

# Impact of a Parent-Based Interdisciplinary Intervention for Mothers on Adjustment in Children Newly Diagnosed With Cancer

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**Objective** To determine if maternal distress predicts child adjustment outcomes or if child adjustment outcomes predict maternal distress among children newly diagnosed with cancer, and if a parent-focused intervention has downstream effects on child adjustment. **Methods** Mothers ( $n = 52$ ) were randomly assigned to a clinic-based, interdisciplinary intervention for parents of children newly diagnosed with cancer. Measures of maternal distress and child adjustment were collected at baseline, posttreatment, and follow-up. **Results** A lagged relationship was identified between maternal distress and child internalizing symptoms, but not externalizing symptoms. The parent intervention reduced child internalizing and externalizing symptoms at follow-up. Only the child internalizing symptoms effect was mediated by reduced maternal distress. The child externalizing symptoms effect was mediated by unobserved parent factors. **Conclusions** This study provides support for illness adjustment and coping models that emphasize the role of parent factors in driving child adjustment outcomes and is encouraging for future parent-focused intervention research.

**Key words** adjustment; cancer and oncology; children; parents.

In the United States in 2012, >12,000 children were expected to be diagnosed with pediatric cancer (American Cancer Society, 2012), with the majority of these children treated on intensive protocols lasting up to 3 years. Pediatric cancer and its treatment (e.g., various combinations of radiation, chemotherapy, surgery, bone marrow transplants) have the potential to exert family-system-wide influences, placing all family members at risk for psychological adjustment problems (e.g., American Cancer Society, 2012; Kazak et al., 2005).

The majority of children diagnosed with cancer will cope relatively well with their disease (Kupst, Natta, & Richardson, 1995; Patenaude & Kupst, 2005). However,

children diagnosed with cancer have been found to have significantly higher child internalizing symptoms than community controls during treatment (Sawyer, Antoniou, Toogood, & Rice, 1997), and a consistent subset of these youth will evidence difficulties in a variety of interpersonal and social domains over time (e.g., Friedman & Meadows, 2002; Patenaude & Kupst, 2005; Vannatta & Gerhardt, 2003). Pediatric cancer survivors have increased rates of posttraumatic stress disorder compared with siblings (Stuber et al., 2010), a potentially higher risk of suicidal ideation than the general population (Recklitis et al., 2010), more activity limitations, and lower rates of marriage as they enter adulthood (Langeveld et al., 2003)

when compared with controls. Thus, there appear to be both immediate and long-term adjustment outcome risks for children who undergo pediatric cancer treatment.

To date, few child-based interventions for children newly diagnosed with pediatric cancer exist. The results of the existing interventions have been mixed, with some demonstrating benefits in specific areas of adjustment (e.g., Varni, Katz, Colegrove, & Dolgin, 1993) and others demonstrating no difference from comparison groups (e.g., Hinds et al., 2000; Stehl et al., 2009). It is also particularly difficult to intervene with children at the time of their cancer diagnosis as they are undergoing intensive treatments and experiencing severe side effects, which can make it difficult for them to engage in an intervention.

Parents of children with cancer are also at risk for poor adjustment outcomes, even more so than their diagnosed child (Kazak, 1994; Pai et al., 2007). These parents may experience moderate-to-severe levels of posttraumatic stress symptoms (Kazak, Boeving, Alderfer, Hwang, & Reilly, 2005; Rodriguez et al., 2012), and mothers have been found to be at risk for anxious and depressive symptoms (Manne et al., 2001). Such problems can persist for years after their child's cancer treatment is complete (Bruce, Gumley, Isham, Fearon, & Phipps, 2011; Pelcovitz et al., 1998; Stuber, Gonzalez, Benjamin, & Golant, 1995).

