.00	.07	.70	
Pain intensity x Gender	-.02	-.08	-.60	
<i>Parental Encouragement and Monitoring (N=590)</i>				
Model 1				.01**
Child's age	-.03	-.12	-2.89**	
Model 2				.00



Child's age	-03	-.12	-2.91**	
Child's gender	-.07	-.04	-1.07	
Model 3				.01
Child's age	-.03	-.13	-3.06**	
Child's gender	-.07	-.04	-1.08	
Pain duration	.00	.07	1.74	
Pain intensity	.01	.02	.52	
Model 4				.00
Child's age	-.03	-.13	-3.09**	
Child's gender	-.11	-.07	-.62	
Pain duration	.00	.12	1.38	
Pain intensity	-.01	-.02	-.19	
Pain duration x Gender	-.00	-.06	-.62	
Pain intensity x Gender	.01	.07	.47	

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\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

Table 8

*Moderating effects of child's race (i.e., Black) on the relation between child's pain characteristics and parental responses to pain (White participants are the comparison group).*

Variables	B	$\beta$	<i>t</i>	R <sup>2</sup> Change
<i>Parental Protectiveness (N=531)</i>				
Model 1				.02**
Child's age	-.01	-.04	-.83	
Child's gender	-.21	-.14	-3.33***	
Model 2				.02***
Child's age	-.01	-.04	-.96	
Child's gender	-.20	-.14	-3.21***	
Child's race (i.e., Black)	.55	.15	3.44***	
Model 3				.01
Child's age	-.01	-.04	-.87	
Child's gender	-.20	-.14	-3.27***	
Child's race (i.e., Black)	.57	.15	3.54***	
Pain duration	-.00	-.04	-.89	
Pain intensity	.02	.06	1.38	
Model 4				.00
Child's age	-.01	-.04	-.82	
Child's gender	-.20	-.14	-3.18**	
Child's race (i.e., Black)	.80	.21	2.21*	
Pain duration	-.00	-.03	-.78	
Pain intensity	.02	.07	1.50	
Pain duration x Race	.00	.01	.13	
Pain intensity x Race	-.05	-.08	-.64	
<i>Parental Minimization (N=537)</i>				
Model 1				.01*
Child's age	-.02	-.09	-2.06*	
Child's gender	.09	.06	1.40	
Model 2				.00
Child's age	-.02	-.09	-2.05*	
Child's gender	.09	.06	1.38	
Child's race (i.e., Black)	-.04	-.01	-.251	
Model 3				.02**
Child's age	-.02	-.08	-1.95	
Child's gender	.08	.06	1.28	
Child's race (i.e., Black)	-.01	-.00	-.07	
Pain duration	-.00	-.04	-1.00	
Pain intensity	.04	.13	3.00**	
Model 4				.00
Child's age	-.02	-.08	-1.92	
Child's gender	.08	.06	1.28	
Child's race (i.e., Black)	.08	.02	.23	
Pain duration	-.00	-.04	-.92	
Pain intensity	.04	.132	2.99**	

Pain duration x Race	-8.79E-5	-.00	-.02	
Pain intensity x Race	-.02	-.03	-.23	
<hr/>				
<i>Parental Encouragement and Monitoring (N=534)</i>				
<hr/>				
Model 1				.02*
Child's age	-.03	-.12	-2.67**	
Child's gender	-.08	-.05	-1.15	
Model 2				.02**
Child's age	-.03	-.12	-2.80**	
Child's gender	-.07	-.05	-1.03	
Child's race (i.e., Black)	.49	.12	2.88**	
Model 3				.01
Child's age	-.03	-.13	-2.91**	
Child's gender	-.07	-.05	-1.06	
Child's race (i.e., Black)	.49	.12	2.90**	
Pain duration	.00	.07	1.6	
Pain intensity	.01	.04	.99	
Model 4				.00
Child's age	-.03	-.12	-2.89**	
Child's gender	-.07	-.04	-1.00	
Child's race (i.e., Black)	.52	.13	1.35	
Pain duration	.00	.06	1.42	
Pain intensity	.01	.04	.95	
Pain duration x Race	.00	.03	.49	
Pain intensity x Race	-.02	-.03	-.26	
<hr/>				
* $p < .05$ ; ** $p < .01$ ; *** $p < .001$				

Table 9

*Moderating effects of child's race (i.e., Hispanic) on the relation between child's pain characteristics and parental responses to pain (White participants are the comparison group).*

Variables	B	$\beta$	<i>t</i>	R <sup>2</sup> Change
<i>Parental Protectiveness (N=543)</i>				
Model 1				.02**
Child's age	-.01	-.04	-.95	
Child's gender	-.21	-.14	-3.39***	
Model 2				.03***
Child's age	-.01	-.05	-1.09	
Child's gender	-.22	-.15	-3.50***	
Child's race (i.e., Hispanic)	.45	.16	3.89***	
Model 3				.01
Child's age	-.01	-.04	-1.01	
Child's gender	-.22	-.15	-3.55***	
Child's race (i.e., Hispanic)	.45	.16	3.83***	
Pain duration	-.00	-.03	-.77	
Pain intensity	.02	.06	1.52	
Model 4				.00
Child's age	-.01	-.04	-1.00	
Child's gender	-.22	-.15	-3.54***	
Child's race (i.e., Hispanic)	.47	.17	1.40	
Pain duration	-.00	-.03	-.76	
Pain intensity	.018	.07	1.50	
Pain duration x Race	.00	.01	.07	
Pain intensity x Race	-.01	-.02	-.15	
<i>Parental Minimization (N=548)</i>				
Model 1				.01*
Child's age	-.02	-.07	-1.72	
Child's gender	.11	.07	1.73	
Model 2				.00
Child's age	-.02	-.07	-1.74	
Child's gender	.11	.07	1.72	
Child's race (i.e., Hispanic)	.11	.04	.94	
Model 3				.03**
Child's age	-.02	-.07	-1.63	
Child's gender	.10	.07	1.61	
Child's race (i.e., Hispanic)	.10	.04	.84	
Pain duration	-.00	-.04	-.99	
Pain intensity	.04	.15	3.50***	
Model 4				.01
Child's age	-.02	-.07	-1.64	
Child's gender	.10	.07	1.55	
Child's race (i.e., Hispanic)	-.18	-.06	-.53	
Pain duration	-.00	-.04	-.94	
Pain intensity	.04	.13	2.978**	

