Parent and Family Factors Associated with Child Adjustment to Pediatric Cancer

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Objective To identify factors that influence the association between parent and child distress among families of children with cancer and comparison peers. **Methods** Parent and child distress, social support, and family environment were assessed among families of 95 children with cancer (94 mothers, 67 fathers) and 98 comparison peers (97 mothers, 77 fathers). **Results** Significant associations were found between parent and child distress. For models examining the impact of fathers' distress on children, several moderators were identified (i.e., family environment, child age and gender, a cancer diagnosis, and treatment severity). Family environment also partially mediated father and child distress. **Conclusions** Children whose parents were distressed were more likely to be distressed themselves. Subgroups of children were particularly vulnerable, indicating a need to identify further mechanisms of risk and resilience and to develop family-based interventions. Support was found for including fathers as independent sources of information in pediatric psychology research and clinical practice.

Key words adjustment; cancer; families; family environment; social support.

Cancer is diagnosed in over 12,000 US children under the age of 20 each year (Ries et al., 2005). Although recent advances in treatment have lead to a significant increase in survival (Ries et al., 2005), children often undergo multimodal treatment including surgeries, chemotherapy, and radiation, which can cause numerous acute and long-term side effects. Painful procedures, hospitalizations, and an uncertain prognosis are common stressors that can pose a substantial threat to the adjustment of children and families (Sloper, 2000). Despite the stressful nature of cancer, research has found considerable variability in the functioning of children after a diagnosis (Thompson & Gustafson, 1996; Wallander & Varni, 1998). In some cases, children have been found to struggle socially (Noll, Bukowski, Davies, Koontz, & Kulkarni, 1993), emotionally (Sawyer, Antoniou, Toogood, Rice, & Baghurst, 2000), and academically (Sanger, Copeland, & Davidson, 1991). However, other studies have suggested that children adjust well and can even demonstrate growth or resilience (Anholt, Fritz, & Keener, 1993; Hampel, Rudolph, Stachow, Lass-Lentzsch, & Petermann, 2005; Stam, Grootenhuis, & Last, 2001). Heterogeneity in the adjustment of children with cancer makes it essential to identify specific risk and resilience factors that lead to this variability in outcome.

Social–ecological theories suggest that a person's well-being is dependent not only on personal characteristics, but also on the social systems and resources around them (Broffenbrenner, 1979). The family system is an important and proximal factor for children with a chronic illness (Kazak, Rourke, & Crump, 2003). According to these theories, the adjustment of children to a stressor may be influenced by the adjustment of those around them and the family's available resources. A stressor such as a chronic illness requires all family members to adapt to medical appointments, new responsibilities, financial strain, and

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physical absences of multiple family members. Therefore, when examining the adjustment of children affected by cancer, it is important to consider the adjustment of the entire family.

Parent distress has been found to be positively related to distress in children. For example, children of depressed mothers display a variety of internalizing and externalizing symptoms, above and beyond those displayed by children of nondepressed mothers (Brennan, Hammen, Katz, & LeBrocque, 2002; Langrock, Compas, Keller, Merchant, & Copeland, 2002). Similarly, anxiety in parents has been linked to anxiety in children (Langrock et al., 2002; Whaley, Pinto, & Sigman, 1999). Parents, particularly mothers, of children with cancer may display more internalizing difficulties than parents of healthy children (Dahlquist, Czyzewski, & Jones, 1996; Dockerty, Williams, McGee, & Skegg, 2000; Hoekstra-Weebers, Jaspers, Kamps, & Klip, 1999), which in turn may leave children with cancer more vulnerable to internalizing difficulties.

Parental social support may buffer the association between parent and child distress (Cohen & Wills, 1985); however, the quality of support available to parents of children with a chronic illness has not been well established. In some cases, support networks were found to be smaller and qualitatively different than those of healthy families (Dockerty et al., 2000; Kazak, Reber, & Carter, 1988); other studies have found no differences in support (Gerhardt et al., 2003; Kazak, 1992). It is essential to examine the support needed by and provided for parents of children with chronic illnesses and to clarify its impact on child and family functioning.