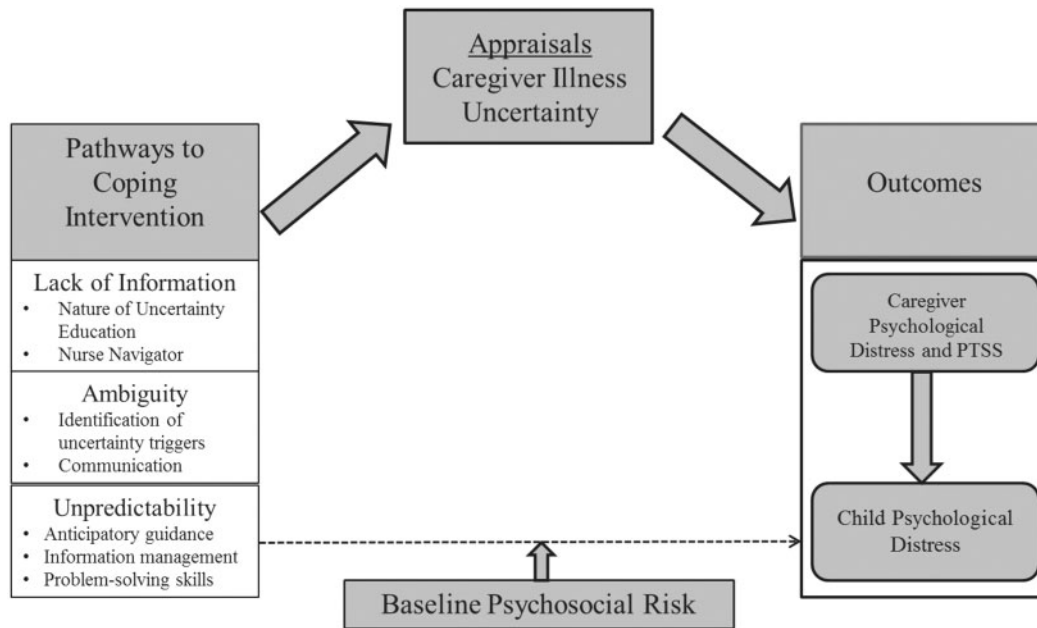
Two well-researched theoretical models of family adjustment to pediatric chronic illness have posited a robust relationship between child and parent adjustment is the transactional stress and coping model (Thompson, Gil, Burbach, Keith, & Kinney, 1993) and the social ecological model (Kazak, Segal-Andrews, & Johnson, 1995). Both models outline that parent and child adjustment (or maladjustment) are interrelated via a transactional process between child and parent variables (e.g., child and parent coping), illness characteristics, and the larger sociocultural context (Kazak et al., 1995; Thompson et al., 1993). Research has supported these theories by consistently demonstrating that parent and child adjustment outcomes are closely correlated in several chronic illness populations (e.g., Chaney et al., 1997; Mullins et al., 1995). Initial studies examining transactional patterns of parent and child adjustment within pediatric cancer populations were largely cross-sectional. These studies have shown that factors such as parental coping efforts are correlated with a variety of child adjustment outcomes at simultaneous time points (Morris, Blount, & Cohen, 1997; Mulhern, Fairclough, Smith, & Douglas, 1992; Sanger, Copeland, & Davidson, 1991). However, the cross-sectional nature of these studies precludes the temporal sequencing, which is critical for informing possible causal relationships between parent and child adjustment.

Cross-sectional data cannot discriminate whether parent adjustment may drive child adjustment, whether child adjustment may drive parent adjustment, or whether both of these processes are operating. Better understanding of the temporal aspects of these relationships is critical for designing interventions to improve both child and parent coping with cancer. If parent adjustment is a key driver of child adjustment and coping, then services that improve parent adjustment may not only be of value for their direct benefit to parents, but they may also be beneficial for their indirect effects on the child.

