# PARENTAL INFLUENCE ON CHILDREN'S CHRONIC ABDOMINAL PAIN EXPERIENCES: EXPLORING THE RELATIONSHIP BETWEEN PARENTAL PROTECTIVE BEHAVIORS AND CHILD QUALITY OF LIFE

BY

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Abstract

Initial studies examining relationships between parent behaviors and child functioning in chronic pain populations have documented positive associations between parental protective behaviors and child somatic complaints, emotional difficulties (e.g., anxiety, depression), and functional disability. The current study attempts fills existing gaps in this literature by examining the relationship between two specific types of parental protective behaviors (i.e., provision of attention and activity restriction) and Quality of Life (QoL) in a clinical population of children with chronic abdominal pain, while including age and gender as potential moderators. Medical records from initial evaluation at a tertiary pain clinic were reviewed for 430 child and adolescent chronic abdominal pain patients. Parent-reported protective behaviors were assessed via the Illness Behavior Encouragement Scale (IBES; Walker & Zeman, 1992) and QoL was assessed using the Pediatric Quality of Life Inventory, Version 4.0 (PedsQL 4.0; Varni, Seid, & Kurtin, 2001). Simple and hierarchical regression analyses were conducted to examine relationships among variables of interest. Results support previous findings that indicate the importance of parental protective behavior in predicting child functioning and extend previous findings to include multiple types of protective behavior and domains of child functioning. Age and gender differences in these relationships are noted. By identifying specific parental behaviors associated with particularly negative child QoL, the reported results provide information relevant to the development of targeted and effective parent education programs for families coping with a child with chronic pain and directions for future research within the field.

# Parental Influence on Children's Chronic Abdominal Pain Experiences: Exploring the Relationship between Parental Protective Behaviors and Child Quality of Life

In the last twenty years, chronic and recurrent pain (typically defined as pain present at least 8-12 weeks within the last year) has become increasingly recognized as an often-debilitating problem that affects children, as well as adults (Dahlquist & Nagel, 2009). Prevalence estimates indicate that as many as 20-30% of children and adolescents are affected at some point by chronic or recurrent pain (Perquin et al., 2000). Children with chronic pain tend to concurrently exhibit higher levels of anxiety and depressive symptoms, higher functional disability, and lower quality of life (QoL) than their healthy peers (Di Lorenzo et al., 2005; Hunfeld et al., 2001; Youssef, Langseder, Verga, Mones, & Rosh, 2005). Furthermore, pediatric chronic pain has been associated with long-term risk of chronic pain conditions, psychiatric symptoms and functional impairment (Fearon & Hotopf, 2001; Walker, Dengler-Crish, Rippel, & Bruehl, 2010; Walker, Garber, Van Slyke, & Greene, 1995), making pediatric chronic pain a significant public health concern.

Abdominal pain is one of the most common pain complaints among children and adolescents, affecting as much as 22% of the population of children with chronic pain conditions (Perquin et al., 2000), and thus deserves special attention. Similar to other chronic pain complaints, abdominal pain has long been theorized to be associated with anxiety, and has a number of other documented psychosocial correlates impacting at least a substantial subset of children, including depression, poor QoL, impaired social skills, and poor school functioning (Bongers, van Dijk, Benninga, & Grootenhuis, 2009; Mackner, 2004; Schurman et al., 2008; Walker et al., 1993). Traditionally, chronic abdominal pain has been conceptualized as being categorized into two distinct types: organic and functional (i.e., those associated with known

structural or biochemical abnormalities and those not; Banez & Cunningham, 2009). While some cases may have a clear organic cause, as many as 70-95% are considered functional and are ill-defined as to the causes involved (El-Matary, Spray, & Sandhu, 2004; Gaylord & Carson, 1983). This organic versus non-organic dichotomy has fueled the belief that some types of pain are biologically derived while other types (typically non-organic in etiology) are "simply" psychological. More recent research has called into question the validity of this historical belief that pain is either biological or psychological, however (e.g., Gatchel, Peng, Peters, Fuchs, & Turk, 2007; Hyams & Hyman, 1998). Instead, this recent work suggests a much more complex etiology and system of maintenance for pain previously considered functional in nature.

A biopsychosocial model is now commonly regarded as the gold standard for understanding chronic pain, including pediatric functional abdominal pain. This model proposes that chronic pain is both a result and a cause of complex interactions between neurological, physiological, emotional, and social components (Gatchel, Peng, Peters, Fuchs, & Turk, 2007). Increased scientific attention and improvements in technology have yielded rapid gains in the understanding of chronic pain in recent years. However, the specific mechanisms of the relationships involved in pain etiology and expression, as well as the impact of these complex relationships on treatment, are still unclear. The multitude of psychosocial factors potentially implicated in chronic pain (Gatchel et al., 2007) makes this component one of the least understood aspects of the biopsychosocial model.

Interactions with parents may be one particularly important psychosocial factor potentially associated with pediatric chronic pain. Most theories of social development argue that parents represent a large and important component of a child's social network (e.g.,

Furman, 1989). Furthermore, previous research has noted the continued influence of parents on psychosocial development and health behaviors, such as medication adherence, throughout adolescence (Ellis et al., 2007; von Salisch, 2001), suggesting that parents may be a key element in considering the psychosocial functioning of pediatric populations. Several parental characteristics and attitudes already have documented relationships with child outcomes among pediatric pain populations. These include parent anxiety, depression, appraisal of risk associated with pain, and coping style (Guite, Logan, McCue, Sherry, & Rose, 2009; Koloski, Boyce, & Talley, 2005; Lipani & Walker, 2005). Recently, studies have begun to examine the direct behavioral responses to pain that parents exhibit and how these responses are related to child pain experiences and psychosocial outcomes.

*Parental Behavior in Response to Pain*

Results of a factor analysis by Van Slyke and Walker (2006) indicated that parental responses to pain behavior comprise three distinct factors. First, protection behaviors include paying more attention to the child than usual and restricting the child's behaviors during times of pain. Second, minimization behaviors include ignoring behavior and expressing irritation in response to pain behavior. Finally, distraction and monitoring behaviors include encouraging engagement in pleasant or pain-reducing activities and checking on pain symptoms. Theoretically, these distinct parent reactions may be associated with different child behaviors with regard to pain and, thus, may be associated with unique outcomes across a variety of domains (e.g., social, emotional, and physical functioning).

Parental protective behaviors are among the most frequently reported responses to child pain (Claar et al., 2008). Parents may engage in these protective responses because they believe that the positive attention and/or rest is less likely to make their child feel worse than

distraction techniques or minimization (Walker et al., 2006). Parents may have learned that these behaviors are immediately effective in reducing their children's discomfort during typical acute illness situations (e.g., flu, common cold, etc.). However, despite the intuitive appeal to parents, protective illness response behaviors within the context of chronic pain actually may be associated with increased illness behavior and maladaptive outcomes in the child. According to operant conditioning principles, protective behaviors may be reinforcing to children and thus increase the incidence illness-related behavior (e.g., complaining of pain, avoiding school, restricting activities; Flor, Knost, & Birbaumer, 2002; Joliffe & Nicholas, 2004). Multiple mechanisms could be at play in this relationship between parental behaviors and child factors. Some parental behaviors (e.g., providing the child with special treats when sick) will act as positive reinforcers, while others (e.g., allowing the child to miss school) will negatively reinforce behaviors. The differences in the reinforcement processes involved may result in important differences in child outcomes. For example, avoidance of unpleasant activities may be particularly reinforcing for children, in turn leading to more undesirable illness behavior than additional attention only. Alternately, the combination of both positive and negative reinforcers may be more reinforcing than either alone. Previous analyses of a measure specific to parental protective behavior in the context of chronic pain/illness supported a two-factor solution that maps well onto this conceptual dichotomization (Bijttebier & Vertommen, 1999; Schurman et al., in preparation). Specifically, these studies were consistent in identifying two distinct factors within the broader category of parental protection behavior: (a) attention (positive reinforcement); and, (b) release from responsibility (negative reinforcement).

Initial studies also have supported the possible connection between protective behaviors

and maladaptive child outcomes (Claar et al., 2008; Guite et al., 2009; Kaczynski et al., 2008). These early studies rarely distinguished between the two types of protective behaviors and focus primarily on parental attention to illness behaviors. In one seminal study (Whitehead, Winget, Fedoravicius, Wooley, & Blackwell, 1982), more parental attention to minor childhood illness (colds and abdominal pain), examined by retrospective report, was positively associated with more somatic complaints in adulthood. Recently, some carefully controlled laboratory experiments have been conducted to better understand the role of specific types of parental protective behavior on pain. Although these laboratory studies largely focus on acute and/or procedural pain, findings may be relevant to chronic pain situations. One such study of acute pain from a cold pressor procedure performed with healthy children found that daughters of mothers trained to use protective verbalizations (e.g., attention, sympathy) reported much higher intensity of pain (though no less tolerance for pain or more negative affect; Chambers et al., 2002). Walker and colleagues (2006) found similar results in another laboratory study of acute abdominal discomfort from a waterload task. In this experimental study, some parents were trained to verbally attend to their child's pain, some parents were trained to use distraction techniques, and some parents received no training at all. In response, children in the verbal attention group reported nearly twice the number of pain-related symptoms as those in the no training group and nearly four times the pain-related symptoms as those in the distraction group. A large body of research on immunization and procedural pain has reported that similar effects can be seen in more naturally occurring acute pain (see Schechter et al., 2006, for a review).

A few studies are available that support the extrapolation of these findings to children with chronic pain. Within these chronic pain studies, measures that assess severity of pain tend

to be associated with parental protective behavior more clearly than measures of pain frequency alone. Studies examining pediatric abdominal pain, in particular, have found a positive relationship between parental protective responses and *severity* of pain (Levy et al., 2004; Walker, Claar, & Garber, 2002). However, parental behavior has not been associated with *frequency* of abdominal pain or other pain complaints (Levy et al., 2004). Taken together, research on both acute and chronic pain in children suggests that parental behavior may not prevent or induce pain per se, but instead affects child appraisal of pain or other psychosocial factors that, in turn, result in more expressed severity but no more discrete instances of pain.

Although most previous studies of parental protective behavior use a measure of pain (e.g., frequency, severity) as the primary outcome, psychosocial outcomes may tap the effects of parental protective behaviors on child functioning more directly. Furthermore, direct measures of pain may not always be the most clinically relevant outcomes given that the complete absence of pain is not always a viable goal for children with chronic pain. In practice, this causes a need to shift the goals of clinical treatment from the absence of pain to improvement in the management of symptoms, coping ability of the child, and engagement in normal daily activities (Banez & Cunningham, 2009). Consequently, QoL may be particularly relevant, and arguably better than measures of pain, in assessing outcomes for pediatric chronic pain (Roberts, Brown, Johnson, & Reinke, 2005; Spieth & Harris, 1996). QoL provides information on functioning in broad areas that are likely to be affected by childhood health problems, such as physical, emotional, social, and school domains. As outlined above, a sizable body of literature has been developed regarding the associations between social factors such as parent responses to pain and physical functioning. However, the associations between the same social factors and children's psychosocial functioning, broadly defined, are still relatively

understudied. The emerging empirical literature within the field and the biopsychosocial model of chronic pain suggests that both types of functioning may be important to examine in understanding children's overall well-being. The ability of QoL measures to assess both physical and psychosocial aspects of functioning makes them particularly promising for further exploring the associations between specific parent behaviors and child outcomes.

Despite often being treated equivalently, QoL may be differentiated from the related construct of functional disability. QoL measures focus on the presence or absence of adaptive functioning, rather than on maladaptive symptoms. While functional disability tools tend to focus exclusively on a patient's ability to complete specific tasks of daily living, QoL may be conceptualized more broadly as assessing the presence of adaptive skills in a wider variety of areas (e.g., emotional functioning and quality of social relationships, as well as physical functioning and specific skills) and the individual's overall satisfaction with life. Thus, QoL provides a broader conceptual understanding of children's overall functioning beyond that provided by measures of disability alone.

