Temperament, Personality, and Quality of Life in Pediatric Cancer Patients

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Objective  The developmental psychology literature shows that children with higher levels of effortful control (EC) and ego-resilience (ER) display greater social competence and better emotional adjustment. This study examined whether these dispositional attributes contribute to positive quality of life (QOL) in pediatric cancer patients. Method  Participants were 103 pediatric cancer patients (and their parents) who were part of a larger parent study. At study entry, parents reported their own anxiety and depression and their children’s EC and ER. At 3-month follow-up, parents reported children’s QOL. Results  ER was positively correlated with children’s QOL. EC showed a positive indirect effect on QOL through ER. Inclusion of potential correlates of pediatric QOL (e.g., parent neuroticism) did not change these relationships. Conclusions  Temperament and personality play significant roles in pediatric cancer patients’ QOL. Assessing dispositional attributes early in treatment may help identify children at risk for poor QOL during and after treatment.

Key words  dispositional attributes; effortful control; ego-resilience; pediatric cancer; quality of life.

In addition to physical and medical challenges, children with pediatric cancer can also experience psychosocial challenges. One of these is a decline in their quality of life (QOL; e.g., social and emotional impact of disease) (Testa & Simonson, 1996; Tsai et al., 2012; Yagc-Küpeli, Akyüz, Küpeli, & Büyükpamukçu, 2012). Although poor QOL is often assumed to be an inevitable consequence of the pediatric cancer experience, previous research (Patenaude & Kupst, 2005) suggests there is substantial variability in children’s psychosocial responses to cancer and the invasive and stressful treatments children typically receive. This study sought to identify potential sources of this variability.

Many developmental researchers believe that enduring dispositional attributes play an important role in explaining differences in how children respond to stressful events (e.g., poverty, child abuse). Differences in child temperament and personality can influence type of coping strategies used, reactions to a stressful event, and even amount of support elicited from parents (Wachs, 2006; Walco, 2008). Effortful control (EC) and ego-resilience (ER) are two attributes that have been identified as strong influences on children’s positive social and psychological functioning (Hofer, Eisenberg, & Reiser, 2010; Masten, 2001; Philippe, Laventure, Beaulieu-Pelletier, Lecours, & Lekes, 2011).

EC reflects the ability to voluntarily focus and shift attention, inhibit or initiate behaviors, and develop and modify planful behavior (Kochanska, Murray, & Harlan, 2014).
2000; Rothbart, Ahadi, Hershey, & Fisher, 2001). EC is a part of executive functioning (i.e., the meta-cognitive process that regulates and controls other cognitive functions; Posner & Petersen, 1990) and can affect how children, even those in infancy, modulate their emotions and behaviors (Eisenberg et al., 2004; Rothbart, Ahadi, & Evans, 2000). Developmental researchers (Eisenberg et al., 2004; Taylor, Eisenberg, Spinrad, & Widaman, 2013) have argued that the ability to modulate negative emotions (e.g., discomfort, fear, and frustration) in particular can be an advantage in regard to adapting successfully in stressful situations.

Whereas EC is the ability to plan and control attention, behavior, and emotions, ER reflects the degree to which a person can endure and “bounce back” after a stressful experience (Block & Block, 1980; Eisenberg, Fabes, Guthrie, & Reiser, 2000; Hofer et al., 2010). According to Eisenberg et al. (2003), high ER in children is associated with the ability to effectively adapt coping behaviors and problem-solving strategies to changing circumstances; in contrast, low ER is associated with the tendency to perseverate on negative outcomes, become disorganized, and have difficulty recovering from changing and/or stressful situations. In children, ER has been positively associated with self-regulation, and accordingly, with better emotional adjustment and higher social competence (Eisenberg, 2000; Eisenberg et al., 2003, 2004).

Although EC and ER are moderately correlated, previous research suggests EC develops before and predicts children’s subsequent ER (Eisenberg et al., 2003; McAdams & Olson, 2010; Taylor et al., 2013). Further, it appears the effects of EC on children’s psychosocial adjustment are mediated through ER (Cumberland-Li, Eisenberg, & Reiser, 2004; Eisenberg et al., 2004; Taylor et al., 2013). For example, ER has been shown to mediate the relationship between EC and children’s agreeableness (higher EC and ER are associated with greater agreeableness), internalizing problems (higher EC and ER are associated with fewer problems), and social competence (higher EC and ER are associated with higher competence) (Cumberland-Li et al., 2004; Eisenberg et al., 2003, 2004; Spinrad, Eisenberg, & Gaertner, 2007).