In an effort to elucidate directionality in the relationship between parent and child adjustment, recent studies among other disease populations have used longitudinal designs. Specifically, within a population of children diagnosed with juvenile rheumatic diseases, baseline levels of parent distress were found to be related to later child distress; however, baseline levels of child distress were not predictive of later parent distress (Ryan et al., 2010). In other words, parent distress was found to temporally precede child distress in this study, suggesting that parent adjustment may drive later child adjustment. In a small study of young children with cancer (2–5-year-olds) and their parents, a similar pattern was noted (Sawyer, Streiner, Antoniou, Toogood, & Rice, 1998). Two-year lagged mother-to-child correlations were reported between maternal psychopathology and child internalizing and externalizing symptoms. This is partially consistent with findings from Ryan et al. (2010), although cross-lagged relationships, including parent-to-child paths, were not simultaneously tested. Importantly, no treatment manipulations were involved in either study.

In light of these predicted transactional directions, it has been suggested that the provision of an intervention that improves parent adjustment could also have the potential to mitigate poor adjustment outcomes in children with chronic illnesses, such as cancer (Hoff et al., 2005; Varni et al., 1999). Studies have demonstrated that interventions targeting parental factors can indirectly result in positive outcomes in their children (National Research Council and Institute of Medicine, 2009). For example, a reduction in parental dysthymia via psychosocial intervention has been associated with reduced child emotional and behavioral symptoms (Browne et al., 2002; Byrne et al., 2006). To date, however, we are not aware of any treatment studies with parents of children with cancer that have also examined the impact of treatment-induced parent improvement on *downstream* child adjustment.

Recently, we reported findings from a randomized clinical trial of a clinic-based interdisciplinary intervention for parents of children newly diagnosed with cancer



**Figure 1.** Conceptual illness uncertainty intervention framework.

(Mullins et al., 2012). Our intervention, which focused on helping mothers to manage illness uncertainty (Mishel, 1990), consisted of the following six distinct modules: (1) the nature of uncertainty, (2) communication with medical staff, (3) cognitive coping, (4) problem-solving, (5) social support, and (6) consolidation of skills. The conceptual framework for the intervention is displayed in Figure 1. The in-clinic intervention was delivered in 12 sessions by psychology and nursing interventionists. Compared with mothers receiving standard clinic services, we found treatment-related improvements in maternal distress, posttraumatic stress symptoms, and caregiver burden. The main effect of the intervention was to prevent worsening of distress. Mothers in the intervention group (IG) tended to improve or remain stable in their adjustment, while some mothers in the comparison group evidenced worsening distress over time.

The present study sought to extend our previous work and expand on the parent and child adjustment literature by examining the indirect impact of our parent-based intervention on downstream child outcomes. The current study sought to test two hypotheses. First, consistent with previous studies, which used longitudinal designs (Ryan et al., 2010; Sawyer et al., 1998), we expected that child internalizing symptoms among children undergoing cancer treatment would be predicted in a lagged manner by maternal distress, more so than vice versa. Second, given that the randomly allocated psychosocial intervention for mothers was found to reduce parent distress, we expected

a significant relationship between the parent intervention and downstream child internalizing symptoms, with maternal distress mediating some portion of this relationship. Should there be an indirect treatment effect on children, we will explore what portion of this indirect effect is mediated by measured maternal distress improvement and what portion is mediated by unobserved maternal factors that the treatment may have impacted. As an exploratory aim, we also will explore whether similar effects are found for child externalizing symptoms. Previous research has found lagged mother-to-child associations between maternal psychopathology and child externalizing symptoms; however, externalizing problems (EP) are of secondary interest given that increased risk for internalizing problems (IP) are more often reported as associated with cancer treatment (Sawyer et al., 1997). Because the treatment did not involve the children, only mothers, we assumed that any predicted downstream treatment effects on child adjustment must be mediated by some form of maternal factor, either observed (i.e., measured maternal distress) or unobserved. If supported, these hypotheses would indicate the utility of parent-focused psychosocial interventions for improving children's adjustment during cancer treatment.

