Understanding differences in the long-term psychosocial adjustment of pediatric cancer patients and their parents: an individual differences resources model

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Abstract

The experience of childhood cancer is a major life stressor for children and their parents. There is substantial variability among pediatric cancer patients and their parents in their ability to cope with the cancer. Although other models typically focus on the psychological resources families use to broadly cope with a diagnosis of pediatric cancer, we present a model that focuses specifically how parents and children cope with the stress of invasive and often painful treatment episodes. Our resources model is further distinct with its focus on individual differences in personal (e.g., personality traits) and social (e.g., social support) resources and the role these differences may play in psychosocial adjustment of families confronting pediatric cancer. We use findings from the broader pediatric cancer research literature and our own 15-year program of research on individual differences in psychological resources and parents and children's responses to treatment episodes to provide empirical support for our model. Support was found for the six premises of the model: (a) parent resources influence their longer-term psychosocial adjustment, (b) parent resources influence children's responses to treatment episodes, (c) parent resources indirectly influence their longer-term psychosocial adjustment through their responses to treatment episodes, (d) children's personal resources influence how parent responses to treatment episodes, (e) children's resources influence their longer-term psychosocial adjustment, and (f) children's resources indirectly influence their longer-term psychosocial adjustment through their responses to treatment episodes. Understanding how the availability of resources influences parents and children confronting cancer provides a foundation for future research on individual differences in resources and offers other avenues through which clinicians can assess and treat families at risk for poor psychosocial adjustment during treatment and in their life beyond cancer treatments.

Keywords

Cancer, Pediatric, Family, Psychosocial, Quality of life, Resources model

INTRODUCTION

In the USA in 2017, an estimated 10,200 children younger than 15 years were diagnosed with cancer and 1,100 children died from one of the multiple kinds of pediatric cancer (e.g., leukemia, brain and central nervous system cancers, Wilms' tumor) [1]. Pediatric cancer is the leading non-accident-related cause of death of children in the

Implications

Practice: Interventions designed to reduce child distress can also have the added benefit of increasing child cooperation, thereby potentially mitigating parents' and children's anticipatory anxiety over time. Interventions designed to enhance (e.g., parent caregiving self-efficacy, child attentional control) or mitigate (e.g., parent anxiety and depression, child behavioral problems) personal and social resources offer clinicians another avenue through which to improve the psychosocial adjustment for children with pediatric cancer and their parents during treatment and in the life beyond cancer.

Policy: Policymakers who want to improve the mental health of children with cancer and their parents should consider implementing screening of all families at the time of children's cancer diagnosis to identify those at high risk for poor psychological outcomes during treatment.

Research: Understanding how the availability of personal and social resources influences coping for parents and children confronting cancer provides a foundation for examining the role of individual differences in resources in future research as causes of variability in responses to treatment episodes and, in turn psychosocial adjustment for parents and children over time.

USA. However, survival rates for children with pediatric cancers have improved dramatically over the last 40 years. In the 1980s, about 10% of children diagnosed with cancer survived 5 years. Today, the 5-year survival rate is almost 85% and the 10-year rate is about 70% [2].

Thus, pediatric cancer has largely gone from being an acute and likely fatal disease to a chronic disease that can be managed over long periods of time with appropriate treatments. Although these medical advances prolong the lives of pediatric cancer patients, the diagnosis and treatment of cancer can

present substantial physical challenges (e.g., late and long-term effects of treatment) and psychosocial challenges that significantly influence children and parents' psychological adjustment and family functioning [3,4].

However, there is substantial variability among pediatric cancer patients and their parents in their ability to psychologically cope with the cancer and associated treatments. Although the majority of patients and their parents fare relatively well over the course of treatment and beyond, about 25%–30% of pediatric cancer survivors have significant psychosocial problems during treatment and years later [5]. These problems (e.g., lower academic achievement, impaired social relationships, problems with self-esteem) may persist more than a decade after treatment is completed (e.g., [3,6,7]). Children and parents may also experience longer-term depression, anxiety, and poorer quality of life (cf. [3,8–10]). Further, parents of children with cancer experience greater stress than parents of healthy children and children with other medical challenges [11]. Some researchers have even found evidence that parents may experience symptoms of post-traumatic stress (cf. [4]). In sum, there is ample evidence that pediatric cancer is an extremely stressful long-term experience for many parents [12].