These findings suggest EC and ER may have important implications for children’s ability to adjust to cancer treatment. First, it is possible that higher EC directly translates into a greater ability to regulate emotions during difficult procedures, more effective planning of behavior to minimize distress, and better developed skills to elicit support from parents and/or medical staff. In a study of children undergoing a diagnostic procedure (i.e., voiding cystourethrogram), child EC (as reported by parents) was positively associated with observer ratings of effective coping behaviors (e.g., self-distraction) during the procedure (Salmon & Pereira, 2002).

Second, ER may serve a complementary function to EC. Children with higher ER may display greater flexibility in responding to the changing and unpredictable aspects of treatment, disengaging from and redirecting ineffective behavior, and persevering despite extended and ongoing treatments. In a previous study (Harper, Penner, Peterson, Albrecht, & Taub, 2012), children’s ER was negatively associated with parent, child, nurse, and observer ratings of children’s distress (e.g., crying, screaming) during cancer treatment procedures, supporting the premise that higher ER is associated with better modulation and regulation of emotions in pediatric cancer patients.

In summary, previous research suggests EC and ER may each result in more positive social and emotional functioning, and therefore better QOL outcomes, in pediatric cancer patients. Moreover, as discussed earlier, ER may mediate the association between EC and QOL.

**Current Study**

While there have been a few studies of dispositional attributes (e.g., neuroticism, conscientious, defensiveness) in the context of children coping with pediatric cancer (De Clercq, De Fruyt, Koot, & Benoit, 2004; Phipps, Larson, Long, & Rai, 2006), there are no previous studies of the impact of EC and ER on QOL in this population. The present study is intended to extend the research literature in both developmental psychology and pediatric cancer by empirically determining if dispositional attributes (EC and ER) that have been studied primarily in the context of social-emotional interactions among healthy children are also relevant to understanding how children cope with life-threatening diseases. The study had two aims. The first aim was to examine the bivariate associations between EC, ER, and QOL in pediatric cancer patients. We predicted that higher EC and ER would both be associated with better QOL (after controlling for relevant covariates). The second aim was to examine the mediational relationship among EC, ER, and QOL. We predicted that ER would mediate the effects of EC on QOL.

**Method**

**Overview**

This study is part of a larger, ongoing longitudinal study that began in 2009 at two major children’s hospitals in the United States. The primary aim of the parent study is to identify personal, interpersonal, and environmental factors
that place families at risk for psychosocial problems due to the stress of cancer-related treatment procedures. In the parent study, there are three phases of data collection: (1) Initial assessment: Adult primary caregivers (henceforth “parents”) complete questionnaires about themselves and their children at the time of entry into the study. (2) Treatment assessments: Immediately before and after up to three of their children’s treatment-related procedures (port starts, bone marrow aspirations, or lumbar punctures), parents complete questions about their thoughts and feelings. Treatments are video recorded, and child distress and cooperation during procedures are rated by multiple raters. The treatment assessments are separated by 2 or more weeks, depending on the child’s medical responses to treatments. (3) Follow-up assessment: 3 months after the last treatment assessment, parents complete a set of questionnaires about themselves and their children. This follow-up assessment typically occurs 5–7 months after families enter the study. The study protocol was reviewed and approved by institutional review boards at the two hospitals.

Families were eligible for the study if their child was between 3 and 12 years old, in active treatment, and had no history of cancer. A clinical trial coordinator and medical staff identified eligible children. Medical staff initially approached families about their interest in the study. Research staff met with interested parents and obtained informed consent, and when appropriate, verbal assent from children. Parents received $15 gift cards for the initial assessment and each video-recorded procedure and $20 gift cards for the 3-month follow-up. Children received $10 gift cards for each of these data collection points. Eighty-nine percent \((n = 133)\) of families approached for the larger study agreed to participate. For the study reported here, participants were 103 families (82%) who had completed the initial assessment, treatment assessments for at least one procedure, and the 3-month follow-up assessment. Parents and children in this study did not significantly differ from those in the larger group on any of the demographic or clinical characteristics measured.