Several studies document lower QoL among children with chronic abdominal pain and other chronic pain conditions compared to healthy peers (e.g., Hunfeld et al., 2001; Talley et al., 2005; Youssef, Murphy, Langseder, & Rosh, 2006). Research into potential mechanisms underlying the relationship between chronic pain and lower QoL has only begun to take shape and the possible effects of parent behaviors on this relationship have not yet been fully examined. However, existing studies examining related psychosocial concepts, such as functional disability and specific psychological symptoms, can shed some light on the potential role parent behavior might play within this relationship.

To date, parental attention and allowing absence from school have been associated with

increased functional disability and psychosocial difficulties such as depressions, as well as decreased family functioning, among children with chronic pain (e.g., Claar et al., 2008; Kaczynski, Claar, & Logan, 2008; Merlijn et al., 2006; Wagner et al., 2003). However, research in this area is still in its nascence and some studies have found inconclusive and even contradictory results. Merlijn et al. (2006), notably, found that parental attention to pain was associated with better psychosocial functioning. In contrast, Claar and colleagues (2008) observed noted that more parental protective behavior as a whole (i.e., both attention and release from responsibility) was weakly associated with worse physical functioning, as measured by greater functional disability and somatic complaints, among children with chronic pain. Lipani and Walker (2005) echoed these latter findings; they found that more restriction of family activities was associated with the child's greater perceived threat of the pain, revealing the potential role of release from responsibility in poorer psychosocial functioning. However, there are potentially important caveats to these discrepant findings. First, the relationship described by Merlijn et al. was found in a sample comprised only of adolescents, whereas the other studies noted above included a cross-section of children and adolescents. In addition, the relationship described by Claar's group was seen only in children with higher levels of anxiety and depression symptoms, variables which were not included as potential moderators in the other studies. Finally, the studies by Merlijn et al. and Lipani and Walker focused exclusively on independently measured positive and negative reinforcement behaviors, respectively, whereas Claar and colleagues included both positive and negative reinforcement behaviors examined as a unitary construct. Such differences in methodology, especially in clearly defining parental protective behavior as positive reinforcement (i.e., attention), negative reinforcement (i.e., release from responsibility), or both, make it difficult to differentiate the

effects of different types of parental protective behaviors on child physical and psychosocial functioning, or on quality of life more broadly.

Furthermore, more complex moderated relationships have yet to be fully explored. Some of the discrepancies identified within the literature may be the result of demographic characteristics of the samples utilized. As noted above, Claar et al. (2008) sampled both children and adolescents, whereas Merlijn and colleagues' (2006) sample included only adolescents. A similar study exclusively comprised of adolescents with chronic pain found that parent reinforcement of illness behavior was not consistently related to experiencing chronic pain (Brace, Smith, McCauley, & Sherry, 2000). These results may suggest that children are affected more negatively by parental protective behaviors than adolescents. Theoretical models and basic research that propose the increasing importance of peers relative to parents in predicting psychosocial well-being throughout adolescence further support this possibility (e.g., Helsen, Vollebergh, & Meeus, 2000; Nickerson & Nagle, 2005). However, studies also report that parent relationships remain at least as strongly predictive of life satisfaction as are peers throughout adolescents (Helsen et al., 2000; Raja, McGee, & Stanton, 1992). Differential relationships based on age are thus worthy of additional attention but have not yet been closely examined within this context. The effect of gender on the relationships between parental protective behavior and child pain experiences and psychosocial functioning is similarly unclear. An early study of parental behavior and child acute pain in laboratory settings indicated that girls whose parents were instructed to engage in protective verbal behaviors were more affected by this parental behavior than their male counterparts (Claar et al., 2008). However, Kaczynski, Claar, and Logan (2009) were unable to replicate gender differences outside the laboratory environment when they examined ratings of naturally

occurring pain among a sample of chronic pain patients. Additional research is needed to clarify the role that these demographic variables, which are common across all chronic pain populations, play in the actual relationship between parental protective behaviors and child functioning.

On balance, there appears to be general support for the association of parental protective behaviors and impaired physical and psychosocial functioning among chronic pain populations. These broad results have important clinical implications, supporting the need to educate parents regarding the potentially problematic effects of their natural inclination toward protective behaviors within the context of chronic pain. However, identifying which specific parental behaviors are most strongly associated with particularly problematic child functioning, and for which children, is an essential step in developing targeted and effective parent education programs for families coping with a child with chronic pain.

*Current Study*

The current study examined the relationship between parental protective behaviors and child QoL in a clinical population of children with chronic abdominal pain. Chronic abdominal pain was selected as the target of this study given its high prevalence within the pediatric chronic pain population, but may serve as a model for other chronic pain subgroups. The primary aim of this study was to replicate and extend previous findings regarding the negative contemporaneous associations between parental protective behavior and child functioning. The study sought first to replicate findings that greater parental protective behavior, as a unitary construct, is associated with worse child physical functioning and to extend this relationship to a more comprehensive measure of both physical and psychological well-being (i.e., QoL). The study sought to further expand the understanding of this broad relationship by

examining the independent associations of the two previously defined types of parental protective behavior (i.e., attention and release from responsibility) with the child's quality of life. Finally, the present study afforded the opportunity to examine age and gender as potentially important moderators of any significant relationships identified.

The two primary hypotheses of this study, supported by the current literature, were: (a) higher levels of parental protective behavior, as a unitary construct, would correlate with lower physical and psychosocial functioning in the child; and (b) higher levels of parental attention (i.e., positive reinforcement) would correlate with lower physical and psychosocial functioning in the child. Release from responsibility has rarely been studied independently of parental attention and, thus, only a tentative independent relationship could be hypothesized with physical and psychosocial functioning in the same direction as outlined for parental attention. The relative strength of these two factors and the potential for interactions between the two have not been previously studied and were considered exploratory analyses. Finally, child age and gender were expected to moderate relationships between parental protective behaviors and child functioning such that stronger relationships would exist for younger children and girls.

## Method

### Participants

Participants were patients seen for a first evaluation within a single outpatient multidisciplinary clinic specializing in the assessment and treatment of pediatric functional abdominal pain between May 2007 and May 2010. This clinic, housed within a large pediatric hospital in the Midwest, serves children and adolescents aged 8-17 (inclusive) who report a history of abdominal pain persisting for at least 8 weeks. Children with medical "red flags" indicating likely identifiable organic disease (e.g., significant short-term weight loss, bloody

stools, excessive vomiting) are not seen within the clinic and are, instead, referred to other providers and services. In addition, children identified by their parents during phone intake as having significant learning or developmental disabilities that would make them unable to complete the standard assessment process for the clinic (including several paper-based multiple choice questionnaires) are referred to other providers and services. As part of the standard clinical assessment process, all patients are diagnosed using the Rome III symptom-based criteria for functional gastrointestinal disorders (FGIDs; Rasquin et al., 2006). Families in the clinic represent children with a variety of FGIDs and are predominantly Caucasian. Parent measures are completed by the accompanying legal guardian, which is most often patients' mothers.

Data were collected via chart review from 440 patients who were seen at the clinic during this three year period and, thus, completed the standard clinical assessment battery. Information from both the patient and the accompanying parent were collected. Ten cases were missing at least one of the three measures used in this study and were excluded from analyses (final N = 430). Given that all measures are required to be completed as part of the standard clinical assessment, missing data likely resulted from clerical issues in sending/receiving charts from long-term storage. No other cases were excluded from the current study. Data on patients referred to other clinics or services was not available given the chart review nature of this study.

**Measures**

*Parental Protective Behavior*. The Illness Behavior Encouragement Scale (IBES; Walker & Zeman, 1992) is a 12-item self-report scale that assesses parental protective responses to child pain behaviors. The scale was developed for use with parents of children

and adolescents with chronic abdominal pain. Scores are reported on a five-point Likert-type scale (ranging from never to almost always). Two items are reverse scored. Higher scores reflect more frequent occurrence of protective behaviors. Relatively high Cronbach's alphas have been reported for maternal report of behavior ($\alpha$ = .71 to .85; Guite et al., 2009; Jellesma et al., 2008; Walker & Zeman, 1992). Cronbach alphas for the current sample were comparable to previous analyses ($\alpha$ = .73, $\alpha$ = .79, and $\alpha$ = .83 for Release from Responsibility, Attention, and total IBES, respectively). Similarly, Pearson correlation coefficients indicate acceptable test-retest reliability (r = 0.72; Walker & Zeman, 1992). Factor analysis of the scale indicates that items load onto two distinct factors: Attention and Release from Responsibility (Bijttebier & Vertommen, 1999; Schurman et al., in preparation). The Release from Responsibility factor taps behaviors that may act as negative reinforcers for child illness behavior. It includes items such as "let [your child] stay home from school" and "say [your child] does not have to finish homework." Items that load on the Attention factor address the receipt of social attention and special privileges that are potential positive reinforcers for child illness behavior. It includes items such as "spend more time with [your child]" and "bring special treats or little gifts [to your child]." Total scores on these two factors were used as separate measures of parental protective behavior. A composite score of all items (including the two reverse scored items) also was calculated to test parental protective behavior as a unitary construct.

*Health-Related Quality of Life (HRQOL)*. The Pediatric Quality of Life Inventory 4.0 (PedsQL 4.0; Varni, Seid, & Kurtin, 2001) is a 23-item Likert-type scale with child self-report and parent proxy-report forms. Parallel forms are available for children ages 5-7, 8-12, and 13-18 and their parents. The PedsQL 4.0 is comprised of two broad factors that assess distinct

areas of functioning (Physical and Psychosocial) and which also can be broken down further into four specific domains (Physical, Emotional, Social, and School Functioning). Responses for individual items range from 0 (never a problem) to 4 (almost always a problem). Items are reverse scored and transformed to a 100-point scale, with larger values indicating higher QoL. Scale scores are computed for each of the factors and/or domains by summing the relevant item responses and dividing by the number of items completed for that factor or domain. A global score also may be computed. In order to minimize the effects of conducting multiple tests on the same data set, the present study used the two-factor rather than the four-domain PedsQL structure. A total summary score, as well as each of the two domain scores, was calculated for parent- and self-reported PedsQL. Initial psychometric studies of the PedsQL reported total and factor scale score Cronbach's alphas between .80 and .88 for child self-report and between .86 and .90 for parent report (Varni, Seid, & Kurtin, 2001). Similar reliability was found in the current sample for child self-report ($\alpha$ = .86, $\alpha$ = .87, and $\alpha$ =.91 for psychosocial, physical, and total QoL, respectively) and for parent-report ($\alpha$ = .86, $\alpha$ = .86 and $\alpha$ =.90 for psychosocial, physical, and total QoL, respectively). The two-factor structure was confirmed using factor analysis (Varni et al., 2001). The two factors also accurately distinguished between groups of healthy children and those with acute and chronic pain conditions, indicative of its sensitivity to potentially clinically meaningful differences in QoL (Varni et al., 2001).

**Procedure**

Although the current study involved chart review only, some details regarding the standard evaluation process are provided for context. Specifically, prior to scheduling the child's initial clinical evaluation, clinic nurses provide a brief phone screening with parents to

ensure that the child meets criteria for the multidisciplinary abdominal pain clinic, as previously described. At the initial clinical evaluation, parents and children are placed in separate rooms for questionnaire completion to ensure independent responding. The child then completes the PedsQL, while one accompanying parent/legal guardian completes both the PedsQL and the IBES, as part of routine clinical care.

For the current study, medical records for all patients seen for initial evaluation in the multidisciplinary abdominal pain clinic during the target time period were reviewed to obtain basic demographic information, parent-reported IBES and PedsQL, and self-reported PedsQL previously collected as part of routine clinical evaluation. Study procedures were approved by the Institutional Review Board at the author's institution, as well as the institution at which data was collected.

