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Children's positive dispositional attributes, parents' empathic responses, and children's responses to painful pediatric oncology treatment procedures

Felicity W. K. Harper¹, Louis A. Penner^{1,2}, Amy Peterson¹, Terrance L. Albrecht^{1,2}, and Jeffrey Taub³

¹Karmanos Cancer Institute Population Studies and Health Disparities Program

²Wayne State University Department of Oncology

³Children's Hospital of Michigan

Abstract

Pain/distress during pediatric cancer treatments has substantial psychosocial consequences for children and families. We examined relationships between children's positive dispositional attributes, parents' empathic responses, and children's pain/distress responses to treatment procedures.

Participants were 41 pediatric cancer patients and parents. Several weeks before treatment, parents rated children's resilience and positive dimensions of temperament. Parents' pre-treatment empathic affective responses to their children were assessed. Children's pain/distress during treatments was rated by multiple independent raters.

Children's resilience was significantly and positively associated with parents' empathic affective responses and negatively associated with children's pain/distress. Children's adaptability and attention focusing also showed positive relationships ($p < .10$) with parents' empathic responses. Parents' empathic responses mediated effects of children's resilience on children's pain/distress.

Children's positive dispositional attributes influence their pain/distress during cancer treatments; however, these effects may be mediated by parents' empathic responses. These relationships provide critical understanding of the influence of parent-child relationships on coping with treatment.

Keywords

families; pediatric; cancer; pain/distress; resilience; temperament; empathy

Due to advances in treatment, nearly 80% of pediatric cancer patients are expected to survive five years and 70% will survive ten years (National Cancer Institute, 2010, 2011). However, the pain and distress experienced by children during the medical procedures used to treat cancer has negative short- and long-term psychosocial consequences (Kazak et al., 1997; Stuber et al., 1997). For example, post-traumatic stress symptoms (PTSS) have been

Correspondence concerning this article should be addressed to Felicity Harper, Population Studies and Health Disparities Program, Karmanos Cancer Institute, 4100 John R Street – HP10CB, Detroit, MI 48201. harperf@karmanos.org.

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found in both pediatric cancer patients and their parents (Alderfer, Cnaan, Annunziato, & Kazak, 2005; Barakat, Alderfer, & Kazak, 2006; Bruce, 2006; Kazak, Boevig, Alderfer, Hwang, & Reilly, 2005). Further, there is evidence of a positive relationship between distress and PTSS symptoms in parents and children (Barakat et al., 1997; Kazak et al., 1997; Pelcovitz et al., 1996; Pelcovitz et al., 1998; Stuber, Christakis, Houskamp, & Kazak, 1996; Stuber, Meeske, Gonzalez, Houskamp, & Pynoos, 1994). Therefore, understanding correlates of parents' and children's reactions to pediatric cancer treatments is likely an important avenue toward improving the psychosocial well-being and adjustment of children and their families (Kazak et al., 1997; Tyc, Bieberich, Hinds, & Sifford, 1998; Walco, Sterling, Conte, & Engel, 1999).

Although pain as experience during treatments is presumed to have the same organic cause and therefore same effect across individuals (Walco et al., 1999), there is significant variability in children's experience of pain, and therefore, distress (Chen, Craske, Katz, Schwartz, & Zeltzer, 2000). Previous research suggests that differences in the way people respond to distressing situations are, at least partly, due to an individual's dispositional attributes (DeLongis & Holtzman, 2005; Linley & Joseph, 2004). The growth of positive psychology has led to an increased focus on personal strengths in coping with stressful situations (Aspinwall, 2010; Bonanno, 2008; Carver, 2010; Park, 1998; Rasmussen, Wrosch, Scheier, & Carver, 2006). The purpose of this research was to examine whether children's positive dispositional attributes are related to variability in children's responses to painful and distressing cancer treatments and to better understand potential parent-child mechanisms responsible for this relationship.

Children's dispositional attributes

The choice of children's dispositional attributes for this study was influenced by the work of developmental and cognitive psychologists who have shown certain positive dimensions of personality and temperament to be related to children's social competence and their ability to adaptively and effectively deal with stress (Derryberry, Reed, & Pilkenton-Taylor, 2003; Goldsmith et al., 1987; Kochanska, Murray, & Harlan, 2000; Thomas & Chess, 1977).