## Method

### *Participants and Procedure*

The current study was approved by the institutional review board at a large children's hospital in the Midwestern

United States. Eligible mothers were identified by the pediatric oncologist from a pool of all mothers of children who were newly diagnosed with cancer within the past 4–16 weeks. Inclusion criteria specified that (1) children were between the ages of 2 and 18 years and were diagnosed with leukemia or lymphoma, solid tumor, or brain tumor; (2) mothers spoke English as their primary language; (3) mothers had phone access; and (4) the child's treatment protocol included chemotherapy. Families were excluded from the study if (1) the mother was <18 years of age; (2) the mother was receiving treatment for a psychiatric disorder or evidenced low cognitive functioning; (3) the child's diagnosis was a second malignancy or relapse; or (4) the child was receiving palliative care or experiencing an imminent medical crisis necessitating significant medical intervention.

Eligible mothers were identified by physician consultation and recruited by a graduate research assistant during a clinic visit. Eighty-three families were approached, with 15 families not meeting inclusion criteria and 11 declining to participate. The consent rate for the study was 84%. All participants were asked to complete measures before randomization (baseline). Participants in the IG were given measures at posttreatment and again approximately three months later (follow-up). Participants in the treatment as usual (TAU) group were reassessed at approximately 16 and 24 weeks, from the baseline time point. Participants were compensated monetarily for their participation. Blocked randomization, based on  $n = 4$  chronological enrollment blocks allocated using preset 50/50 allocation patterns, was used for participant assignment to condition.

Participant flow through the study, including the number of participants at each time point, is outlined in our previous publication (Mullins et al., 2012). Participants were 52 mothers of children who were newly diagnosed with cancer (28 males, 24 females). Notably, 27 mothers were in the IG and 25 mothers were in the TAU group at baseline. Mothers ranged in age from 22 to 55 years ( $M = 35.15$ ,  $SD = 7.24$ ) and the majority self-identified as Caucasian (61.5%). The majority of mothers reported completing some college or technical school (30.8%) or graduating from college (34.6%). A substantial number of families reported an annual income <\$30,000 (43.8%), which is consistent with the average incomes for families presenting to the oncology clinic. Children ranged in age from 2 to 17 years ( $M = 8.22$ ,  $SD = 4.60$ ) and had an illness duration that ranged from 2 to 4 months ( $M = 2.42$ ,  $SD = 1.00$ ). The majority of the sample was diagnosed with leukemia or lymphoma (57.7%) followed by solid tumor (30.8%) and brain tumor (11.5%).

### Treatment as Usual Group

Participants randomized to the TAU group received standard clinic care, which involved each family receiving *ad hoc* services from the oncology team. The oncology team included a psychologist who was available to provide services on an as-needed basis during outpatient clinic visits and inpatient hospitalizations, nursing support, social work, and child life services. Participants in the TAU group could elect to receive the intervention after completion of data collection.

### Intervention Group

An individually administered, manualized, 12-session interdisciplinary intervention from psychology and nurse interventionists was delivered to participants in the IG. There were two interventionist dyads with each consisting of an advanced doctoral student in Clinical Psychology and a Master's level Registered Nurse with pediatrics experience. The intervention was structured in an alternating weekly format such that psychology interventionists delivered the in-clinic intervention on the odd numbered weeks, and the nurse interventionists delivered the phone intervention on the even numbered weeks. Mothers also received handouts and homework assignments that were cognitive-behavioral based and specific to the core content of each module in a program binder. All sessions included specific treatment goals that were reviewed with mothers. In-clinic sessions took approximately 45 min to 1 hr and phone interventions took approximately 15–30 min. Interventionists were trained by the corresponding author, and regular meetings were held to discuss implementation issues and monitor fidelity (see Mullins et al. [2012] for a more complete description of the intervention).

### Measures

#### Demographic and Medical Information

Demographic information was obtained using a self-report questionnaire. Participants also reported medical information including date of child's diagnosis, type of cancer and treatment, and number of hospitalizations. Chart review and physician consultation were conducted to verify all medical information.

