Published in final edited form as:

Psychooncology. 2009 September ; 18(9): 992–1002. doi:10.1002/pon.1496.

Symptoms of post-traumatic stress in children with cancer: Does personality trump health status?

Sean Phipps, Nichole Jurbergs, and Alanna Long

Division of Behavioral Medicine, St. Jude Children's Research Hospital, Memphis, TN

Abstract

Objective—To examine symptoms of posttraumatic stress (PTSS) in children as a function of health status (cancer vs. healthy) and adaptive style.

Methods—Children with cancer (N = 199) and healthy acquaintance control children (N = 108) completed a standardized measure of posttraumatic stress symptoms. Measures of trait anxiety and defensiveness were obtained to characterize the adaptive style of respondents.

Results—Within the cancer group, levels of PTSS did not differ as a function of diagnosis, time since diagnosis, or whether children were on or off treatment. The only cancer-related factor associated with elevated PTSS was a history or relapse or recurrence. Children with cancer reported significantly fewer symptoms of reexperiencing/intrusion than did healthy children, but also reported greater symptoms of numbing/avoidance. However, there were no differences in total PTSS scores between children with cancer and controls. In contrast, a significant effect of adaptive style on PTSS was observed, with children identified as repressors or low anxious obtaining lower scores on total PTSS and all PTSS subscales than high anxious children, regardless of health status. Estimates of the number of children meeting criteria for PTSD did not differ between children with cancer and healthy children, and were low in both groups.

Conclusions—Children with cancer report levels of PTSS that are no higher than their healthy peers. Personality factors such as adaptive style are a much more salient determinant of PTSS than is health history. These findings raise further questions regarding the value of a traumatic stress model for understanding the experiences of children with cancer.

Keywords

childhood cancer; posttraumatic stress; adaptive style; anxiety

The view of childhood cancer as a traumatic event, and the consequent application of a traumatic stress model towards understanding the experiences of children with cancer, has become a major focus of research in pediatric oncology over the past decade [1]. Many studies have been reported on the incidence of post-traumatic stress disorder (PTSD) or subclinical levels of post-traumatic stress symptoms (PTSS) in children with cancer [2-9] as well as adolescent and young adult survivors of childhood cancer [10-14]. Despite this traumatic stress focus, most studies have not shown a significant elevation in levels of PTSD in the pediatric cancer population. This has led researchers to focus more on subclinical levels of PTSS, suggesting that while full spectrum PTSD may be relatively rare, many children continue to demonstrate concerning levels of post-traumatic symptoms [1,5,15,16]. Yet, even when the focus is limited to PTSS, most studies have failed to show higher levels of PTSS in children with cancer relative to healthy children [2,3,14,17].

Although a number of developmental considerations (e.g., slower and less complete encoding of the traumatic event, lack of knowledge regarding implications of the traumatic event) suggest that children might be less susceptible to PTSD, the available literature actually indicates higher prevalence rates of PTSD in children when compared to adults exposed to comparable trauma [18,19]. It may be that other developmental factors, such as less mature processes of emotional regulation and thus a reduced ability to process and resolve traumatic experiences, serve to increase the likelihood of problematic post-trauma responses [19]. The DSM-IV does not provide distinct diagnostic criteria for children, although it suggests that some symptoms may manifest differently (e.g., repetitive play, in lieu of intrusive thoughts or flashbacks). Nevertheless, in regards to children with cancer, not only do they report levels of PTSS similar to those reported by healthy children, they report lower levels of PTSS than individuals who experienced other stressful events during childhood, such as natural disasters, major accidents, serious physical injury, and death of a parent [18,20-24].

The low levels of PTSS in children with cancer are even more curious when one considers that the context of the cancer experience involves several factors that could artifactually inflate the endorsement of symptoms consistent with those found on PTSS inventories. For example, with regard to the triad of symptom domains associated with PTSD, re-experiencing/intrusion symptoms (Criteria B) normally defined in terms of thoughts about past events, may be present, but reflect realistic fears about one's current health and invasive treatments, or future oriented fears about the possibility of relapse [25]. Likewise, some of the Criteria C symptoms (numbing/avoidance), particularly those related to diminished recall or distorted encoding (e.g., 'I have trouble remembering parts of what happened'), might reflect the acute or long-term cognitive effects of treatment. Finally, several of the Criteria D symptoms of increased arousal, which include items involving disturbances in sleep, concentration, and irritability, are also common side effects of cancer therapies. Thus many of the disturbed psychological processes associated with PTSD are confounded with commonly observed effects of cancer and/or its' treatment [1,19]. Moreover, given that cancer and its' treatment is an ongoing process involving repeated stressors, one might expect that some symptoms could be endorsed that reflect acute, rather than post-traumatic stress reactions. From this perspective, the low levels of PTSS typically observed in childhood cancer populations are all the more remarkable.

