Adjustment in Childhood Cancer Survivors, Healthy Peers, and Their Parents: The Mediating Role of the Parent–Child Relationship

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Abstract

Objectives Aims were to (1) determine whether the associations between parent psychological functioning and adjustment outcomes of childhood cancer survivors (CCS) were mediated by the parent–child relationship and (2) examine possible differences in pathways for CCS and healthy peers. **Method** The study included CCS ($n = 206$), healthy peers ($n = 132$), and their primary caregivers. Youth (8–21 years) reported on the quality of the parent–child relationship and on their positive and negative adjustment outcomes. Parents reported on their own distress, posttraumatic growth, quality of the parent–child relationship, and their child's positive and negative adjustment outcomes. Two mediation models were tested, first examining youth-reported adjustment as the outcome and second examining parent-reported youth adjustment. Differences between model path coefficients of CCS and healthy peers were assessed by multigroup analyses. **Results** In the youth-reported model, the parent–child relationship mediated the relation between parental distress and adjustment, with more care leading to better youth-reported adjustment outcomes and more overprotection leading to poorer adjustment outcomes. In the parent-reported model, relational frustration and attachment mediated the link between parental distress/growth and parent-reported youth adjustment, with more relational frustration and less attachment relating to poorer youth adjustment outcomes. Multigroup analyses revealed no differences in model path coefficients between CCS and healthy peers. **Conclusions** Parental distress and the parent–child relationship likely play an important role in both youth- and parent-reported adjustment, and associations among these constructs do not differ between CCS and healthy peers. Families with less optimal parental functioning may benefit from interventions improving the quality of parent–child interactions.

Key words: cancer and oncology; coping skills and adjustment; parent–adolescent communication; parent stress; resilience; statistical applications.

Although survival rates have increased tremendously for youth with cancer, treatment often remains intense and the accompanying short- and long-term physical and psychological side effects may interfere with the

long-term adjustment of survivors of childhood cancer (Brinkman, Recklitis, Michel, Grootenhuis, & Klosky, 2018) and their parents. Compared with healthy peers, survivors (Zeltzer et al., 2009) and their parents

(Price, Kassam-Adams, Alderfer, Christofferson, & Kazak, 2016) are at risk for psychological distress. According to the literature, about 6%–15% of survivors and 20%–22% of their parents experience some form of psychological distress (Price et al., 2016; Zeltzer et al., 2009).

Despite the potential negative effects of childhood cancer on adjustment, most youth and their families demonstrate resilience in the long term (Price et al., 2016; Van Schoors, Caes, Verhofstadt, Goubert, & Alderfer, 2015). Positive changes after childhood cancer have also been noted, such as posttraumatic growth, benefit finding, and strengthened family relationships (Barakat, Alderfer, & Kazak, 2006; Klosky et al., 2014; Koutna, Jelinek, Blatny, & Kepak, 2017). Studies show that the constructs of distress and growth are only marginally to moderately correlated, indicating that they are largely distinct constructs (Barakat et al., 2006; Klosky et al., 2014; Koutna et al., 2017). This finding advocates for research that includes both positive and negative constructs to study the effects of childhood cancer on youth adjustment.

Parental health and well-being play an important role in youth adjustment outcomes. Several parent and family determinants of poor adjustment outcomes in youth with cancer have been identified, such as parental anxiety and depression, parental distress, impaired parent health-related quality of life (QoL), and poor family functioning and coping (Klassen, Anthony, Khan, Sung, & Klaassen, 2011; Momani, Hathaway, & Mandrell, 2016; Okado, Long, & Phipps, 2014). Furthermore, a stronger association between parent and child distress has been noted for children with cancer than for healthy peers (Okado et al., 2014). Of note, the link between positive parental factors such as parental growth and adjustment outcomes in children is less well documented. As the constructs of parental distress and growth are largely distinct, they might therefore predict unique variance in the case of youth adjustment outcomes.

In addition to determining the associations among parental distress, parental growth, and youth adjustment, the mechanisms underlying such relationships need to be further examined. Qualities of the parent–child relationship may be important mediators of the link between parental functioning and youth adjustment, as they can influence several outcomes of youth adjustment. For example, parental overprotection has been linked to poorer adjustment outcomes in children, such as increased child distress and decreased health-related QoL (Hullmann, Wolfe-Christensen, Meyer, McNall-Knapp, & Mullins, 2010; Tillery, Long, & Phipps, 2014). Similarly, positive parent–child relationships (e.g., better perceived quality of the parent–child relationship and parental warmth) are

associated with higher psychosocial QoL (Orbuch, Parry, Chesler, Fritz, & Repetto, 2005) and higher youth posttraumatic growth (Koutna et al., 2017). Thus, qualities of the parent–child relationship seem to play a key role in both positive and negative adjustment outcomes in youth with cancer.

Given the potential impact of the parent–child relationship on youth adjustment outcomes, an important question to ask is if parenting practices are influenced by child health status, such as having a child with a chronic illness or cancer. Mixed findings have been reported, with some studies showing impaired parent–child relationships (e.g., lower levels of parental warmth and higher levels of hostility and family conflict) for children with a chronic illness (Murphy et al., 2017; Pai et al., 2007; Pinquart, 2013; Williams, Lamb, & McCarthy, 2014), whereas others reporting no differences or slightly better outcomes (e.g., less parental overprotection and more parental care) for children with cancer than for healthy norms or comparison groups (Davies, Noll, DeStefano, Bukowski, & Kulkarni, 1991; Schepers, Long, Russell, & Phipps, 2018; Tillery et al., 2014). To disentangle possible health status differences in the pathways between parent and child adjustment outcomes, it is therefore imperative to compare families of children with cancer with families of healthy children.