#### Symptom Checklist 90-Revised

The Symptom Checklist 90-Revised (SCL-90-R; Derogatis, 1994) is a 90-item self-report measure that assesses a wide range of clinical dimensions of distress and psychological adjustment. For the current study, the Global Severity Index, a composite index of general psychological distress and adjustment, was used as a measure of maternal distress. Respondents are asked to indicate the frequency of



which they experienced various symptoms within the past week. The SCL-90-R has demonstrated good internal consistency ( $\alpha = .77-.90$ ), test-retest reliability (.78-.90; Derogatis, 1994), and concurrent, predictive, and construct validity in a wide range of adult populations (Derogatis, 1994; Peveler & Fairburn, 1990).

### Behavior Assessment System for Children—2nd Edition: Parent Report Scale

The Behavior Assessment System for Children—2nd Edition: Parent Report Scale (BASC-2-PRS; Reynolds & Kamphaus, 2004) was used to measure the emotional and behavioral functioning of the children newly diagnosed with cancer. The BASC is a broad-band measure with forms available for children aged 2–21 years. Mothers were asked to complete the BASC-2-PRS that corresponded with the age of their child. The BASC-2-PRS yields four adaptive subscales, eight clinical subscales, and three composite scores. The IP and EP composite *t*-score, based on developmentally appropriate norms, were used in the current study. The BASC-2-PRS has demonstrated solid psychometric properties across a range of clinical child populations (Reynolds & Kamphaus, 2004).

### Overview of Analyses

Preliminary analyses were conducted to examine differences between the treatment groups on illness, demographic, or outcome variables at baseline. All analyses were conducted in accordance with an intent-to-treat model. The main study hypotheses involve examining the relationship between maternal distress and child adjustment over time, with particular attention to bidirectional lagged effects and indirect treatment effects. Cross-lagged panel models, also known as simplex models (Twisk, 2003), were used as the overarching analytic paradigm. These types of models are common for exploring potential reciprocal relationships over time. The basic three-wave (baseline, posttreatment, follow-up) model is diagrammed in Figure 2 and includes autoregressive relationships within mother and child variables, respectively, over time (paths *a* and *d* in the model), crossed lagged relationships (paths *b* and *c* in the model), and baseline covariance (path *e* in the model). Initial model exploration supported applying equality constraints for the autoregressive and cross-lagged pathways, respectively, and for residuals within measures, which provides a single omnibus test of hypothesis 1.

In this model, support for the first hypothesis would be found in a significant effect for path *b* along with little or no effect for path *c*. Hypothesis 2 was tested using the same strategy, eliminating path *c* if it fails to approach

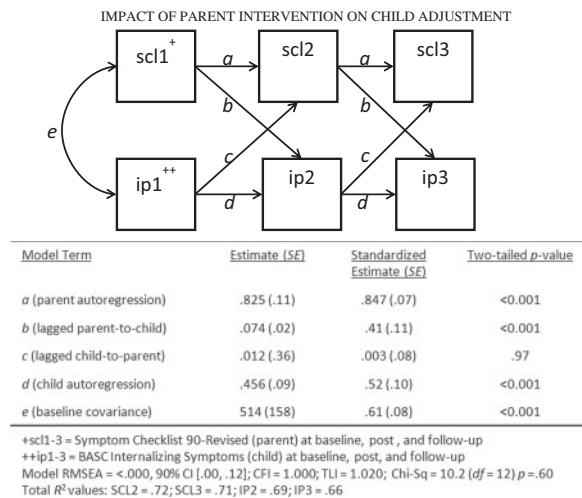


Figure 2. Lagged panel model for hypothesis 1.