Why are levels of PTSS in the cancer population so low? Certainly, one possible explanation is that the pediatric cancer experience is not as traumatic as many have suggested. A recent study indicates that less than 10% of childhood cancer survivors report a cancer-related trauma [26]. By extension, the tendency to develop PTSD may be more reflective of the adjustment history and personality functioning of the child than it is of the precipitating event, a view put forth by several PTSD theorists [25,27]. From this perspective, one might suspect that the low levels of PTSS are related to differences in personality characteristics between children with cancer and their healthy peers. For instance, a number of studies have found lower levels of trait anxiety in pediatric cancer patients relative to their healthy peers [28-30]. Studies have also shown that within pediatric cancer populations, PTSS is higher in those with high trait anxiety as compared to those with low trait anxiety [1,2,10,31].

The finding of low trait anxiety in children with cancer has been conceptualized more specifically as part of the construct of adaptive style [32,33]. The adaptive style paradigm involves the simultaneous use of two measures; a measure of subjective distress (e.g., trait anxiety) and a measure of defensiveness, typically assessed using social desirability scales [32,33]. Cutoffs are made on these measures to assign respondents into 4 categories, labeled as high anxious, low anxious, defensive high anxious, and repressor. The repressor cell has been the primary focus of study. Repressors tend to present themselves in a favorable light,

and thus to look good on most self-report measures. However, research has shown that repressive adaptation is not merely the indication of a response style, but reflects a substantive personality variable [33-35]. Repressors genuinely think of themselves as well-adjusted, self-controlled, and content, and organize their behavior to protect that self-image.

A higher incidence of repressive adaptive style has been consistently found in childhood cancer patients compared to healthy children [28-30,36]. The genesis of cancer-control differences in adaptive style is not understood. It may reflect a contingent response to the stress of the cancer diagnosis, and there is some evidence to support this in the context of adult cancer [37,38]. However, evidence also suggests that adaptive style reflects a stable, enduring personality variable [33], and in children with cancer, adaptive style measures obtained shortly after diagnosis remain stable across the first year following diagnosis [30]. One study examining PTSS in childhood cancer patients and survivors has shown adaptive style to be a significant determinant of self-reported levels of PTSS [31]. Children identified as low anxious or repressors reported lower levels of PTSS than high anxious children. The authors hypothesized that the generally low levels of PTSS found in children with cancer [2,3,17] might be explained, in part, by adaptive style differences between children with cancer and their healthy peers. However, this study could not directly address the effect of adaptive style on cancer-control differences in PTSS, because the study design did not include a comparison group of healthy children.

The current study was designed to extend the work of Phipps et al.[31] by examining the relationship of PTSS to adaptive style in children with cancer and a healthy comparison group. A cross-sectional sample of patients and survivors of pediatric cancer provided self-report measure of PTSS and adaptive style, and nominated acquaintances among their healthy peer group to serve as controls. Based on prior literature, we hypothesized three findings: 1) First we predicted that there would be no differences in levels of PTSS between children with cancer and a healthy peer comparison group. 2) Secondly, we predicted adaptive style would be a significant determinant of PTSS, with children identified as low anxious and repressor reporting lower levels of PTSS than the high anxious participants. 3) Following tautologically from 1 and 2, we predicted that adaptive style would be a much more salient determinant of PTSS outcomes than child health status or health history (cancer vs. control).

Methods

Participants

Cancer group—Children with cancer were recruited from outpatient clinics at a major pediatric oncology center. Eligible children were between the ages of 7-18 with a diagnosis of malignancy, English speaking, and no known cognitive deficits. Patients who were at least one month from diagnosis were eligible, with no upper limit to time elapsed since diagnosis. Sampling procedures were designed to obtain a broad cross-section of patients in terms of diagnosis, and time-elapsed since diagnosis. Stratified sampling was used to obtain equal numbers of patients in 4 time-from diagnosis groups: 1-6 months; 6-18 months, 18 months to 5 years; and > 5 years. Out of the 339 patients we approached, 249 (73%) were initially enrolled. Of these, 35 returned incomplete information and 15 withdrew before completing all materials, leaving a sample of 199 cancer patients. Of these, 71 patients (36%) were in active treatment and 128 (64%) were off treatment at the time of their participation in the study. The diagnostic breakdown of the cancer group is generally representative of the population served by the institution. A total of 30 patients (15.1%) had experienced a relapse.

Control group—Children in the control group were recruited through an “acquaintance control” methodology. Cancer patients recruited to the study were asked to identify up to three friends from their home neighborhood or school who were within ± 2 years of the age of the patient. Data from those agreeing to participate were obtained through the mail, with telephone assistance where necessary. Using this procedure, 367 potential control participants were identified by cancer patients. Of these 367 potential control children, 8 refused participation, 5 proved ineligible, and 57 had insufficient or incorrect contact information. Survey packets were sent to the remaining 297 potential control participants and complete information was received back from 108 (36%).