When considering adjustment outcomes of youth and associations between adjustment and the quality of the parent–child relationship, both youth and parent perspectives are important. Using multiple informants may provide useful information for clinical practice and research, as to whether certain behaviors occur in certain contexts. Furthermore, discordance in perspectives may point to issues in the parent–child relationship and they may be associated with youth adjustment difficulties (De Los Reyes et al., 2015; Korelitz & Garber, 2016). Studying both perspectives simultaneously may help in understanding the pathways that promote resilience and those that lead to distress or maladjustment.

This study therefore aimed to (1) test whether the quality of the parent–child relationship (as perceived by youth and their parents) mediates the relationship between parental distress and growth and parent- and self-reported outcomes of positive and negative adjustment in youth, and (2) examine possible differences in pathways associated with adjustment between childhood cancer survivors (CCS) and healthy peers. We hypothesized that higher parental distress and lower parental growth lead to more negative (e.g., parental overprotection and relational frustration) and less positive (e.g., parental care and attachment) parent–child interactions, which in turn leads to more negative (e.g., internalizing problems) and less positive

(e.g., personal adjustment and adaptive skills) youth adjustment outcomes. On the basis of literature showing few differences between children with cancer and healthy comparisons regarding the parent–child relationship (Davies et al., 1991; Noll et al., 1999; Phipps et al., 2014; Phipps et al., 2015; Schepers et al., 2018; Tillery et al., 2014), it was hypothesized that pathways for CCS and healthy controls do not differ from each other. Finally, on the basis of previous studies reporting parent–child concordance (De Los Reyes et al., 2015; Korelitz & Garber, 2016; Schepers et al., 2018), we hypothesized that cross-informant pathways (i.e., youth-reported quality of the parent–child relationship to parent-reported adjustment and vice versa) would be weaker than single-informant pathways.

Method

Procedure

This project was part of a larger longitudinal study measuring coping and adjustment in youth with cancer and their parents (Phipps et al. 2014). CCS and their primary caregivers were recruited from the outpatient clinic of a large children's hospital in Southeast United States. Participants were told that this was a study examining stress, adjustment, and growth in children and families. Data were collected upon entry to the study (range = 1 month to ≥ 5 years post diagnosis) and 1 and 3 years later. The current study included data from participants who completed study measures 3 years post baseline. Eligibility criteria at study enrollment included (1) age 5–17 years, (2) diagnosis of any malignancy, (3) at least 1 month after diagnosis at baseline, (4) ability to speak and read English, and (5) no significant cognitive or sensory deficits. Informed consent or assent was obtained from all CCS and their parents, and they completed questionnaires in separate rooms. Trained research assistants were available to assist and read items aloud if needed. Participants received a \$25.00 gift card as compensation. The hospital institutional review board approved the study procedures.

Healthy peers and their primary caregiver were enrolled from a comparison pool of children from schools in the three-state area surrounding the hospital. Comparison participant eligibility criteria at study enrollment included (1) age 5–17 years, (2) no history of serious illness, (3) ability to speak and read English, and (4) no significant cognitive or sensory deficits. Permission slips were distributed through the schools, and returned permission slips included information on child age, gender, race/ethnicity, and parental education and occupation. The returned data were used to create a pool of potential control participants, who were subsequently contacted, based on frequency

matching according to demographics. As eligible comparison participants were identified from the pool through frequency matching, their parents were contacted by a member of the research team via telephone and given an overview of the study. Families interested in participating were scheduled for an appointment at the hospital, given full details about the study during the meeting, and signed the informed consent form. After completing the questionnaires, youth and their primary caregivers each received a \$25.00 gift card as compensation.

Participants

A total of 521 ($n = 282$ youth with cancer; $n = 239$ healthy peers) youth (age 5–17 years at baseline) and their primary caregiver were enrolled at baseline. As described in an earlier report on baseline findings from this study (blinded for review), 68% of youth with cancer and 87% of healthy peers approached agreed to participate. Participants and nonparticipants did not differ by age, gender, race/ethnicity, or cancer diagnosis at baseline, and the final sample was representative of the population served by the hospital. Of the initial participants who were enrolled at baseline, 206 CCS (67%, age 8–21 years), 132 healthy peers (55%), and one of their parents completed the study measures at 3 years post baseline. Participants included in the present sample did not differ in baseline demographic characteristics from those who were not included. Background characteristics for the current study participants are described in Table I. Three years post baseline, there were no differences in background characteristics between CCS and healthy peers in terms of youth and parent age and gender (see Table I). However, families of CCS were significantly more often from a low socioeconomic status (SES) than were families of healthy youth.

Measures

Sociodemographic and Medical Information

Parents reported their age, gender, educational level, occupational status, and marital status. Youth reported their age and gender. Family SES was calculated using the Barratt Simplified Measure of Social Status (Barratt, 2006). For the current study, groups were recoded into low SES (Groups IV and V), medium SES (Group III), and high SES (Groups I and II). Diagnosis and treatment information for CCS were obtained from medical records.