Pain duration x Race	-.01	-.05	-.71	
Pain intensity x Race	.07	.16	1.50	
<hr/>				
<i>Parental Encouragement and Monitoring (N=546)</i>				
<hr/>				
Model 1				.01*
Child's age	-.03	-.11	-2.58**	
Child's gender	-.07	-.05	-1.13	
Model 2				.01*
Child's age	-.03	-.11	-2.67**	
Child's gender	-.08	-.05	-1.18	
Child's race (i.e., Hispanic)	.308	.11	2.49*	
Model 3				.01
Child's age	-.03	-.12	-2.78**	
Child's gender	-.08	-.05	-1.22	
Child's race (i.e., Hispanic)	.31	.11	2.50*	
Pain duration	.00	.07	1.54	
Pain intensity	.01	.03	.59	
Model 4				.01
Child's age	-.03	-.12	-2.79**	
Child's gender	-.08	-.05	-1.17	
Child's race (i.e., Hispanic)	.49	.17	1.35	
Pain duration	.00	.06	1.41	
Pain intensity	.01	.04	.95	
Pain duration x Race	.01	.10	1.33	
Pain intensity x Race	-.07	-.15	-1.42	

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

Table 10

*Moderating effects of child's race (i.e. Multiracial) on the relation between child's pain characteristics and parental responses to pain (White participants are the comparison group).*

Variables	B	$\beta$	<i>t</i>	R <sup>2</sup> Change
<i>Parental Protectiveness (N=531)</i>				
Model 1				.02**
Child's age	-.02	-.06	-1.38	
Child's gender	-.20	-.14	-3.13**	
Model 2				.02**
Child's age	-.01	-.05	-1.08	
Child's gender	-.19	-.13	-3.11**	
Child's race (i.e., Multiracial)	.47	.13	2.93**	
Model 3				.01
Child's age	-.01	-.04	-1.01	
Child's gender	-.20	-.14	-3.15**	
Child's race (i.e., Multiracial)	.48	.13	2.98**	
Pain duration	-.00	-.03	-.77	
Pain intensity	.02	.06	1.40	
Model 4				.00
Child's age	-.01	-.04	-.94	
Child's gender	-.20	-.13	-3.11**	
Child's race (i.e., Multiracial)	.77	.21	1.55	
Pain duration	-.00	-.03	-.77	
Pain intensity	.02	.07	1.49	
Pain duration x Race	.00	-.00	-.04	
Pain intensity x Race	-.05	-.08	-.69	
<i>Parental Minimization (N=537)</i>				
Model 1				.01*
Child's age	-.02	-.09	-2.09*	
Child's gender	.09	.07	1.57	
Model 2				.00
Child's age	-.02	-.09	-2.02*	
Child's gender	.10	.07	1.58	
Child's race (i.e., Multiracial)	.09	.02	.55	
Model 3				.02**
Child's age	-.02	-.08	-1.93	
Child's gender	.09	.06	1.48	
Child's race (i.e., Multiracial)	.10	.03	.65	
Pain duration	-.00	-.04	-1.04	
Pain intensity	.04	.135	3.15**	
Model 4				.00
Child's age	-.02	-.09	-1.96	
Child's gender	.09	.06	1.39	
Child's race (i.e., Multiracial)	-.03	-.01	-.06	
Pain duration	-.00	-.04	-.92	
Pain intensity	.04	.13	2.99**	

Pain duration x Race	-0.00	-0.04	-0.70	
Pain intensity x Race	.04	.07	.60	
<hr/>				
<i>Parental Encouragement and Monitoring (N=534)</i>				
<hr/>				
Model 1				.02**
Child's age	-0.04	-0.13	-3.09**	
Child's gender	-0.05	-0.04	-0.81	
Model 2				.01
Child's age	-0.03	-0.13	-2.91**	
Child's gender	-0.05	-0.03	-0.79	
Child's race (i.e., Multiracial)	.271	.07	1.59	
Model 3				.01
Child's age	-0.03	-0.13	-2.99**	
Child's gender	-0.05	-0.04	-0.81	
Child's race (i.e., Multiracial)	.27	.07	1.60	
Pain duration	.00	.06	1.32	
Pain intensity	.01	.04	1.02	
Model 4				.00
Child's age	-0.03	-0.13	-2.99**	
Child's gender	-0.06	-0.04	-0.90	
Child's race (i.e., Multiracial)	.29	.07	.55	
Pain duration	.00	.06	1.43	
Pain intensity	.01	.04	.94	
Pain duration x Race	-0.01	-0.05	-0.83	
Pain intensity x Race	.02	.03	.29	
<hr/>				
* $p < .05$ ; ** $p < .01$ ; *** $p < .001$				

Table 11

*Moderating effects of child's race (i.e., Hispanic) on the relation between child's pain characteristics and parental responses to pain (Black participants are the comparison group).*