significance as predicted, and introducing the randomized treatment group allocation into the model as a direct predictor of posttreatment maternal distress, with two routes for influencing downstream (i.e., follow-up) child internalizing symptoms and externalizing symptoms. The first route is an indirect effect via posttreatment maternal distress. The second route, although modeled and diagrammed as a direct effect, is conceptually equivalent to mediation by unobserved factors under our assumption that because the treatment did not directly interact with children in any way, all effects of a parent treatment on child outcomes are indirect. The sum of these two pathways is equivalent to the effect of treatment on follow-up child adjustment, controlling for prior child adjustment values. This model is diagrammed in Figure 3. All models used robust maximum likelihood estimation under the MAR assumption for missing data and were estimated using MPlus 7.0 software (Muthén & Muthén, 2012). Two-tailed *p*-values were reported, but these should be interpreted in light of the *a priori* directional hypotheses. Model fit was assessed with the Tucker-Lewis Index (TLI), comparative fit index (CFI), and the root-mean-square error of approximation (RMSEA).

## Results

### Preliminary Analyses

The assumption of normality was found to be tenable for all dependent variables. There were no significant differences between the treatment groups on illness, demographic, or outcome variables at baseline,  $p > .05$ . In particular, child age was not found to be associated with maternal distress, child IP, or child EP. Please refer

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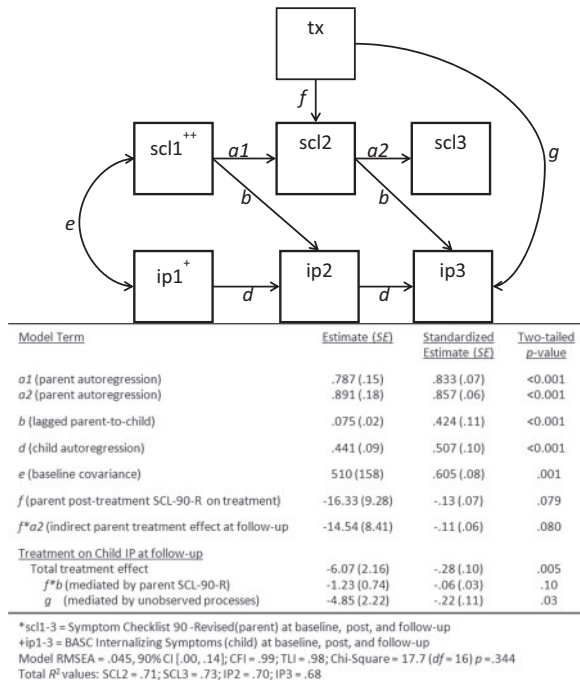


Figure 3. Lagged panel model for hypothesis 2.

to Mullins and colleagues (2012) for a description of the sample by treatment condition.

### Hypothesis 1

The first hypothesis predicted a significant lagged mother-to-child adjustment relationship, but not vice versa. Raw model estimates, standard errors, and two-tailed  $p$ -values for the basic cross-lagged panel model are shown in the table below Figure 2. Results suggest that the model was an excellent fit to the data,  $\chi^2(12, N = 52) = 10.20, p = .60$ ; CFI = 1.00, TLI = 1.02, RMSEA < .001, 90% confidence interval (CI) (0.00, 0.12). As predicted, the mother-to-child effect was significant (standardized effect = 0.41,  $SE = 0.11, p < .001$ ), and the child-to-mother effect did not approach significance. As is normally expected in these types of models, both autoregressive pathways were significant. Covariances between mother and child measures at simultaneous time points beyond baseline (i.e., posttreatment and follow-up) were added to the model, but did not approach significance and so were not included in final models.

### Hypothesis 2

Building on the findings from hypothesis 1, the child-to-mother pathways in the model were dropped, and the randomized treatment allocation variable (0 = TAU; 1 = IG) was added to the model as shown in Figure 3.