Among researchers who study the effects of pediatric cancer, there is general consensus that a family's resources play a critical role in how well they cope with the stresses of pediatric cancer [4,13]. In this article, we present a model that builds on this prior research on the types of resources families need to effectively cope with pediatric cancer. However, whereas other models typically focus on how families broadly cope with a diagnosis of pediatric cancer, our model focuses on a specific aspect of the pediatric cancer experience—coping with the stress of invasive and often painful treatment episodes that children must almost inevitably endure. Treatment episodes are specific treatment occurrences that include the waiting time in a clinic, any tests prior to treatment (e.g., blood draw), entry into a procedure room, and the procedures themselves. The procedures typically used for pediatric cancer (e.g., port starts, lumbar puncture, and bone marrow aspirations) are less painful than they once were but can still be extremely invasive and stressful for both the children and their parents. Indeed, children and parents have reported that treatment episodes are often worse than the disease itself [14,15].

Repeated treatment episodes can influence children and parents' psychosocial adjustment simply through consistently raising their general stress levels each time they occur [16]. Experiences with one treatment episode can also influence responses to subsequent ones. For example, a traumatic experience with one procedure (e.g., difficulty accessing a

port) may lead to anticipatory anxiety and fear prior to the next treatment episode, which may make children subsequently less cooperative. This vicious circle can serve to make each subsequent treatment episode more stressful and traumatic for children and their parents, which can have a significant negative impact on psychosocial adjustment over time [17,18]. It is possible, of course, that some children and parents may habituate to the treatment episodes over time such that this general stress remains constant or even decreases over time. However, it is unlikely that parents or children ever become inured to these typically painful treatments.

Our resources model is further distinct from other models with its focus on individual differences in personal and social resources and the role that these differences may play in affecting the psychosocial adjustment of children coping with pediatric cancer and their parents. Our model examines these differences in the context of treatment episodes and how they specifically affect affective and cognitive responses to treatment episodes. The intended benefit of our model is that early assessment of individual differences in personal and social resources that affect treatment responses can facilitate early identification of and interventions for families at risk of adverse reactions to treatment episodes.

We acknowledge, of course, the value of models that focus on family systems and material resources (e.g., [19,20]), which are not included in this model. Indeed, we view our model as complementing rather than supplanting these models. Further, our model specifically addresses the treatment phase of pediatric cancer, and therefore, it is not intended to supplant other models of more general coping with the challenges of pediatric cancer. Further, as a model concerned solely with psychosocial adjustment, it does not address the medical aspects of the disease (e.g., child's overall health before and after diagnosis, type of cancer, type of treatment) on the immediate and longer-term psychological and physical health of parents and their children, including long-time survivors of pediatric cancer and their families. However, given the unique focus on individual differences in personal and social resources and their effect on parent and child psychological responses to treatment episodes, we believe that this model can make a significant contribution to theory and practice related to pediatric cancer.

Our resources model focused on two distinct types of parent and child resources.

Personal resources

Personal resources are enduring individual attributes that involve strengths and weaknesses that existed before the onset of the pediatric cancer (e.g., trait anxiety, depression, temperament). In personality psychology, these are often called personality traits [21]. Most personality traits are normally distributed

in the population, and they influence how a person responds to similar situations in which the trait is relevant. There will typically be consistency in the person's thoughts and behaviors across these situations.

Similarities across cancer treatment procedures make the consideration of personality traits very relevant to this context. For example, there are often long waits before procedures begin, many procedures require invasive preliminary tests, and most procedures cause substantial levels of discomfort and distress for the child and for their parents who support them. Further, the clinic environment and procedure room are imposing and anxiety provoking for most parents and children. In sum, most procedures have similarities in how parent and how children perceive and respond to them over the course of treatment, thus making the consideration of differences in this kind of personal resources an important area of focus.