**Participants**

Parent and child demographic characteristics are shown in Table I. The majority of children were diagnosed with acute lymphoblastic leukemia (81%), followed by Wilms’ tumors (4%), non-Hodgkin’s lymphoma (4%), lymphoma (2%), astrocytoma (2%), rhabdomyosarcoma (2%), and other (e.g., Ewing’s sarcoma, osteosarcoma, unspecified; 5%). At study entry, the average time children had been in treatment was 13.73 weeks (standard deviation \([SD] = 14.73; \text{range} = 4–74\) weeks). In the 2 months before study entry, children had undergone 3.65 lumbar punctures \((SD = 2.57; \text{range} = 0–12)\), 1.90 bone marrow aspirations \((SD = 1.62; \text{range} = 0–7)\), and 7.12 port-start procedures \((SD = 7.11; \text{range} = 0–30)\).

Forty-eight percent of the video-recorded procedures were port-starts for chemotherapy infusion and used topical anesthesia; 52% were lumbar punctures/bone marrow aspirations and used general anesthesia. At the 3-month follow-up assessment, the average amount of time children had been in treatment (i.e., previous treatment plus treatment during study) was 10.57 months \((SD = 4.14)\). Ninety percent of children were still in treatment at the 3-month assessment.

**Measures**

**Initial Assessment—Demographics, Clinical Characteristics, and Dispositional Attributes**

At study entry, parents completed an initial assessment. They provided information about their own and their child’s demographics and their child’s clinical history (e.g., type of cancer, time since diagnosis, number of procedures in the past 2 months). Parents also completed
measures of their own and their child’s dispositional attributes as described in the following text.

Effortful Control
EC was assessed using age-appropriate temperament scales developed by Rothbart and colleagues (c.f., Putnam, Ellis, & Rothbart, 2001; Rothbart, 2006; Rothbart et al., 2001). Although each of the scales produces a construct-valid measure of EC, one scale uses different subscales to assess EC. Specifically, the Child Behavior Questionnaire (Rothbart et al., 2001) (ages 3–6) and the Temperament in Middle Childhood Questionnaire Version 3 (Simonds & Rothbart, 2004) (ages 7–9) use the Attention, Inhibitory Control, Low Intensity Pleasure, and Perceptual Sensitivity subscales. However, the Early Adolescent Temperament Questionnaire Revised (Ellis & Rothbart, 1999) (ages 10–12) uses the Attention, Activation Control, and Inhibitory Control subscales to measure EC. Each subscale contains 5–10 items with a 5-point scale (ranging from 1 = “almost always untrue of your child” to 5 = “almost always true of your child”). Overall EC is operationalized as the average of the average score on each of the relevant subscales. In this study, coefficient alphas (α) for overall EC were: .87 (ages 3–6), .93 (ages 7–9), and .79 (ages 10–12); the α for the subscales used to produce overall EC scores were all ≥.63, with most >.75.

Based on previous work (Harper et al., 2012), we had concerns about enrolling sufficient numbers of children to conduct meaningful analyses with sufficient power within the different age-groups. We consulted with the scale authors about the strategy of combining EC scores from the three scales into one age-standardized overall distribution. We followed this strategy of using a single age-standardized distribution of EC scores.

Ego-Resilience
Parents reported on their child’s ER using an 11-item version of a questionnaire adapted by Eisenberg and colleagues (Eisenberg et al., 2003) from Block and Block’s (Block & Block, 1980) ER Q-sort. Sample items include “can bounce back or recover after a stressful or bad experience” and “can talk about unpleasant things that have happened.” According to Eisenberg et al. (2004), the ER scale measures the extent to which one manages and adapts to stressful situations. ER items were rated using the same 5-point Likert scale used with EC items. In this sample, α across the three age-groups ranged from .64 to .71.

Initial Assessment—Covariates
The following measures were also included in the initial assessment because previous research suggests they may be associated with psychosocial outcomes in pediatric cancer patients and survivors (Klassen, Anthony, Khan, Sung, & Klassen, 2011; Patenaude & Kupst, 2005; Varni, Burwinkle, & Katz, 2004; Zebrack et al., 2012) and thus are potential covariates in the analyses.

Time in Treatment
At study entry, parents reported how long their child had been in treatment. This measure was combined with the child’s actual time in this study (i.e., from the initial assessment to the 3-month follow-up) to create a “time in treatment” variable.