Parental Distress and Parental Growth

All parents spontaneously identified their most stressful or traumatic event without any orientation to cancer. Questionnaire measures of distress and growth were obtained in reference to the parents' spontaneously identified most stressful event. Parental distress

Table 1. Background Characteristics of Childhood Cancer Survivors and Healthy Peers

	Survivors(<i>n</i> = 206)		Healthy peers(<i>n</i> = 132)		<i>p</i>
	<i>N</i>	%	<i>N</i>	%	
Child age (years), <i>M</i> ± <i>SD</i>	15.04	3.22	14.42	3.50	.092
Child gender					
Male	105	51.0	60	45.5	.322
Female	101	49.0	72	54.5	
Child diagnosis					
Acute lymphoblastic leukemia	54	26.2	–	–	
Other leukemia ^a	11	5.4	–	–	
Hodgkin and non-Hodgkin lymphoma	28	13.6	–	–	
Solid tumor	82	39.8	–	–	
Brain tumor	31	15.0	–	–	
Child time since diagnosis (years), <i>M</i> ± <i>SD</i>	7.06	4.25	–	–	
Child time off therapy (years), <i>M</i> ± <i>SD</i>	5.78	4.32	–	–	
Child on treatment					
No	201	97.6	–	–	
Yes	5	2.4	–	–	
Child relapsed					
No	171	83.0	–	–	
Yes	35	17.0	–	–	
Parent age (years), <i>M</i> ± <i>SD</i>	43.67	7.03	44.32	6.59	.554
Parent gender					
Mother	181	87.9	119	90.2	.516
Father	25	12.1	13	9.8	
Parent socioeconomic status					
Low (Groups IV and V)	77	37.4	28	21.2	.004
Medium (Group III)	67	32.5	46	34.8	
High (Groups I and II)	62	30.1	58	43.9	

Note. ^aOther leukemia includes acute myeloid leukemia, acute biphenotypic leukemia, and acute promyelocytic leukemia. *M* = mean, *SD* = standard deviation.

was assessed with the 18-item Brief Symptom Inventory (BSI-18). The BSI-18 is a short screener for measuring self-reported symptoms on three domains of psychological distress: somatization, depression, and anxiety (Derogatis, 2000). A combined global severity index (GSI) score was calculated to measure overall psychological distress. Considerable normative data are available, with age- and gender-normed *T* scores, which were used in the analyses for the current study. *T* scores ≥ 63 on the GSI or on two or more subscales represent a cutoff suggestive of clinical levels of distress. Reliability of the BSI-GSI-18 was good (Cronbach's $\alpha = .89$) for the current sample.

Parental growth was assessed with the total scale of the 21-item Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996), which measures the positive psychological change experienced as a result of a stressful life event on several domains: relating to others, new possibilities, personal strength, spiritual change, and appreciation of life. Items are scored on a 6-point Likert scale. The current study used the full scale, which had excellent reliability ($\alpha = .96$).

Quality of the Parent–Child Relationship

Youth perceptions of the parent–child relationship were measured with the Parental Bonding Instrument (PBI). This 25-item questionnaire (Parker, Tupling, &

Brown, 1979) measures parental care (12 items) and overprotection (13 items) as perceived by youth. Items are measured on a 4-point scale, ranging from 0 to 3. The original measure assessed child perceptions of parenting in a retrospective manner. For the current study, the dimensions of care and overprotection were slightly adjusted to allow measurement of youth's current perceptions of the parent–child relationship (e.g., “Seemed emotionally cold to me” into “Seems emotionally cold to me” and “Tended to baby me” into “Tends to baby me”). The PBI has good psychometric properties with long-term stability over time (Wilhelm, Niven, Parker, & Hadzi-Pavlovic, 2005). For the current sample, internal consistency was good for the PBI care ($\alpha = .88$) and overprotection ($\alpha = .82$) scales. Parents' perceptions of the parent–child relationship were assessed with the Parenting Relationship Questionnaire (PRQ). This 71-item instrument (Kamphaus & Reynolds, 2006) assesses the parent–child relationship in seven scales: attachment, communication, discipline practices, involvement, parenting confidence, satisfaction with the child's schooling, and relational frustration. In the current study, parents only completed the scales on attachment (11 items) and relational frustration (14 items). Items were rated on a 4-point scale. *T* scores that correct for children's age and parent's gender were used in the analyses.

There was good reliability for scales in the current sample ($\alpha = .83-.87$).

Youth Adjustment

Youth adjustment was measured using the Behavior Assessment System for Children, Second Edition (BASC-2; Reynolds & Kamphaus, 2004), which is a widely used broad-band behavior measure for children and adolescents. For youth-reported positive and negative adjustment outcomes, we used composite scales of personal adjustment and internalizing problems. For parent-reported youth adjustment outcomes, the composites of adaptive skills and internalizing problems were used. The BASC-2 provides age- and gender-corrected *T* scores, which were used in the analyses for the current study. The BASC-2 has excellent psychometric properties (Reynolds & Kamphaus, 2004).

Statistical Analyses

Statistical analyses were conducted in three steps. First, descriptive statistics were used to examine distributional properties of all variables and to characterize the sample. *T* tests were used to examine differences between CCS and healthy peers on predictor and outcome variables, and associations among predictor and outcome variables were examined separately for CCS and healthy peers, using Pearson's correlation. Descriptive analyses were performed with the Statistical Package for Social Sciences, Version 22.