Table 1 displays the medical and demographic information for the cancer and healthy control groups. Although the acquaintance control method was used in an attempt to obtain a close demographic match, a few significant differences among the cancer and control groups emerged. The groups were comparable on gender and age, but differed by race, $\chi^2(2) = 11.72, p = .003$, with significantly more African American children in the cancer group than in the control group. The groups also differed significantly in socioeconomic status (SES), $\chi^2(2) = 13.65, p = .001$, using the Barratt Simplified Measure of Social Status [39], an updated adaptation of the Hollingshead index [40], with significantly more SES group I and II, and fewer SES group IV and V children in the healthy control group than in the cancer group.

Measures

UCLA PTSD Index for DSM-IV (PTSDI)—This measure was originally designed to assess DSM-III-R PTSD criteria and has been revised for the DSM-IV [41-43]. The PTSDI has been widely used to assess childhood trauma following a variety of acute stressors and traumatic events including cancer. Excellent internal reliability and test-retest reliability have been reported [44]. In the current study, children in the cancer group responded to items in reference to cancer as the stressor. Participants in the control group identified what they consider to be the most major stressor they have experienced, and responded to items based on it. The 22-items are grouped into DSM-IV criteria clusters B (Re-experiencing/Intrusion), C (Avoidance and/or Numbing), and D (Arousal). In the current study, the PTSDI total score was found to have high internal consistency for the total score ($\alpha = .908$) and for clusters B ($\alpha = .840$) and C ($\alpha = .819$), and moderate consistency for cluster D ($\alpha = .667$).

Stressors that the healthy control children reported in reference to on the PTSDI fell into six general categories. Of the 108 control group children, 20 (18.5%) indicated death of a relative, friend or pet; 15 (13.8%) indicated illness of a friend or relative as their most major stressor; 11 (10.2%) reported either their parents' divorce or moving; 8 (7.4%) stated that an accident or emergency room visit was the most traumatic stressor they had experienced; 7 (6.5%) indicated a natural disaster; 28 (25.3%) indicated another less common stressor; and 19 (17.6%) did not report a specific stressor.

Children's Social Desirability Scale (CSD)—A 25-item version of the CSD [45], which was modeled after the Marlowe-Crowne adult measure [46] was utilized. Items represent behaviors and attitudes that are socially desirable but improbable (e.g., “I always do as I am told,” “I never tell a lie”) and are presented in yes/no question format. The reliability and validity of this instrument are well established. The CSD is used as the measure of defensiveness in the adaptive style paradigm. The CSD was found to have high internal consistency for the total sample ($\alpha = .823$).

State-Trait Anxiety Inventory for Children (STAIC)—The 20-item trait scale of the STAIC was used to assess dispositional anxiety [47]. Children respond to each anxiety-related statement on a 3-point scale (hardly ever, sometimes, often). This scale is widely-used and empirically supported, with reliability and validity well established. The STAIC is used as the measure of subjective distress in the adaptive style paradigm. The STAIC was found to have high internal consistency for the current total sample ($\alpha = .882$.)

Procedure

All participants completed this battery of self-report measures as part of a larger study assessing additional psychosocial outcomes. Questionnaire packets were administered to cancer patients during clinic visits after informed consent and assent were obtained. The same packets were mailed to participants in the control group after informed consent was obtained over the phone. Adaptive style was categorized in a manner similar to that used by Weinberger, et al.[32] and Phipps and Srivastava [29]. An age-corrected upper quartile split on the CSD and a median split on the STAIC were taken to create four groups: repressor (low STAIC/high CSD), low anxious (low STAIC/low CSD), high anxious (high STAIC/low CSD), and defensive high anxious (high STAIC/high CSD). Significant cancer-control differences in adaptive style were seen [χ^2 (df 3, $N = 307$) = 8.22, $p < .05$]. As anticipated, there was a higher percentage of repressors among children with cancer (24.1%) than controls (15.7%), although this difference is smaller than observed in past studies.

Results

Effects of Demographic and Medical Factors on Child PTSS

Across both cancer and control groups, there were no significant relationships found between the demographic factors of child age, race, gender, or SES and any of the PTSDI subscales or total score. Within the cancer group, differences in PTSS between children on active treatment and off therapy were examined. There were no significant differences on any of the subscales or the total score of the PTSDI, although descriptively, symptom levels were slightly higher in the on-treatment group (for PTSDI total score M on-treatment = 19.2 (14.4 S.D.); M off treatment = 16.7 (13.2), t (191) = 1.2, $p > .20$). In examining the effects of time since diagnosis on level of symptoms, there was a trend towards a decrease in symptom reports with longer time elapsed since diagnosis, but this reached significance only on the re-experiencing/intrusion subscale ($r = -.16$, $p = .03$). Likewise, when looking categorically at time since diagnosis groups (1-6 months; 6 months to 18 months; 18 months to 5 years; > 5 years), there was a trend for the > 5 year from diagnosis group to report lower symptom levels, but this failed to reach significance. There were no significant differences or trends towards differences in PTSS symptoms as a function of diagnostic category.