Another factor linked to distress in children is the quality of their family environment. Children raised in environments high in conflict may be more prone to adjustment problems (Hammen, Brennan, & Shih, 2004; Varni, Katz, Colgrove, & Dolgin, 1996). However, children in a positive family environment (e.g., high expressiveness and cohesion, and low conflict) are more likely to adjust well (Drotar, 1997; Varni et al., 1996). For a child with cancer, cohesive and expressive families may be more capable of ensuring the adjustment of each family member, and thereby buffer parent and child distress (Hammen et al., 2004). Varni and colleagues (1996) examined aspects of family environment related to child adjustment and found that in families with a child newly diagnosed with cancer, cohesion and expressiveness were associated with fewer child internalizing problems. Unfortunately, greater conflict and lower cohesion and expressiveness have been found in families of children with a chronic illness, as well as in families with a distressed parent (Eiser, 1990; Kashdan et al., 2004). Furthermore, the diagnosis and treatment of cancer may disrupt the family environment (McGrath, 2001), possibly leaving children vulnerable to internalizing problems.

Despite increased attention to the psychosocial effects of chronic illness, theoretical and methodological limitations in the literature make it difficult to draw firm conclusions. Existing research has focused on either medical or psychosocial variables as predictors of functioning in children. The possibility that these factors may have an additive or mediational effect on functioning is less frequently considered. Also, many studies lack a comparison group, making it difficult to determine whether associations found in the context of normal development differ in the context of childhood cancer. In addition, even controlled studies often have small samples, limiting power. Finally, many studies rely upon a single source, often mothers.

Previous data reported by this research group has suggested that mothers of children with cancer may be at risk for distress, particularly internalizing difficulties (Gerhardt et al., 2006; Noll et al., 1995). Because of the aforementioned association between parent and child distress (Brennan et al., 2002; Langrock et al., 2002; Whaley et al., 1999), children were also expected to be at risk for difficulties. Surprisingly, reports of child internalizing problems in this sample were no different from comparison children (Noll et al., 1999). This prompted the current examination of other family and individual characteristics that may act as potential mediators or moderators of the link between parent and child distress, thereby serving as protective factors for those children diagnosed with cancer.

This study examined family (i.e., parent distress, parent social support, and family environment), individual (i.e., child age and gender), and medical (i.e., treatment severity) factors associated with the functioning of children on treatment for cancer. Using a controlled design with multiple informants, we examined moderational and mediational models to explain the association between parent and child distress in the context of normal development, as well as in the context of cancer. We expected that parent distress would be positively associated with child internalizing symptoms, but that this association would be moderated by parental social support and family environment. Due to a lack of consensus in literature, family environment was also examined as a potential mediator. We explored whether these associations differed based on child age, gender, health status, and treatment severity for children with cancer.

Method

Participants

This research was an expansion of a study on the adjustment of families of children with cancer and healthy comparison peers (Noll et al., 1999) involving an initial assessment of children in school and later home visits with target and comparison families.[1] Families of children on treatment for cancer at a large children's hospital were identified from a local cancer registry and invited by a primary investigator to participate in the school assessment. Eligible children were: (a) 8–15 years old, (b) on treatment for cancer not primarily involving the central nervous system (CNS), (c) in school without full-time special education, (d) English-speaking, and (e) living within a 50-mile radius of the hospital. After the school assessment, families were contacted again to participate in the home visit; 100 families were eligible, and 95% ($n = 95$) participated. The sample was on average 12.02 years old ($SD = 2.51$), 65% ($n = 62$) male, and 86% ($n = 82$) Caucasian. Diagnoses included 53% ($n = 50$) leukemias, 29% ($n = 28$) lymphomas, and 18% ($n = 17$) solid tumors. Children were on average 21.52 months old ($SD = 11.97$) post diagnosis. Data were collected from 94 mothers and 67 fathers. One family had a single father, 27 had a single mother, and one father declined.

Comparison Families

Comparison families were selected after the school assessment from amongst classmates who were the same gender, race, and closest in birth date to the child with cancer. Of the eligible families, 98% ($n = 98$) participated. Comparison families were screened to ensure the absence of a pediatric chronic illness in the family. The sample was on average 12.19 years old ($SD = 2.51$), 64% ($n = 63$) male, and 84% ($n = 82$) Caucasian. Data were collected from 97 mothers and 77 fathers. One family had a single father, 20 had a single mother, and one father declined.