Second, two-path analysis mediation models were tested by using Mplus 7.31 (Muthén & Muthén, 1998-2012). Missing data were handled using full information maximum likelihood, with standard errors that are robust to non-normal data (Little, Jorgensen, Lang, & Moore, 2014). The first model tested whether the pathways showing the effects of parental distress and parental growth on youth positive and negative adjustment outcomes were mediated by the quality of the parent-child relationship if *youth self-reported their adjustment*. The second model tested the same pathways but used *parent-reported youth adjustment* as the outcome. Models were trimmed such that only significant demographic or medical background variables of outcome were kept in the model as covariates. The fit statistics used to evaluate model fit were chi-squared test (χ^2 ; $p > .05$ excellent fit), root mean square error of approximation (RMSEA; $<.05$ excellent fit), comparative fit index (CFI; $>.95$ excellent fit), and the standardized root mean square residual (SRMR; $<.05$ excellent fit; Hu & Bentler, 1999; Kline, 2005).

Finally, using the Satorra-Bentler scaled chi-square difference test (Satorra & Bentler, 2010), multigroup path analysis was used to determine whether paths

were different for CCS and healthy peers in each model.

Results

Descriptive Comparisons Between Childhood Cancer Survivors and Healthy Peers

Table II provides descriptive statistics for the predictor and outcome variables of interest. *T* tests revealed significant differences by health status on several youth- and parent-reported variables of interest. Parents of CCS reported less distress, more growth, and more positive perceptions of the parent-child relationship than did parents of healthy peers. The self-reported outcomes of CCS did not differ from those of healthy peers, except for internalizing problems, where CCS reported fewer problems than healthy peers.

Table III shows correlations among variables of interest for CCS and healthy peers. Correlations were in the expected directions, with more parental distress correlating with less positive youth- and parent-reports of the parent-child relationship. More parental distress was also associated with less positive and more negative youth adjustment outcomes. Notably, in healthy peers, parental growth significantly correlated with parent perceptions of attachment ($r = .23$, $p = .007$) but not with youth-reported perceptions of the parent-child relationship or with either self- or parent-reported outcomes of youth adjustment.

The Parent-Child Relationship as a Mediator of Parent and Youth Adjustment

Results of the mediation models are presented in Figure 1a (youth-reported adjustment) and Figure 1b (parent-reported youth adjustment). Both mediation models demonstrated a good model fit—self-reported model: $\chi^2(21, N = 338) = 34.60$, $p = .03$, RMSEA = .04, CFI = .98, SRMR = .04; parent-reported model: $\chi^2(24, N = 338) = 44.25$, $p = .01$, RMSEA = .05, CFI = .97, SRMR = .04. SES was inversely correlated with parental growth in both models ($\beta = -.15$, $p = .01$), indicating that higher growth was reported by parents of lower SES than parents of higher SES. Youth age was negatively associated with youth-reported parental overprotection ($\beta = -.25$, $p < .001$), showing that older youth perceived their parents as less overprotective than did younger youth. Finally, youth gender was positively associated with parent-reported relational frustration ($\beta = .15$, $p < .01$); that is, parents reported more relational frustration for girls than for boys. In addition, in the parent-reported model of youth adjustment, parent age ($\beta = .10$, $p = .03$), youth age ($\beta = .23$, $p < .001$), and youth gender ($\beta = .14$, $p < .01$) were significantly positively associated with parent-reported youth adaptive skills; that is, older parents reported more adaptive skills in their

Table II. Descriptive Statistics for Study Variables

Constructs	Survivors			Healthy peers			<i>p</i>
	<i>N</i>	<i>M</i> (range)	<i>SD</i>	<i>N</i>	<i>M</i> (range)	<i>SD</i>	
Parental distress							
P: BSI GSI	206	47.32 (33–81)	10.82	132	49.58 (33–71)	9.41	.043
Parental growth							
P: PTGI growth	205	68.94 (10–105)	25.51	132	60.07 (1–105)	24.27	.002
Parent–child relationship							
Y: PBI overprotection	206	13.69 (0–38)	7.08	131	14.54 (1–37)	7.36	.294
Y: PBI care	206	29.21 (0–36)	6.16	132	28.76 (1–36)	6.42	.520
P: PRQ attachment	206	49.81 (24–73)	8.67	132	47.30 (20–73)	8.86	.010
P: PRQ relational frustration	206	48.15 (31–90)	9.23	132	51.29 (31–84)	8.99	.002
Youth internalizing problems							
Y: BASC internalizing problems	206	46.82 (32–88)	10.54	130	49.91 (32–85)	9.75	.007
P: BASC internalizing problems	206	48.98 (32–110)	10.60	131	51.06 (35–86)	9.98	.073
Youth positive adjustment							
Y: BASC personal adjustment	206	53.12 (21–71)	9.80	130	51.78 (14–70)	10.80	.245
P: BASC adaptive skills	206	51.39 (18–77)	11.01	131	51.16 (27–77)	9.96	.848

Note. *M* = mean; *SD* = standard deviation; P = parent report; Y = youth report; BSI GSI = Brief Symptom Inventory General Symptoms Index; PTGI = Posttraumatic Growth Inventory; PBI = Parental Bonding Instrument; PRQ = Parenting Relationship Questionnaire; BASC = Behavioral Assessment Scale for Children.