Finally, we examined the effects of relapse history. Of the 30 patients who had experienced a relapse, 12 were on active treatment at the time of their participation in the study and 18 had completed therapy. No differences were observed in PTSS scores between relapsed patients on and off therapy, and mean scores were elevated in both groups relative to those with no relapse history. When comparing those with and without a history of relapse (regardless of treatment status), significant differences were found on the re-experiencing/intrusion subscale (t (191) = 3.5, $p < .001$), the numbing/avoidance scale (t (191) = 2.8, $p = .005$) and the total score (t (191) = 2.9, $p = .005$). In all instances, patients who experienced a relapse reported higher PTSS (for total score, M relapse = 24.2 (17.3); M no relapse = 16.4 (12.7)). In subsequently comparing the cancer group to controls, we considered several options, including simply eliminating those with a relapse history from the analyses, or examining separate groups of patients with and without relapse. However, since we predicted low levels of PTSS in the cancer group that would not exceed that of controls,

maintaining the relapse group in the sample serves to provide a stronger test of this hypothesis. We conducted our primary analyses both with and without the relapse sample included, and the results and interpretations of the findings did not differ. Thus all subsequent analyses are presented comparing the healthy control children to the entire sample of children with cancer, both those on and off treatment and with and without a history of relapse.

Differences in Children's Self-reported PTSS by Health Status and Adaptive Style

A series of 2(cancer vs. control) $\times$ 4 (adaptive style) ANCOVAs were used to examine differences in the three subscales and total score of the PTSDI after controlling statistically for race and SES. Means on the subscales and the total score for the four adaptive style groups as well as the cancer and control groups are presented in Table 2, along with all significant main effects and contrasts. There were no significant interactions or covariates in these analyses.

Health status had no significant effect on the PTSDI total score; children with cancer and healthy control children reported near identical levels of post-traumatic symptoms overall (Cancer $M = 17.55$, $SD = 13.7$; Control $M = 17.15$, $SD = 14.8$) [$F(1, 276) = .42$, $p > .5$]. There was a small, but significant effect of health status on the Re-experiencing/Intrusion subscale [$F(1, 276) = 4.17$, $p < .05$], in the direction that the children with cancer reported *lower* symptoms of re-experiencing and intrusion than did the healthy control children. There was also a small, but significant effect for the Avoidance/Numbing subscale [$F(1, 276) = 5.75$, $p < .05$], but in the opposite direction, with children in the cancer group reporting greater symptoms of avoidance and numbing than children in the control group. Finally, on the Arousal subscale, there were no differences in symptom levels between the cancer and control groups [$F(1, 276) = .47$, $p = .5$].

There were significant main effects of adaptive style seen on the total score and all three subscales of the PTSDI. On the total score, there was a significant effect of adaptive style [$F(3, 276) = 26.66$, $p < .001$]; and pairwise contrasts revealed that repressors and low anxious children reported lower levels of PTSS than defensive high anxious children, who reported lower levels than high anxious children (all p 's $< .01$). On the Re-experiencing/Intrusion subscale [$F(3, 276) = 17.67$, $p < .001$], repressive and low anxious children reported lower levels of symptoms than high anxious and defensive high anxious children. A similar effect of adaptive style was found for the Avoidance/Numbing subscale [$F(3, 276) = 18.73$, $p < .001$], with children categorized as repressive and low anxious reporting fewer symptoms than those categorized as high anxious and defensive high anxious. A main effect of adaptive style was again found on the Arousal subscale [$F(3, 276) = 19.53$, $p < .001$], and again high anxious children reported the highest levels of symptoms, followed by defensive high anxious children, and then repressive and low anxious children, who scored similarly. The simultaneous effects of adaptive style and health status on self-report of PTSS are illustrated in Figure 1.

PTSD Outcomes by Adaptive Style and Health Status

Although the assessment approach used in the current study does not allow for true diagnostic evaluation of the presence or absence of PTSD, we classified likely cases of PTSD using an approach similar to that used recently in a report by Schwartz and Drotar [14]. Participants who indicated a severity score of 3 or higher on each item from the PTSDI representing a symptom from Cluster B, C, or D were judged as having endorsed that symptom. Participants that endorsed one or more symptoms from cluster B (PTSDI re-experiencing/intrusion subscale), three or more from cluster C (numbing/avoidance subscale), and two or more from cluster D (hyperarousal subscale) were classified as having

met criteria for diagnosis of PTSD. This approach yielded 12 such cases (4.1% of the total sample; see Table 3). There were no significant cancer (3.6%)-control (5%) differences in PTSD cases [χ^2 (df 3, N = 293) = .32, $p > .5$]. However, there were significant differences seen by adaptive style [χ^2 (df 3, N = 293) = 9.35, $p = .025$]. A prevalence of 9.7% of cases was observed among high anxious children (8/102), 7.3% of the defensive high anxious children (3/41), only 1.2% of the low anxious children (1/86), and 0% of those children classified as repressors (0/64).

Discussion

Although childhood cancer has been accepted as a traumatic event severe enough to fulfill the requirement of criteria A for a diagnosis of PTSD in the DSM-IV, the current study failed to find increased rates of PTSD in children with cancer as compared to healthy peers. Not only does the data show there were no differences in likely rates of diagnosable PTSD, there was also no increase in posttraumatic stress symptoms in children with cancer, relative to their healthy peers. These results are consistent with the existing literature indicating neither increased rates of PTSD, nor increased levels of PTSS in the pediatric cancer population [1-3,6,14,24,31,48].