Procedure

This study was approved by the institutional review board. Data were collected in participants' homes to minimize potential confounds associated with emotional responses to the hospital. Following informed consent, parents and the child independently completed questionnaires with a trained research assistant. Questionnaires were read to participants who needed assistance. Families were compensated for their time.

Parent Measures

Demographic Questionnaire

This questionnaire (Noll et al., 1995) was used to assess characteristics of the respondent including education, occupation, marital status, and age. Family socio-economic status (SES) was based on the Revised Duncan (TSEI; Nakao & Treas, 1992), a contemporary indicator of SES sensitive to changes in occupational attainment (Hauser, 1994).

Symptom Checklist 90-Revised (SCL-90-R)

The SCL-90-R (Derogatis, 1983) is a 90-item self-report measure of psychological symptoms rated on a 5-point Likert scale. It comprises nine subscales and three global indices of distress. The Global Severity Index (GSI) is considered the best overall summary of distress. The SCL-90-R has good internal consistency ($\alpha = .77$–$.90$), test–retest reliability (1 week, $r = .78$–$.90$), and concurrent validity (Brophy, Norvell, & Kiluk, 1988; Derogatis, 1983).

Family Environment Scale (FES)

The FES (Moos & Moos, 1994) consists of 90 items rated as ''true'' or ''false'' to assess family climate. In this study, the Family Relationship Index (FRI), a higher order factor score, was examined due to its extensive use in previous research (Kronenberger & Thompson, 1990). Internal consistency ($\alpha = .61$–$.78$), test–retest reliability ($r = .68$–$.86$), and concurrent validity are adequate (Moos & Moos, 1994).

Norbeck Social Support Interview (NSSI)

The NSSI (Norbeck, Lindsey, & Carrieri, 1981) requires individuals to identify people in their support network and respond to six questions about their satisfaction with support from each person. Derived scores included Network Size and Perceived Functional Support. Predictive, construct, and concurrent validity, as well as test–retest reliability ($r = .85$–$.92$) and internal consistency ($\alpha > .85$) have been documented (Norbeck et al., 1981, Norbeck, Lindsey, & Carrieri, 1983).

Child Behavior Checklist (CBCL)

The CBCL (Achenbach, 1991) is a widely used parent-report measure that assesses emotional and behavioral problems, as well as social competence, for children aged

[1]The Noll et al. (1999) study reported results from 70 families of children with cancer and 70 comparison families. The current study includes data from an additional wave of data collection, yielding 95 families of children with cancer and 98 comparison families.

4–18 years. The CBCL consists of 113 items that are scored on a 3-point Likert scale to describe the child during the preceding 6 months. Eight cross-informant syndromes reflecting behavioral and emotional problems are derived, along with three broad-band scores for internalizing and externalizing problems, and social competence. The broad-band scale describing child internalizing symptoms was examined in this study. The CBCL has well-established reliability and validity (Achenbach, 1991).

Child Measures

Children's Depression Inventory (CDI)

The CDI (Kovacs, 1992) is a 27-item self-report measure of depressive symptoms. The child selects one of three statements for each item that best reflects their feelings over the past 2 weeks. Items are scored on a 3-point Likert scale and tallied to comprise a total score. The CDI is the most widely used measure to assess depression in children, and sufficient reliability and validity have been reported (Kovacs, 1992).

Roberts Apperception Test for Children (RATC)

The RATC (McArthur & Roberts, 1982) is a projective task that requires a child to tell stories about standardized drawings. Interpretation is based on the notion that when a child is presented with an ambiguous drawing, he or she will project his or her own concerns, thoughts, conflicts, and ways of coping into the stories. This projective task permits the evaluation of a child's feelings that is less susceptible to social desirability and defensive strategies. Trained research assistants administered the test, and responses were audio recorded and transcribed. Themes of anxiety and depression in stories were tallied, and frequencies were calculated as a child's score. Final scores were based on consensus, and agreement between two independent raters was $K = .88$ for anxiety and $K = .92$ for depression. Although validity and reliability have not been well established, confirmatory factor analysis has been conducted, and discriminant validity has been established between healthy and chronically ill children (Palomares, Crowley, Worchel, Olson, & Rae, 1991).