Table III. Pearson Correlations Among Study Variables of Interest for Childhood Cancer Survivors (*N* = 206) and Healthy Peers (*N* = 132)^a

Constructs	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. P: BSI GSI	–	–.08	–.16*	.18*	–.09	.34***	.22**	–.19**	.52***	–.30***
2. P: PTGI growth	.08	–	.04	.01	.11	–.10	.03	.01	–.01	.07
3. Y: PBI care	–.21*	.01	–	–.41***	.23**	–.36***	–.54***	.53***	–.15*	.27***
4. Y: PBI overprotection	.10	–.03	–.39***	–	–.04	.22**	.49***	–.40***	.14*	–.27***
5. P: PRQ attachment	–.24**	.23**	.34***	–.15	–	–.35***	–.16*	.18**	–.07	.42***
6. P: PRQ relational frustration	.26**	–.06	–.37***	.30**	–.41***	–	.32***	–.26***	.50***	–.42***
7. Y: BASC internalizing problems	.22*	.01	–.34***	.33***	–.11	.25**	–	–.75***	.28***	–.35***
8. Y: BASC personal adjustment	–.22*	–.01	.36***	–.29**	.15	–.31***	–.73***	–	–.28***	.43***
9. P: BASC internalizing problems	.38***	–.001	–.06	.22*	–.14	.45***	.47***	–.40***	–	–.39***
10. P: BASC adaptive skills	–.21*	.10	.26**	–.32***	.55***	–.51***	–.25*	.29**	–.40***	–

Note. P = parent report; Y = youth report; BSI GSI = Brief Symptom Inventory General Symptoms Index; PTGI = Posttraumatic Growth Inventory; PBI = Parental Bonding Instrument; PRQ = Parenting Relationship Questionnaire; BASC = Behavioral Assessment Scale for Children.

^aCorrelations above the diagonal describe families of childhood cancer survivors, whereas those below the diagonal describe families of healthy peers.

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

child than did younger parents, and parents reported more adaptive skills for older children than younger children and for girls than for boys. These significant covariates were included as predictors of specific outcome variables in the mediation analyses.

Youth-Reported Adjustment Outcomes

For the model in which youth self-reported their adjustment outcomes (Figure 1a), the direct effect of parental distress on youth-reported internalizing problems was marginally significant ($\beta = .10$, $p = .05$). None of the other direct effects between parent- and youth-reported adjustment was significant (all $p > .05$). Yet, youth-reported quality of the relationship with their parent mediated the effects of parental

distress on youth-reported internalizing problems and personal adjustment. Parental distress was associated with less youth-reported parental care and more overprotection, which in turn linked to poorer personal adjustment and higher internalizing problems. There was a moderate positive association between parental distress and parent-reported relational frustration. In addition, relational frustration was positively associated with youth-reported internalizing problems. Yet, these were small effects, and there was only a trend for an indirect effect through parent-reported relational frustration ($\beta = .03$, $p = .06$). The variables in this model explained 29% of the variance in youth self-reported internalizing problems and 26% of the variance in self-reported personal adjustment.

Figure 1. (a) Standardized path model of youth-reported adjustment outcomes. (b) Standardized path model of parent-reported adjustment outcomes.

Note. Indirect effects are indicated by dashed lines and direct effects by solid lines. Abbreviations: PBI = Parental Bonding Instrument; PRQ = Parenting Relationship Questionnaire. To decrease complexity, insignificant indirect paths and covariates (parent gender, parent age, child gender, child age, and socioeconomic status) have not been included in the figure. Only significant coefficients are reported.

Parent-Reported Youth Adjustment Outcomes

In the parent model (Figure 1b), there was a significant small-to-medium direct effect between parental distress and parent-reported youth internalizing problems ($\beta = .36, p < .001$) and adaptive skills ($\beta = -.11, p = .02$). Parents who were more distressed reported more internalizing problems and less adaptive skills in their child than did parents who were less distressed. There was no direct effect between parental growth and parent-reported youth internalizing problems ($p = .63$) and adaptive skills ($p = .99$). The relationship between parental distress and parent-reported youth adjustment outcomes was mediated by parental perceptions of the relationship with their child. However, there was no comparable mediation effect when using youth-reported perceptions of the parent-child relationship. The more distressed parents were, the less attached they felt to their child and the more relationally frustrated, which in turn related to higher parent-reported youth internalizing problems and less adaptive skills. Even though there was a small positive association between youth-reported parental care and

parent-reported youth internalizing problems, youth-reported perceptions of the parent-child bond were not a significant mediator in the model. Finally, there was an indirect effect of parent-reported attachment, with higher parental growth leading to higher parent-reported attachment, which was associated with higher parent-reported youth adaptive skills. The total variance explained by the variables in this model was 37% for parent-reported youth internalizing problems and 42% for parent-reported youth adaptive skills.

Effect of Health Status on Model Relationships

Multigroup analyses revealed a nonsignificant difference in scaled chi-square between the constrained path invariance model and the baseline unconstrained model, both for the model in which youth reported their adjustment outcomes, $\Delta\chi^2 = 4.52$ ($\Delta df = 25$), $p = .999$, and that for which parents reported youth adjustment outcomes, $\Delta\chi^2 = 22.40$ ($\Delta df = 27$), $p = .717$. These results suggest that path coefficients did not differ between groups.