Whereas children with and without cancer reported similar levels of total PTSS, differences were found on two subscales of the PTSDI. The cancer group reported significantly *lower* levels of re-experiencing and intrusion than did their healthy peers. This curious finding has not been reported previously in the PTSS literature, but serves to highlight the low levels of symptomatology in the cancer group. This finding mirrors the results of studies of depressive symptoms, in which children with cancer report lower levels of depressive symptomatology than healthy comparison children [28,29,49]. In contrast, children with cancer also reported significantly higher levels of avoidance and numbing symptoms than the comparison group. Increases in symptoms of numbing/avoidance have occasionally been reported in pediatric cancer survivors, and certainly may indicate a stress response to trauma, but this finding can also be interpreted as a reflection of the more avoidant coping of children with cancer, which has been previously documented [28,29,50].

The current findings failed to replicate those of a study by Phipps et al.[8] which found that recently diagnosed patients experienced higher levels of PTSS than long term survivors. In the current study, however, there were no differences in self-reported PTSS between recently diagnosed patients and long-term survivors, nor between patients in active treatment and those who had completed treatment. Reasons for the discrepancy between the two studies are not clear. However, the current findings are perhaps explained by basal, or floor effects, since PTSS levels were so low, even among the recently diagnosed, it would be difficult to document a decline over time. The only subgroup of patients who appear to be at risk of elevated PTSS are those that experienced a relapse or recurrence of their illness, and this group appears at higher risk regardless of treatment status or time since diagnosis. A similar finding has been recently reported in parents of children with cancer, and discussed in terms of a 'second hit' in a two stage process [51]. This finding is consistent with literature which indicates that PTSS increases with multiple traumas and a subsequent trauma carries a heightened risk of PTSD [1,18,52]. It appears that in the absence of a strong premorbid disposition, the diagnosis of cancer in a child does not lead to increased symptoms of PTSS, but may leave them sensitized and at increased vulnerability to subsequent stressors, such as a second major cancer-related event, i.e., a relapse or recurrence. Inclusion of this subsample of relapsed patients in our cancer-control comparisons and still failing to find differences serves to strengthen our conclusion that PTSS is not elevated in the childhood cancer populations.

As predicted, this study replicates the results of Phipps et al.[31] in reference to the differences in self-reported PTSS as a function of adaptive style group membership. Regardless of health status, repressors and low anxious children reported lower levels of PTSS, including total score and subscale scores, than did children in the high anxious and defensive high anxious groups. However, the lack of differences between the repressor and low anxious groups suggests that it is primarily the factor of trait anxiety accounting for observed differences in levels of PTSS rather than adaptive style group, and that level of defensiveness is less relevant as a determinant of PTSS outcomes. Regardless of whether one focuses on trait anxiety or the more specific construct of adaptive style, it is clear that the personality factor of disposition towards anxiety is a more powerful determinant of PTSS outcomes than is 'health trauma history', i.e., whether or not a child has been diagnosed and treated for cancer. This is reinforced further by an absence of differences within the cancer group, between those on vs. off treatment, as a function of time since diagnosis, or by diagnostic category. A relapse/recurrence event was the only cancer-related factor associated with elevated PTSS. Unfortunately, our retrospective design did not include measures of disease severity or treatment intensity. However, prior research suggests that it may not be severity of disease or intensity of treatment per se that are the determinants of posttraumatic stress, but rather level of perceived threat[1,24,53]. We posit that perceived threat is likely to be associated more closely with trait anxiety and other personality factors than to disease variables, a question that would be worthy of further research.

The number of children meeting criteria for a probable diagnosis of PTSD did not differ by health status, with a very small percentage of cases in both groups. This is not surprising, given the absence of differences in total PTSS levels. In the absence of an unusual distribution within the cancer group, similar levels of PTSS across groups should be associated with a similar prevalence of PTSD. In the current study, the distributions in the two groups were similar, approximating normal, with a moderately positive skew. Prior studies that have used a diagnostic interview to identify PTSD cases, the prevalence of PTSD in children has been similar to that reported here, although it has tended to be higher in studies of young adult survivors [5,6,10,12]. Rates of PTSD from interview are sometimes higher than what might be expected based on results of self-report inventories of PTSS. While diagnostic interviews have long been considered the 'gold standard', some caution is in order. Respondent biases of social desirability and impression management should be as active if not stronger in interview settings as on self-report surveys, whereas the influence of researcher expectancies or interviewer bias would be expected to be stronger with designs involving interview assessments, particularly when blinding is not possible.