Socioeconomic Status
Household income and parent education were measured at the initial assessment; they were moderately correlated (r = .44, p < .001). Each variable was standardized and averaged to create a relative socioeconomic status index, which was considered as a covariate.

Parent Neuroticism
To assess parents’ psychological functioning, parent trait anxiety and depression were measured at the initial assessment. Parent’s trait anxiety was assessed with the 20-item self-report trait subscale of the State-Trait Anxiety Inventory (Spielberger, 1977). Extensive research supports the measure’s construct validity (Spielberger, Sydeman, Owen, & Marsh, 1999). The α in this sample was .89. Depression was measured with the 20-item Center for Epidemiologic Studies—Depression Scale (Radloff, 1977). Extensive research supports its reliability and construct validity (c.f., Knight, Williams, McGee, & Olaman, 1997). Coefficient α in this sample was .87. Parents’ trait anxiety and depression were highly correlated (r = .66, p < .0001). Therefore, the variables were combined into a single index of “parent neuroticism” by standardizing and averaging scores on the two measures.

Follow-up Assessment
Quality of Life
At the 3-month follow-up assessment, parents completed age-appropriate versions of the PedsQL™ Cancer Module. Subscales of the Cancer Module have demonstrated good construct validity and high coefficient alphas (Varni,
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Burwinkle, Katz, Meeske, & Dickinson, 2002). The module assesses cancer procedure- and treatment-related QOL problems in eight areas (communication, cognitive problems, nausea, procedure anxiety, pain and hurt, perceived physical appearance, treatment anxiety, and worry) (Varni et al., 2002, 2004). Items are scored on a 0–100 scale, with higher scores indicating better QOL. Subscale scores in the present study ranged from 56 (procedure anxiety) to 88 (worry). The alphas for the subscales in this study ranged from .74 to .92. Individual QOL scale scores and published normed comparison scores are available in a supplemental table.

Data Preparation and Analysis Plan

Values for sporadic missing data (≤1% of all items) were imputed using substitution of sample mean. Data were inspected for outliers; none were identified. To create equivalent scores on age-appropriate scales, EC, ER, and QOL scores were standardized within each of the three agegroups and combined to create a single distribution of scores for each variable. Subsequent correlations between standardized age variables and child age were not significant, indicating that age standardization adequately controlled for any effect of child age in the analyses.

Our first hypothesis (Aim 1) was that higher EC and ER would both be associated with better QOL. Before directly testing this hypothesis, we first examined which, if any, potential covariates should be included in the analysis of associations between EC, ER, and QOL. Partial correlations using significant covariates as controls were used to test the first hypothesis that children’s EC and ER are each directly related to QOL.

Our second hypothesis (Aim 2) was that ER would mediate the relationship between EC and QOL. To test this hypothesis, we used Mplus Version 7.0 to test a path model in which EC was the predictor, ER was the mediator, and QOL was the outcome. Multiple fit indices were examined to test the model (described in the Results section). The indirect effects (i.e., whether the impact of EC on QOL was significantly mediated by ER) were calculated using the delta method (MacKinnon, 2008). Appropriate covariates were included in the path model.

2 One item from the cognitive problems scale (i.e., trouble writing school papers or reports) was inadvertently omitted. Despite this, the coefficient alpha for this subscale was equivalent to that of the other subscales.

3 The delta method uses path coefficients and standard errors for the paths between the independent variable and the mediator and between the mediator and the dependent variable to generate asymptotic confidence intervals for indirect effects similar to the Sobel test.

Results

Direct Associations (Aim 1)

Our first hypothesis was that higher EC and higher ER would both be associated with better QOL. First, we conducted bivariate associations to assess for potential covariates. Time in treatment and socioeconomic status were not reliably associated with children’s EC, ER, or QOL subscales, all ps > .05. In contrast, higher levels of parent neuroticism were significantly associated with lower EC and ER and lower QOL (on six of eight subscales). Therefore, we controlled for parent neuroticism in all subsequent analyses.

The main test of the hypothesis was partial correlations between EC, ER, and QOL subscales (controlling for parent neuroticism). As shown in Table II, EC was significantly and positively associated with QOL for cognitive problems (i.e., higher EC, fewer cognitive problems); EC was unrelated to any other QOL subscales. In contrast, ER showed significant and positive partial correlations with five QOL subscales; the higher the child’s ER, the higher his/her QOL.