## Data Analyses

Primary data analyses were conducted using SAS 9.2. A priori power analyses were run to ensure that an adequate sample was obtained to test higher-order interactions. Univariate descriptive statistics were calculated for each variable. Because absolute zero points are not interpretable for any of the continuous variables, variables were mean-centered for ease of interpretation. Mean centering also standardizes the scale for all variables, making direct comparisons of associated beta weights more feasible. The data were analyzed for outliers using the DFFITS statistic, an overall measure of how unusual and influential a data point is that combines leverage and studentized residual statistics. A sample-size adjusted DFFITS cut-off of $2\sqrt{\frac{p}{N}}$ was used to flag potential outliers in the current sample for additional examination (Belsley, Kuh, & Welsch, 1980). A more common and conservative cut-off of 2 (SAS Institute Inc., 2004) was used to identify extreme outliers for removal because previous

analyses of similar datasets indicated that a significant subset of the clinic population consistently respond differently than the rest of the population, and that these may not represent true outliers (Schurman et al., 2008). For the highest-order significant interaction identified for each outcome, an additional interaction term was added to the hierarchical regression analysis to examine potential differences between this "outlying" subset and the rest of the dataset with regards to each association of interest.

A correlation matrix was calculated as a preliminary step to determine the associations among each factor of the IBES and between parent- and self-report of overall, physical, and psychosocial QoL. Although regression analyses are relatively robust to these correlations, multicollinearity in this sample was examined using the Variance Inflation Factor (VIF) and logical examinations of the data, in accordance with recommendations by Cohen, Cohen, West, and Aiken (2003).

Simple regression analyses were conducted to examine the predictive value of both the IBES as a whole and of Attention and Release from Responsibility as distinct factors on parent- and self-reported QoL. A series of hierarchical regression analyses then was conducted to examine potential interactions between the two factors of the IBES, as well as the potential moderating effects of child age and gender. Four separate regression analyses were performed for the four outcome factors: Parent-Reported Physical Functioning (PR-PHYS), Parent-Report Psychosocial Functioning (PR-PSY), Self-reported Physical Functioning (SR-PHYS), and Self-reported Psychosocial Functioning (SR-PSY). For each outcome measure, Step One included the two demographic variables (i.e., age and gender). Step Two introduced the two IBES factors in order to determine their unique predictive value above and beyond the potential confounding effects of the demographic variables. In Step Three, each potential

pairwise interaction was tested in a separate interaction analysis. Step Four tested three way interactions between the two IBES factors and each potential moderator separately. Finally, Step Five tested a model that included both age and gender as moderators of the relationship between both IBES factors and QoL (i.e., a four-way interaction including two factors and two moderators).

Significant three-way interactions were probed using a web-based interaction utility (Preacher, Curran, & Bauer, 2006). Significant four-way interactions were first probed using SAS 9.2. Data were analyzed first by dummy coding gender. Analyses were run first with boys coded as 0 and girls as 1, then the reverse coding system was used. This method generated three-way interactions for each gender while maintaining sufficient power by utilizing the full sample for all analyses. These three-way interactions were then entered into the online calculator. The online utility provides simple slopes and intercepts at theoretically relevant points of interest of the predictor and moderator variables. Regions of significance along the moderating variable are identified, indicating values of the moderating variables for which the simple slope of the primary predictor is significant. For all significant 4-way interactions, the two IBES factors were identified as the primary predictor (x) and primary moderator (z) with age as a secondary moderator (w). This structure provided information about the relationship between Attention and Release from Responsibility for four subsets of the sample: older boys, younger boys, older girls, and younger girls. Significant interactions were probed and, in accordance with recommended practice, figures were obtained by plotting values one standard deviation above and below the mean for the moderator variables (Aiken & West, 1991); specifically, relationships are plotted for children whose age is one standard deviation younger than the mean (9.95) and adolescents whose age is one standard deviation

older than the mean (15.15) and for values of Release from Responsibility and Attention one standard deviation above and below the mean.

## Results

### Preliminary Analyses

The power analysis indicated that a sample size of approximately 345 was necessary to detect a small effect given the complexity of the four-way interactions tested. Approximately 12% of the data were identified as a potential outlier for at least one of the four hierarchical regressions. No significant differences emerged between this subset and the rest of the dataset on any of the significant relationships identified. Furthermore, no data points exceeded the more conservative DFFITS cut-off; thus, all data were retained for analyses described below. Thus, a final sample size large enough detect small effects was obtained (N = 430). Of these, approximately 65% (N = 280) were girls. Demographic and descriptive data are presented in Table 1. A correlation matrix indicated that the two IBES factors were somewhat correlated with one another, such that parents who reported high levels of Attention also reported high levels of Release from Responsibility, $r = .50$, $p < .0001$. However, a VIF < 2 was obtained for all models, suggesting that multicollinearity was not likely to be a major influence on these analyses.

### Primary Analyses

Results from simple regressions are presented in Table 2. Both Attention and Release from Responsibility factors, as well as overall parent protective behavior as a unitary construct, significantly predicted overall parent- and self-reported QoL. Both factors of the IBES, as well as the total score, also significantly predicted both physical and psychosocial QoL in most cases. For SR-PHYS, Attention approached, but did not reach significance. All relationships

were in the expected direction, such that higher levels of Attention and Release from Responsibility (separately and in sum total) predicted lower Physical and Psychosocial QoL (separately and in sum total). Examination of the parameter estimates for each factor indicated that Release from Responsibility was more strongly predictive of QoL for those with an average Attention score than was Attention for those with an average Release from Responsibility score in most cases. For PR-PSYC, the parameter estimates were equivalent for the two factors. These relationships are presented in Table 2. However, moderator analyses yielded significant interactions, indicating that the strength of the relationship between one IBES factor and QoL often was dependent upon the level of the other factor based on age and/or gender.

**Moderator Analyses**

*Parent-Reported Physical Quality of Life.* The two demographic variables entered into the first step of the model significantly predicted PR-PHYS, $R^2 = .06$, $F(1, 428) = 13.41$, $p < .0001$. Both IBES factors predicted PR-PHYS above and beyond the demographic factors alone, $R^2 = .26$, $\Delta R^2 = .20$, $F(1, 428) = 36.76$, $p < .0001$. No significant two-way interactions were identified in the third step. In the fourth step, a significant Attention-by-Age-by-Gender interaction emerged, $\beta = -0.65$, $p < .05$. Specifically, a significant interaction was found between age and attention for boys, $\beta = 0.21$, $t = 2.12$, $p < .05$. As shown in Figure 1, further probing of this finding indicated that higher levels of Attention were associated with lower PR-PHYS, but only for younger boys. The relationship between Attention and PR-PHYS was not significant for older boys. The region of significance for this model indicates that simple slopes for Attention were significant only for boys under the age of 12.1 years. This interaction between age and Attention was not significant in girls. However, the main effect for Attention

was significant for girls. Attention was negatively correlated with PR-PHYS, indicating that girls whose parents reported higher levels of Attention reported lower psychosocial quality of life. No significant three-way interactions involving Release from Responsibility were identified, confirming that higher Release from Responsibility was associated with lower PR-PHYS across boys and girls of all ages. No significant four-way interactions emerged in the final step. As indicated by the $R^2$, the overall model accounted for 25% of the variance in PR-PHYS QoL scores. The full hierarchical analyses are presented in Table 3.

*Parent-Reported Psychosocial Quality of Life.* The two demographic variables entered into the first step of the model significantly predicted PR-PSYC, $R^2 = .04$, $F(1, 428) = 8.00$, $p < .001$. Both IBES factors predicted PR-PSYC above and beyond the demographic factors alone, $R^2 = .23$, $\Delta R^2 = .20$, $F(1, 428) = 31.94$, $p < .0001$. No significant two-way interactions were identified in the third step. No significant three-way interactions emerged in the fourth step. In the final step, a significant four-way interaction emerged, $\beta = 0.21$, $t = 2.32$, $p < .05$. Initial probing indicated that the three-way interaction between Attention, Release from Responsibility, and age was non-significant for boys and significant for girls. These interactions are depicted in Figure 2. For boys, Attention, Release from Responsibility, and age did not interact to predict PR-PSYC. However, a two-way interaction between Attention and Release from Responsibility was significant for boys, $\beta = -0.13$, $t = -2.09$, $p < .05$. Further probing of this relationship indicated that Release from Responsibility was negatively associated with PR-PSYC and that the strength of this relationship increased as Attention increased for both older and younger boys. This relationship held across all levels of Attention, simply strengthening as Attention increased.

For girls, Attention, Release from Responsibility, and age did interact to predict PR-

PSYC, β = 0.11, $t$ = 2.53, $p$ < .05. Further probing indicated that, for younger girls, Release from Responsibility was negatively associated with PR-PSYC and that the strength of this relationship increased as Attention increased. The relationship between Release from Responsibility and PR-PSYC was significant only for younger girls with average or higher Attention. For younger girls with lower Attention, Release from Responsibility did not significantly predict PR-PSYC. For older girls, however, the opposite was true. The strength of the relationship between Release from Responsibility and PR-PSYC decreased as Attention increased. The relationship between Release from Responsibility and PR-PSYC was significant only for older girls with lower levels of Attention. For older girls with higher Attention, Release from Responsibility did not significantly predict PR-PSYC. As indicated by the $R^2$, the overall model accounted for 25% of the variance in PR-PSYC QoL scores. The full hierarchical analyses are presented in Tables 4a and 4b.

*Self-Reported Physical Quality of Life.* The two demographic variables entered into the first step of the model significantly predicted SR-PHYS, $R^2$ = .03, $F$(1, 428) = 6.15, $p$ < .01. Both IBES factors predicted SR-PHYS above and beyond the demographic factors alone, $R^2$ = .10, Δ $R^2$ = .07, $F$(1, 428) = 12.12, $p$ < .0001. No significant two-way interactions were identified in the third step. No significant three-way interactions emerged in the fourth step. In the final step, a significant four-way interaction emerged, β = 0.81, $t$ = 02.95, $p$ < .01. Initial probing indicated that the three-way interaction between Attention, Release from Responsibility, and age was significant for boys and non-significant for girls. These interactions are depicted in Figure 3. For boys, Attention, Release from Responsibility, and age interacted to predict SR-PHYS, β = -0.21, $t$ = -2.49, $p$ < .05. Further probing of this relationship indicated that, for older boys, Release from Responsibility was negatively

associated with SR-PHYS and that the strength of this relationship increased as Attention increased. This relationship between Release from Responsibility and SR-PHYS was significant only for older boys with average or higher Attention. For older boys with lower Attention, Release from Responsibility did not predict SR-PHYS. For younger boys, however, Attention did not significantly interact with Release from Responsibility to predict SR-PHYS. That is, for younger boys, the relationship between Release from Responsibility and SR-PHYS was non-significant and was not affected by Attention scores. The relationship between Attention and SR-PHYS also was non-significant for younger boys.

For girls, Attention, Release from Responsibility, and age did not significantly interact to predict SR-PHYS. However, the main effects for both Release from Responsibility, $\beta = -0.17$, $t = -3.01$, $p < .01$ and Attention, $\beta = -0.19$, $t = -2.69$, $p < .01$ were significant. Both IBES factors were negatively correlated with SR-PHYS, such that girls whose parents reported higher levels of Attention and Release from Responsibility reported lower psychosocial quality of life. As indicated by the $R^2$, the overall model accounted for 14% of the variance in CR-PHYS QoL scores. The full hierarchical analyses are presented in Tables 5a and 5b.