Variables	B	$\beta$	<i>t</i>	R <sup>2</sup> Change
<i>Parental Protectiveness (N=38)</i>				
Model 1				.12
Child's age	-.02	-.07	-.44	
Child's gender	-.41	-.33	-2.06*	
Model 2				.00
Child's age	-.02	-.07	-.46	
Child's gender	-.40	-.32	-1.93	
Child's race (i.e., Hispanic)	-.07	-.06	-.39	
Model 3				.01
Child's age	-.02	-.07	-.40	
Child's gender	-.45	-.35	-1.95	
Child's race (i.e., Hispanic)	-.10	-.09	-.51	
Pain duration	-.00	-.10	-.54	
Pain intensity	.02	.08	.41	
Model 4				.01
Child's age	-.02	-.08	-.42	
Child's gender	-.45	-.36	-1.79	
Child's race (i.e., Hispanic)	-.23	-.21	-.50	
Pain duration	-.00	-.11	-.42	
Pain intensity	.01	.04	.09	
Pain duration x Race	.00	.08	.30	
Pain intensity x Race	.01	.10	.16	
<i>Parental Minimization (N=37)</i>				
Model 1				.01
Child's age	.01	.04	.25	
Child's gender	.13	.09	.51	
Model 2				.02
Child's age	.01	.05	.30	
Child's gender	.10	.07	.38	
Child's race (i.e., Hispanic)	.16	.13	.72	
Model 3				.13
Child's age	.00	.01	.07	
Child's gender	-.12	-.08	-.44	
Child's race (i.e., Hispanic)	.06	.04	.24	
Pain duration	-.00	-.23	-1.23	
Pain intensity	.09	.41	2.11*	
Model 4				.02
Child's age	.01	.05	.25	
Child's gender	-.03	-.02	-.11	
Child's race (i.e., Hispanic)	-.23	-.18	-.42	
Pain duration	-.00	-.08	-.30	
Pain intensity	.02	.09	.21	



Pain duration x Race	-.01	-.15	-.53	
Pain intensity x Race	.08	.49	.81	
<hr/>				
<i>Parental Encouragement and Monitoring (N=38)</i>				
<hr/>				
Model 1				.07
Child's age	.01	.03	.16	
Child's gender	-.33	-.26	-1.60	
Model 2				.02
Child's age	.00	.02	.12	
Child's gender	-.30	-.24	-1.44	
Child's race (i.e., Hispanic)	-.14	-.13	-.77	
Model 3				.11
Child's age	.00	.01	.04	
Child's gender	-.15	-.12	-.69	
Child's race (i.e., Hispanic)	-.05	-.05	-.29	
Pain duration	.01	.33	1.87	
Pain intensity	-.05	-.27	-1.45	
Model 4				.03
Child's age	-.01	-.04	-.21	
Child's gender	-.24	-.19	-1.02	
Child's race (i.e., Hispanic)	.02	.02	.05	
Pain duration	.00	.14	.56	
Pain intensity	.01	.03	.07	
Pain duration x Race	.01	.28	1.08	
Pain intensity x Race	-.06	-.40	-.70	

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

Table 12

*Moderating effects of child's race (i.e., Multiracial) on the relation between child's pain characteristics and parental responses to pain (Black participants are the comparison group).*

Variables	B	$\beta$	<i>t</i>	R <sup>2</sup> Change
<i>Parental Protectiveness (N=26)</i>				
Model 1				.02
Child's age	-.02	-.12	-.57	
Child's gender	-.06	-.06	-.27	
Model 2				.02
Child's age	-.03	-.18	-.78	
Child's gender	-.03	-.03	-.14	
Child's race (i.e., Multiracial)	-.13	-.15	-.64	
Model 3				.05
Child's age	-.02	-.10	-.39	
Child's gender	.07	.07	.27	
Child's race (i.e., Multiracial)	-.08	-.09	-.39	
Pain duration	.00	.11	.41	
Pain intensity	-.05	-.27	-1.01	
Model 4				.01
Child's age	-.02	-.12	-.42	
Child's gender	.11	.11	.36	
Child's race (i.e., Multiracial)	-.27	-.30	-.44	
Pain duration	.00	.18	.48	
Pain intensity	-.07	-.38	-.88	
Pain duration x Race	.00	-.01	-.02	
Pain intensity x Race	.04	.25	.35	
<i>Parental Minimization (N=26)</i>				
Model 1				.30
Child's age	-.04	-.17	-.82	
Child's gender	-.00	-.00	-.01	
Model 2				.01
Child's age	-.03	-.12	-.53	
Child's gender	-.03	-.02	-.10	
Child's race (i.e., Multiracial)	.13	.12	.53	
Model 3				.17
Child's age	-.04	-.19	-.79	
Child's gender	-.34	-.28	-1.12	
Child's race (i.e., Multiracial)	.05	.05	.21	
Pain duration	-.01	-.38	-1.54	
Pain intensity	.10	.47	1.86	
Model 4				.02
Child's age	-.03	-.17	-.62	
Child's gender	-.35	-.29	-1.02	
Child's race (i.e., Multiracial)	.12	.11	.17	
Pain duration	-.00	-.28	-.78	
Pain intensity	.08	.09	.94	

Pain duration x Race	-.00	.01	-.58	
Pain intensity x Race	.01	.11	.12	
<hr/>				
<i>Parental Encouragement and Monitoring (N=26)</i>				
<hr/>				
Model 1				.04
Child's age	-.03	-.19	-.93	
Child's gender	.08	.08	.37	
Model 2				.08
Child's age	-.05	-.32	-1.45	
Child's gender	.13	.13	.63	
Child's race (i.e.)	-.27	-.31	-1.42	
Model 3				.07
Child's age	-.07	-.45	-1.82	
Child's gender	.16	.17	.66	
Child's race (i.e.)	-.31	-.36	-1.59	
Pain duration	.00	.17	.67	
Pain intensity	.03	.18	.69	
Model 4				.08
Child's age	-.07	-.45	-1.70	
Child's gender	.22	.22	.82	
Child's race (i.e.)	-.56	-.65	-1.03	
Pain duration	.01	.48	1.41	
Pain intensity	-.03	-.19	-.47	
Pain duration x Race	-.01	-.34	-1.06	
Pain intensity x Race	.08	.61	.94	
<hr/>				