Treatment Severity

Two pediatric oncologists independently rated each child's treatment protocol from least (1) severe to most (10) severe using a forced choice technique (Noll et al., 1999). Rankings correlated at .82, suggesting reasonable agreement between the two raters.

Statistical Analyses

Two-tailed, independent *t*-tests and chi-square analyses ($\alpha = .05$) were used to compare families of children with cancer and comparison families, on background characteristics. Prior to regression analyses, independent variables were centered (Holmbeck, 1997). Separate hierarchical regressions examined whether family environment, parental support, child age, child gender, group (i.e., cancer or comparison), or treatment severity moderated the association between parent distress and each of the four indicators of child internalizing symptoms. Separate analyses were conducted for data from mothers and fathers. In all cases, the main effects of parent distress and the potential moderator were entered in step 1, and a calculated interaction term was entered in step 2. For significant moderators, post hoc analyses were conducted to determine whether simple slopes of parent distress on child internalizing symptoms were significantly different from zero (Holmbeck, 2002).

Bivariate correlations examined the associations between parent distress, family environment, and child outcomes to determine the necessary conditions for mediational analyses: (a) the independent variable must predict the potential mediator; (b) the potential mediator must predict the dependent variable; and (c) control of the mediator must reduce or eliminate the previously significant relationship between the independent and dependent variables (Baron & Kenny, 1986). When appropriate, separate hierarchical regressions examined whether family environment mediated the association between parent distress and each of the four indicators of child internalizing symptoms. In all cases family environment was entered in step 1, and parent distress was entered in step 2. Post hoc analyses used a bootstrapping technique (Preacher & Hayes, 2004) to account for nonnormal distributions which can occur in smaller samples.

Using GPOWER (Faul & Erdfelder, 1992), the sample of 191 mothers produced ample power (.93–.99) to detect medium effects for *t*-tests ($d = 0.5$), chi-square analyses ($w = 0.3$), correlations ($r = .3$), and multiple regressions ($f^2 = .15$) with two predictors. The sample of 144 fathers also produced ample power (.84–.98) to detect medium effects for *t*-tests ($d = 0.5$), chi-square analyses ($w = 0.3$), correlations ($r = .3$), and multiple regressions ($f^2 = .15$) with two predictors. Finally, the sample of 95 children with cancer produced ample power (.89) to detect medium effects for multiple regressions ($f^2 = .15$) with two predictors.

Table I. Mean Differences in Demographic Variables and Adjustment for Families of Children with Cancer ($n = 95$) and Comparison Peers ($n = 98$)[a]

	Cancer	Comparison	$t(191)$
Demographic variables			
Child age	12.02 ± 2.51	12.19 ± 2.51	−0.46
Mother age	38.59 ± 7.31	39.08 ± 5.84	−0.52
Father age	40.90 ± 5.28	41.79 ± 7.03	−0.84
Mother education	13.32 ± 2.22	13.55 ± 2.39	−0.71
Father education	13.27 ± 3.22	13.59 ± 3.01	−0.63
Family income[b]	37.17 ± 26.72	45.68 ± 26.85	−2.18*
Occupational index	42.67 ± 20.05	43.84 ± 19.75	−0.41
Child variables			
CDI	6.76 ± 6.22	6.77 ± 6.40	−0.01
RAnx	6.68 ± 2.82	7.18 ± 2.78	−1.25
RDepr	3.87 ± 2.36	3.72 ± 2.43	0.42
Treatment severity	5.61 ± 2.49		
Mother variables			
MFRI	10.26 ± 3.75	9.68 ± 4.32	1.00
MSUP	226.01 ± 130.83	182.60 ± 98.84	2.59*
MGSI	56.07 ± 9.97	53.47 ± 8.72	1.92
MCBCL	54.76 ± 11.07	52.90 ± 9.52	1.24
Father variables			
FFRI	8.95 ± 4.80	8.99 ± 4.12	−0.05
FSUP	199.15 ± 119.77	187.22 ± 107.07	0.62
FGSI	56.62 ± 10.55	56.92 ± 10.46	−0.17
FCBCL	51.49 ± 9.92	51.82 ± 9.66	−0.20

CDI = Child Depression Inventory; RAnx = Roberts Anxiety score; RDepr = Roberts Depression score; MFRI = mother Family Relationship Index; MSUP = mother social support score; MGSI = mother self-report of distress; MCBCL = mother report of child internalizing; FFRI = father Family Relationship Index; FSUP = father social support score; FGSI = father self-report of distress; FCBCL = father report of child internalizing.