*Self-Reported Psychosocial Quality of Life.* The two demographic variables entered into the first step of the model significantly predicted SR-PSYC, $R^2 = .02$, $F(1, 428) = 4.47$, $p < .01$. Both IBES factors predicted SR-PSYC above and beyond the demographic factors alone, $R^2 = .10$, $\Delta R^2 = .08$, $F(1, 428) = 11.14$, $p < .0001$. No significant two-way interactions were identified in the third step. No significant three-way interactions emerged in the fourth step. In the final step, a significant four-way interaction emerged, $\beta = -0.01$, $t = 2.32$, $p < .05$. Initial probing indicated that the three-way interaction between Attention, Release from Responsibility, and age was non-significant for boys and significant for girls. These

interactions are depicted in Figure 4. For boys, Attention, Release from Responsibility, and age did not significantly interact to predict SR-PSYC. Furthermore, the main effects for both Release from Responsibility and Attention were non-significant for boys.

For girls, Attention, Release from Responsibility, and age did interact to predict SR-PSYC in a relationship that approached significance, $\beta = 0.09$, $t = 1.90$, $p = .058$. Further probing of this relationship indicated that, for older girls, Release from Responsibility was negatively associated with SR-PSYC and that the strength of this relationship decreased as Attention increased. This relationship between Release from Responsibility and SR-PSYC was significant only for older girls with lower levels of Attention. For older girls with higher Attention, Release from Responsibility did not predict SR-PSYC. For younger girls, however, Attention did not significantly interact with Release from Responsibility to predict SR-PSYC. That is, for younger girls, the relationship between Release from Responsibility and SR-PSYC was non-significant and was not affected by Attention scores. The relationship between Attention and SR-PSYC was significant and negative for younger girls, such that young girls whose parents reported higher levels of Attention reported lower Psychosocial QoL. As indicated by the $R^2$, the overall model accounted for 13% of the variance in CR-PSYC QoL scores. The full hierarchical analyses are presented in Tables 6a and 6b.

## Discussion

The primary study hypotheses were supported by the current analyses. As expected, higher levels of parental protective behavior, as a unitary construct, predicted lower physical and psychosocial quality of life in children and adolescents with chronic abdominal pain. Furthermore, both Attention and Release from Responsibility appear to be independently correlated with QoL as well. As expected, higher amounts of either type of parental protective

behavior were associated with lower quality of life in child and adolescent pain patients. Interestingly, the Release from Responsibility factor appeared to be more strongly predictive of quality of life than Attention, which has historically received the most study and discussion in the theoretical and empirical literature on children's pain.

However, as predicted, the relationships described above were complicated by the moderating effects of age and gender. For girls, more reinforcement of either type was associated with lower physical QoL. More complicated relationships were found when psychosocial QoL was considered. For younger girls, despite some discrepancies between reporters, results generally indicated relationships in the expected direction. The two types of parental protective behavior may potentially interact for this subgroup such that release from responsibility is most likely to be problematic when attention is also high. For older girls, however, release from responsibility is most likely to be problematic for those who receive *less* attention from their parents. This unexpected relationship was found across both parent and child self-reports of psychosocial QoL.

Relationships were less consistent across reporter for boys. Significant relationships were found between parental report of their own behavior and their child's QoL. As observed for girls, more reinforcement of either type appears to be associated with lower physical QoL per parent report (although Attention may be less important for older boys). Unlike girls, there do not appear to be differences based on age for psychosocial functioning. Rather, psychosocial QoL appears to be related to both types of parental protective behaviors for boys of all ages as it is for younger girls: release from responsibility may be more problematic when attention also is high. However, strong relationships were not found between either IBES factor and either type of QoL based on self-report for boys, making the impact of parental protective

behavior less clear than for girls.

In sum, these results only partially support hypotheses regarding age and gender relationships. Although some differences in the relationships between parental protective behaviors and child QoL do appear to exist based on age, these differences do not consistently support the idea that children with chronic pain are more likely to be affected by parent behavior than are adolescents. Rather, children and adolescents may be affected differently, based partially on gender. Similarly, the hypothesis that girls are more affected by parental attention and release from responsibility is not clearly supported or refuted with the current analyses. General trends suggest that relationships between parental protective behavior and child QoL may be more likely to be significant for girls than for boys, particularly for attention. However, differences found by reporter do not allow firm conclusions to be drawn based on the current data.

The present findings confirm the fundamental findings of previous research within this area that parental protective behaviors are associated with poorer child functioning (e.g., Claar et al., 2008; Whitehead et al., 1982). These results also provide a novel contribution to the field by identifying both types of protective behavior as potentially problematic. Although previous studies have occasionally examined one type of behavior or the other, direct comparisons of the two have not been previously available. Results from the current study suggest that release from responsibility (e.g., allowing avoidance of school, homework, and chores) may be at least as important, and in some cases more important, in predicting broad child functioning as is parental attention (e.g., providing treats, privileges, pampering, and extra time with parents).

The current study also extends previous investigations by examining quality of life as a

broader indicator of child functioning. Findings support the importance of examining QoL among children with chronic pain. In general, both types of quality of life were lower in this sample than has been reported in norm samples of healthy children (Varni, Burwinkle, Seid, & Skarr, 2003) and in other samples of children with varying types of abdominal pain (Varni et al., 2003; Youssef, Murphy, Langseder, & Rosh, 2006). Although suggested clinically meaningful cut-offs for the PedsQL vary, the scores reported here generally indicate clinically impaired functioning across domains (e.g., Haung et al., 2009; Varni, Burwinkle, Seid, & Skarr, 2003). Whereas most previous research has focused on either physical outcomes or psychosocial outcomes in isolation, the current investigation was able to identify important, differential associations between parental behavior and child functioning in both domains by examining them together. Generally low scores in both domains and the significant associations identified in the present study provide support for the continued inclusion of both domains of functioning in order to fully understand the daily functioning of children with chronic pain. Low levels of both parent- and child self-reported perceptions of physical QoL, in particular, support the importance of considering measures beyond simple frequency of pain episodes or complaints when exploring the relationship with parental behaviors (Hunfeld et al., 2001).

Finally, the large sample utilized in the current study allowed for the consideration of potentially complex relationships between moderators more fully than previous studies have been able to do. The strengths of association (i.e., $R^2$ values) from the overall models indicate relatively robust effects when all variables are considered. These models accounted for one quarter of the variance in parent-reported QoL and about 12% of the variance in child-reported QoL. These results confirm that both parent behavior and child demographic factors are

important in understanding QoL in children with chronic pain and offer some potential explanations for conflicting reports regarding gender in previous studies (e.g. Claar et al., 2008; Kaczynski et al., 2009). Specifically, the current results suggest that gender differences may not be consistent across ages or outcomes of interest. Future work in this area will need to carefully consider the role of age and gender in further illuminating relationships between parental behavior and child functioning within the context of pain.

While direct examination of mechanisms underlying the associations found between parental behavior and child QoL was beyond the scope of the current cross-sectional study, results suggest potential future directions for this type of work. For adolescent boys and younger children of both genders, attention and release from responsibility may act directly as positive and negative reinforcers of sick role behaviors, as outlined earlier. As expected, the impact on child functioning is greatest when high levels of both types of reinforcers are present. For adolescent girls, this also holds for physical QoL. However, the mechanisms at play when it comes to psychosocial QoL for adolescent girls are less clear. For girls of this age, it appears that parental attention, when provided in response to pain episodes, may be particularly problematic in terms of psychosocial functioning. This finding is contrary to some previous research generally reporting that gender differences are minimal in terms of the importance of parent relationships among adolescents (e.g., Nickerson & Nagle, 2004; Wenk, Hardesty, Morgan, & Blair, 1994). However, one particular study of children and adolescents with chronic illness similarly noted the importance of some types of parental attention on child quality of life for older girls only (Wiebe et al., 2005). Thus, while the exact relationships and underlying mechanisms are still unclear, it appears that there may be increased valence of some types of attention for adolescent girls within the context of chronic illness and/or pain. In this

situation, higher parental attention may minimize or mask the effects of negative reinforcement for adolescent girls. A simple additive negative effects model for the two types of reinforcers may not adequately capture the complexity of the relationship between parental protective behavior and QoL.

Further examination of these gender relationships is needed. Future research should seek to clarify the complex moderating effects of age and gender on the relationship of parental behaviors and measures of child physical and psychosocial functioning reported herein. Inclusion of specific parent-child relationship factors may help to further define the unexpected relationship found between parental protective behaviors and psychosocial QoL for adolescent girls. A better understanding of the differences between boys and girls of various ages, as well as the mechanisms underlying relationships between parental behavior and QoL within these subgroups, will help define the unique needs of each subgroup and guide development of targeted, developmentally sensitive interventions for families of children with chronic pain.

Future research also will want to improve upon the findings of the current study by including a wider array of participants. The chart review method utilized in this study allowed for a large sample size that included all children seen within the clinic during the entire study period. This method minimizes the potential for selection bias often associated with volunteer samples and increases potential generalizability of results. This large sample size allowed the exploration of more complex relationship than has previously been examined in one set of analyses.

However, the chart review method limits the demographic information available. For instance, children seen in this clinic are most often Caucasian, but ethnicity of the particular children included in this sample cannot be determined from the medical chart and, thus, is not

available for analyses. Furthermore, children and adolescents in this study were drawn from only one clinical setting. Given that it was drawn from a specialty clinic housed within a children's hospital, the current study sample may represent a more extreme end of the spectrum of children with chronic abdominal pain in terms of parental behavior and/or QoL in comparison to children presenting to other types of clinics (e.g., primary care offices, free-standing gastroenterology practices) or those who do not seek health care for their abdominal pain. This sample also represents a specific subset of all children who experience chronic pain (i.e., children with abdominal pain that has no clearly identifiable organic cause). Previous research within the area of parental responses to child pain suggests that frequency of parental protective behaviors and their relationships with child functioning are generally similar across various pain populations (e.g., Claar, Simons, & Logan, 2008; Wagner et al., 2003; Walker, Garber, & Greene, 1993). However, replication of these findings with more diverse samples and/or across multiple sites (e.g., primary care offices, school-based sampling) will confirm generalizability to multiple pain populations and strengthen the confidence in the relationships found.

Furthermore, similar studies in the future should consider including multiple reports of parental behavior. One strength of the current study is the examination of both parent and self-reported outcomes. However, the current study included only a parent-reported measure of protective behavior. The differing results by reporter suggest that there is some degree of method variance associated with information obtained from different reporters. The varying patterns of relationships found between parental protective behaviors and QoL, particularly for boys, may indicate that children's perceptions of their own functioning are more important than their observable behaviors per se. This may also be true for parental protective behaviors.

In other words, it may be important to assess what children perceive their parents' behavior to be, in addition to what parents think they do in response to pain episodes. A recent laboratory study involving children with chronic abdominal pain suggests that child appraisal may indeed be an important factor in their responses to parent verbal attention during a water-load task (Williams, Blount, & Walker, 2011). Perhaps appraisal also accounts, at least in part, for the relatively higher salience of release from responsibility over parental attention in child QoL outcomes. Parents likely engage in a certain amount of "protective" attending regardless of their child's pain (e.g., spending time with the child, providing occasional treats, showing affection) and simply increase this already present behavior during times of pain. In contrast, parents may be less likely to allow a child to skip school or homework completion as part of an everyday routine. As a result, release consequences may be interpreted differently by the child within the context of pain. Further examination into the importance of child cognitive factors in their response to parent behavior is needed, as appraisal may serve an important moderating role for some children and mark another important target for intervention.

Future research also may use daily diary measurements to provide a more complete understanding of the relationship between parental behavior and child functioning than the single time-point, retrospective measures used here. Such prospective daily reporting could be used to begin examining the causal pathways between parental protective behavior and child QoL. Most research in this area involving chronic pain conditions, including the present study, are correlational in nature and strong causal conclusions cannot be drawn. Daily diary studies offer the ability to determine temporal precedence within the relationships identified here (West & Hepworth, 1991). Longitudinal studies that follow children from their initial pain complaints may similarly offer evidence for causal pathways. Tracking children from initial

clinic visits should be viewed cautiously, however, because children have likely experienced pain for some time before engaging health care services and patterns of parental reaction likely already developed, making causal directionality still somewhat difficult to determine.