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

Table 13

*Moderating effects of child's race (i.e., Multiracial) on the relation between child's pain characteristics and parental responses to pain (Hispanic participants are the comparison group).*

Variables	B	$\beta$	<i>t</i>	R <sup>2</sup> Change
<i>Parental Protectiveness (N=38)</i>				
Model 1				.09
Child's age	-.04	-.18	-1.12	
Child's gender	-.34	-.25	-1.58	
Model 2				.00
Child's age	-.04	-.20	-1.11	
Child's gender	-.35	-.26	-1.58	
Child's race (i.e., Multiracial)	-.05	-.05	-.26	
Model 3				.01
Child's age	-.05	-.22	-1.13	
Child's gender	-.38	-.28	-1.56	
Child's race (i.e., Multiracial)	-.05	-.05	-.26	
Pain duration	-4.86E-5	-.00	-.01	
Pain intensity	.02	.08	.43	
Model 4				.01
Child's age	-.04	-.21	-.99	
Child's gender	-.40	-.30	-1.55	
Child's race (i.e., Multiracial)	.21	.19	-.34	
Pain duration	.00	.06	.20	
Pain intensity	.02	.12	.54	
Pain duration x Race	-.00	-.12	-.34	
Pain intensity x Race	-.03	-.17	-.37	
<i>Parental Minimization (N=37)</i>				
Model 1				.04
Child's age	.02	.06	.38	
Child's gender	.32	.19	1.14	
Model 2				.00
Child's age	.02	.08	.44	
Child's gender	.33	.20	1.14	
Child's race (i.e., Multiracial)	.07	.05	.27	
Model 3				.15
Child's age	.00	.01	.06	
Child's gender	.09	.05	.31	
Child's race (i.e., Multiracial)	.09	.07	.39	
Pain duration	-.01	-.19	-1.08	
Pain intensity	.09	.36	2.05*	
Model 4				.01
Child's age	.01	.04	.19	
Child's gender	.11	.06	.34	
Child's race (i.e., Multiracial)	.28	.21	.39	
Pain duration	-.01	-.23	-.83	
Pain intensity	.10	.39	1.94	

Pain duration x Race	.00	.05	.14	
Pain intensity x Race	-.04	-.17	-.38	
<hr/>				
<i>Parental Encouragement and Monitoring (N=38)</i>				
<hr/>				
Model 1				.01
Child's age	-.02	-.09	-.53	
Child's gender	-.07	-.05	-.29	
Model 2				.00
Child's age	-.02	-.09	-.51	
Child's gender	-.07	-.05	-.29	
Child's race (i.e., Multiracial)	-.02	-.01	-.08	
Model 3				.03
Child's age	-.01	-.05	-.24	
Child's gender	.01	.01	.06	
Child's race (i.e., Multiracial)	-.02	-.02	-.09	
Pain duration	.00	.05	.25	
Pain intensity	-.04	-.18	-.92	
Model 4				.12
Child's age	-.03	-.14	-.69	
Child's gender	-.12	-.09	-.47	
Child's race (i.e., Multiracial)	-.16	-.15	-.27	
Pain duration	.01	.43	1.59	
Pain intensity	-.05	-.25	-1.22	
Pain duration x Race	-.02	-.61	-1.70	
Pain intensity x Race	.09	.47	1.02	
<hr/>				
* $p < .05$ ; ** $p < .01$ ; *** $p < .001$				

Table 14

*Moderating effects of child's functional disability on the relation between child's pain characteristics and parental responses to pain.*

Variables	B	$\beta$	<i>t</i>	R <sup>2</sup> Change
<i>Parental Protectiveness (N=566)</i>				
Model 1				.03***
Child's age	-.01	-.03	-.74	
Child's gender	-.23	-.15	-3.70***	
Model 2				.07***
Child's age	-.01	-.05	-1.23	
Child's gender	-.24	-.16	-3.93***	
Child's FDI	.01	.26	6.46****	
Model 3				.00
Child's age	-.01	-.05	-1.20	
Child's gender	-.24	-.16	-3.88***	
Child's FDI	.01	.27	6.36***	
Pain duration	.00	-.01	-.24	
Pain intensity	-.01	-.04	-.86	
Model 4				.02*
Child's age	-.01	-.05	-1.14	
Child's gender	-.24	-.16	-3.98***	
Child's FDI	.03	.51	4.28***	
Pain duration	.00	.14	1.82	
Pain intensity	.02	.06	.75	
Pain duration x FDI	.00	-.19	-2.35*	
Pain intensity x FDI	-.00	-.23	-1.53	
<i>Parental Minimization (N=570)</i>				
Model 1				.01
Child's age	-.02	-.07	-1.63	
Child's gender	.05	.03	.81	
Model 2				.01*
Child's age	-.02	-.08	-1.79	
Child's gender	.05	.03	.79	
Child's FDI	.01	.10	2.49*	
Model 3				.02**
Child's age	-.02	-.07	-1.74	
Child's gender	.04	.02	.58	
Child's FDI	.00	.06	1.29	
Pain duration	-.00	-.05	-1.24	
Pain intensity	.04	.14	3.13**	
Model 4				.00
Child's age	-.02	-.07	-1.71	
Child's gender	.04	.02	.58	
Child's FDI	-.00	-.01	-.08	
Pain duration	-.00	-.04	-.52	
Pain intensity	.02	.09	1.05	
Pain duration x FDI	-7.60E-6	-.01	-.12	