Social resources

According to human ecology theories (e.g., [22]), people's social environment during times of stress has a strong influence on their response to the stress. In this case, social resources, such as social support, may mitigate the psychosocial distress associated with the experience of having a child with cancer. Support can be emotional, such as offering comfort and reassurance, or instrumental, such as providing practical kinds of support (e.g., money, caregiving, transportation) [23]. Extensive research shows the positive impact of social support in reducing stress, facilitating coping, and improving health outcomes [23]. Although, other models have focused on how social support can moderate the broad psychosocial impact of pediatric cancer on families [13], our model specifically focuses on how social support can moderate parents' and children's responses to extended periods of treatment.

AN INDIVIDUAL DIFFERENCES RESOURCES MODEL OF ADJUSTMENT TO PEDIATRIC CANCER

The model (Fig. 1) begins with two widely shared assumptions: (a) pediatric cancer is a major life stressor for parents and their children and presents a serious risk to their psychosocial adjustment,

and (b) families need certain personal and social resources to effectively reduce this risk. Thus, our model contains direct paths from parents and children's preexisting resources to their longer-term psychosocial adjustment. However, our model uniquely assigns a central role to parents' and children's affective and cognitive responses to treatment episodes. Finally, the model proposes that these responses to treatment episodes directly affect longer-term psychosocial adjustment and mitigate the effect of resources on longer-term adjustment.

RESEARCH BACKGROUND

The research we present to support our model is drawn from two grants from the National Cancer Institute focused on investigating parents' and children's responses to cancer treatment episodes and their role in the longer-term psychosocial adjustment of families facing pediatric cancer. Project 1 (R01CA100027, PI: T.L.A.) was conducted between 2003 and 2008. Project 2 (R01CA138981, PI: L.A.P.) was conducted between 2009 and 2016. The participants were convenience samples of families confronting pediatric cancer studied at two different times and at two hospitals located in different regions of the USA. In both projects, all research protocols were reviewed and approved by our university institutional review board and the institutional review boards at the children's hospitals where the research was conducted.

Owing to space limitations, we have omitted some details about the projects. In both of them, all self-report assessments were made with previously published, widely used scales with well-established reliabilities and validities, and all observational measures showed substantial convergence among coders [24]. Information about specific self-report scales used at study entry, at the time of treatment episodes, and follow-ups; the observational measures; and other study procedures can be obtained from the first author or the published articles cited in this article.

Project 1 was a cross-sectional study of children with cancer who were receiving outpatient treatment in a clinic at a public children's hospital in a large metropolitan area. At study entry, parents completed questionnaires about family

Fig. 1 | An individual differences resources model of psychological adjustment in pediatric cancer patients and their parents.

demographic and socioeconomic factors and personal and social resources of both the child and the parent with primary caregiving responsibility for the child. Immediately before treatment episodes, parents completed questionnaires that assessed their treatment-related affect and cognition (see [25]).

As part of the study, parents and children were video recorded while they were in the procedure rooms. Recordings began when the child entered the procedure room and ended when there were no more activities or conversations relevant to the procedure. Each family had one recording, which included the pre-procedure, actual procedure, and post-procedure phase of the treatment episode. All children were either fully awake or partially sedated during procedures, which included port starts, lumbar punctures, and bone marrow aspirations. During the post-procedure phase, parents, nurses, and children themselves made independent assessments of the child's pain and/or distress during the treatment. Trained coders later viewed the recording of the treatment episode and independently rated the child's pain and distress and the parents' distress.

There were 45 families in Project 1. The overwhelming majority of adult caregivers were mothers. The children were between 3 and 12 years old. We used 12 as the upper age limit as we had planned to collect physiological measures and wanted to reduce the impact of hormonal and behavioral changes associated with puberty on these measures. Although this limits the generalizability of our findings to children younger than 13 years, most children with pediatric cancer are less than 12 years old when they are diagnosed and with an average age of 6 years old. In this and Project 2, the distribution of types of cancer the children had was consistent with national data on the frequencies of different pediatric cancers (e.g., acute lymphoblastic leukemia was the most frequent cancer). In both projects, the demographic characteristics of children also matched national demographic data on children with cancer [25]. Parents and children were each compensated with gift cards for their participation in both projects.