Finally, in order to increase the clinical utility of measures of parental protective behaviors, researchers within the field should consider developing clinically meaningful cut-off scores for potentially problematic levels of protective behavior. The current results suggest that any meaningful cut-off scores will need to consider both positive and negative reinforcers of behavior. Developers of cut-off scores will also need to consider age and gender in identifying clinically significant levels of parental protective behaviors. Although the relationships reported here appear to be linear in nature, researchers considering clinically meaningful cut-scores will want to explore the possibility that, for some subsets of children, there may be naturally occurring cut-offs at which clinically meaningful changes in child functioning are identified. As an alternative, suggested clinical cut-offs on the PedsQL may be used to complete sensitivity/specificity analyses to determine whether certain values on the IBES are associated with clinically depressed QoL. Similarly, in order to maximize the clinical utility of the measure in daily practice, researchers will want to determine minimally clinically important differences (MCID; Jaeschke, Singer, & Guyatt, 1989) in scores in order to track functionally important changes in parent behavior in response to clinical intervention.

Despite the need for much more work in this area, study results offer some clinically meaningful implications that can be incorporated into current practice. Clinicians should consider both Attention and Release from Responsibility when working with families of a child coping with chronic abdominal pain. Because of the relative importance of release from responsibility in predicting QoL, negative, rather than positive, reinforcers may be of particular

clinical interest. This focus on decreasing negative reinforcement also may feel less contradictory to parents' natural inclinations toward nurturance than asking them to not provide comforting attention to their child's pain. However, the particular age and gender of the child should be considered in tailoring interventions in this area. For example, release from responsibility consequences for pain behaviors may be a more effective target of clinical attention when low levels of parental attention are reported in an adolescent girl with abdominal pain. Conversely, when attention is high, focusing on minimizing parents' tendency to release their adolescent from daily responsibilities may not have the desired effect on girls' functioning. In contrast, focusing clinical attention on either type of parental protective behavior may be relatively ineffective in increasing boys' perceptions of their QoL, even if observed behavior demonstrates change, given the weak relationships for boys' self-reports found here.

The present study emphasizes the importance of developing conceptual clarity within the field with regard to particular types of parental protective behaviors and considering both types of behaviors, as well as both physical and psychosocial outcomes, in future clinical and research applications within pediatric chronic pain. This study provides a first step toward defining the types of interventions that might be best suited to a given child, based on initial presentation to clinic, but more questions remain. An improved understanding of the mechanisms underlying these relationships within the context of gender and age is necessary for the development of targeted, timely, and empirically-driven interventions. Given the high potential cost of pain to the individual, family, and society over the long term, the pursuit of effective parent education programs as part of a larger multicomponent treatment package is vital for families coping with a child with chronic pain. Addressing multiple factors within the

biopsychosocial model that may be contributing to pain maintenance will place health care providers in the best possible position to make a meaningful difference to this large group of children and their families.

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Table 1. Descriptive Analyses by Gender

| | Total (N = 430) | | Boys (N = 150) | | Girls (N = 280) | |
|---|---|---|---|---|---|---|
| Variable | Mean | Standard Deviation | Mean | Standard Deviation | Mean | Standard Deviation |
| Age | 12.55 | 2.60 | 12.25 | 2.55 | 12.70 | 2.63 |
| Parental Protective Behaviors | | | | | | |
| Total IBES | 13.97 | 6.84 | 14.10 | 6.45 | 13.89 | 7.05 |
| Release from Responsibility | 5.58 | 2.93 | 5.66 | 2.98 | 5.53 | 2.91 |
| Attention | 5.65 | 3.70 | 5.73 | 3.45 | 5.61 | 3.84 |
| Physical Quality of Life | | | | | | |
| Parent-Report | 68.27 | 21.39 | 71.71 | 20.41 | 66.47 | 21.71 |
| Child-Report | 65.70 | 21.93 | 69.87 | 20.73 | 63.50 | 22.25 |
| Psychosocial Quality of Life | | | | | | |
| Parent-Report | 67.83 | 16.98 | 68.69 | 17.76 | 67.38 | 16.57 |
| Child-Report | 66.21 | 16.56 | 68.13 | 15.12 | 65.21 | 17.21 |

Table 2. Single-Regression IBES Analyses

| Outcome/Predictor | *B* | *SE B* | t-value |
|---|---|---|---|
| *Parent-Reported Physical QoL* | | | |
| IBES Total | -0.41 | 0.04 | -9.28*** |
| Release | -0.30 | 0.04 | -7.83*** |
| Attention | -0.14 | 0.05 | -2.77** |
| *Parent-Reported Psychosocial QoL* | | | |
| IBES Total | -0.43 | 0.04 | -9.78*** |
| Release | -0.24 | 0.04 | -6.02*** |
| Attention | -0.24 | 0.05 | -4.70*** |
| *Self-Reported Physical QoL* | | | |
| IBES Total | -0.25 | 0.05 | -5.34*** |
| Release | -0.17 | 0.04 | -4.06*** |
| Attention | -0.10 | 0.05 | -1.87 |
| *Self-Reported Psychosocial QoL* | | | |
| IBES Total | -0.27 | 0.05 | -5.69*** |
| Release | -0.16 | 0.04 | -3.71*** |
| Attention | -0.13 | 0.05 | -2.39* |

Note. IBES = Illness Behavior Encouragement Scale; Attention = Attention; Release = Release from Responsibility; *p < .05, **p < .01, ***p < .0001

Table 3. Predictors of Parent-Reported Physical Quality of Life for Whole Sample (N=430)

| Predictor | *B* | *SE B* | t value | $\Delta R^2$ |
|---|---|---|---|---|
| *Step 1* | | | | 0.04 |
| Age | -1.23 | 0.31 | -3.92*** | |
| Gender | -0.80 | 1.70 | -0.47* | |
| *Step 2* | | | | 0.19 |
| Age | -0.79 | 0.29 | -2.72** | |
| Gender | -0.053 | 0.09 | -2.76** | |
| Release | -0.27 | 0.04 | -6.84*** | |
| ATTN | -0.16 | 0.05 | -3.26** | |
| *Step 3* | | | | .01 |
| Age | -0.21 | 0.22 | -0.19** | |
| Gender | -0.22 | 0.09 | -2.52* | |
| Release | -0.19 | 0.06 | -2.94* | |
| ATTN | -0.19 | 0.09 | -2.13** | |
| Release x ATTN | -0.01 | 0.03 | -0.28 | |
| Release x Age | 0.06 | 0.04 | 1.43 | |
| Release x Gender | -0.13 | 0.08 | -1.58 | |
| ATTN x Age | -0.00 | 0.05 | -0.06 | |
| ATTN x Gender | 0.06 | 0.11 | 0.55 | |
| Age x Gender | 0.10 | 0.10 | 1.07 | |
| *Step 4* | | | | .01 |
| Age | -0.20 | 0.08 | -2.45 | |
| Gender | -0.35 | 0.11 | -3.35* | |
| Release | -0.20 | 0.07 | -2.99* | |
| ATTN | -0.14 | 0.09 | -1.51 | |
| Release x ATTN | -0.09 | 0.06 | -1.48 | |
| Release x Age | -0.06 | 0.07 | -0.81 | |
| Release x Gender | -0.14 | 0.08 | -1.67 | |
| ATTN x Age | 0.21 | 0.10 | 2.12* | |
| ATTN x Gender | 0.01 | 0.11 | 0.12 | |

| | | | | |
|---|---|---|---|---|
| Age x Gender | 0.09 | 0.08 | 1.93 | |
| Release x ATTN x Age | 0.00 | 0.04 | 0.09 | |
| Release x ATTN x Gender | 0.10 | 0.07 | 1.44 | |
| Release x Age x Gender | 0.16 | 0.08 | 1.93 | |
| ATTN x Age x Gender | -0.30 | 0.12 | -2.53* | |
| *Step 5* | | | | .00 |
| Age | 0.15 | 0.08 | -1.76 | |
| Gender | -0.36 | 0.10 | -3.40*** | |
| Release | -0.36 | 0.10 | -3.40*** | |
| ATTN | -0.10 | 0.09 | -1.10 | |
| Release x ATTN | -0.12 | 0.06 | -1.87 | |
| Release x Age | -0.07 | 0.07 | -1.06 | |
| Release x Gender | -0.10 | 0.09 | -1.18 | |
| ATTN x Age | 0.18 | 0.10 | 1.80 | |
| ATTN x Gender | -0.03 | 0.11 | -0.24 | |
| Age x Gender | 0.02 | 0.11 | 0.20 | |
| Release x ATTN x Age | -0.10 | 0.08 | -1.34* | |
| Release x ATTN x Gender | 0.13 | 0.07 | 1.71 | |
| Release x Age x Gender | 0.18 | 0.09 | 2.10 | |
| ATTN x Age x Gender | -0.27 | 0.12 | -2.30* | |
| 4-Way Interaction | 0.14 | 0.09 | 1.57 | |

Note. ATTN = Attention; Release = Release from Responsibility; *p < .05, **p < .01, ***p < .0001

Table 4a. Predictors of Parent-Reported Psychosocial Quality of Life for Boys (N = 430)

| Predictor | *B* | *SE B* | t value | $\Delta R^2$ |
|---|---|---|---|---|
| *Step 1* | | | | .04 |
| Age | -0.19 | 0.05 | -3.92*** | |
| Gender | -0.05 | 0.10 | -0.47 | |
| *Step 2* | | | | .19 |
| Age | -0.12 | 0.04 | -2.72** | |
| Gender | -0.08 | 0.09 | -0.90 | |
| Release | -0.21 | 0.04 | -5.10*** | |
| ATTN | -0.25 | 0.05 | -5.08*** | |
| *Step 3* | | | | .00 |
| Age | -0.15 | 0.08 | -1.83 | |
| Gender | -0.08 | 0.09 | -0.85 | |
| Release | -0.18 | 0.07 | -2.65** | |
| ATTN | -0.25 | 0.09 | -2.75** | |
| Release x ATTN | -0.01 | 0.03 | -0.23 | |
| Release x Age | -0.02 | 0.04 | -0.42 | |
| Release x Gender | -0.04 | 0.09 | -0.47 | |
| ATTN x Age | 0.00 | 0.05 | 0.09 | |
| ATTN x Gender | -0.01 | 0.11 | -0.07 | |
| Age x Gender | 0.04 | 0.10 | 0.39 | |
| *Step 4* | | | | .01 |
| Age | -0.17 | 0.08 | -2.06* | |
| Gender | -0.15 | 0.11 | -2.06 | |
| Release | -0.16 | 0.07 | -2.41* | |
| ATTN | -0.22 | 0.10 | -2.33* | |
| Release x ATTN | -0.09 | 0.062 | -1.47 | |
| Release x Age | -0.04 | 0.07 | -0.54 | |
| Release x Gender | -0.05 | 0.09 | -0.59 | |
| ATTN x Age | 0.08 | 0.10 | 0.78 | |
| ATTN x Gender | -0.06 | 0.11 | -0.54 | |

| | | | | |
|---|---|---|---|---|
| Age x Gender | 0.02 | 0.09 | 0.18 | |
| Release x ATTN x Age | 0.06 | 0.04 | 1.61 | |
| Release x ATTN x Gender | 0.11 | 0.07 | 1.51 | |
| Release x Age x Gender | 0.02 | 0.09 | 0.18 | |
| ATTN x Age x Gender | -0.10 | 0.12 | -0.83 | |
| *Step 5* | | | | .01 |
| Age | -0.10 | 0.09 | -1.14 | |
| Gender | -0.16 | 0.11 | -1.48 | |
| Release | -0.21 | 0.07 | -3.04** | |
| ATTN | -0.17 | 0.10 | -1.74 | |
| Release x ATTN | -0.13 | 0.06 | -2.09* | |
| Release x Age | -0.07 | 0.07 | -0.91 | |
| Release x Gender | 0.01 | 0.01 | 0.01 | |
| ATTN x Age | 0.04 | 0.11 | 0.34 | |
| ATTN x Gender | -0.12 | 0.12 | -1.05 | |
| Age x Gender | -0.09 | 0.11 | -0.85 | |
| Release x ATTN x Age | -0.10 | 0.08 | -1.26 | |
| Release x ATTN x Gender | 0.15 | 0.08 | 1.93 | |
| Release x Age x Gender | 0.04 | 0.09 | 0.44 | |
| ATTN x Age x Gender | -0.06 | 0.12 | -0.52 | |
| 4-Way Interaction | 0.21 | 0.09 | 2.35* | |