Pain intensity x FDI	.00	.10	.66	
<hr/>				
<i>Parental Encouragement and Monitoring (N=569)</i>				
<hr/>				
Model 1				.02**
Child's age	-.03	-.12	-2.96**	
Child's gender	-.06	-.04	-.90	
Model 2				.01**
Child's age	-.04	-.13	-3.18**	
Child's gender	-.06	-.04	-.95	
Child's FDI	.01	.12	2.83**	
Model 3				.01
Child's age	-.04	-.14	-3.33**	
Child's gender	-.06	-.04	-.86	
Child's FDI	.01	.13	3.06**	
Pain duration	.00	.08	1.94	
Pain intensity	-.01	-.03	-.63	
Model 4				.00
Child's age	-.04	-.14	-3.29***	
Child's gender	-.06	-.04	-.90	
Child's FDI	.01	.21	1.71	
Pain duration	.00	.16	1.96*	
Pain intensity	-.00	-.01	-.09	
Pain duration x FDI	-7.14E-5	-.10	-1.12	
Pain intensity x FDI	.00	-.05	-.35	

*FDI* Functional Disability Inventory (child self-report)

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

Table 15

*Moderating effects of child's depression on the relation between child's pain characteristics and parental responses to pain.*

Variables	B	$\beta$	<i>t</i>	R <sup>2</sup> Change
<i>Parental Protectiveness (N=407)</i>				
Model 1				.01
Child's age	-.02	-.07	-1.46	
Child's gender	-.14	-.09	-1.89	
Model 2				.03***
Child's age	-.02	-.10	-1.95	
Child's gender	-.16	-.11	-2.24*	
Child's CDI	.01	.19	3.79***	
Model 3				.00
Child's age	-.02	-.10	-1.94	
Child's gender	-.16	-.11	-2.22*	
Child's CDI	.01	.19	3.74***	
Pain duration	4.27E-5	.00	.05	
Pain intensity	-.00	-.01	-.11	
Model 4				.01
Child's age	-.02	-.09	-1.84	
Child's gender	-.17	-.12	-2.34*	
Child's CDI	.02	.34	2.10*	
Pain duration	.01	.36	1.89	
Pain intensity	.02	.09	.42	
Pain duration x CDI	.00	-.38	-1.95	
Pain intensity x CDI	-.00	-.14	-.51	
<i>Parental Minimization (N=412)</i>				
Model 1				.01
Child's age	-.02	-.09	-1.79	
Child's gender	.10	.07	1.40	
Model 2				.05***
Child's age	-.03	-.12	-2.38*	
Child's gender	.08	.05	1.03	
Child's CDI	.01	.22	4.45***	
Model 3				.02*
Child's age	-.03	-.11	-2.31*	
Child's gender	.06	.04	.83	
Child's CDI	.01	.19	3.94***	
Pain duration	-.00	-.06	-1.26	
Pain intensity	.03	.11	2.31*	
Model 4				.24
Child's age	-.03	-.11	-2.26*	
Child's gender	.05	.03	.68	
Child's CDI	.00	-.01	-.06	
Pain duration	.00	.03	.15	
Pain intensity	-.05	-.19	-.97	
Pain duration x CDI	-2.81E-5	-.09	-.45	



Pain intensity x CDI	.00	.42	1.58	
<hr/>				
<i>Parental Encouragement and Monitoring (N=410)</i>				
<hr/>				
Model 1				.03**
Child's age	-.03	-.12	-2.44*	
Child's gender	-.16	-.11	-2.16*	
Model 2				.02*
Child's age	-.04	-.13	-2.75**	
Child's gender	-.18	-.12	-.12*	
Child's CDI	.01	.13	2.54**	
Model 3				.00
Child's age	-.04	-.14	-2.81**	
Child's gender	-.17	-.11	-2.30*	
Child's CDI	.01	.13	2.51**	
Pain duration	.00	.05	1.03	
Pain intensity	-6.31E-5	.00	-.01	
Model 4				.00
Child's age	-.04	-.14	-2.82**	
Child's gender	-.17	-.11	-2.23*	
Child's CDI	.01	.13	.81	
Pain duration	-.00	-.03	-.17	
Pain intensity	.01	.03	.15	
Pain duration x CDI	2.91E-5	.09	.45	
Pain intensity x CDI	.00	-.04	-.15	

*CDI* Child Depression Inventory (child self-report)

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

Table 16

*Moderating effects of child's anxiety on the relation between child's pain characteristics and parental responses to pain.*

Variables	B	$\beta$	<i>t</i>	R <sup>2</sup> Change
<i>Parental Protectiveness (N=407)</i>				
Model 1				.02*
Child's age	-.02	-.08	-1.69	
Child's gender	-.15	-.10	-2.03*	
Model 2				.05***
Child's age	-.03	-.13	-2.56**	
Child's gender	-.15	-.10	-2.15*	
Child's RCMAS	.01	.23	4.65***	
Model 3				.00
Child's age	-.03	-.13	-2.55**	
Child's gender	-.15	-.11	-2.18*	
Child's RCMAS	.01	.23	4.59***	
Pain duration	.00	-.01	-.20	
Pain intensity	.01	.03	.55	
Model 4				.01
Child's age	-.03	-.12	-2.50**	
Child's gender	-.15	-.10	-2.10*	
Child's RCMAS	.02	.41	2.65**	
Pain duration	.00	.01	.04	
Pain intensity	.09	.32	1.40	
Pain duration x RCMAS	-9.20E-6	-.03	-.12	
Pain intensity x RCMAS	-.00	-.37	-1.31	
<i>Parental Minimization (N=412)</i>				
Model 1				.01
Child's age	-.03	-.10	-2.04*	
Child's gender	.10	.07	1.34	
Model 2				.03**
Child's age	-.03	-.13	-2.65**	
Child's gender	.09	.06	1.29	
Child's RCMAS	.01	.16	3.28**	
Model 3				.03**
Child's age	-.03	-.13	-2.62**	
Child's gender	.07	.05	.99	
Child's RCMAS	.01	.16	3.20**	
Pain duration	-.00	-.07	-1.50	
Pain intensity	.04	.14	2.81**	
Model 4				.00
Child's age	-.03	-.13	-2.61**	
Child's gender	.07	.05	.99	
Child's RCMAS	.01	.09	.61	
Pain duration	-.01	-.17	-.72	
Pain intensity	.02	.06	.28	
Pain duration x RCMAS	3.58E-5	.10	.43	