Discussion

Our study examined the extent to which youth-reported and parent-reported qualities of the parent-child relationship mediate relationships between both positive (i.e., parental growth) and negative (i.e., parental distress) parent factors and the adjustment outcomes of CCS and healthy peers. Overall, our results demonstrate a mediating role of the parent-child relationship in the link between parent functioning and youth adjustment outcomes. We also confirmed that CCS appear resilient based on comparison with healthy peers, with lower levels of internalizing problems and comparable levels of personal adjustment by self-report, and similar levels by parent report. Although internalizing symptoms were lower for CCS, they were within normal limits within both groups. Parents of youth with cancer also demonstrated considerable resilience, with significantly lower levels of global psychological distress than parents of healthy peers. Again, scores were in the normal range across both groups. Parents of CCS furthermore reported more growth, higher attachment to their child, and less relational frustration than parents of healthy peers. These findings are in line with previous literature demonstrating family resilience after pediatric cancer (Robinson, Gerhardt, Vannatta, & Noll, 2007, 2009; Van Schoors et al., 2015).

In our parent and youth models, we found a small positive association between parental distress and youth-reported internalizing problems but no significant association with youth-reported personal adjustment. Furthermore, we did not find significant associations between parental growth and youth-reported or parent-reported adjustment outcomes. Parental distress, but not parental posttraumatic growth, predicted their subsequent reporting of their child's internalizing problems and adaptive skills. Our findings suggest that the impact of parental distress on child adjustment is more pronounced than the impact of parental growth. In providing interventions for youth with adjustment issues, it might therefore be important to target on parental distress as opposed to parental growth. Future studies should explore if these results can be replicated in different populations of children with chronic illnesses.

Our mediation results show that the parent-child relationship is an important factor to consider in the associations between parent and youth adjustment outcomes. Interestingly, mediational associations relied only on parent-child relationship perceptions of the informant: youth-reported quality of the parent-child relationship was a mediator that explained the effects of parental distress on self-reported adjustment outcomes, whereas parent-reported quality of this relationship was a mediator that explained the effects of parental distress on parent-reported youth adjustment.

Our findings are consistent with previous research showing that reporter perceptions of the parent-child relationship influence the ratings of youth internalizing symptoms (Treutler & Epkins, 2003). Furthermore, our findings demonstrate that parental distress plays a particularly important role in both self- and parent-reported youth adjustment outcomes. Parental distress was a predictor of the parent-child relationship in both models, which in turn led to youth- and parent-reported youth adjustment outcomes.

Parental growth had a less prominent role in predicting youth adjustment outcomes. However, parent-reported attachment within the parent-child relationship mediated the link between parental growth and parent-reported adaptive skills. Thus, parental growth may be associated with improved parent-child attachment, which in turn can predict more positive parental views on the youth's ability to carry out developmentally appropriate everyday tasks. Our study is the first to analyze the link between parental growth and adjustment outcomes of CCS. As we were interested in both youth and parent reporting of youth adjustment, we selected negative and positive adjustment constructs from the BASC-2 that were relatively comparable with each other (e.g., internalizing problems for both youth and parent reports and adaptive skills/personal adjustment). Future studies could examine how parental growth might relate to other constructs of youth adjustment outcomes, such as externalizing problems and QoL.

Although descriptive results showed some differences between CCS and healthy peers, these potential differences were not seen when accounting for all pathways in the mediation model. This observation again underscores that CCS and their parents appear similar to healthy peers. It also highlights the benefits of newer, more sophisticated statistical approaches, such as multigroup mediation path analysis, to depict and account for the complex effects of positive and negative factors on youth adjustment outcomes. Even though the mechanisms underlying parental distress and youth adjustment are similar for CCS and healthy peers, this finding still highlights the need to screen for parental distress to target youth at risk for negative adjustment outcomes. Interventions that focus on reducing parental distress and supporting the parent-child relationship hold promise in promoting resilience in CCS.

Medium-to-large correlations between youth- and parent-reported child adjustment outcomes were found in our sample, and mean scores suggested that these outcomes were comparable across informants. Yet, the parent-child relationship related differently to child adjustment outcomes in the youth- versus the parent-reported model. The recent literature

acknowledges that the issue of parent–child discordance is not merely explained by measurement bias and that differences might be meaningful, reliable, and stable over time (De Los Reyes et al., 2015; Korelitz & Garber, 2016). Our findings suggest that it might be useful to take the level of parent–child concordance into account in clinical assessments and when planning interventions, as this may reflect issues in the parent–child relationship that could be associated with the child’s adjustment (Korelitz & Garber, 2016). When both informants report no parenting issues, there is probably no reason for concern. Yet, when there is disagreement, greater follow-up exploring the reasons for discordance might be warranted. Interventions might focus on understanding and reducing the inconsistencies, with the goal to improve family cohesion.

Despite several strengths, our study also had some limitations. First, although we attempted to obtain a demographically matched comparison group, there were significant differences in SES between CCS and healthy peers. As SES was inversely related to parental growth, we controlled for this variable in our models. Future studies should examine whether parental growth and its subsequent relationships to the parent–child bond and youth adjustment are more evident in low-SES families. In addition, the finding of higher parent-reported relational frustration and adaptive skills in girls than boys might relate to the fact that our parent sample was composed predominantly of mothers, with relatively few fathers. Research has found that most parent–child conflicts during adolescence involve mothers (Laursen & Collins, 1994) and that the behavior of girls is mainly influenced by the functioning of mothers, whereas the behavior of boys is more influenced by the functioning of both parents (Papp, Cummings, & Goeke-Morey, 2005). Future research should attempt to also take the other parents’ perspective into account when examining predictors and outcomes of a healthy family environment. Finally, this study examined relationships between parent and youth functioning at one point in time. Longitudinal studies could examine parental distress at diagnosis and during treatment to determine whether the effects we found are sustained over time and how reciprocal processes in the parent–child dynamic might appear.