Note. Analyses included all participants with gender dummy coded such that boys = 0 and girls = 1. ATTN = Attention; Release = Release from Responsibility; *p < .05, **p < .01, ***p < .0001

Table 4b. Predictors of Parent-Reported Psychosocial Quality of Life for Girls (N = 430)

| Predictor | *B* | *SE B* | t value | $\Delta R^2$ |
|---|---|---|---|---|
| *Step 1* | | | | .04 |
| Age | -0.19 | 0.05 | -3.92*** | |
| Gender | 0.05 | 0.10 | 0.47 | |
| *Step 2* | | | | 0.19 |
| Age | -0.12 | 0.05 | -2.72** | |
| Gender | 0.08 | 0.09 | 0.90 | |
| Release | -021 | 0.04 | -5.10*** | |
| ATTN | -0.25 | 0.05 | -5.08*** | |
| *Step 3* | | | | .00 |
| Age | -0.11 | 0.05 | -2.05* | |
| Gender | 0.08 | 0.09 | 0.85 | |
| Release | -0.22 | 0.05 | -4.14*** | |
| ATTN | -0.26 | 0.06 | -4.02*** | |
| Release x ATTN | -0.01 | 0.03 | -0.23 | |
| Release x Age | -0.02 | 0.04 | -0.42 | |
| Release x Gender | 0.04 | 0.09 | 0.47 | |
| ATTN x Age | 0.00 | 0.05 | 0.09 | |
| ATTN x Gender | 0.01 | 0.11 | 0.07 | |
| Age x Gender | -0.04 | 0.10 | -0.39 | |
| *Step 4* | | | | .01 |
| Age | -0.16 | 0.06 | -2.52* | |
| Gender | 0.15 | 0.11 | 1.40 | |
| Release | -0.21 | 0.05 | -4.06*** | |
| ATTN | -0.28 | 0.05 | -4.06*** | |
| Release x ATTN | 0.02 | 0.04 | 0.55 | |
| Release x Age | -0.02 | 0.05 | -0.45 | |
| Release x Gender | 0.05 | 0.09 | 0.59 | |
| ATTN x Age | -0.02 | 0.06 | -0.32 | |
| ATTN x Gender | 0.06 | 0.11 | 0.54 | |

| | | | | |
|---|---|---|---|---|
| Age x Gender | -0.02 | 0.10 | -0.17 | |
| Release x ATTN x Age | 0.06 | 0.04 | 1.61 | |
| Release x ATTN x Gender | -0.11 | 0.07 | -1.15 | |
| Release x Age x Gender | -0.02 | 0.10 | -0.17 | |
| ATTN x Age x Gender | 0.10 | 0.12 | 0.83 | |
| *Step 5* | | | | .01 |
| Age | -0.20 | 0.06 | -3.05** | |
| Gender | 0.16 | 0.11 | 1.48 | |
| Release | -0.21 | 0.05 | -4.00*** | |
| ATTN | -0.30 | 0.06 | -4.50*** | |
| Release x ATTN | 0.01 | 0.04 | 0.31 | |
| Release x Age | -0.03 | 0.05 | -0.56 | |
| Release x Gender | -0.01 | 0.09 | -0.07 | |
| ATTN x Age | -0.03 | 0.06 | -0.44 | |
| ATTN x Gender | 0.12 | 0.12 | 1.05 | |
| Age x Gender | 0.09 | 0.11 | 0.85 | |
| Release x ATTN x Age | 0.11 | 0.04 | 2.53 | |
| Release x ATTN x Gender | -0.15 | 0.08 | -1.93 | |
| Release x Age x Gender | -0.04 | 0.09 | -0.44 | |
| ATTN x Age x Gender | 0.06 | 0.12 | 0.52 | |
| 4-Way Interaction | -0.01 | 0.00 | -2.32* | |

Note. Analyses included all participants with gender dummy coded such that boys = 1 and girls = 0. ATTN = Attention; Release = Release from Responsibility; *p < .05, **p < .01, ***p < .0001

Table 5a. Predictors of Child-Reported Physical Quality of Life for Boys (N = 430)

| Predictor | *B* | *SE B* | t value | $\Delta R^2$ |
|---|---|---|---|---|
| *Step 1* | | | | .03 |
| Age | -0.10 | 0.05 | -1.99* | |
| Gender | -0.27 | 0.10 | -2.72** | |
| *Step 2* | | | | .07 |
| Age | -0.05 | 0.05 | -0.97 | |
| Gender | -0.29 | 0.10 | -3.01** | |
| Release | -0.07 | 0.02 | -3.74*** | |
| ATTN | -0.10 | 0.05 | -2.00* | |
| *Step 3* | | | | .01 |
| Age | 0.10 | 0.09 | 0.13 | |
| Gender | -0.30 | 0.10 | -3.12** | |
| Release | -0.1527 | 0.07 | -2.17* | |
| ATTN | -0.00 | 0.10 | -0.04 | |
| Release x ATTN | 0.04 | 0.04 | 1.02 | |
| Release x Age | -0.02 | 0.04 | -0.43 | |
| Release x Gender | -0.01 | 0.09 | -0.15 | |
| ATTN x Age | 0.01 | 0.6 | 0.16 | |
| ATTN x Gender | -0.17 | 0.12 | -1.43 | |
| Age x Gender | -0.08 | 0.10 | -0.74 | |
| *Step 4* | | | | .01 |
| Age | 0.00 | 0.09 | 0.05 | |
| Gender | -0.41 | 0.12 | -3.54*** | |
| Release | -0.15 | 0.07 | -2.13* | |
| ATTN | 0.03 | 0.10 | 0.31 | |
| Release x ATTN | -0.04 | 0.07 | -0.65 | |
| Release x Age | -0.10 | 0.08 | -1.34 | |
| Release x Gender | -0.02 | 0.09 | -0.24 | |
| ATTN x Age | 0.12 | 0.11 | 1.11 | |
| ATTN x Gender | -0.20 | 0.12 | -1.68 | |

| | | | | |
|---|---|---|---|---|
| Age x Gender | -0.07 | 0.11 | -0.68 | |
| Release x ATTN x Age | 0.01 | 0.04 | 0.21 | |
| Release x ATTN x Gender | 0.11 | 0.08 | 1.32 | |
| Release x Age x Gender | 0.12 | 0.09 | 1.25 | |
| ATTN x Age x Gender | -0.16 | 0.13 | -1.23 | |
| *Step 5* | | | | .02 |
| Age | 0.10 | 0.09 | 1.03 | |
| Gender | -0.41 | 0.11 | -3.60*** | |
| Release | -0.22 | 0.07 | -2.94** | |
| ATTN | 0.10 | 0.10 | 0.95 | |
| Release x ATTN | -0.10 | 0.07 | -1.76 | |
| Release x Age | -0.13 | 0.08 | -1.76 | |
| Release x Gender | 0.05 | 0.09 | 0.53 | |
| ATTN x Age | 0.06 | 0.11 | 0.53 | |
| ATTN x Gender | -0.28 | 0.12 | -2.29* | |
| Age x Gender | -0.22 | 0.12 | -1.86 | |
| Release x ATTN x Age | -0.21 | 0.08 | -2.49* | |
| Release x ATTN x Gender | 0.15 | 0.08 | 1.84 | |
| Release x Age x Gender | 0.14 | 0.06 | 1.51 | |
| ATTN x Age x Gender | -0.11 | 0.13 | -0.81 | |
| 4-Way Interaction | 0.28 | 0.10 | 2.95** | |

Note. Analyses included all participants with gender dummy coded such that boys = 0 and girls = 1. ATTN = Attention; Release = Release from Responsibility; *p < .05, **p < .01, ***p < .0001

Table 5b. Predictors of Child-Reported Physical Quality of Life for Girls (N = 430)

| Predictor | *B* | *SE B* | t value | $\Delta R^2$ |
|---|---|---|---|---|
| *Step 1* | | | | .03 |
| Age | -0.10 | 0.05 | -1.99* | |
| Gender | 0.27 | 0.10 | 2.72** | |
| *Step 2* | | | | .07 |
| Age | -0.05 | 0.05 | -0.97 | |
| Gender | 0.29 | 0.10 | 3.01** | |
| Release | -0.16 | 0.04 | -3.74*** | |
| ATTN | -0.11 | 0.05 | -2.00* | |
| *Step 3* | | | | .01 |
| Age | -0.12 | 0.06 | -1.84 | |
| Gender | 0.30 | 0.10 | 3.12** | |
| Release | -0.17 | 0.06 | -2.95* | |
| ATTN | -0.17 | 0.07 | -2.51* | |
| Release x ATTN | 0.04 | 0.04 | 1.02 | |
| Release x Age | -0.02 | 0.04 | -0.43 | |
| Release x Gender | 0.01 | 0.09 | 0.15 | |
| ATTN x Age | 0.01 | 0.06 | 0.16 | |
| ATTN x Gender | 0.17 | 0.12 | 1.43 | |
| Age x Gender | 0.08 | 0.10 | 0.74 | |
| *Step 4* | | | | .01 |
| Age | -0.07 | 0.07 | -1.01 | |
| Gender | 0.41 | 0.12 | 3.54*** | |
| Release | -0.17 | 0.06 | -3.08** | |
| ATTN | -0.17 | 0.06 | -3.08* | |
| Release x ATTN | 0.06 | 0.04 | 1.45 | |
| Release x Age | 0.02 | 0.05 | 0.28 | |
| Release x Gender | 0.02 | 0.09 | 0.24 | |
| ATTN x Age | -0.04 | 0.07 | -0.54 | |
| ATTN x Gender | 0.20 | 0.12 | 1.68 | |

| | | | | |
|---|---|---|---|---|
| Age x Gender | 0.07 | 0.11 | 0.68 | |
| Release x ATTN x Age | 0.01 | 0.04 | 0.21 | |
| Release x ATTN x Gender | -0.11 | 0.08 | -1.32 | |
| Release x Age x Gender | -0.12 | 0.09 | -1.25 | |
| ATTN x Age x Gender | 0.16 | 0.13 | 1.23 | |
| *Step 5* | | | | .02 |
| Age | -0.12 | 0.07 | -1.75 | |
| Gender | 0.41 | 0.11 | 3.60*** | |
| Release | -0.17 | 0.06 | -3.01** | |
| ATTN | -0.19 | 0.07 | -2.69** | |
| Release x ATTN | 0.05 | 0.04 | 1.15 | |
| Release x Age | 0.01 | 0.05 | 0.14 | |
| Release x Gender | -0.05 | 0.09 | -0.53 | |
| ATTN x Age | -0.05 | 0.07 | -0.70 | |
| ATTN x Gender | 0.28 | 0.12 | 2.29* | |
| Age x Gender | 0.22 | 0.12 | 1.86 | |
| Release x ATTN x Age | 0.07 | 0.05 | 1.61 | |
| Release x ATTN x Gender | -0.15 | 0.08 | -1.84 | |
| Release x Age x Gender | -0.14 | 0.09 | -1.51 | |
| ATTN x Age x Gender | 0.11 | 0.13 | 0.81 | |
| 4-Way Interaction | -0.01 | 0.00 | -2.95** | |