In both projects, parents were not approached about participation until 4–6 weeks after their first clinic visit. We found in Project 1 that parents were typically too distressed during these first weeks to be asked to participate in a nontherapeutic study, and therefore, we decided we could not ethically approach parents at their very first visit. After families were consented, we obtained parents' retrospective self-reports of medically relevant factors such as their child's date of initial diagnosis, treatment history prior to study entry, and precancer health status. We controlled as much as possible for these preenrollment factors in our analyses, although we acknowledge that not being able to collect baseline

data at the exact time of diagnosis may somewhat weaken some of the causal inferences made about factors present at diagnosis.

Project 2 was a larger longitudinal study of parents and children ($N = 147$ families) conducted at two large children's hospitals in different regions of the USA. We used the same child age limit of 12 years to permit comparisons across the two projects. Parents completed a questionnaire at study entry similar to Project 1 about family demographic and socioeconomic factors and parent and child personal and social resources. The distributions of cancer types and demographic and socioeconomic characteristic were comparable to those in Project 1. Immediately before and after treatment episodes, parents completed similar questionnaires about their treatment-related affect and cognition. Unlike Project 1, families had up to three separate treatment episodes video recorded for each child and parent.

Three and 9 months after the last recorded procedure (hereafter called, 3- and 9-month follow-ups), parents were recontacted and asked to complete validated measures of their own psychosocial adjustment (e.g., psychological distress, physical symptoms, and post-traumatic stress) and of their child's quality of life in areas related to pediatric cancer and its treatments [26]. The retention rate for the follow-up assessments was high (>70%). Analyses showed that parents who completed the follow-ups did not differ from those who enrolled in the study but did not complete the follow-ups. As was true in Project 1, the great majority of caregivers were mothers.

CORE PREMISES

There are six premises that drive the individual differences resources model. They are divided into those that primarily address parent resources and those that address children's resources. Later we present and provide empirical support for each premise.

Parent resources

Premise one: parent resources influence their longer-term psychosocial adjustment

The first premise of the model is that parents' social resources not only benefit their children during treatment episodes but also provide benefits for the parents as well. This is a fairly well-established finding in the research literature (e.g., [4,13,27,28]). However, a study conducted by Harper et al. [29] in Project 2 further explicates these findings. Specifically, it examined two separate aspects of social support: parents' satisfaction with their level of support and with the size of their support network (i.e., the number of people they could rely on for social support) [30]. After controlling for levels of parent trait anxiety and depression at study entry, Harper et al. found that higher levels of both kinds

of support positively influenced parents' longer-term psychological adjustment but in different ways. First, higher levels of satisfaction were directly associated with lower levels of psychological distress, irrespective of the levels of parent trait anxiety and depression at study entry. That is, the more satisfied parents were with their social support, the less psychosocial distress they reported at both the 3- and 9-month follow-ups. In contrast, the size of the network moderated or "buffered" the impact of both parents' trait anxiety and depression on psychosocial distress. For parents with smaller support networks, higher trait anxiety and depression at study entry were associated with higher psychological distress at follow-ups. However, there was no relationship for parents with larger social networks. These findings were consistent with Cohen and Wills' [31] model of social support and of the different ways in which social support can reduce stress in the recipients of support.

Premise two: parent resources influence children's responses to treatment episodes

Several researchers have found that parents' personal and social resources can affect how their children respond to stressful and invasive treatment procedures (e.g., [32,33]). Our own work in the context of the model further explicates this causal relationship. In Project 1, Penner et al. [25] had parents complete measures of trait anxiety, ego resilience (a predisposition to recover from negative experiences and adapt to changing life demands), enduring positive and negative affect, and social support at study entry. Immediately before their children entered the procedure room, parents completed measures of state anxiety, personal distress, and empathic concern (other-oriented feelings about a person in distress that are associated with altruistic motivations for helping). Following the procedure, raters rated the child's pain and/or distress.