Results are shown in the table below the figure. Results suggest that the model was an excellent fit to the data,  $\chi^2(16, N = 52) = 17.70, p = .34$ ; CFI = 0.99, TLI = 1.02, RMSEA = 0.045, 90% CI (0.00, 0.14). The total effect of the treatment on child adjustment outcomes at follow-up was significant (standardized effect = 0.28,  $SE = 0.10, p = .005$ ), with the majority of the effect attributable to unobserved mediators and with approximately 20% of the total indirect effect mediated through treatment effects on posttreatment parent SCL-90-R (see Figure 3). Post hoc descriptive examination of the treatment effect on BASC-2 IP scores revealed that the percent of children with a clinical-range BASC-2 IP score (i.e., a  $t$ -score of  $\geq 65$ ) was fairly constant across the three time points for the TAU group (36, 37, and 29%), but dropped for the IG group (24, 12, and 0%), with no children of mothers in the IG group scoring in the clinical range at follow-up.

### Exploratory Aim

As expected, externalizing symptoms were not elevated in this sample. The mean baseline BASC-2 EP  $t$ -score was 50, no children had a  $t$ -score >70 at baseline, and only three children had a  $t$ -score >65. This is comparable with general population norms. The cross-lagged panel model (Figure 2) was repeated, replacing the BASC-2 IP score with the BASC-2 EP score. No cross-lagged pathways between maternal distress and child EP, in either direction, reached significance in this model. The indirect treatment effect model (Figure 3) also was repeated using the EP score. There was a significant standardized effect of treatment on EP at follow-up of  $-0.49 (SE = 0.20, p < .05)$ . Examining components of this overall indirect effect, mediation of EP by maternal distress was not a significant pathway (standardized estimate =  $-0.05, SE = 0.04, p = .24$ ), and most of the effect was mediated by unobserved factors (standardized estimate =  $-0.044, SE = 0.21, p < .05$ ).

### Discussion

The primary aims of the current examination sought to determine (1) whether internalizing symptoms among children undergoing cancer treatment would be predicted in a lagged manner by maternal distress, more so than vice versa, and (2) whether a clinic-based, interdisciplinary intervention for mothers of children newly diagnosed with cancer, previously demonstrated to prevent worsening maternal distress, has downstream effects on child internalizing symptoms. As an exploratory aim, the current study also examined whether similar effects existed for child externalizing symptoms.

The results support our first hypothesis in that a lagged relationship was identified between maternal distress and child adjustment, such that maternal distress predicted later child internalizing symptoms, but child internalizing symptoms did not predict later maternal distress. This relationship is consistent with previous studies in the pediatric psychology literature (e.g., Ryan et al., 2010) and broadens support for illness adjustment and coping models that emphasize the role of parent factors in driving child adjustment outcomes. The overall size of the partial correlations between lagged parent SCL-90-R scores and child BASC-2 internalizing scores was 0.41, which corresponds to a moderate size effect.

Our second hypothesis was also supported in that the intervention significantly reduced child internalizing symptoms at the follow-up time point. The standardized effect, which is interpretatively similar to a partial correlation, was  $-0.28$ , which corresponds to a small-medium effect size. No children of mothers in the treatment condition scored above the BASC-IP clinical cutoff at posttreatment, compared with approximately a third of children of mothers in the TAU condition. We assessed how much of this total effect was mediated by treatment effects on posttreatment parent adjustment, as measured by the SCL-90-R, vs. other unobserved, parent factors. The majority of the indirect effect (approximately 80%) of the intervention on child outcomes was mediated by unobserved factors. This would reflect maternal treatment outcomes that either were not measured or were not reflected in the SCL-90-R. For example, this might have included treatment outcomes such as improved parenting, communication patterns, or enhanced problem-solving skills. It also might have included more adaptive attributions and attitudes about the child's illness and treatment that may have been conveyed to the child, including less uncertainty about the illness and its treatment, or better communication with health care providers. Despite some ambiguity around the specific indirect treatment effects, these results suggest that participating in the current intervention did, in fact, lead to positive downstream child outcomes, which is encouraging for future parent-focused intervention trials.