One such positive attribute is *resilience*, a person's ability to endure stress and "bounce back" after a stressful experience (Block & Block, 1980; Eisenberg, Fabes, Guthrie, & Reiser, 2000). According to Eisenberg et al., in children, higher resilience is associated with the ability to resourcefully adapt to changing circumstances and flexible use of problem-solving strategies; in contrast, lower resilience involves the tendency to persevere or become disorganized when dealing with change or stress and difficulty recovering after stressful situations. Prior research finds that resilience is positively associated with children's ability to regulate and express emotions (Eisenberg, 2000; Eisenberg et al., 1995). Evidence also suggests that higher resilience children are better-adjusted and more socially competent than children with lower resilience (Eisenberg, 2000; Eisenberg et al., 2004; Eisenberg et al., 2003).

We also examined certain dimensions of children's temperament. *Temperament*, as defined by Rothbart, Derryberry, and Hershey (Rothbart, Derryberry, & Hershey, 2000), refers to individual differences in reactivity and self-regulation assumed to have a constitutional basis. That is, temperament is influenced by biology, heredity, maturation, and experience and is a relatively enduring part of a person's makeup (Rothbart, Ahadi, & Evans, 2000). We explored whether certain positive dimensions of temperament, which are associated with greater acceptance from others and more adaptive responses to stressful stimuli, might also be associated with children's responses to painful cancer treatments. The first of these positive dimensions is *attention focusing* (Goldsmith & Rothbart, 1991; Rothbart, Ahadi,

Hershey, & Fisher, 2001), proposed by Rothbart and colleagues to reflect the self-regulatory dimension of temperament. As the name suggests, attention focusing refers to a child's ability to concentrate on an activity or task (e.g., picking up toys) (Rothbart et al., 2001). Attention focusing is also an element of Rothbart's more recent and broader concept of effortful control (Ahadi & Rothbart, 1993; Posner & Rothbart, 2007; Rothbart & Ahadi, 1994), which is theorized to be a key determinant of how individuals regulate their emotional responses to stressful situations (Rothbart, Ahadi, et al., 2000; Rothbart & Jones, 1998; Ruff & Rothbart, 2001). Higher levels of self-regulation are generally associated with better adjustment and social competence and also are positively related to resilience (Eisenberg et al., 2004; Kyrios, 1990).

At a conceptual level, attention focusing and other aspects of self-regulation seem to be related to *persistence*, another dimension of Carey's model of temperament (Carey, 1970, 1972; McDevitt & Carey, 1978b). Persistence references a child's ability and/or desire to follow through on activities. Thus, persistence was also measured as an aspect of children's temperament in this study.

Finally, we considered the relevance of the reactivity dimension of temperament to the pediatric cancer context. Specifically, we assessed *adaptability* and *approach*, which are also part of Carey's model of temperament (Carey, 1970, 1972; McDevitt & Carey, 1978b). Previous research shows that children who are rated higher on these dimensions of temperament are not only better adjusted but also respond better to general stressors, and more importantly, painful stimuli (Brody, Stoneman, & Burke, 1987; Carson & Bittner, 1994; Kyrios, 1990; Lee & White-Traut, 1996; Schechter, Bernstein, Beck, Hart, & Scherzer, 1991).

Several studies have shown children's dispositional attributes to be related to children's pain/distress behavior during dental procedures (Lochary, Wilson, Griffen, & Coury, 1993; Quinonez, Santos, Boyar, & Cross, 1997; Radis, Wilson, Griffen, & Coury, 1994), routine immunization (Schechter et al., 1991), and hospitalization (Wallace, 1989). Voepel-Lewis and colleagues (Voepel-Lewis, Malviya, Prochaska, & Tait, 2000) also found children's dispositional attributes to be related to sedation levels during magnetic resonance imaging (MRI) procedures. Children with higher persistence were more able to undergo MRIs either without any sedation or with only minimal sedation as compared to children with lower persistence; further, the likelihood of requiring additional sedation was greater in children who had lower adaptability as compared to children with higher adaptability. Based on these findings, these aspects of temperament seem relevant to children's reactions to painful cancer treatments. However, we are not aware of any prior studies that have specifically looked at relationships between the positive dimensions of temperament and children's pain/distress in a pediatric cancer context.