Penner et al. found that higher levels of trait anxiety were associated with higher levels of state anxiety and personal distress in parents just before treatment episodes, which were, in turn, associated with higher levels of children's pain during treatment episodes as rated by parents. In addition, higher levels of enduring positive affect and social support (assessed at study entry) were associated with higher levels of parent empathic concern just before they entered the procedure room. Higher levels of empathic concern were, in turn, associated with lower ratings of children's pain and/or distress during treatments as made by all raters, including the children themselves. In sum, parents' personal and social resources influenced their affect at the time of treatment, which then influenced children's pain and/or distress during treatment episodes.

A study by Peterson et al. [34] in Project 2 of caregiver self-efficacy provides further support for

the premise about the impact of parents' personal resources on children's responses to treatments. Although other researchers (e.g., [35–37]) have studied general self-efficacy among parents of pediatric cancer patients and its relationship to overall distress, Peterson et al. focused on a specific kind of caregiver self-efficacy—the expectation or confidence that the caregiver can effectively cope with and succeed at specific treatment-related tasks [38]. They examined the personal resources associated with differences in caregiver self-efficacy and the effects of parents' self-efficacy on children's responses to cancer treatments.

Immediately before entering the procedure room, parents were asked about their self-efficacy for specific caregiving tasks during their children's treatment episodes. Tasks included keeping their child calm before and during the procedure, hiding emotions from their child, and involving their child in everyday and/or normal activities before the actual procedure begins.

The study found that higher levels of parents' empathic concern, resilience, enduring positive affect, and satisfaction with social support assessed at study entry were associated both with higher overall caregiver self-efficacy and self-efficacy for individual tasks. In contrast, higher trait anxiety was associated with lower levels of both types of self-efficacy. The study also found parents' self-efficacy influenced their children's responses to treatment. There were effects for overall self-efficacy and self-efficacy specifically about keeping the child calm during procedures. Self-efficacy about this task was associated with less child distress and more child cooperation during treatments across all the rating sources, including the children themselves.

Premise three: parent resources indirectly influence their longer-term psychosocial adjustment through their responses to treatment episodes

This premise extends the first premise by proposing that parents' treatment responses may mitigate the longer-term impact of personal resources on psychosocial adjustment. As far as we know, this indirect causal relationship has not been specifically tested by other researchers. Indeed, some researchers assume there is only a direct relationship between personal resources and parents' psychosocial adjustment (e.g., [39]). In Project 2, we conducted three studies that support this premise about the indirect effects of resources.

First, Harper et al. [40] found that parents' trait anxiety and depression at study entry significantly predicted their psychosocial adjustment at the 3-month follow-up. However, this relationship was in part mediated by parents' affective responses at the time of their children's treatment episodes. Specifically, Harper et al. found that parents' state anxiety, negative mood, and distress at the time of

treatments partially mediated the effects of both trait anxiety and depression on level of psychosocial adjustment. Higher levels at study entry lead to higher levels of negative affect during treatment episodes, which in turn predicted lower psychosocial adjustment at follow-up.

In a second study, Harper et al. [41] examined the association between parents' caregiver self-efficacy, negative affect at the time of treatment, and psychosocial adjustment at follow-up. Higher caregiver self-efficacy for keeping the child calm during procedures was significantly associated with less parent distress at the time of treatment episodes; this aspect of caregiver self-efficacy was also significantly associated with higher psychosocial adjustment at the 3-month follow-up. This latter association was further fully mediated by parents' negative affect at the time of treatment, suggesting that the primary reason why parents with higher caregiving self-efficacy showed better subsequent psychosocial adjustment was because this task-specific self-efficacy reduced their negative affect at the time of treatment episodes.

Finally, Penner et al. [42] examined how different parent resources can interact to influence parent responses to treatment episodes and in turn longer-term psychosocial adjustment. At study entry, Penner et al. measured parents' trait anxiety and a resource known as self-distancing. Self-distancing refers to the perspectives people adopt when thinking about stressful events [43]. Some people can adopt a "fly on the wall" perspective about stressful events they may encounter. That is, rather than becoming immersed in the event, these people self-distance and experience the event from the perspective of an observer.