Exploratory analyses revealed that there were no lagged relationships between maternal distress and child EP. Furthermore, although there were significant and beneficial indirect effects of the parent intervention on EP, these were not mediated by the treatment's effects on maternal distress. These results stand in contrast to the IP findings in the current study and are counter to those of Sawyer et al. (1998) who found 2-year lagged mother-to-child correlations for both internalizing and

externalizing symptoms. These discrepant findings could stem from differences in study methodology. Sawyer et al. (1998) found lagged associations for EP 2 years after diagnosis, whereas the follow-up time points for the current study occurred closer to the child's diagnosis. Children in the Sawyer et al. (1998) study were also younger (2–12-year-olds) than those in the current study (2–17-year-olds). Therefore, EP associated with maternal distress may take longer to develop or occur more frequently in younger children. Despite differences in findings, it is important to acknowledge that externalizing symptoms for children in both studies were fairly low, perhaps reflecting children's normal range variations of externalizing symptoms. Our data suggest that internalizing symptoms may be the more important clinical target for newly diagnosed children with cancer.

The current results should be considered in light of several limitations. First, we acknowledge that relying on parent-proxy report of child symptomatology is a weakness of the current study. The level of agreement between parent and child report of a child's symptoms can vary considerably, especially in adolescents (Achenbach, McConaughy, & Howell, 1987). Furthermore, the reliance of parent report for both maternal distress and child adjustment at all three time points introduces concerns of common method bias. This possibility may be somewhat mitigated by the fact that in our model, only baseline levels of maternal distress and child adjustment were correlated. When including both autocorrelations and cross-lagged predictors, contemporaneous associations (e.g., associations between SCL2 and IP2 or SCL3 and IP3 in Figure 2) at posttreatment and follow-up were not significant as an incremental effect; only lagged predictions were significant. Furthermore, our findings suggest that mothers were not unselective endorsers of problem items in general given differences in lagged associations between maternal distress and internalizing and EP. Nevertheless, future examinations should use a multi-method multi-informant approach to limit the effect of common method bias. Second, the sample size was small, and children spanned a large age range. Future examinations should continue to examine the relationship between parent and child adjustment outcomes across age or developmental levels in larger samples. Third, we were unable to collect data on the number of families who accessed other psychosocial services outside of the study, which may have influenced the current findings. Fourth, the current sample included only mothers of children who had been newly diagnosed with cancer. Future studies should examine the parent-child adjustment relationship in a heterogeneous sample of caregivers and in children who are at different stages of

treatment. Collectively, these limitations should be addressed in future studies to determine if the current results generalize to other samples, including across different types of caregivers and time periods during the cancer treatment process.

Future investigations should attempt to elucidate parent factors, which may mediate the effectiveness of parent interventions on downstream child adjustment outcomes in pediatric cancer, including capturing a broader range of possible treatment effects on parents. Maternal distress does appear to be one driver of child adjustment, but it is not the only parent factor affected by the treatment that translates into downstream child benefits. Conceptual models of children's psychological adjustment to pediatric cancer should include parent factors, including, parent adjustment, attitude toward illness, and problem-solving abilities, among others.

The results of the current study have important implications for conceptualization and treatment of maternal distress and child psychological adjustment in the context of pediatric cancer. To our knowledge, this is the first examination in the pediatric oncology literature to examine the maternal distress–child adjustment relationship using a cross-lagged methodology. It also builds on previous pediatric oncology research (Sawyer et al., 1998) by identifying maternal distress as temporally preceding child adjustment in a newly diagnosed sample. Our results indicate that psychological interventions for mothers of children newly diagnosed with cancer can have positive downstream effects on child adjustment. Indeed, it may be argued that targeting parent distress is a potentially cost-effective and efficacious means of treating families of youth with a chronic health condition in a health care environment where resources are under considerable scrutiny by hospital systems. As such, the current examination supports continued development and empirical validation of psychological interventions for parents of children newly diagnosed with cancer, not only to improve parent adjustment outcomes, but also to improve child adjustment to pediatric cancer.

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*Conflicts of interest:* None declared.

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