[a]Plus–minus values are means ± *SD*.

[b]Annual family income in thousands of dollars.

*$p < .05$, two-tailed.

Results

Demographics

Background variables were compared for families of children with cancer and comparison peers (Table I); two significant differences were found. Mothers of comparison peers were more likely to be married (83%) than mothers of children with cancer (68%); $\chi^2(1,\ n = 192) = 5.51,\ p < .05$, and comparison families had a higher annual income, $t(187) = -2.18,\ p < .05$.[2] Group differences on predictor and outcome measures are also shown in Table I; portions of this data have been published (Noll et al., 1999) and are presented for summary purposes.

[2]These demographic differences were not significantly associated with child outcomes. Thus, they were trimmed from the regression models.

Main Effects: The Association between Parent and Child Distress

Pearson correlations indicated that mothers' distress was significantly associated with both mothers' ($r = .43$, $p < .001$) and fathers' ($r = .26$, $p < .05$) report of child internalizing symptoms. Fathers' distress was significantly associated with fathers' report of child internalizing symptoms ($r = .41$, $p < .001$). However, parent distress was not associated with child-reported outcomes.

Moderators of the Association between Parent and Child Distress

Social Support

Hierarchical regressions examined whether social support moderated associations between parent and child distress. Neither mothers' nor fathers' report of social support moderated the associations between parent distress and any of the child outcomes.

Family Environment

Family environment (FRI) did not moderate the association between mothers' or fathers' distress and any of the child outcomes, except for the association between fathers' distress (FGSI), and children's report of anxiety on the Roberts, R^2 change = .047, $F(1,\ 133) = 6.64$, $p < .05$. Post hoc analyses revealed that when the FGSI × high FRI interaction was entered, the main effect of FGSI remained significant; $t(3) = -2.43$, $p < .05$. When the FGSI × low FRI interaction was entered, the main effect of FGSI was no longer significant; $t(3) = .63$, $p =$ n.s., indicating that children living in a more positive family environment were less vulnerable to anxiety when fathers were distressed (Fig. 1a).

Demographic Characteristics

Regression analyses examined whether the strength of associations between parent and child distress varied as a function of child age and gender. No evidence of moderation was found for associations involving maternal distress. The association between fathers' distress and children's report of anxiety on the Roberts was significantly moderated by child age; R^2 change = .042, $F(1,\ 133) = 6.44$, $p < .05$. Neither main effects remained significant, but slopes of each regression line showed that younger children, $t(3) = .48$, $p =$ n.s., were more vulnerable to anxiety than older children, $t(3) = -1.90$, $p =$ n.s., when fathers were distressed (Fig. 1b). Finally, the association between fathers' distress and fathers' report of child internalizing symptoms was moderated by child gender; R^2 change = .025, $F(1,\ 134) = 4.15$, $p < .05$.