The absence of elevations in PTSS or probable PTSD raises questions about the value of using a trauma framework for understanding the responses of children with cancer. Similar questions regarding the applicability of a traumatic stress model for adult cancer patients have also been raised [54], and several points are relevant here. In a cross-sectional study of women with breast cancer, Palmer et al. [51] found that less than half reported responding with intense fear, helplessness or horror (i.e., meeting DSM-IV A2 criterion). The overall incidence of PTSD was very low (4%). The A2 criteria was a very poor predictor of PTSD, and it was also associated with other pathological outcomes such as major depression or generalized anxiety disorder, as well as non-specific elevations in psychological distress. Although psychological distress was more common in this population than is typically seen in children with cancer, it was rarely associated with PTSD. The authors suggest that what is labeled PTSS in the cancer population may be a misnomer, and is better viewed as representing an adjustment disorder than a traumatic stress response [54]. More recently, a study of young adult survivors of childhood cancer found that less than 10% reported a cancer-related event as being traumatic, and none of those who reported a cancer-related

trauma met criteria for PTSD[26]. Of course, limitations of the posttraumatic stress model as applied to cancer raises questions regarding the utility of a PTSD model in promoting understanding of response to trauma more generally. Such a discussion is beyond the scope of this paper, but a number of recent papers have reignited this controversy [55-57].

The primacy of personality variables such as adaptive style over health history in predicting PTSS outcomes is highlighted in a recent study which examined the childhood antecedents of PTSD [58]. In that study, children who were rated by their first grade teachers as exhibiting more externalizing behavior problems were more likely to experience traumatic/violent events as young adults, but no more likely to experience PTSD following trauma. In contrast, children who self-reported higher levels of internalizing symptoms (depression, anxiety) as first graders were no more likely to be exposed to trauma, but were significantly more likely to develop PTSD following trauma [58]. It is important to point out that in this study, susceptibility to PTSD was not found as a function of prior disorder, but only a prior tendency towards higher levels (above the median) of symptoms of psychological distress. This provides another caution regarding the non-specific nature of many of the symptoms labeled PTSS, highlighting that those who have previously experienced higher level of psychological distress are those most likely to experience higher levels of psychological distress following traumatic (or merely stressful) events. The corollary would be that those with a tendency towards low levels of internalizing symptoms (e.g., repressors or low anxious children) will also be less likely to experience such symptoms following trauma.

There are several limitations of the current study. Perhaps most problematic is the differential rates of participation between children in the cancer group (73% of those approached) and in the control group (36% of those approached). This is likely an artifact of the acquaintance-control procedures used. Recruitment in the cancer group always involved some face to face contact in a clinic setting, whereas control participants were recruited with telephone and mail contacts only. Regardless, the control participants represent a more select group, and thus selection bias cannot be ruled out as a factor in these findings. However, the literature indicates that it is the more distressed children who are less likely to agree to participate in research, suggesting that if the lower participation rates in the control sample created a bias, it would skew the data towards lower levels of distress [59]. This would be a more relevant concern if the findings indicated higher levels of distress in the cancer group. A related limitation of our sampling is that it did not produce demographically matched groups, with group differences emerging on race and SES. Two factors help to mitigate this concern: First, PTSS outcomes did not differ as a function of race or SES. Secondly, these variables were included as covariates in all ANCOVA models.

An additional limitation of our design is that the cancer and control groups completed the PTSS measure in reference to different stressful events. The cancer group was prompted to respond to items based on their cancer experience. In contrast the control group responded based on a wide range of events that they spontaneously identified as stressful. This approach, geared to assess cancer-related effects, has been commonly used in the pediatric cancer literature, but assumes that cancer has been a traumatic event, when the respondent may not have that perception. Indeed, a recent study suggests that only a small percentage of childhood cancer survivors may report a cancer-related traumatic event [26]. Our approach may have primed children in the cancer group to view their cancer history as traumatic, and could have acted to elevate their symptom report. Whereas the diagnosis of a life-threatening illness is considered an event of sufficient magnitude to meet criterion A1 from the DSM-IV, few of the events reported by the control participants appeared to meet this criteria. Intuitively, it might be expected that such a difference would contribute to lower levels of PTSS in the control group. However, there is evidence to suggest that commonly

experienced stress events that do not meet A1 criteria may produce as much, or even more PTS symptoms as traumatic events consistent with A1 criteria [60]. A final limitation is the absence of a diagnostic assessment of PTSD. Our decision to not include a structured diagnostic interview was based on the expectation of very few cases of diagnosable PTSD in both groups, making the time and labor requirements for conducting structured interviews with all participants difficult to justify. As mentioned above, diagnostic interviews are not without potential drawbacks, and moreover, we feel that our method of categorizing cases of likely PTSD is a sufficient approximation that has a strong precedent in the literature [14,59].