Overall, our findings show that CCS, as well as their parents, show similar or slightly better adjustment outcomes when compared with healthy peers. On average, survivors do not show evidence of elevations in internalizing problems, personal maladjustment, or adaptive skill deficit compared with healthy peers. Moreover, compared with healthy peers, there is no difference in the way they are affected by parental functioning and parent–child relationship quality.

However, these findings also highlight the need to screen for and reduce parental distress to improve subsequent outcomes of CCS, as their adjustment appears to be negatively affected by parental distress. Furthermore, interventions targeting both youth and parent views on the parent–child relationship, in particular youth perceptions of care and overprotection as well as parent perceptions of attachment and relational frustration, may help promote resilience in CCS and parents who are at risk for maladjustment.

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References

- Barakat, L. P., Alderfer, M. A., & Kazak, A. E. (2006). Posttraumatic growth in adolescent survivors of cancer and their mothers and fathers. *Journal of Pediatric Psychology*, 31, 413–419.
- Barratt, W. (2006). *The Barratt Simplified Measure of Social Status (BSMSS) Measuring SES*. Terre Haute, IN: Indiana State University. Retrieved from <http://socialclassoncampus.blogspot.com/2012/06/barratt-simplified-measure-of-social.html>.
- Brinkman, T. M., Recklitis, C. J., Michel, G., Grootenhuys, M. A., & Klosky, J. L. (2018). Psychological symptoms, social outcomes, socioeconomic attainment, and health behaviors among survivors of childhood cancer: Current state of the literature. *Journal of Clinical Oncology*, 36, 2190–2197. doi: 10.1200/JCO.2017.76.5552
- Davies, W. H., Noll, R. B., DeStefano, L., Bukowski, W. M., & Kulkarni, R. (1991). Differences in the child-rearing practices of parents of children with cancer and controls: the perspectives of parents and professionals. *Journal of Pediatric Psychology*, 16, 295–306.
- De Los Reyes, A., Augenstein, T. M., Wang, M., Thomas, S. A., Drabick, D. A., Burgers, D. E., & Rabinowitz, J. (2015). The validity of the multi-informant approach to assessing child and adolescent mental health. *Psychological Bulletin*, 141, 858–900.
- Derogatis, L. R. (2000). *BSI-18 Administration, Scoring and Procedures Manual*. Minneapolis, MN: National Computer Systems.
- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling—A Multidisciplinary Journal*, 6, 1–55.
- Hullmann, S. E., Wolfe-Christensen, C., Meyer, W. H., McNall-Knapp, R. Y., & Mullins, L. L. (2010). The relationship between parental overprotection and health-related quality of life in pediatric cancer: The mediating role of perceived child vulnerability. *Quality of Life Research*, 19, 1373–1380.