Parents' affective responses

In addition to examining the direct effects of children's positive dispositional attributes of resilience and temperament on children's reactions to cancer treatments, we examined an indirect path whereby these attributes may affect children's levels of pain/distress. Specifically, we examined the relationship between children's dispositional attributes and parents' affective responses at the time of treatment. Our own research and that of others has consistently shown a relationship between *parents' affective responses* before and during treatments and children's responses to treatment (Dahlquist, Power, & Carlson, 1995; Dahlquist, Power, Cox, & Fernbach, 1994; Manne et al., 1992; Penner et al., 2008). For example, parents' negative affect states just before treatment, such as state anxiety, have been positively associated with children's negative responses to treatment (Dahlquist et al.,

1994; Stuber et al., 1997). In addition, Penner et al (Penner et al., 2008) found that *positive* affect states have an impact as well. Specifically, Penner et al. measured parents' empathic concern just before their children had cancer treatment procedures. Empathic concern is a construct derived from the bystander intervention literature in social psychology (Darley & Latane, 1968; Latane & Darley, 1968) and refers to an other-oriented affect state, which reflects feelings of concern, warmth, and compassion for a person in distress (Batson, 1991; Batson & Oleson, 1991). Penner et al. found significant *negative* associations between parents' empathic concern and children's pain/distress; that is, the more empathic concern parents experienced prior to treatments, the less pain/distress children were observed to experience during the treatments.

Current study

As mentioned, there is no previous study of children's resilience and temperament and their pain/distress behavior during cancer treatments. Further, there is no study linking such positive dispositional attributes to children's pain/distress through their parents' affective responses. However, it seems reasonable to suggest a relationship between the effectiveness of children's coping with treatment procedures and parents' affective responses. Specifically, children with more positive dispositional attributes – that is, children with a propensity for bouncing back and more effectively and adaptively coping with a stressor such as cancer treatment – may elicit more positive empathic responses from their parents than children with fewer positive attributes.

Thus, in the current study we considered how the children's positive dispositional attributes were related to their pain/distress during cancer treatments, and further, whether this relationship was mediated by parents' affective states just prior to the treatments. First, we hypothesized that children's resilience, attention focusing, persistence, and adaptability would all be inversely related to children's pain/distress during treatment procedures. Second, we hypothesized that these same dispositional attributes would be associated with more positively-valenced empathic affective responses among parents prior to the treatment. Finally, we hypothesized that parents' affective responses before treatments would mediate the relationship between children's dispositional attributes and children's pain/distress during treatments.

Method

Participants

Data were collected between 2004 and 2007 at an urban children's hospital in Detroit, Michigan. Participants were 41 children (ages 3–12) with pediatric cancer and their adult primary caregivers. Mothers were often the primary caregiver ($n=30$), followed by grandmothers ($n=5$), fathers ($n=4$), and other adults ($n=2$). In 11 cases, two or more caregivers (hereafter called *parents*) were present.¹ All children were receiving an outpatient pediatric cancer treatment procedure. Average child age was 6.83 years ($SD=3.14$); 54% of children were male. Average age of the primary parent was 37.69 ($SD=10.97$). Parent-reported ethnicities were 69% Caucasian and 21% African American; the remaining parents reported other ethnicities.

Mean time in treatment was 13.74 months ($SD=15.55$). The most common diagnosis was acute lymphocytic leukemia ($n=23$) followed by tumors ($n=13$) and lymphomas ($n=3$). Twenty three children received port-start procedures, 16 received lumbar punctures, and 2

¹Although 41 children were observed, complete pain/distress ratings or questionnaire data was not available on 3 cases; therefore, the number of cases included in the analyses was 38.

children received both procedures; 1 child also had a bone marrow aspiration. Children undergoing port starts often had topical anesthetic prior to the port start. Children undergoing lumbar punctures had both a topical and a subcutaneous anesthetic and were therefore consciously sedated. Average time children were in the procedure room was 79.79 minutes ($SD=54.99$).