Pain intensity x RCMAS	.00	.09	.33	
<hr/>				
<i>Parental Encouragement and Monitoring (N=410)</i>				
<hr/>				
Model 1				.03**
Child's age	-.03	-.12	-2.41*	
Child's gender	-.16	-.11	-2.20*	
Model 2				.02*
Child's age	-.04	-.14	-2.85**	
Child's gender	-.17	-.11	-2.25*	
Child's RCMAS	.01	.13	2.57*	
Model 3				.00
Child's age	-.04	-.14	-2.90**	
Child's gender	-.16	-.11	-2.17*	
Child's RCMAS	.01	.13	2.51*	
Pain duration	.00	.05	.92	
Pain intensity	.00	.00	.05	
Model 4				.00
Child's age	-.04	-.14	-2.89**	
Child's gender	-.16	-.11	-2.14*	
Child's RCMAS	.00	.08	.48	
Pain duration	-.00	-.06	-.27	
Pain intensity	-.01	-.04	-.19	
Pain duration x RCMAS	3.99E-5	.12	.47	
Pain intensity x RCMAS	.00	.06	.21	

*RCMAS* Revised Children's Manifest Anxiety Scale (child self-report)

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

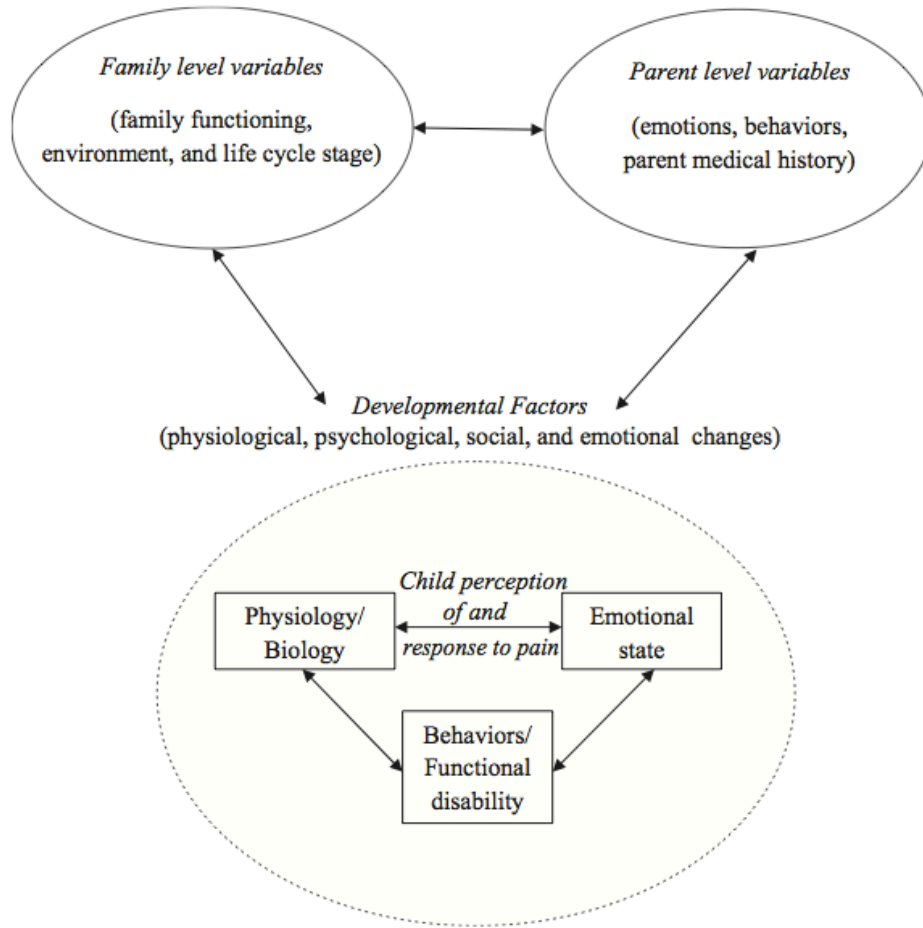


Figure 1. A developmental perspective on family and parent influences on pediatric chronic pain and disability (Palermo et al., 2014).

## Appendix A

## Demographic Questionnaire

Today's Date: \_\_\_/\_\_\_/\_\_\_

Child's Name: \_\_\_\_\_

Child's Age: \_\_\_\_\_

Child's Gender: \_\_\_\_\_

Child's Race (Select all that apply)

White  Black  Asian  Native American  Multiracial  Other

Child's Ethnicity

Not Hispanic or Latino  Hispanic or Latino

Parent's Marital Status: \_\_\_\_\_

Parents' Occupation:

Mother: \_\_\_\_\_

Father: \_\_\_\_\_

Parents' Highest Level of Education

Mother: \_\_\_\_\_

Father: \_\_\_\_\_

When did your child's recent pain problem begin? \_\_\_/\_\_\_ (month/year)

## Appendix B

## Adult Responses to Children's Symptoms

(Van Slyke &amp; Walker, 2006)

The next questions are about what you do when your child has pain. For each question, choose one of the answers: Never = you never do this; Once in a while = you only do this once in a while; Sometimes = you do this some of the time; Often = you usually do this; Always = you always do this.

OVER THE PAST TWO WEEKS, when your child has pain, how often do you...