Note. Analyses included all participants with gender dummy coded such that boys = 1 and girls = 0. ATTN = Attention; Release = Release from Responsibility; *p < .05, **p < .01, ***p < .0001

Table 6a. Predictors of Child-Reported Psychosocial Quality of Life for Boys (N = 430)

| Predictor | *B* | *SE B* | t value | $\Delta R^2$ |
|---|---|---|---|---|
| *Step 1* | | | | .02 |
| Age | -0.12 | 0.48 | -2.44* | |
| Gender | -0.15 | 0.10 | -1.54 | |
| *Step 2* | | | | .07 |
| Age | -0.07 | 0.05 | -1.55 | |
| Gender | -0.17 | 0.10 | -1.76 | |
| Release | -0.14 | 0.04 | -3.21* | |
| ATTN | -0.14 | 0.05 | -2.58* | |
| *Step 3* | | | | .01 |
| Age | -0.06 | 0.09 | -0.74 | |
| Gender | -0.19 | 0.10 | -1.91 | |
| Release | -0.10 | 0.07 | -1.42 | |
| ATTN | 0.09 | 0.10 | -0.93 | |
| Release x ATTN | 0.01 | 0.04 | 0.04 | |
| Release x Age | -0.07 | 0.04 | -1.57 | |
| Release x Gender | -0.05 | 0.09 | -0.51 | |
| ATTN x Age | 0.08 | 0.06 | 1.32 | |
| ATTN x Gender | -0.08 | 0.12 | -0.71 | |
| Age x Gender | -0.02 | 0.10 | -0.20 | |
| *Step 4* | | | | .01 |
| Age | -0.08 | 0.09 | -0.88 | |
| Gender | -0.26 | 0.12 | -1.86 | |
| Release | -0.10 | 0.08 | -1.30 | |
| ATTN | -0.07 | 0.07 | -1.05 | |
| Release x ATTN | -0.07 | 0.07 | -1.05 | |
| Release x Age | -0.13 | 0.08 | -0.17 | |
| Release x Gender | -0.042 | 0.09 | -0.46 | |
| ATTN x Age | 0.03 | 0.11 | 0.30 | |
| ATTN x Gender | -0.14 | 0.12 | -1.16 | |

| | | | | |
|---|---|---|---|---|
| Age x Gender | -0.04 | 0.12 | -0.37 | |
| Release x ATTN x Age | 0.04 | 0.04 | 1.05 | |
| Release x ATTN x Gender | 0.11 | 0.08 | 1.37 | |
| Release x Age x Gender | -0.10 | 0.09 | -1.12 | |
| ATTN x Age x Gender | 0.70 | 0.13 | 0.54 | |
| *Step 5* | | | | .01 |
| Age | -0.01 | 0.09 | -0.16 | |
| Gender | -0.22 | 0.12 | -1.89 | |
| Release | -0.14 | 0.08 | -1.86 | |
| ATTN | -0.02 | 0.10 | -0.17 | |
| Release x ATTN | -0.11 | 0.07 | -1.57 | |
| Release x Age | -0.03 | 0.08 | -0.45 | |
| Release x Gender | 0.01 | 0.09 | 0.09 | |
| ATTN x Age | -0.01 | 0.11 | -0.10 | |
| ATTN x Gender | -0.20 | 0.12 | -1.57 | |
| Age x Gender | -0.14 | 0.12 | -1.19 | |
| Release x ATTN x Age | -0.11 | 0.08 | -1.27 | |
| Release x ATTN x Gender | 0.14 | 0.08 | 1.72 | |
| Release x Age x Gender | -0.09 | 0.09 | -0.94 | |
| ATTN x Age x Gender | 0.11 | 0.13 | 0.82 | |
| 4-Way Interaction | -0.19 | 0.10 | 2.02* | |

Note. Analyses included all participants with gender dummy coded such that boys = 0 and girls = 1. ATTN = Attention; Release = Release from Responsibility; *p < .05, **p < .01, ***p < .0001

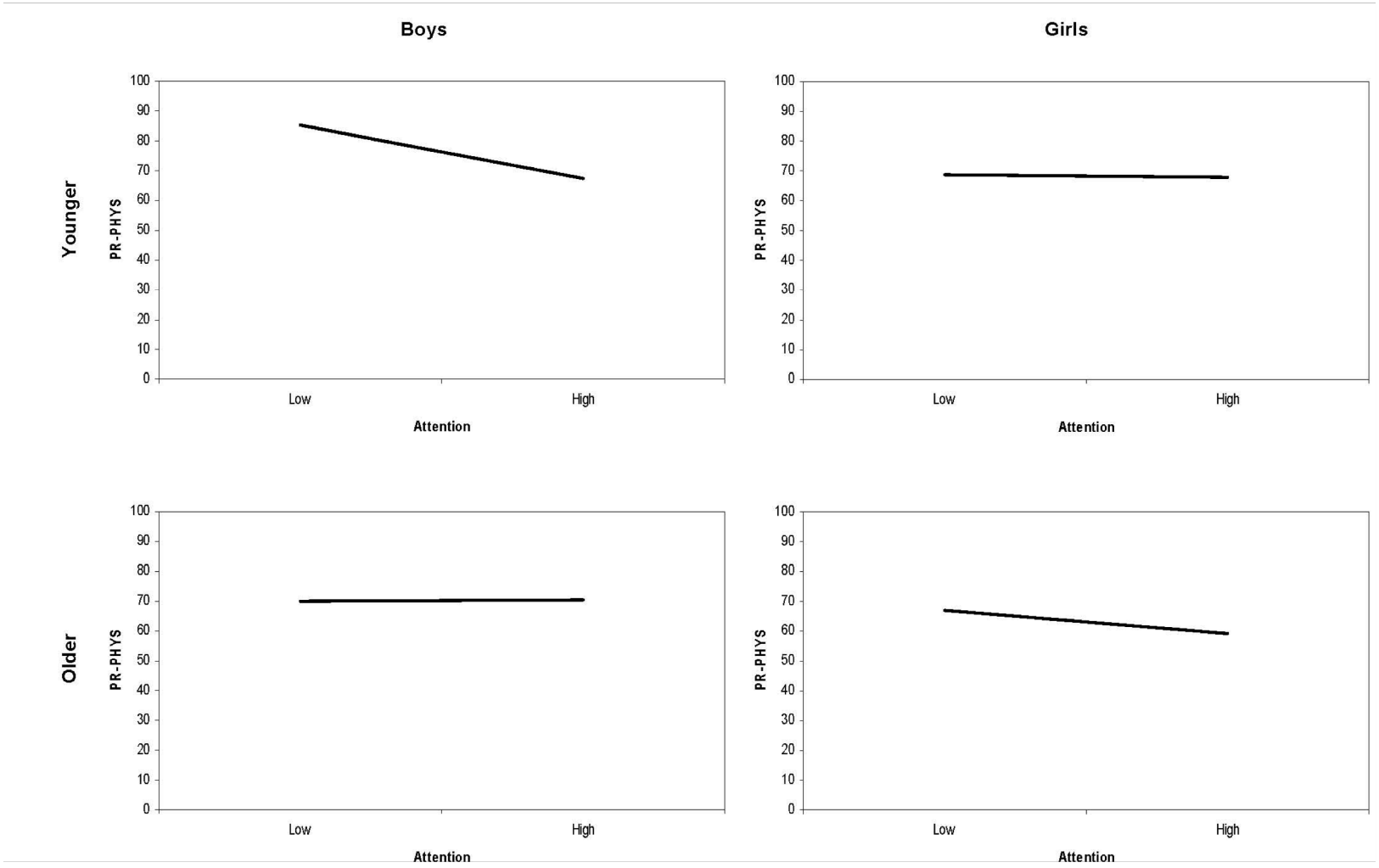
Table 6b. Predictors of Child-Reported Psychosocial Quality of Life for Girls (N = 430)

| Predictor | *B* | *SE B* | t value | $\Delta R^2$ |
|---|---|---|---|---|
| *Step 1* | | | | .02 |
| Age | -0.12 | 0.05 | -2.44* | |
| Gender | 0.15 | 0.10 | 1.54 | |
| *Step 2* | | | | .07 |
| Age | -0.07 | 0.05 | -1.55 | |
| Gender | 0.17 | 0.10 | 1.76 | |
| Release | -0.14 | 0.04 | -3.21** | |
| ATTN | -0.14 | 0.05 | -2.58* | |
| *Step 3* | | | | .01 |
| Age | -0.08 | 0.06 | -1.44 | |
| Gender | 0.19 | 0.10 | 1.91 | |
| Release | -0.15 | 0.06 | -2.60** | |
| ATTN | -0.17 | 0.07 | -2.53* | |
| Release x ATTN | 0.01 | 0.04 | 0.16 | |
| Release x Age | -0.07 | 0.04 | -1.57 | |
| Release x Gender | 0.05 | 0.10 | 0.51 | |
| ATTN x Age | 0.08 | 0.06 | 1.32 | |
| ATTN x Gender | 0.08 | 0.12 | 0.71 | |
| Age x Gender | 0.02 | 0.10 | 0.20 | |
| *Step 4* | | | | .01 |
| Age | -0.12 | 0.07 | -1.75 | |
| Gender | 0.22 | 0.12 | 1.86 | |
| Release | -0.14 | 0.06 | -2.37* | |
| ATTN | -0.21 | 0.07 | -2.96** | |
| Release x ATTN | 0.04 | 0.04 | 0.95 | |
| Release x Age | -0.12 | 0.05 | -2.15* | |
| Release x Gender | 0.04 | 0.09 | 0.46 | |
| ATTN x Age | 0.10 | 0.07 | 1.54 | |
| ATTN x Gender | 0.14 | 0.12 | 0.37 | |

| | | | | |
|---|---|---|---|---|
| Age x Gender | 0.04 | 0.11 | 0.37 | |
| Release x ATTN x Age | 0.04 | 0.04 | 1.05 | |
| Release x ATTN x Gender | -0.11 | 0.08 | -1.37 | |
| Release x Age x Gender | 0.10 | 0.09 | 1.12 | |
| ATTN x Age x Gender | -0.07 | 0.12 | -0.54 | |
| *Step 5* | | | | .01 |
| Age | -0.15 | 0.07 | -2.22 | |
| Gender | 0.22 | 0.12 | 1.89 | |
| Release | -0.13 | 0.06 | -2.31* | |
| ATTN | -0.21 | 0.07 | -3.08** | |
| Release x ATTN | 0.03 | 0.04 | 0.73 | |
| Release x Age | -0.12 | 0.05 | -2.26* | |
| Release x Gender | -0.01 | 0.09 | -0.09 | |
| ATTN x Age | 0.10 | 0.07 | 1.45 | |
| ATTN x Gender | 0.20 | 0.12 | 1.57 | |
| Age x Gender | 0.14 | 0.12 | 1.19 | |
| Release x ATTN x Age | 0.09 | 0.05 | 1.90† | |
| Release x ATTN x Gender | -0.14 | 0.08 | -1.72 | |
| Release x Age x Gender | 0.09 | 0.09 | 0.94 | |
| ATTN x Age x Gender | -0.11 | 0.12 | -0.82 | |
| 4-Way Interaction | -0.01 | 0.11 | -2.02* | |