- Kamphaus, R. W., & Reynolds, C. R. (2010). Test review—Parenting Relationship Questionnaire. *Journal of Psychoeducational Assessment*, 28, 270.
- Klassen, A. F., Anthony, S. J., Khan, A., Sung, L., & Klaassen, R. (2011). Identifying determinants of quality of life of children with cancer and childhood cancer survivors: A systematic review. *Support Care Cancer*, 19, 1275–1287.
- Kline, R. B. (2005). *Principles and Practice of Structural Equation Modeling* (2nd ed.). New York, NY: Guilford Press.
- Klosky, J. L., Krull, K. R., Kawashima, T., Leisenring, W., Randolph, M. E., Zebrack, B. . . Phipps, S. (2014). Relations between posttraumatic stress and posttraumatic growth in long-term survivors of childhood cancer: A report from the Childhood Cancer Survivor Study. *Health Psychology*, 33, 878–882.
- Korelitz, K. E., & Garber, J. (2016). Congruence of parents' and children's perceptions of parenting: A meta-analysis. *Journal of Youth and Adolescence*, 45, 1973–1995.
- Koutna, V., Jelinek, M., Blatny, M., & Kepak, T. (2017). Predictors of posttraumatic stress and posttraumatic growth in childhood cancer survivors. *Cancers*, 9, 26.
- Laursen, B., & Collins, W. A. (1994). Interpersonal conflict during adolescence. *Psychological Bulletin*, 115, 197–209.
- Little, T. D., Jorgensen, T. D., Lang, K. M., & Moore, E. W. (2014). On the joys of missing data. *Journal of Pediatric Psychology*, 39, 151–162.
- Momani, T. G., Hathaway, D. K., & Mandrell, B. N. (2016). Factors affecting health-related quality of life in children undergoing curative treatment for cancer: A review of the literature. *Journal of Pediatric Oncology Nursing*, 33, 228–240.
- Murphy, L. K., Murray, C. B., Compas, B. E., Gerhardt, C. A., Berg, C. A., Wiebe, D. J., & Holmbeck, G. N. (2017). Topical review: Integrating findings on direct observation of family communication in studies comparing pediatric chronic illness and typically developing samples. *Journal of Pediatric Psychology*, 42, 85–94. doi: 10.1093/jpepsy/jsw051
- Muthén, L. K., & Muthén, B. O. (1998–2012). *Mplus User's Guide* (7th ed.). Los Angeles, CA: Muthén & Muthén.
- Noll, R. B., Gartstein, M. A., Vannatta, K., Correll, J., Bukowski, W. M., & Davies, W. H. (1999). Social, emotional, and behavioral functioning of children with cancer. *Pediatrics*, 103, 71–78.
- Okado, Y., Long, A. M., & Phipps, S. (2014). Association between parent and child distress and the moderating effects of life events in families with and without a history of pediatric cancer. *Journal of Pediatric Psychology*, 39, 1049–1060.
- Orbuch, T. L., Parry, C., Chesler, M., Fritz, J., & Repetto, P. (2005). Parent-child relationships and quality of life: Resilience among childhood cancer survivors*. *Family Relations*, 54, 171–183.
- Pai, A. L., Greenley, R. N., Lewandowski, A., Drotar, D., Youngstrom, E., & Peterson, C. C. (2007). A meta-analytic review of the influence of pediatric cancer on parent and family functioning. *Journal of Family Psychology*, 21, 407–415.
- Papp, L. M., Cummings, E. M., & Goeke-Morey, M. C. (2005). Parental psychological distress, parent-child relationship qualities, and child adjustment: Direct, mediating, and reciprocal pathways. *Parenting*, 5, 259–283.
- Parker, G., Tupling, H., & Brown, L. B. (1979). A parental bonding instrument. *British Journal of Medical Psychology*, 52, 1–10.
- Phipps, S., Klosky, J. L., Long, A., Hudson, M. M., Huang, Q., Zhang, H., & Noll, R. B. (2014). Posttraumatic stress and psychological growth in children with cancer: Has the traumatic impact of cancer been overestimated? *Journal of Clinical Oncology*, 32, 641–646.
- Phipps, S., Long, A., Willard, V. W., Okado, Y., Hudson, M., Huang, Q. . . Noll, R. (2015). Parents of children with cancer: At-risk or resilient? *Journal of Pediatric Psychology*, 40, 914–925. doi: 10.1093/jpepsy/jsv047
- Pinquart, M. (2013). Do the parent-child relationship and parenting behaviors differ between families with a child with and without chronic illness? A meta-analysis. *Journal of Pediatric Psychology*, 38, 708–721.
- Price, J., Kassam-Adams, N., Alderfer, M. A., Christofferson, J., & Kazak, A. E. (2016). Systematic review: A reevaluation and update of the integrative (trajectory) model of pediatric medical traumatic stress. *Journal of Pediatric Psychology*, 41, 86–97.
- Reynolds, C., & Kamphaus, R. (2004). *BASC-2: Behavior Assessment System for Children* (2nd ed.). Circle Pines, MN: AGS Publishing.
- Robinson, K. E., Gerhardt, C. A., Vannatta, K., & Noll, R. B. (2007). Parent and family factors associated with child adjustment to pediatric cancer. *Journal of Pediatric Psychology*, 32, 400–410.
- Robinson, K. E., Gerhardt, C. A., Vannatta, K., & Noll, R. B. (2009). Survivors of childhood cancer and comparison peers: The influence of early family factors on distress in emerging adulthood. *Journal of Family Psychology*, 23, 23–31.
- Satorra, A., & Bentler, P. M. (2010). Ensuring positiveness of the scaled difference chi-square test statistic. *Psychometrika*, 75, 243–248.
- Schepers, S. A., Long, A. M., Russell, K., & Phipps, S. (2018). Youth and parent perceptions of parenting in childhood cancer survivors and healthy peers. *Support Care Cancer*, 26, 4143–4149. doi: 10.1007/s00520-018-4285-z
- Tedeschi, R. G., & Calhoun, L. G. (1996). The Posttraumatic Growth Inventory: Measuring the positive legacy of trauma. *Journal of Traumatic Stress*, 9, 455–471.
- Tillery, R., Long, A., & Phipps, S. (2014). Child perceptions of parental care and overprotection in children with cancer and healthy children. *Journal of Clinical Psychology in Medical Settings*, 21, 165–172.
- Treutler, C. M., & Epkins, C. C. (2003). Are discrepancies among child, mother, and father reports on children's behavior related to parents' psychological symptoms and aspects of parent-child relationships? *Journal of Abnormal Child Psychology*, 31, 13–27.
- Van Schoors, M., Caes, L., Verhofstadt, L. L., Goubert, L., & Alderfer, M. A. (2015). Systematic review: Family resilience after pediatric cancer diagnosis. *Journal of Pediatric Psychology*, 40, 856–868.

- Wilhelm, K., Niven, H., Parker, G., & Hadzi-Pavlovic, D. (2005). The stability of the Parental Bonding Instrument over a 20-year period. *Psychological Medicine*, 35, 387–393.
- Williams, L. K., Lamb, K. E., & McCarthy, M. C. (2014). Behavioral side effects of pediatric acute lymphoblastic leukemia treatment: The role of parenting strategies. *Pediatric Blood and Cancer*, 61, 2065–2070.
- Zeltzer, L. K., Recklitis, C., Buchbinder, D., Zebrack, B., Casillas, J., Tsao, J. C. I. . . . Krull, K. (2009). Psychological status in childhood cancer survivors: A report from the Childhood Cancer Survivor Study. *Journal of Clinical Oncology*, 27, 2396–2404.