1. Ask your child what you can do to help?  
 Never    Once in a while    Sometimes    Often    Always
2. Express irritation or frustration with your child?  
 Never    Once in a while    Sometimes    Often    Always
3. Do your child's chores or pick up your child's things instead of making him/her do it?  
 Never    Once in a while    Sometimes    Often    Always
4. Try to get your child to rest?  
 Never    Once in a while    Sometimes    Often    Always
5. Talk to your child about something else to take your child's mind off it?  
 Never    Once in a while    Sometimes    Often    Always
6. Give your child some medicine?  
 Never    Once in a while    Sometimes    Often    Always
7. Reassure your child that he/she is going to be O.K.?  
 Never    Once in a while    Sometimes    Often    Always

8. Get your child something to eat or drink?
- Never    Once in a while    Sometimes    Often    Always
9. Spend more time than usual with your child?
- Never    Once in a while    Sometimes    Often    Always
10. Bring your child treats or special gifts?
- Never    Once in a while    Sometimes    Often    Always
11. Try not to pay attention to your child?
- Never    Once in a while    Sometimes    Often    Always
12. Ask your child questions about how he/she feels?
- Never    Once in a while    Sometimes    Often    Always
13. Let your child stay home from school?
- Never    Once in a while    Sometimes    Often    Always
14. Encourage your child to do something he/she enjoys (like watch TV or play a game)?
- Never    Once in a while    Sometimes    Often    Always
15. Call the doctor or take your child to the doctor?
- Never    Once in a while    Sometimes    Often    Always
16. Tell your child that he/she doesn't have to finish all of his/her homework?
- Never    Once in a while    Sometimes    Often    Always
17. Tell your child there's nothing you can do about it?
- Never    Once in a while    Sometimes    Often    Always
18. Give your child special privileges or let him/her do things that he/she usually isn't allowed to do (like stay up late or watch more TV)?

Never    Once in a while    Sometimes    Often    Always

19. Stay home from work or come home early (or stay home instead of going out or running errands)?

Never    Once in a while    Sometimes    Often    Always

20. Tell others in the family not to bother your child or to be especially nice to your child?

Never    Once in a while    Sometimes    Often    Always

21. Tell your child not to make such a fuss about it?

Never    Once in a while    Sometimes    Often    Always

22. Pay more attention to your child than usual?

Never    Once in a while    Sometimes    Often    Always

23. Worry a lot about your child?

Never    Once in a while    Sometimes    Often    Always

24. Let your child sleep in a special place (like in your room or the couch)?

Never    Once in a while    Sometimes    Often    Always

25. Tell your child that he/she needs to learn to be stronger?

Never    Once in a while    Sometimes    Often    Always

26. Let your child sleep later than usual in the morning?

Never    Once in a while    Sometimes    Often    Always

27. Keep your child inside the house?

Never    Once in a while    Sometimes    Often    Always

28. Let your child get away with things he/she is not supposed to do?

Never    Once in a while    Sometimes    Often    Always



29. Try to involve your child in some activity?

- Never    Once in a while    Sometimes    Often    Always

30. Insist that your child go to school?

- Never    Once in a while    Sometimes    Often    Always

31. Try to make your child as comfortable as possible?

- Never    Once in a while    Sometimes    Often    Always

32. Tell your child you still expect him/her to do his/her chores or pick up his/her things around the house?

- Never    Once in a while    Sometimes    Often    Always

33. Check on your child to see how he/she is doing?

- Never    Once in a while    Sometimes    Often    Always

## Appendix C

## Child – Functional Disability Inventory

Claar and Walker (2006)

When people are sick or not feeling well it is sometimes difficult for them to do their regular activities.

IN THE PAST TWO WEEKS, have you had any physical trouble or difficulty doing these activities?

1. Walking to the bathroom

Never    Once in a while    Sometimes    Often    Always

2. Walking up the stairs

Never    Once in a while    Sometimes    Often    Always

3. Doing something with a friend (for example, playing a game)

Never    Once in a while    Sometimes    Often    Always

4. Doing chores at home

Never    Once in a while    Sometimes    Often    Always

5. Eating regular meals

Never    Once in a while    Sometimes    Often    Always

6. Being up all day without a nap or rest

Never    Once in a while    Sometimes    Often    Always

7. Riding the school bus or travelling in the car

Never    Once in a while    Sometimes    Often    Always

8. Being at school all day

Never    Once in a while    Sometimes    Often    Always

9. Doing the activities in gym class (or playing sports)

Never    Once in a while    Sometimes    Often    Always

10. Reading or doing homework

Never    Once in a while    Sometimes    Often    Always

11. Watching TV

Never    Once in a while    Sometimes    Often    Always

12. Walking the length of a football field

Never    Once in a while    Sometimes    Often    Always

13. Running the length of a football field

Never    Once in a while    Sometimes    Often    Always

14. Going shopping

Never    Once in a while    Sometimes    Often    Always

15. Getting to sleep at night and staying asleep

Never    Once in a while    Sometimes    Often    Always

## Appendix D

## Revised Children's Manifest Anxiety Scale

(Reynolds &amp; Richmond, 1978, 1985)

## What I Think and Feel

(RCMAS-2)

Circle one answer for each sentence.