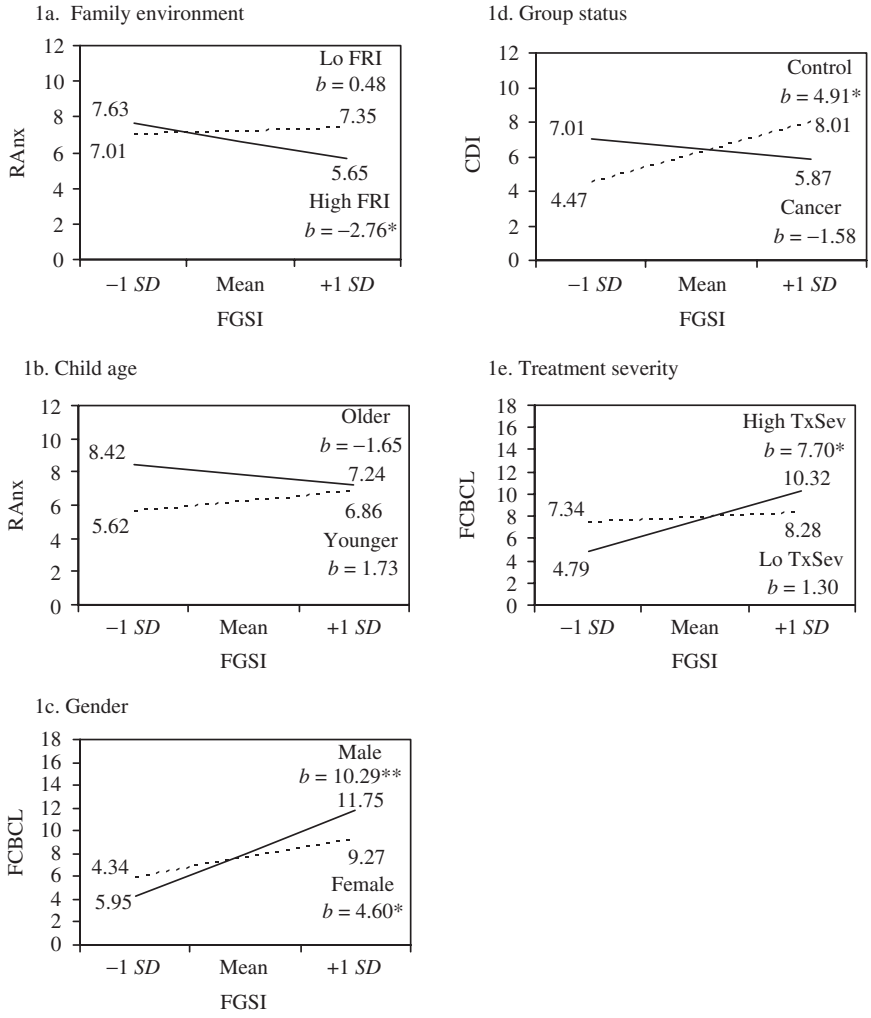

Figure 1. Family, demographic, and disease characteristics that moderate the association between father and child distress. TxSev = treatment severity; CDI = Child Depression Inventory; RAnx = Roberts Anxiety score; FRI = father Family Relationship Index; FGSI = father self-report of distress; FCBCL = father report of child internalizing. $^{*}p < .05$, $^{**}p < .001$ for simple slope (*b*).

Post hoc analyses showed that boys, $t(3) = 5.23$, $p < .001$, were more vulnerable to internalizing symptoms than girls, $t(3) = 2.32$, $p < .05$ (Fig. 1c).

Disease Characteristics

Regression analyses examined whether the strength of associations between parent and child distress varied as a function of whether or not a child had cancer, as well as treatment severity. No evidence of moderation was found for associations involving maternal distress. The association between fathers' distress and children's report of depression on the CDI was significantly moderated by group; R^2 change = .048, $F(1, 134) = 6.77$, $p < .05$. Post hoc analyses showed that comparison children, $t(3) = 2.62$, $p < .05$, were more vulnerable to depression than children with cancer, $t(3) = -.96$, $p =$ n.s., when fathers were distressed (Fig. 1d). In addition, the association between fathers' distress and fathers' report of child internalizing symptoms was marginally moderated by treatment severity; R^2 change = .052, $F(1, 61) = 3.89$, $p = .05$, such that children with higher treatment severity, $t(3) = 3.63$, $p < .05$, were more vulnerable than those with lower treatment severity, $t(3) = .48$, $p =$ n.s. (Fig. 1e).

Mediators of the Association between Parent and Child Distress

Family Environment

Correlations showed significant associations between several predictor and outcome variables (Table II). The conditions necessary to conduct mediational analyses were only met for the association between fathers' distress and fathers' report of child internalizing

Table II. Pearson Correlations between Child Distress, Parent and Family Factors, and Treatment Severity Stratified for Families of Children with Cancer and Comparison Peers[a]