Mediational Effects (Aim 2)

Our second hypothesis was that ER would mediate the effects of EC on QOL (Figure 1). To reduce the probability of type I errors, the model simultaneously tested the relationship with all eight QOL subscales. The model also controlled for parent neuroticism, and the QOL scales were allowed to correlate with each other. Direct paths from EC to QOL scales were not included because, as already shown, EC was generally not correlated with QOL.

The χ² test of model fit was nonsignificant, χ² (8) = 11.51, p > .05, which indicates a good fit to the data. The relative fit indices were root mean square error of approximation = 0.062, comparative fit index = 0.99, and Tucker–Lewis Index = 0.935. All values approximated or exceeded accepted parameters for concluding that a path model provides a good fit for the data (Hu & Bentler, 1999). The variance accounted for when predicting each QOL subscale was: Communication 18%, Cognitive Problems 23%, Nausea 11%, Procedural Anxiety 7%, Pain and Hurt 4%, Perceived Physical Appearance 6%, Treatment Anxiety 16%, and Worry 18%. As shown in Figure 1, the direct path from EC to
ER was significant as were five of the eight paths from ER to QOL, which is consistent with the bivariate correlations.

Next, we examined whether there were significant indirect effects of EC on QOL as mediated by ER. EC was significantly indirectly associated (through ER) with Communication ($z = 2.87, p < .01$), Cognitive Problems ($z = 3.19, p < .01$), Nausea ($z = 2.56, p < .05$), Perceived Physical Appearance ($z = 2.03, p < .05$), and Treatment Anxiety ($z = 3.17, p < .01$). EC did not have significant indirect effects on the remaining three QOL subscales. Overall, the model provides relatively strong support for the hypothesis that EC predicts QOL indirectly through ER.

**Discussion**

The primary purpose of this study was to examine how the temperament and personality of pediatric cancer patients, and specifically EC and ER, might be related to their QOL.
The developmental psychology literature suggests that children who can regulate and modulate their emotional responses to stressful events (i.e., are high on EC) are better able to cope with and bounce back from their effects (i.e., are high on ER; Block & Block, 1980; Eisenberg et al., 2004; Taylor et al., 2013). Given that treatment procedures are often stressful, we proposed that EC and ER would be related to QOL among pediatric cancer patients.

Our first hypothesis (Aim 1) was that EC and ER would be positively associated with QOL. Higher child ER was associated with higher QOL in five areas, but EC only predicted one of the eight aspects of QOL (cognitive problems). Thus, the first hypothesis was only partially supported. Our second hypothesis (Aim 2) was that ER would mediate the effects of EC on QOL in pediatric cancer patients. We found relatively strong support for this hypothesis; there were significant indirect paths to five of the eight areas of pediatric cancer QOL. That is, children with higher EC were more likely to have higher ER (i.e., be better able to adapt and cope with their cancer treatments), and as a result, have higher QOL. These findings are consistent with and extend the findings of developmental studies of EC and ER conducted with noncancer populations (Cumberland-Li et al., 2004; Eisenberg et al., 2003, 2004).

Although the findings are relatively straightforward, two questions remain. First, why did EC only correlate with QOL for cognitive problems? One possible explanation is that the cognitive problems’ construct, as operationalized for the assessment of QOL among pediatric cancer patients (Varni et al., 2002), is related to some major components and correlates of EC. For example, two items of this QOL subscale assess difficulty in paying attention and difficulty remembering what is being read. These items are consistent with the ability to voluntarily focus and shift attention (Rothbart et al., 2001), which are major components of EC. Thus, there is likely a direct connection between EC and the QOL subscale that is specific to the cognitive problems that some pediatric cancer patients face.

The second question is related to the mediation of EC. Although ER accounted for an indirect association between EC and five aspects of QOL, why were there no significant indirect paths to pain and hurt, procedure anxiety, and worry? The signs of these paths were also positive, and therefore, consistent with the other paths. Nonetheless, these null findings merit discussion. Two potential explanations can be offered. First, the aspects of QOL unrelated to ER seem to represent challenges of treatment that are more immediate and tangible for children (e.g., pain/hurt, procedure anxiety); in contrast, most of the aspects of QOL significantly related to ER may represent challenges that are more diffuse and broad in nature (e.g., communication, cognitive problems, perceived physical appearance). ER may help children adapt to broader challenges over time, but be less relevant to treatment-related challenges that are more acute or specific in nature. A second related explanation is that perhaps pain/hurt, procedure anxiety, and worry are normative responses in this population. As such, these aspects of QOL may be problematic for all children regardless of their level of ER. In contrast, other challenges (e.g., communication, cognitive problems, perceived appearance) may be somewhat more removed from the treatment context and thus show variability based on child ER. Clearly, more research is needed to better understand how EC and ER influence specific aspects of children’s adaptation to pediatric cancer.