- |   |     |    |
|---|-----|----|
| 1. Often I feel sick in my stomach .....                                    | Yes | No |
| 2. I am nervous .....   | Yes | No |
| 3. I often worry about something bad happening to me .....                  | Yes | No |
| 4. I fear other kids will laugh at me in class .....                        | Yes | No |
| 5. I have too many headaches .....  | Yes | No |
| 6. I worry that others do not like me .....                                 | Yes | No |
| 7. I wake up scared sometimes .....   | Yes | No |
| 8. I get nervous around people .....  | Yes | No |
| 9. I feel someone will tell me I do things the wrong way .....              | Yes | No |
| 10. I fear other people will laugh at me .....                              | Yes | No |
| <b><i>Continue with item 11 unless you have been told to stop here.</i></b> |     |    |
| 11. I have trouble making up my mind .....                                  | Yes | No |
| 12. I get nervous when things do not ho the right way for me .....          | Yes | No |
| 13. Others seem to do things easier than I can .....                        | Yes | No |
| 14. I like everyone I know .....  | Yes | No |
| 15. Often I have trouble getting my breath .....                            | Yes | No |
| 16. I worry a lot of the time .....   | Yes | No |

- |  |     |    |
|--|-----|----|
| 17. I feel bad if people laugh at me .....                   | Yes | No |
| 18. I am afraid of a lot of things .....                     | Yes | No |
| 19. I am always kind .....                                   | Yes | No |
| 20. I get mad easily .....                                   | Yes | No |
| 21. I worry about what my parents will say to me .....       | Yes | No |
| 22. I feel that others do not like the way I do things ..... | Yes | No |
| 23. I am afraid to give a talk to my class .....             | Yes | No |
| 24. I always have good manners .....                         | Yes | No |
| 25. It is hard for me to get to sleep at night .....         | Yes | No |
| 26. I worry about what other people think about me .....     | Yes | No |
| 27. I feel alone even when there are people with me .....    | Yes | No |
| 28. I get teased at school .....                             | Yes | No |
| 29. I am always good .....                                   | Yes | No |
| 30. My feelings get hurt easily .....                        | Yes | No |
| 31. My hands feel sweaty .....                               | Yes | No |
| 32. I worry about making mistakes in front of people .....   | Yes | No |
| 33. I am always nice to everyone .....                       | Yes | No |
| 34. I am tired a lot .....                                   | Yes | No |
| 35. I worry about what is going to happen .....              | Yes | No |
| 36. Other people are happier than I am .....                 | Yes | No |
| 37. I am afraid to speak in a group .....                    | Yes | No |
| 38. I tell the truth every single time .....                 | Yes | No |
| 39. I have bad dreams .....                                  | Yes | No |

- |  |     |    |
|--|-----|----|
| 40. I get angry sometimes .....                              | Yes | No |
| 41. I worry about being called on in class .....             | Yes | No |
| 42. I worry when I go to bed at night .....                  | Yes | No |
| 43. It is hard for me to keep my mind on my schoolwork ..... | Yes | No |
| 44. I sometimes say things I should not say .....            | Yes | No |
| 45. I worry about someone beating me up .....                | Yes | No |
| 46. I wiggle in my seat a lot .....                          | Yes | No |
| 47. A lot of people are against me .....                     | Yes | No |
| 48. I have told a lie .....                                  | Yes | No |
| 49. I worry about saying something dumb .....                | Yes | No |

## Appendix E

Children's Depression Inventory (2<sup>nd</sup> Ed.)

(Kovacs, 1981)

For each group, pick out the sentence that describes you the best in the PAST TWO WEEKS.

**Item 1**

- I am sad once in a while.
- I am sad many times.
- I am sad all the time.

**Item 2**

- Nothing will ever work out for me.
- I am not sure if things will work out for me.
- Things will work out for me O.K.

**Item 3**

- I do most things O.K.
- I do many things wrong.
- I do everything wrong.

**Item 4**

- I have fun in many things.
- I have fun in some things.
- Nothing is fun at all.

**Item 5**

- I am important to my family.
- I am not sure if I am important to my family.
- My family is better off without me.

**Item 6**

- I hate myself.
- I do not like myself.
- I like myself.

**Item 7**

- All bad things are my fault.
- Many bad things are my fault.
- Bad things are not usually my fault.

**Item 8**

- I do not think about killing myself.
- I think about killing myself but would not do it.
- I want to kill myself.

**Item 9**

- I feel like crying every day.
- I feel like crying many days.
- I feel like crying once in a while.

**Item 10**

- I feel cranky all the time.
- I feel cranky many times.
- I am almost never cranky.

**Item 11**

- I like being with people.
- I do not like being with people many times.
- I do not want to be with people at all.

**Item 12**

- I cannot make up my mind about things.
- It is hard to make up my mind about things.
- I make up my mind about things easily.

**Item 13**

- I look O.K.
- There are some bad things about my looks.
- I look ugly.

**Item 14**

- I have to push myself all the time to do my schoolwork.
- I have to push myself many times to do my schoolwork.
- Doing schoolwork is not a big problem.

**Item 15**

- I have trouble sleeping every night.
- I have trouble sleeping many nights.
- I sleep pretty well.

**Item 16**

- I am tired once in a while.
- I am tired many days.
- I am tired all the time.

**Item 17**

- Most days I do not feel like eating.
- Many days I do not feel like eating.
- I eat pretty well.

**Item 18**

- I do not worry about aches and pains.
- I worry about aches and pains many times.
- I worry about aches and pains all the time.

**Item 19**

- I do not feel alone.
- I feel alone many times.
- I feel alone all the time.

**Item 20**

- I never have fun at school.
- I have fun at school once in a while.
- I have fun at school many times.



**Item 21**

- I have plenty of friends.
- I have some friends but I wish I had more.
- I do not have any friends.

**Item 22**

- My schoolwork is alright.
- My schoolwork is not as good as before.
- I do very badly in subjects I used to be good in.

**Item 23**

- I can never be as good as other kids.
- I can be as good as other kids if I want to.
- I am just as good as other kids.

**Item 24**

- Nobody really loves me.
- I am not sure if anybody loves me.
- I am sure that somebody loves me.

**Item 25**

- It is easy for me to get along with friends.
- I get into arguments with friends many times.
- I get into arguments with friends all the time.

**Item 26**

- I fall asleep during the day all the time.
- I fall asleep during the day many times.
- I almost never fall asleep during the day.

**Item 27**

- Most days I feel like I can't stop eating.
- Many days I feel like I can't stop eating.
- My eating is O.K.

**Item 28**

- It is easy for me to remember things.
- It is a little hard for me to remember things.
- It is very hard to remember things.