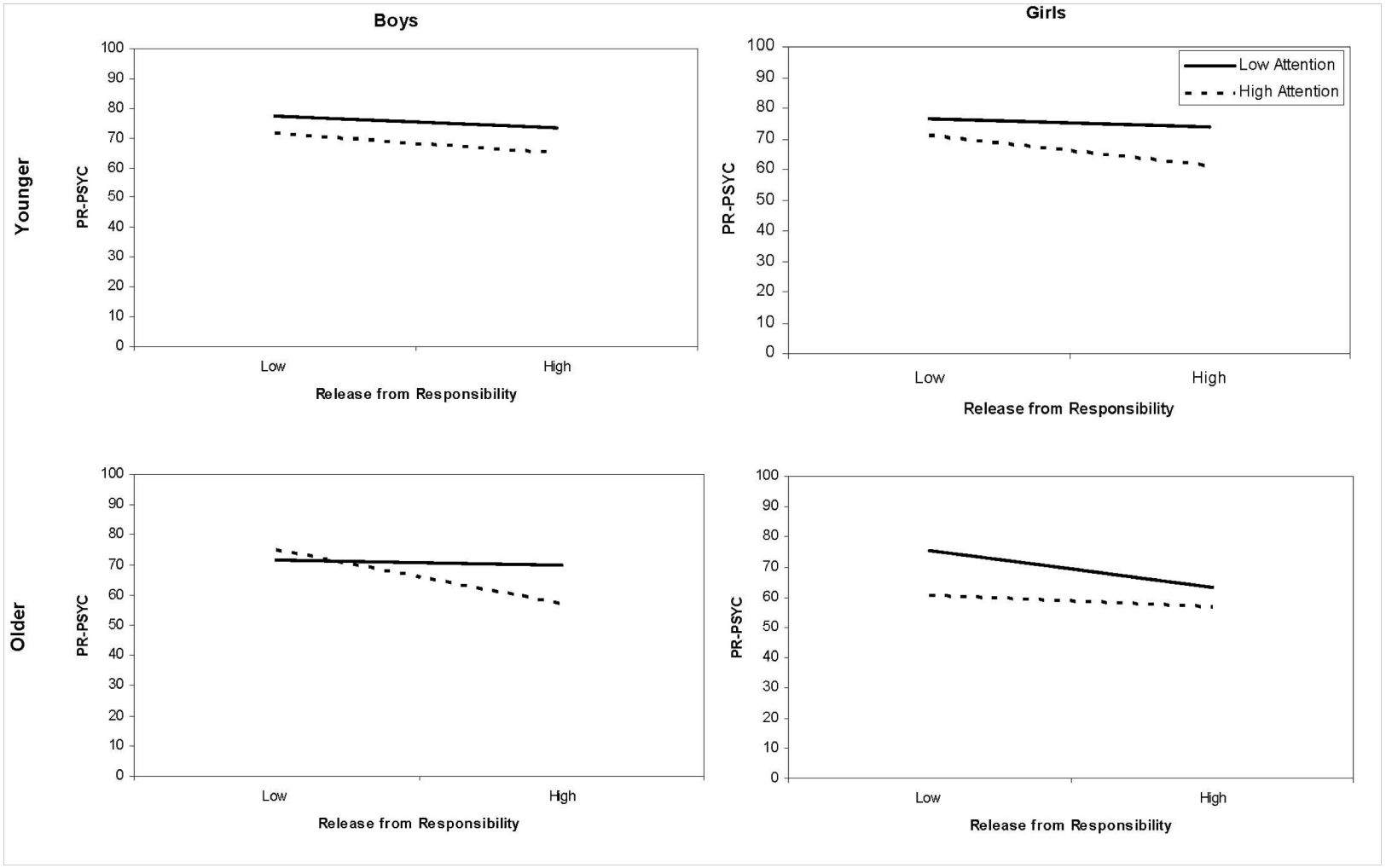
Note. Analyses included all participants with gender dummy coded such that boys = 1 and girls = 0. ATTN = Attention; Release= Release from Responsibility; † < .06 *p < .05, **p < .01, ***p < .0001

Figure 1. Parent-Reported Physical Quality of Life Interactions



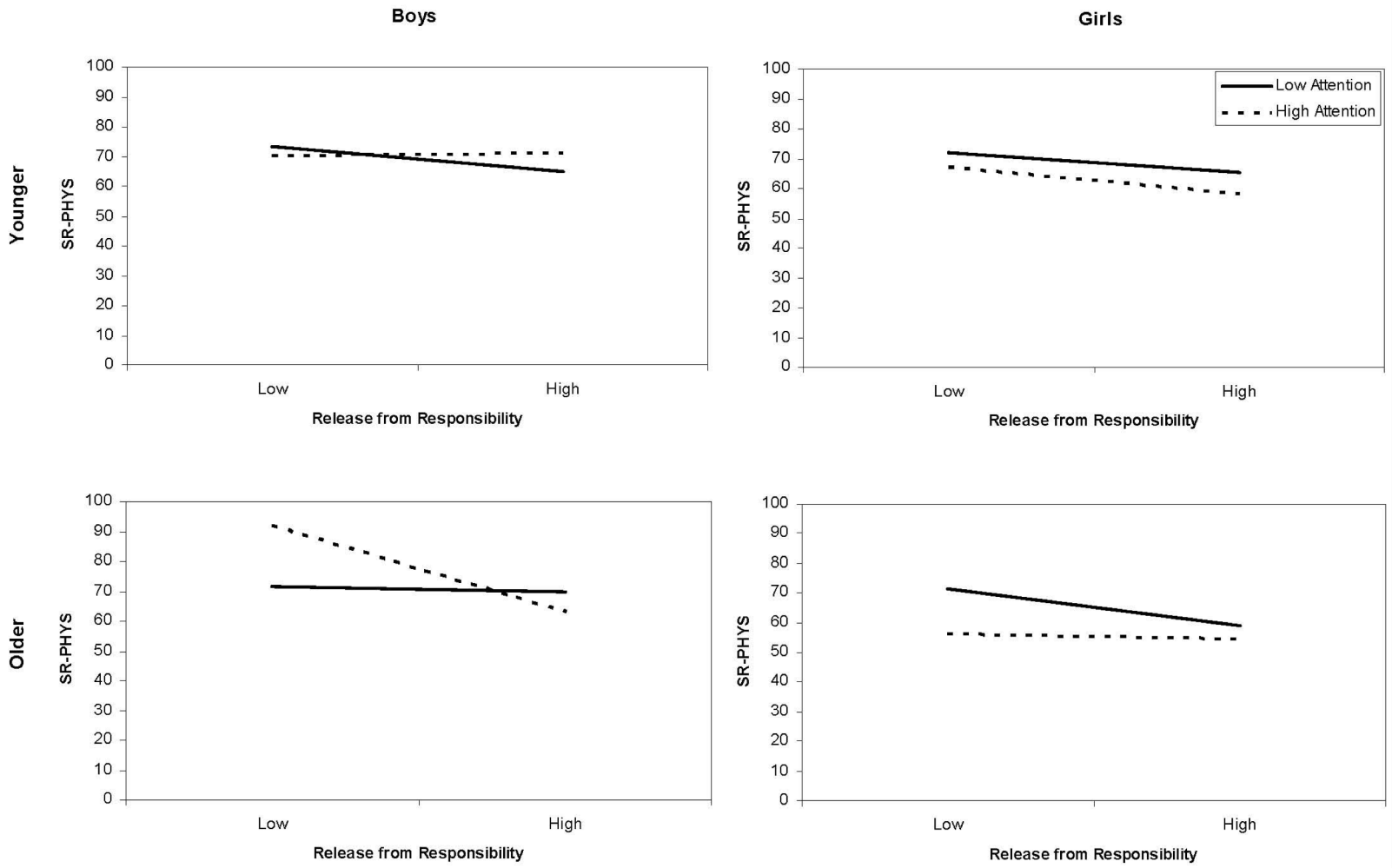

Note. PR-PHYS = Parent-Reported Physical Quality of Life

Figure 2. Parent-Reported Psychosocial Quality of Life Interactions



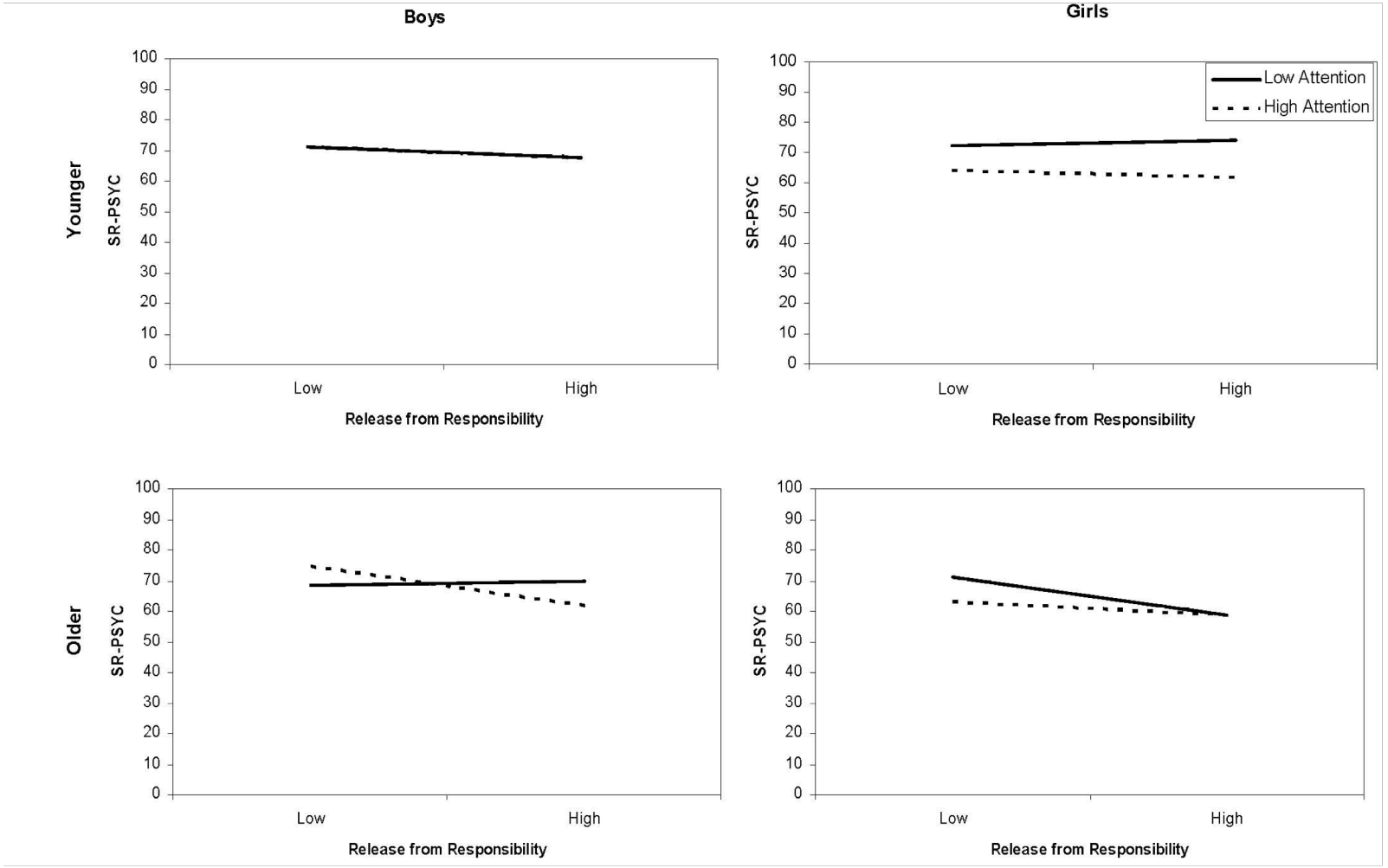

Note. PR-PSYC = Parent-Reported Psychosocial Quality of Life

Figure 3. Self-Reported Physical Quality of Life Interactions




Note. SR-PHYS = Self-Reported Physical Quality of Life

Figure 4. Self-Reported Psychosocial Quality of Life Interactions




Note. SR-PSYC = Self-Reported Psychosocial Quality of Life