Study overview

A nurse initially approached eligible parents in clinic and obtained oral permission for the investigators to discuss the study. Parents signed informed consent and HIPAA documents, and where appropriate, children provided verbal assent. Parents consented to complete initial questionnaires at the beginning of the study, immediately before and during the treatments, and after the video recording of one of their child's treatment procedures (*described below*). Seventy-six percent of eligible families agreed to participate. Children received \$10.00 gift cards for their participation in each stage of data collection.

Initial questionnaires

Parents were given a questionnaire packet to take home and report their own demographic characteristics and their children's demographic characteristics, medical history (e.g., type of cancer, type of procedure, length of time since diagnosis, and number of procedures in the past 2 months), and dispositional attributes. The packets, which were either returned by mail or collected in person by research assistants, contained the following measures.

Resilience—Parents rated their child's level of resilience using an 11-item measure developed by Eisenberg and colleagues (Eisenberg et al., 2003). Eisenberg et al (2004) argue the scale measures the extent to which an individual manages and adapts to stressful situations. Items were rated on a 5-point Likert scale (ranging from 1 = "almost always untrue of your child" to 5 = "almost always true of your child"). The scale has good internal consistency (Eisenberg et al., 2003; Penner & Orom, 2009) and has consistently been associated with measures of effortful control, another measure of ability to cope with stressful stimuli (Eisenberg et al., 2004; Eisenberg et al., 2003). Coefficient alpha in the present study was .71.

Temperament—Temperament was measured with age-appropriate versions of the Carey Temperament Scales (Carey & McDevitt, 1997; Carey & McDevitt, 2000). The Behavioral Style Questionnaire (McDevitt & Carey, 1978a, 1996) was used for children ages 3–7 and the Middle Childhood Temperament Questionnaire (Hegvik, McDevitt, & Carey, 1982) for children ages 8–12. Although these measures assess multiple dimensions of temperament, for this study only those subscales most relevant to positive dimensions of temperament and children's reactions to painful and/or stressful stimuli (i.e., adaptability, approach, and persistence) were used. The scales have been normed on age-appropriate groups and have acceptable test-retest reliability and internal consistency with coefficients (i.e., high .70s to low .80s) (Carey & McDevitt, 2000; Hegvik et al., 1982; Houck, 1999; Jinsong, Jide, & Lixiao, 2000; McDevitt & Carey, 1978a). Similar alphas were obtained in the present study (i.e., >.70). Monographs by Carey and McDevitt (Carey & McDevitt, 1995; Levine, Carey, & Crocker, 1992) indicate that the scales validly assess temperament in children.

Due to concerns about participant burden and our emphasis on positive attributes, we did not use Rothbart and colleagues' full temperament measures; however, parents completed 6 items from Goldsmith and Rothbart's (Goldsmith & Rothbart, 1991) measure of *attention focusing* (coefficient alpha=.60). Given that different measures of temperament are typically used for different age groups, for all measures of temperament, we computed separate

standardized scores for the older and younger children. The standardized scores were then combined into a single overall distribution for each aspect of temperament.

Video-recorded treatment procedure

Video-recordings were made via a system specifically developed for the parent study. The system has been demonstrated to be minimally intrusive and nonreactive in a medical setting (Albrecht & Goldsmith, 2003; Penner et al., 2007). No participants terminated participation because of video recording. On the day of the treatment procedure (approximately 3–4 weeks after the completion of the initial questionnaire), parents reported their empathic affective responses prior to entering the procedure room with their children. Video-recording started when families entered the room and ended when families left the room or lights were turned off while children rested after the procedure.