In summary, the current study failed to identify differences in total symptoms of posttraumatic stress between children with cancer and their healthy peers. Although many researchers continue to focus on PTSS as a problem in children with cancer, these results are consistent with a preponderance of the existing literature, suggesting that PTSD and PTSS are simply not elevated in this population. This is not to say that children with cancer are immune to PTSD or that it never occurs in this group, but that it is not a widespread problem or one that occurs in unusually high frequency in this context. In addition, PTSS outcomes are much more dependent on dispositional factors or personality traits such as adaptive style than on health history. But whether one uses the framework of adaptive style, the simpler continuum of trait anxiety, or other personality constructs such as neuroticism or attributional style, it appears that development of PTSD is more a reflection of an underlying predisposition to pathological states than it is a specific response to the trauma of cancer. In the past, researchers spent considerable effort examining depressive symptoms in children with cancer, eventually turning their focus to other outcomes when they recognized that depression was not a major problem, and might not be the best model for understanding adjustment in this population [62,63]. In the same way we question whether it is time to turn our focus away from PTSD outcomes. The current findings, consistent with much of the existing data, suggest that posttraumatic stress is not a very informative model for understanding the responses of children with cancer to their diagnosis and treatment.

References

1. Bruce M. A systematic and conceptual review of posttraumatic stress in childhood cancer survivors and their parents. *Clin Psychol Rev.* 2006; 26:233–256. [PubMed: 16412542]
2. Barakat LP, Kazak AE, Meadows AT, Casey R, Meeske K, Stuber ML. Families surviving childhood cancer: A comparison of posttraumatic stress symptoms with families of healthy children. *J Pediatr Psychol.* 1997; 22:843–859. [PubMed: 9494321]
3. Brown RT, Madan-Swain A, Lambert R. Posttraumatic stress symptoms in adolescent survivors of childhood cancer and their mothers. *J Trauma Stress.* 2003; 16:309–318. [PubMed: 12895012]
4. Butler RW, Rizzi LP, Handwerger BA. Brief report: The assessment of posttraumatic stress disorder in pediatric cancer patients and survivors. *J Pediatr Psychol.* 1996; 21:499–504. [PubMed: 8863459]
5. Erickson SJ, Steiner H. Trauma and personality correlates in long-term pediatric cancer survivors. *Child Psychiat and Hum Dev.* 2001; 31:195–213.
6. Kazak AE, Alderfer M, Rourke MT, Simms S, Streisand R, Grossman J. Posttraumatic stress disorder (PTSD) and posttraumatic stress symptoms (PTSS) in families of adolescent childhood cancer survivors. *J Pediatr Psychol.* 2004; 29:211–219. [PubMed: 15131138]
7. Landolt MA, Vollrath M, Ribi K, Gnehm HE, Sennhauser FH. Incidence and associations of parental and child posttraumatic stress symptoms in pediatric patients. *J Child Psychol Psychiat.* 2003; 44:1199–1207. [PubMed: 14626460]
8. Phipps S, Long A, Hudson M, Rai SN. Symptoms of post-traumatic stress in children with cancer and their parents: Effects of informant and time from diagnosis. *Pediatr Blood Cancer.* 2005; 45:952–959. [PubMed: 15806541]