As predicted by previous research [44], self-distancing moderated the impact of parents' trait anxiety on their state anxiety at the time of treatment episodes. Among parents with higher levels of trait anxiety, those higher in self-distancing experienced significantly less anxiety at the time of their children's treatment episodes than parents lower in self-distancing. Further, the exact same effects of self-distancing were found for parents' psychosocial adjustment at the 3-month follow-up.

Finally, Penner et al. examined whether self-distancing influenced the relationship between trait anxiety, negative affect at the time of treatment episodes, and subsequent psychosocial adjustment. Results showed that parents' state anxiety at the time of their children's treatment episodes mediated the relationship between trait anxiety and their psychosocial adjustment at the 3-month follow-up; however, this was true only among parents low in self-distancing. Among high self-distancing parents, parents' state anxiety did not influence later psychosocial adjustment, which suggests that self-distancing may serve a buffering function by minimizing the

effects of state anxiety at treatment episodes on parents' long-term psychological adjustment.

Children's resources

Consistent with other researchers [13,16,27,45], our model posits that the resources children bring to the cancer experience will affect their own and their parents' psychosocial adjustment. However, our model, consistent with our focus on treatment episodes, also proposes that children's responses to treatment episodes mitigate this relationship.

Premise four: children's personal resources influence parent responses to treatment episodes

Almost all models of how families adjust to pediatric cancer assume some level of interdependent relationship between parents' resources and those of their children. However, other models largely focus on how parents' resources affect their children. In both projects, we conducted studies on how children's resources might affect parents' responses to treatments.

A study conducted by Harper et al. [46] in Project 1 examined how children's adaptive temperaments [47] and ego-resilience—the ability to bounce back from a stressful experience [48]—affected parents' responses to treatment episodes. The parents of children with more adaptive temperaments and higher resilience were more likely than other parents to display positive affective responses with their child (i.e., more empathic concern, less state anxiety) immediately before a treatment episode. More positive affective responses by parents were, in turn, associated with lower ratings of child pain and/or distress at the time of treatment. A mediational analysis further showed that parents' affective responses mediated the relationship between children's resilience and their pain and/or distress in response to treatment episodes.

In Project 2, Menke et al. [49] also found that children's resources assessed at study entry predicted parents' state anxiety at the time of the treatment. More specifically, children's resilience was associated with less state anxiety among parents at the time of treatment episodes, whereas, higher levels of emotional and behavioral problems in children were associated with higher parent state anxiety. Consistent with other studies (e.g., [50]), parents' state anxiety was positively associated with children's distress in response to treatment episodes.

Premise five: children's resources influence their longer-term psychosocial adjustment

As already noted, there is consensus that the resources children bring to the cancer experience affect their longer-term psychosocial adjustment. As we discuss later, our own research supports and extends this conclusion.

At study entry in Project 2, we assessed children's levels of "effortful control" and resilience. Effortful control is the ability of child to voluntarily focus and shift attention, inhibit or initiate behaviors, and develop and modify intentional behavior [47,51]. In the cancer context, the ability to modulate negative emotions (e.g., discomfort, fear, and frustration) can help children successfully respond to stressful situations [52,53]. Effortful control is considered by developmental researchers (e.g., [53,54]) to be a central part of a child's temperament and a precursor to other child resources such as resilience [52]. In fact, it is generally agreed that the effects of effortful control on children's general adjustment are mediated by their resilience.

To explore the effects of these child resources in the pediatric cancer context, Harper et al. [55] examined how children's effortful control and resilience assessed at study entry was associated with their subsequent quality of life. Consistent with the literature [52], Harper et al. found that the impact of children's effortful control on their quality of life at the 3-month follow-up was not direct but rather was mediated by children's level of resilience. Children who had higher levels of effortful control and higher levels of resilience had higher quality of life at follow-up.