Pre-treatment questionnaires

Parents' empathic affective responses—Parents completed two measures of empathic affective response approximately 5 to 25 minutes prior to entering the treatment room. Negative empathic affective responses (*State Anxiety*) were measured using the state subscale of Spielberger et al. (Spielberger, 1977) State-Trait Anxiety Inventory (STAI). The STAI, a widely used measure of anxiety in response to a specific stimulus or situation, has good internal consistency (alphas $>.85$) and construct validity (Spielberger, Sydeman, Owen, & Marsh, 1999). Cronbach's alpha in this study was .94. Positive empathic affective responses (*Empathic Concern*) were measured using six items (i.e., softhearted, warm, tender, moved, sympathy, and compassion) from Batson's (Batson, 1991) Empathic Responses Questionnaire. As noted earlier, Batson argues that empathic concern is an other-oriented affective state that reflects feelings of concern, warmth, and compassion for a person in distress. The measure of empathic concern has demonstrated reliability and is consistently associated with prosocial actions motivated by concern for others (Batson, 1991; Otten, Penner, & Altabe, 1991); in the present study, the coefficient alpha was .82.

As we were interested in the overall valence of the parent's empathic response, we decided to compute the signed difference between each parent's score on the *Empathic Concern* measure and their score on the *State Anxiety* and use this as an index of the valence of the parents' *Empathic Affective Response (EAR)*. With the EAR difference score, the larger the positive difference, the more positively valenced the parents' overall affective response. However, prior to computing the difference score, we investigated whether Empathic Concern and State Anxiety scores were actually independent measures. The correlation between the two affective states was, $r=.01$ (*NS*), thus suggesting a signed difference score was appropriate.

Children's pain/distress—Children's pain/distress was assessed using Wong and Baker's Faces Scale (Wong & Baker, 1988). The Faces scale consists of six schematic drawings of a human face accompanied by verbal and numerical descriptions showing varied reactions to pain/distress (ranging from "no pain/distress at all" to "extreme pain/distress"). Four independent raters – parents, nurses, children, and trained observers – blinded as to one another's ratings completed the Faces scale. (The nurses, children and observers were also blinded as to the parents' affective responses prior to treatment.) Parents, nurses, and children completed the scales while still in the treatment rooms; the trained observers rated video recordings of the treatments at a later point in time. (When multiple parents or nurses were present, ratings were averaged for analyses.)²

Prior studies using these same procedures to rate pain/distress (Cline et al., 2006; Penner et al., 2008) reported extremely high inter-judge reliability when more than one parent or nurse

rated pain/distress ($r_s > .90$) and among trained observers' ratings of distress ($r_s > .90$); there was also good-to-excellent convergent validity among different raters' ratings of children's pain/distress (r_s ranged from .48 to .64).

Data preparation and analysis—Values for sporadic missing data (1% of all items) were imputed using substitution of the sample mean. Data were inspected for outliers, but none were identified. Statistical analyses were performed using the IBM Statistical Package for the Social Sciences, Release 19.0. Analyses consisted of zero-order Pearson product-moment correlations and multiple linear regressions. Due to the small sample size, and therefore reduced power, we have reported findings significant at the $p < .10$ level as *trends*.

Results

Children's demographic, clinical variables, and pain/distress ratings

Correlations between children's age and children's pain/distress ratings showed a negative relationship across all rating sources (from $r = -.52$ [observers] to $r = -.34$ [children's self-ratings]; all $p_s < .05$). Older children were rated as having significantly less pain/distress than younger children. However, children's gender and type of parent (e.g., mother, father) were not significantly related to children's pain/distress ratings (all $p_s > .05$). None of the children's demographic variables (age, gender, relationship to parent) were related to parents' EAR difference scores (all $p_s > .05$). Children's clinical variables (e.g., type of procedure, length of time since diagnosis, and number of procedures in the past 2 months) were also unrelated to all pain/distress ratings and parents' EAR scores.³

Children's dispositional attributes and pain/distress

Our first hypothesis was that each of the measures of children's positive dispositional attributes would be inversely related to ratings of children's pain/distress during treatment. That is, we expected higher levels of resilience and the four positive dimensions of temperament – adaptability, approach, persistence, and attention focusing – to be associated with less pain/distress in children.

As shown in Table 1, children's resilience was significantly and negatively related to pain/distress as rated by all sources (i.e., parents, nurses, children, and trained observers); more resilient children experienced less treatment-related pain/distress. Controlling for children's age had no meaningful impact on any of these correlations. However, contrary to the first hypothesis, none of the dimensions of child temperament – adaptability, approach, persistence, and attention focusing – were significantly related to children's treatment-related pain/distress as rated by any source.