	TxSev	CDI	RAnx	RDepr	MFRI	MSUP	MGSI	MCBCL	FFRI	FSUP	FGSI	FCBCL
TxSev	–	−.01	.11	−.05	−.04	.18	.05	−.12	−.03	.01	.01	.03
CDI	–	–	.05	.09	−.08	−.02	.07	.06	−.11	−.07	−.12	−.10
RAnx	–	.07	–	.46*	−.14	−.03	−.01	−.05	−.21	−.01	−.03	−.06
RDepr	–	.01	.35*	–	.07	−.01	−.04	.04	−.03	−.01	.03	.11
MFRI	–	−.15	.16	.05	–	.31*	−.28*	−.26*	.41*	.13	.04	.07
MSUP	–	−.17	.10	.07	.21**	–	−.23**	−.29*	.06	.58*	−.10	−.09
MGSI	–	−.14	−.11	.01	−.31*	−.10	–	.43*	−.33*	−.15	.27*	.27*
MCBCL	–	.08	−.07	.09	−.23**	−.04	.39*	–	−.13	−.22	−.05	.35*
FFRI	–	−.14	−.01	−.03	.51*	.16	−.06	−.11	–	.10	−.33*	−.12
FSUP	–	−.09	−.02	−.01	.07	.53*	−.10	−.21	.15	–	−.10	.02
FGSI	–	.29**	−.02	.21	−.14	.04	.25**	.25**	−.16	−.12	–	.35*
FCBCL	–	.37*	.00	.20	.34*	−.19	.27**	.51*	−.37*	−.13	.48*	–

TxSev = treatment severity; CDI = Child Depression Inventory; RAnx = Roberts Anxiety score; RDepr = Roberts Depression score; MFRI = mother Family Relationship Index; MSUP = mother social support score; MGSI = mother self-report of distress; MCBCL = mother report of child internalizing; FFRI = father Family Relationship Index; FSUP = father social support score; FGSI = father self-report of distress; FCBCL = father report of child internalizing.

[a]Correlations above the split describe families of children with cancer; correlations below the split describe families of comparison children.

*$p < .01$, two-tailed; **$p < .05$, two-tailed.

symptoms. The overall model for the hierarchical regression was significant; R^2 change = .063, $F(1, 136) = 9.20$, $p < .05$. Post hoc analysis using a bootstrapping method (Preacher & Hayes, 2004) indicated that fathers' report of the family environment partially mediated the association between father and child distress.

Discussion

Studies have shown that children with cancer and other illnesses may be vulnerable to psychosocial difficulties (e.g., Sanger et al., 1991; Sawyer et al., 2000), but these findings are by no means universal (Anholt et al., 1993; Hampel et al., 2005; Stam et al., 2001). Methodological problems have made it difficult to draw meaningful conclusions about the impact of chronic illness on families and to identify what resources, if any, are needed. Thus, utilizing a controlled design and information from multiple sources, we examined whether family environment, parental social support, child age and gender, cancer diagnosis, and treatment severity affected the association between parent and child distress. Consistent with developmental literature and family systems theory, we found a concordance in distress between family members based on both mother and father reports, as well as several factors that moderated this association.

It is notable that research in pediatric psychology has often excluded fathers (Phares & Compas, 1992; Phares, Lopez, Fields, Kamboukos, & Duhig, 2005). Unfortunately, studies that have included fathers frequently combined maternal and paternal reports of child functioning, overlooking the possibility of dissimilar effects (Phares et al., 2005). Based on our results, the adjustment of fathers, as well as mothers, played a significant role in the well-being of children. However, unlike mothers, the association between father and child distress was dependent upon a number of family and child factors. This highlights the importance of including fathers in family-based interventions and as independent sources in clinical assessment and research.

Interestingly, parent social support was not found to significantly reduce the association between parent and child distress. Although social support may buffer distress (Cohen & Wills, 1985), measurement of the construct has been problematic. In addition, the support needed by individuals varies, as does the quality of support provided by similar networks. The measure used in the current study had adequate psychometrics, but it relied on respondents to identify their sources of support and then comment on satisfaction with each source. Although this was advantageous because it allowed for parents to report a wide variety and number of people, there was little variability in satisfaction. It is likely that parents failed to report potential sources of support that were not helpful, causing inflated reports of effective functional support. Using a measure that assessed support from predefined individuals or assessing support sufficiency (i.e., whether they had enough support) may be alternative approaches.