Premise six: children's resources indirectly influence their longer-term psychosocial adjustment through their responses to treatment episodes

The final premise of the model posits that children's responses to treatment episodes mediate the relationship between their personal resources and their subsequent psychosocial adjustment. Although there is research with healthy children to suggest that this premise is plausible, our work is the first to explore this relationship in pediatric cancer patients.

In Project 2, Trentacosta et al. [24] conducted a longitudinal study that examined whether the relationship between effortful control, resilience, and quality of life was mediated by children's responses to treatment episodes. On the basis of earlier work [45,46], Trentacosta et al. focused on attentional control—a specific facet of effortful control that seemed directly relevant to children's responses to stressful treatment episodes. Attentional control is the capacity to shift and focus one's attention and has been associated with lower levels of anxiety and similar responses in healthy children (cf. [45]). Trentacosta et al. examined the association between attentional control assessed at study entry and children's "treatment-related anxiety" at the 3- and 9-month follow-ups. Treatment-related anxiety is a specific aspect of children's cancer-related quality of life that involves anticipatory anxiety specifically about treatment procedures (e.g., injections). As predicted, higher child attentional control was associated with both higher children resilience

and lower child distress during treatment episodes. Both attentional control and resilience were, in turn, related to children's treatment-related anxiety at 3-month follow-up, which was associated with treatment-related anxiety at the 9-month follow-up. Interestingly, follow-up analyses showed that these relationships were more applicable to boys than girls. We have not yet determined the reason for this gender difference. However, it is possible there may be gender differences in how attentional control influences children's responses to treatment episodes.

SUMMARY AND IMPLICATIONS

The primary focus of our work has been on understanding individual differences in factors that drive the long-term psychosocial adjustment of children with pediatric cancer and their parents. We share the widely held assumption that the experience of pediatric cancer is a major life stressor for parents and their children. Guided by our individual differences resources model of adjustment and focus on cancer treatment episodes, our core premise is that parent and child personal and social resources can mitigate their psychological responses to repeated painful and invasive treatment episodes, which are an integral part of the cancer experience, and further, that these psychological responses to treatment episodes, can in turn, influence parents and children's long-term psychosocial adjustment. As we have discussed, there is compelling empirical evidence to support the assumptions of our individual differences resources model.

Understanding how the availability of personal and social resources influences coping for parents and children confronting cancer provides a foundation for examining the role of individual differences in resources in future research as causes of variability in responses to treatment episodes and, in turn, psychosocial adjustment for parents and children over time. This research complements existing resources models that examine the contribution of family (e.g., family functioning) and material (e.g., transportation, economic) resources (e.g., [19]).

Our individual differences resources model also has important clinical implications for helping parents and children cope during the pediatric cancer experience. Collectively, our research demonstrates the critical need to enhance parent and child personal and social resources during cancer treatment episodes to promote more positive psychological adjustment over time. For parents, our findings specifically point to the importance of adding personal and social resources (e.g., trait anxiety and depression, caregiving self-efficacy, social support) to risk assessment protocols early in treatment to identify those who may be most at risk for negative psychological responses during their child's treatment, and therefore, longer-term psychological

difficulties. Similarly, our findings support the importance of assessing children's personal resources (e.g., effortful control, resilience) early in treatment to identify those at highest risk for distress during treatment episodes, and in turn, poor long-term quality of life outcomes. Interventions designed to reduce child distress can also have the added benefit of increasing child cooperation, thereby potentially mitigating parents' and children's anticipatory anxiety about treatment episodes over time. Interventions designed to enhance (e.g., parent caregiving self-efficacy, child attentional control) or mitigate (e.g., parent anxiety and depression, child behavioral problems) personal and social resources offer clinicians another avenue through which to improve the psychosocial adjustment for children with pediatric cancer and their parents during treatment and in the life beyond cancer.

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Compliance with Ethical Standards

Conflict of Interest: The authors declare that they have no conflicts of interest.

Ethical Approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent: Informed consent was obtained from all individual participants included in the study.

Welfare of Animals: This article does not contain any studies with animals performed by any of the authors.

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