With respect to our second hypothesis, we expected that the children's positive dispositional attributes would also be associated with more positively-valenced parent empathic responses (as reflected by higher EAR difference scores) on the day of treatment. As shown in Table 2, parents' EAR scores were positively and significantly related to children's resilience ($p = .008$) and there were trend relationships with attention focusing ($p = .083$) and adaptability ($p = .074$); children who were rated higher on these dispositional attributes had parents who

²Parents and nurses rated children's pain and distress, children rated their own pain, and trained observers rated the child's distress during the procedure, leading to differences in dimensions rated across sources. At the outset of the study, nurses strongly maintained that child treatment-related pain and distress were related but distinct dimensions. Therefore, parents and nurses rated both child pain and distress. However, it was expected that especially younger children would have difficulty distinguishing between pain and distress; therefore children rated only their pain. Observers, because they were not present in the treatment room, rated only child distress and not pain. Despite these differences in dimensions rated, correlations among all ratings of pain and distress ($r = .64$) suggested they could be combined into a single dimension, hereafter called *pain/distress*.

³Analyses using empathic concern and state anxiety separately showed a similar pattern of results.

responded with more positive empathic responses (i.e., empathic concern less state anxiety) on the day of treatment. Children's approach and persistence scores were unrelated to parents' EAR scores. Controlling for children's age had no impact on any of these correlations.

Parents' empathic affective responses as a mediator

Our third hypothesis was that parents' empathic responses (as reflected by EAR scores) would mediate the relationship between children's positive dispositional attributes (i.e., resilience, adaptability, approach, persistence, attention focusing) and children's pain/distress.

Following Baron and Kenny's traditional approach for the examination of mediation effects (Baron & Kenny, 1986), we first examined zero-order correlations between the hypothesized mediator (i.e., EAR) and the outcome variable (i.e., ratings of children's pain/distress), and as expected, there were significant and negative relationships between EAR scores and all ratings of pain/distress. As previously reported, resilience was the only dispositional attribute that significantly predicted both children's pain/distress and parents' EAR scores; thus, resilience was the only child attribute included in the mediational analyses. Results of the mediational analysis showed that parents' EAR scores significantly mediated the relationship between children's resilience and pain/distress ratings by trained observers. The significant mediation effect for trained observer ratings of children's distress is shown in Table 3.

The full model, including child resilience and parents' EAR scores, significantly predicted observer ratings of child pain/distress ($F(1,35)=8.96$, $p=.001$, $R^2=.34$). However, in this model the direct relationship between children's resilience and observer-rated pain/distress was no longer significant, $p=.13$. The indirect effect is $-.045$ with a medium effect size ($r^2=.186$). The percentage of the total effect mediated is equal to 44.2.

The indirect effect of parents' EAR scores was tested using Sobel's formula (Sobel, 1987, 1988; Sobel & Leinhardt, 1982) and the bootstrapping procedure recommended by Preacher & Leonardelli (Preacher & Leonardelli, 2012) for small samples; results were significant, $z=2.05$, $SE=.007$, $p=.04$. Tests of non-linearity did not show any significant non-linear effects. There were also trend effects ($p<.10$) for parents' EAR scores as a mediator between children's resilience and both nurses' and children's ratings of pain/distress.

Discussion

There has been research on the effect of less adaptive attributes (e.g., trait anxiety) on psychosocial adjustment in both children and parents confronting stressful situations (Kazak et al., 1998; Phipps, Larson, Long, & Rai, 2006). Few, if any, studies have been conducted on the role of positive dispositional attributes and adjustment to pediatric cancer in children and families. In this study, we hypothesized that certain positive child dispositional attributes would be associated with less treatment-related pain/distress among pediatric cancer patients receiving painful medical procedures. As expected, higher levels of children's resilience were associated with less pain/distress during treatment procedures. Development psychologists (Eisenberg et al., 2003) and advocates for positive psychology (Tugade & Fredrickson, 2004) alike have argued that dispositional resilience has benefits for coping with stressful situations. Our data support and extend this argument into the context of pediatric cancer patients coping with stressful treatment procedures.