Family environment influenced some associations between parent and child distress. Specifically, children in a positive family environment were less susceptible to internalizing symptoms when fathers were distressed. In addition, family environment was found to partially mediate the association between fathers' and children's distress. Drawing from family systems theory, high family cohesion may serve to protect children who have a distressed parent (Hammen et al., 2004). In these families, children may receive support from and model well-adjusted family members, rather than the distressed parent. However, in families with low cohesion and high conflict, a father's distress can also exacerbate problems within the family and increase the likelihood that children will be distressed (Phipps, Dunavant, Lensing, & Rai, 2005). Thus, further attention to the role of family environment in the adjustment of children is needed.

Several age and gender effects were also found in our exploratory analyses. Specifically, boys were more vulnerable to distress than girls when their fathers were distressed. This is consistent with research on parent–child bonds, which has indicated that boys who have positive relationships with their fathers are more likely to be well adjusted than boys with less positive relationships (Amato, 1994; Barnett, Marshall, & Pleck, 1992). Research has also found that girls' behavior is primarily influenced by the functioning of mothers, while boys' behavior can be predicted by the functioning of both parents (Papp, Cummings, & Goeke-Morey, 2005).

In addition, younger children were more vulnerable to distress when fathers were distressed. This fits with social development, such that younger children may be more sensitive to family influences than older children who are more independent and gravitate toward peers during adolescence. However, it is interesting that these differences were not evident for mothers' distress, which demonstrated more consistent associations with child well-being across gender and age.

It is important to acknowledge the different associations between father and child distress when a child had a diagnosis of cancer or more severe treatment. Although our results suggested that children with cancer were less likely than comparison peers to report distress when their parent was distressed, having a more difficult treatment protocol appeared to increase their vulnerability according to father report. These apparently inconsistent findings may be the result of source issues. For example, children with cancer may have used a repressive adaptive coping style and underreported symptoms, which led to group differences in the association between father distress and child self-report of depression (Phipps, Steele, Hall, & Leigh, 2001). Alternatively, children with a chronic illness may have more access to psychosocial services, but as treatment severity increases, these services may not be sufficient to protect against such stress. Because parents may have elevated levels of distress during initial and prolonged treatment for cancer (Phipps et al., 2005), routine follow-up of families with newly diagnosed children, especially those with more severe treatment, may help clinicians identify and prevent difficulties.

Despite the absence of significant mediation or moderation of the association between mother and child distress, it is important to clarify that there was a significant main effect, which is consistent with previous work (e.g., Brennan et al., 2002; Langrock et al., 2002; Whaley et al., 1999). Thus, we found that the association between mother and child distress simply did not vary as a function of the factors examined in our study. This may indicate that the main effect is pervasive and is beyond the influence of the study's proposed factors or that we failed to examine the appropriate variables that might play a role. Thus, further research is needed to identify other factors that may influence the association between mother and child distress, as well as focus on directly alleviating distress in mothers to improve the well-being of their children.

Other limitations of this study should be noted. First, many of the effects were found within a single informant (i.e., mothers or fathers) and may have resulted from shared source variance. Specifically, parent distress accounted for more variance when reports of child internalizing were within-source (range = .13–.21) compared with across-source (range = .00–.08). Thus, parent distress may have negatively influenced their impression of their child's adjustment, even if the child was adjusting well. Furthermore, the amount of variance accounted for by parent distress was modest, possibly due to the limited variability in distress among our sample of children with non-CNS disease. The inclusion of a wider variety of children, such as those with brain tumors who may have a less optimistic prognosis and poorer quality of life, would be an interesting avenue for further work. This would also allow for the examination of other disease and treatment processes that may potentially influence the association between parent and child distress and inform more tailored interventions based on these characteristics (Eiser, Greco, Vance, Horne, & Glaser, 2004). Finally, this study examined the functioning of families at one point in time. A longitudinal approach would clarify whether effects are

enduring, and which, if any, of the proposed factors leads to a more rapid alleviation of distress.

Overall, this work highlights the need to include fathers in pediatric research and provides several directions for further study. Clinically, the development and evaluation of family-centered interventions that focus on specific risk and resilience factors is important. This may help clinicians obtain therapeutic goals more rapidly than a generalized approach with individual family members. Although many children, both healthy and those with a chronic illness, appear to adjust well to life's challenges (Masten, 2001), further development and evaluation of interventions aimed promoting healthy adjustment among all family members is needed.

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