**Clinical Implications**

Our findings support the importance of assessing children’s dispositional attributes early in treatment to identify those at highest risk for possible poor QOL outcomes. Interventions designed to increase children’s awareness and management of their affect and improve their executive functioning skills (e.g., inhibitory control, cognitive flexibility) have the potential to facilitate more adaptive responses to stressful treatment procedures (Diamond, Barnett, Thomas, & Munro, 2007; Eisenberg, Spinrad, & Eggun, 2010; Hofer et al., 2010). Children who can regulate their emotion (identify physiological cues, label affect), distract themselves (guided imagery, deep breathing), and increase their self-efficacy (positive self-statements, mastery experiences) are more likely to cope better with stressful situations and therefore have greater ER (Cohen, Blount, & Panopoulos, 1997; Masten, 2001). Further, noting the role of parenting style in children’s level of EC and ER (Eisenberg et al., 2005; Taylor et al., 2013), interventions that consider parent attributes and focus on improving the quality of parent-child interactions (e.g., increasing warmth and decreasing intrusiveness) might provide added benefit in helping children to develop better EC, and by extension, better ER.

**Limitations**

Although these results represent important findings about the dispositional attributes of pediatric cancer patients and their QOL, they should be interpreted in light of several considerations. First, having parents report on their children’s dispositional attributes and their child’s QOL introduces common method variance (Doty, 1998), which may have artificially increased the strength of some relationships. Previous research does find convergence between parent reports of EC and observations of children’s EC-
related behaviors (Kochanska et al., 2000). Nonetheless, future research might benefit from examining the relationship between child dispositional attributes and observed child behaviors during procedures. This knowledge could lead to a better understanding of how EC and ER might translate into specific coping strategies during treatment, and ultimately, affect QOL over time. Second, like most pediatric cancer studies, the sample size was not large enough to conduct separate subgroup analyses. For example, although we did control for child age (by standardizing scores), we were not able to conduct separate analyses for different age-groups to determine if the findings replicated across each age-group. Although there is no previous evidence to suggest that gender would moderate the findings, it would have been desirable if the sample size permitted separate analyses for boys and girls. Third, although we examined a number of different covariates, there may still be other factors that might affect the relationship among EC, ER, and QOL. For example, children’s physical limitations (Testa & Simonson, 1996) and how well they physically tolerate treatments are likely important variables to consider in future research on the predictors of QOL. Finally, QOL was only assessed after children began treatment. Despite the relatively strong support for the path model, our conclusions about the impact of dispositional attributes on pediatric cancer QOL would have been stronger if we had been able to control for QOL before cancer diagnosis and/or treatments. Along the same lines, our study only examined short-term QOL outcomes. Some researchers (Noll & Kupst, 2007) who focus on longer-term outcomes argue that pediatric cancer survivors, as a group, are much “harder” than generally perceived. We believe that enduring dispositions such as EC and ER are important components of hardiness and may also explain why many pediatric cancer survivors adjust well despite the stresses of the disease. Thus, we would encourage researchers interested in successful adaptation to pediatric cancer to include measures of EC and ER in studies of cancer survivors. It may help explain how variables that affect coping strategies during treatments translate into successful long-term survivorship.

### Conclusion

These limitations notwithstanding, we believe our findings contribute to both the theoretical and clinical literature. Our findings clearly demonstrate that pediatric cancer patients’ temperament and personality play significant roles in individual differences in QOL. Early assessment of child EC and ER can provide the basis for interventions designed to increase adaptive responses to treatment, and therefore, positively affect long-term psychosocial outcomes (Kazak et al., 1997; Stuber et al., 1997). Understanding the contribution of children’s dispositional attributes to individual differences in QOL can provide professionals who work with pediatric cancer patients another avenue for anticipating, and intervening with, children who are at-risk for poor QOL outcomes.

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### Supplementary Data

Supplementary data can be found at: http://www.jpepsy.oxfordjournals.org/

### Conflicts of interest

None declared.

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