The pattern of relationships for attention focusing and persistence were also consistent with our hypothesis (i.e., all correlations with pain/distress were negative), although none of the

individual correlations were significant. Further, adaptability and approach were not systematically related to ratings of pain distress. The weak or null relationships between these dimensions of child temperament and pain/distress in this sample is somewhat surprising given previous research showing an association between children's temperament and stress reactions in medical and dental settings (Lochary et al., 1993; Quinonez et al., 1997; Radis et al., 1994; Schechter et al., 1991; Voepel-Lewis et al., 2000; Wallace, 1989). Clearly, there is a need for further investigation to explain the significant relationships for resilience and the null results for the positive dimensions of temperament studied.

As also was expected, the valence of parents' empathic affective responses (i.e. the *difference* between parents' positive empathic and negative empathic affective responses on the day of treatment) was significantly and negatively correlated with children's pain/distress ratings. Specifically, for ratings made by nurses, children, trained observers, the *greater* the parents' positive empathic affective responses relative to their negative empathic affective responses, the *less* pain/distress the children experienced. There was also a trend mediational in the same direction for parents' pain/distress ratings although it was not significant at the *p*-level established for this study. One potential explanation for the lack of significance for parents' pain/distress findings is method bias in having parents report their own empathic responses and report their children's pain/distress. It is reasonable to speculate that more empathic parents may identify *more* (perhaps even over-identify) with their children's pain/distress, thereby attenuating the strength of this relationship, as compared to other observers and maybe even children themselves.

We also hypothesized that parents' EAR scores would be positively associated with certain positive dispositional attributes in the children. Consistent with this hypothesis, resilience was significantly and positively associated with parents' EAR scores; attention focusing and adaptability showed trends ($p < .10$) toward positive relationships with parents' EAR scores. With respect to resilience, it seems reasonable that children who demonstrate higher levels of resilience may elicit more positive empathic responses from their parents. Parents may be more attuned to or affected by the pain/distress of a child who generally demonstrates effective coping, adapts well to stressful situations, and/or has an "easy" (as opposed to "difficult") temperament (Schachter & Stone, 1985; Thomas & Chess, 1977), thereby engendering more empathic feelings in parents.

Finally, mediational analyses showed parents' EAR scores mediated the relationship between children's resilience and children's pain/distress ratings. These findings suggest the possibility that at least part of the reason why children's positive dispositional attributes, such as resilience, might result in less pediatric distress is that resilient children elicit responses from parents that are more empathic and focused on the well-being of their child. That is, parents may display more empathy toward children who are easier to manage and comfort. As a result, parents' empathic responses may also result in more effective and beneficial helping enacted on the child's behalf (Penner et al., 2008), thereby reducing the child's pain/distress in response to treatment.

An alternative explanation is that resilience mediated the effects of parents' empathic responses on children's distress in the treatment situations. That is, parents' positive empathic responses to their children's treatment-related distress caused their children to become more resilient, and as a result, to experience less distress in response to the treatments.

It seems quite reasonable to expect that, over the long run, consistent positive empathic responses from parents may increase a child's resilience. However, the question of interest here is whether an alternative causal model provides a better fit to the data than the model

we hypothesized. Therefore, we empirically tested the alternative mediational model (i.e., child resilience causing parents empathic responses), but found no support for this model. Thus, in the specific situation of children's reactions to cancer treatments, we found no evidence that resilience was mediating the effects of parents' empathic affective responses on children's pain/distress. The broader question of the role of parental dispositions in the development of their children's resilience is an important one, however, and merits further research.

There are prior findings that parents' and children's *negative* stress reactions during cancer treatments put both parents and children at-risk for longer-term negative outcomes such as PTSS (Alderfer et al., 2005; Barakat et al., 2006; Bruce, 2006; Kazak et al., 2005). The present data set allowed us to examine the short-term impact of children's positive attributes and parents' positive affective responses, but did not allow us to test the long-term impact on outcomes such as parent PTSS. However, our study, unlike other previous research, demonstrates the critical role of positive attributes and positive affective responses in pain/distress reactions, and therefore, should be a focus of further research on short-term and longer-term reactions to painful and distressing cancer.

From a clinical perspective, these findings support the practical importance of identifying the individual psychosocial resources and functioning of each family as part of the treatment planning process. Early assessment of family strengths and resource deficits can provide the basis for interventions designed to improve parents' and children's immediate stress reactions to pediatric cancer treatment, and therefore, positively impact long-term psychosocial outcomes (Kazak et al., 1997; Stuber et al., 1997).

Limitations

While these results represent important findings in this area, they should be interpreted in light of several considerations. First, the relatively small sample of families in the study resulted in underpowered analyses, which might have failed to detect some reliable relationships. Second, as mentioned, it is possible that having parents report on their children's dispositional attributes and their child's pain/distress and their own empathic responses represents a source of method bias (Bagozzi, Yi, & Phillips, 1991; Campbell & Fiske, 1959; Doty, 1998), which may have attenuated the strength of some relationships. For example, the strongest effects for the mediational analyses were found using pain/distress ratings made by trained observers. Further, nurses' and children's ratings showed trend effects, whereas, parents' ratings showed no relationship at all.

Limitations aside, the study methodology – including in-vivo recording of treatment procedures and objective children's pain/distress ratings made by trained observers – represent important design strengths, and further, support the following conclusions. First, dispositional resilience contributed to differences in children's experience of pain/distress. Children's ability to bounce back from stressful events and effectively cope with stressors was associated with less treatment-related pain/distress across all five rating sources. One might speculate these children were directly benefiting from more adaptive coping strategies. Second, children's dispositional resilience also had an impact on the way in which parents responded on the day of these procedures. More resilient children had parents who displayed more positive affective responses on the day of treatment. The work of Batson (1991) and others suggests that parents who experienced primarily positive empathic responses were more focused on helping their children than attending to their own distress.

Although these presumed paths of action require independent replication, this is clearly an area in need of further study. The findings argue for the need to identify parents' and children's dispositional strengths and deficits and to better understand the impact of parents'

positive as well as negative affective responses on coping during painful treatment procedures. This understanding can not only inform development of interventions to reduce child pain/distress during pediatric oncology treatments but also has the potential to improve longer-term psychosocial outcomes of both children and their parents.

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Table 1
Correlations between Children's Dispositional Attributes and Children's Treatment-Related Pain/Distress

	Parent pain	Parent distress	Nurse pain	Nurse distress	Child pain	Observer distress
Child resilience	-.34 [*]	-.37 [*]	-.30 [†]	-.42 ^{**}	-.36 [*]	-.43 ^{**}
Child temperament						
Adaptability	-.13	-.09	.03	.04	-.05	-.04
Persistence	-.23	-.14	-.03	-.09	-.10	-.04
Attention Focusing	-.11	-.14	-.03	-.19	-.17	-.20
Approach	-.06	.19	.17	.23	.27	.15

[†] *p* .10

^{*} *p* .05.

^{**} *p* .01.

Table 2

Correlations between Children's Dispositional Attributes and Parents' Affective Responses on the Day of Treatment

	Parent empathic concern	Parent state anxiety	Parent EAR score
Child resilience	.42 ^{**}	-.02	.41 ^{**}
Child temperament			
Adaptability	.29 [†]	-.16	.31 [†]
Persistence	.16	-.11	.17
Attention Focusing	.30 [†]	.06	.30 [†]
Approach	.03	-.03	.03

Note: Parent EAR score is a difference score of level of parent empathic concern less level of parent state anxiety.

[†]
p .10.

^{*}
p .05.

^{**}
p .01.

Parents' EAR as a Mediator of Children's Resilience and Observer Ratings of Children's Pain/Distress

Table 3

Variable	B	SE	β	t	ΔR^2	F	95% CI
Step 1							
Child resilience	-.102	.037	-.415*	-2.74	.173	7.51**	[-.177, -.027]
Step 2							
Child resilience	-.057	.037	-.232	-1.54	.166	8.96**	[-.132, .018]
Parent EAR	-.132	.045	-.447*	-2.97			[-.223, -.042]

Note: Parent EAR score is a difference score of level of parent empathic concern less level of parent state anxiety.

*
p .05.
**
p .01.