9. Stuber ML, Christakis DA, Houskamp B, Kazak AE. Posttrauma symptoms in childhood leukemia survivors and their parents. *Psychosomatics*. 1996; 37:254–261. [PubMed: 8849502]
10. Hobbie WL, Stuber M, Meeske K, et al. Symptoms of posttraumatic stress in young adult survivors of childhood cancer. *J Clin Oncol*. 2000; 18:4060–4066. [PubMed: 11118467]
11. Langveld NE, Grootenhuis MA, Voute PA, de Haan RJ. Posttraumatic stress symptoms in adult survivors of childhood cancer. *Pediatr Blood Cancer*. 2004; 42:604–610. [PubMed: 15127415]
12. Meeske KA, Ruccione K, Globe DR, Stuber ML. Posttraumatic stress, quality of life, and psychological distress in young adult survivors of childhood cancer. *Oncol Nurs Forum*. 2001; 28:481–489. [PubMed: 11338757]
13. Rourke MT, Hobbie WL, Schwartz L, Kazak AE. Posttraumatic stress disorder (PTSD) in young adult survivors of childhood cancer. *Pediatr Blood Cancer*. 2007; 49:177–82. [PubMed: 16862538]
14. Schwartz L, Drotar D. Posttraumatic stress and related impairment in survivors of childhood cancer in early adulthood compared to healthy peers. *J Pediatr Psychol*. 2006; 31:356–366. [PubMed: 15788716]
15. Kazak AE. Posttraumatic distress in childhood cancer survivors and their parents. *Med Pediatr Oncol*, supplement. 1998; 1:60–68.
16. Stuber ML, Kazak AE, Meeske K, Barakat L. Is posttraumatic stress a viable model for understanding responses to childhood cancer? *Child Adolesc Psychiatr Clin N Am*. 1998; 7:169–182. [PubMed: 9894086]
17. Kazak AE, Barakat LP, Meeske K, et al. Posttraumatic stress, family functioning, and social support in survivors of childhood leukemia and their mothers and fathers. *J Consult Clin Psychol*. 1997; 65:120–129. [PubMed: 9103741]
18. Fletcher, KE. Childhood posttraumatic stress disorder. In: Mash, EJ.; Barkley, R., editors. *Child Psychopathology*. New York: Guilford Press; 1997. p. 242–276.
19. Salmon K, Bryant RA. Posttraumatic stress disorder in children: The influence of developmental factors. *Clin Psychol Rev*. 2002; 22:163–188. [PubMed: 11806018]
20. Aaron J, Zagul H, Emery RE. Posttraumatic stress in children following acute physical injury. *J Pediatr Psychol*. 1999; 24:335–343. [PubMed: 10431499]
21. LaGreca AM, Silverman WK, Wasserstein SB. Children's predisaster functioning as a predictor of posttraumatic stress following hurricane Andrew. *J Consult Clin Psychol*. 1998; 66:883–892. [PubMed: 9874901]
22. Lonigan CJ, Shannon MP, Taylor CM, Finch AJ, Sallee FR. Children exposed to disaster: II. Risk factors for the development of post-traumatic stress symptomatology. *J Amer Acad Child Adolesc Psychiat*. 1994; 33:94–105.
23. Stoppelbein LA, Greening L, Elkin TD. Risk of posttraumatic stress symptoms: A comparison of child survivors of pediatric cancer and parental bereavement. *J Pediatr Psychol*. 2006; 31:367–376. [PubMed: 16093521]
24. Yule W. Post-traumatic stress disorder in child survivors of shipping disasters: The sinking of the 'Jupiter'. *Psychother Psychosom*. 1992; 57:200–205. [PubMed: 1410197]
25. Kangas M, Henry JL, Bryant RA. Psychosocial perspectives on post-traumatic theories of post-traumatic stress. *Clin Psychol Rev*. 2002; 15:515–544.
26. Gerhardt CA, Yopp JM, Leininger L. Post-traumatic stress during emerging adulthood in survivors of pediatric cancer. *Journal of Pediatric Psychology*. 2007; 32:1018–1023. [PubMed: 17566005]
27. Yehuda R, McFarlane AC. Conflict between current knowledge about post-traumatic stress disorder and its original conceptual basis. *Amer J Psychiat*. 1995; 152:1705–1713. [PubMed: 8526234]
28. Canning EH, Canning RD, Boyce WT. Depressive symptoms and adaptive style in children with cancer. *J Amer Acad Child Adolesc Psychiat*. 1992; 31:1120–1124.
29. Phipps S, Srivastava DK. Repressive adaptation in children with cancer. *Health Psychol*. 1997; 16:521–528. [PubMed: 9386997]
30. Phipps S, Steele RG, Hall K, Leigh L. Repressive adaptation in children with cancer: A replication and extension. *Health Psychol*. 2001; 20:445–451. [PubMed: 11714187]

31. Phipps S, Larson S, Long A, Rai SN. Adaptive style and symptoms of posttraumatic stress in children with cancer and their parents. *J Pediatr Psychol*. 2006; 31:298–309. [PubMed: 15917493]
32. Weinberger DA, Schwartz GE, Davidson RJ. Low-anxious, high-anxious, and repressive coping styles: Psychometric patterns and behavioral responses to stress. *J Abnorm Psychol*. 1979; 88:369–380. [PubMed: 479459]
33. Weinberger, DA. The construct validity of the repressive coping style. In: Singer, JL., editor. *Repression and dissociation: Implications for personality theory, psychopathology, and health*. Chicago: University of Chicago Press; 1990. p. 337–386.
34. Derakshan N, Eysenck MW. Repression and repressors: Theoretical and experimental approaches. *Eur Psychologist*. 1997; 2:235–246.
35. Myers LB. Identifying repressors: A methodological issue for health psychology. *Psychol and Health*. 2000; 15:205–214.
36. Jurbergs N, Long A, Hudson M, Phipps S. Self-report of somatic symptoms in survivors of childhood cancer: Effects of adaptive style. *Pediatr Blood Cancer*. 2007; 49:84–89. [PubMed: 16847928]
37. Kreitler S, Chaitchik S, Kreitler H. Repressiveness: Cause or result of cancer? *Psycho-oncology*. 1993; 2:43–54.
38. Zachariae R, Jensen AB, Pedersen C, et al. Repressive coping before and after diagnosis of breast cancer. *Psycho-oncology*. 2004; 13:547–561. [PubMed: 15295776]
39. Barratt, W. Indiana State University; The Barratt Simplified Measure of Social Status (BSMSS) Measuring SES. Unpublished manuscript available at http://wbarratt.indstate.edu/socialclass/Barratt_Simplified_Measure_of_Social_Status.pdf
40. Hollingshead, AB. Four factor index of social status. New Haven, CT: Yale University Press; 1975.
41. Pynoos RS, Frederick C, Nader K, et al. Life threat and posttraumatic stress in school-age children. *Archives Gen Psychiatr*. 1987; 44:1057–1063.
42. Frederick, C.; Pynoos, RS.; Nader, K. Reaction Index to Psychic Trauma Form C (Child). University of California; Los Angeles: 1998. Unpublished manuscript
43. Pynoos, RS.; Rodriguez, N.; Steinberg, A.; Stuber, M.; Frederick, C. UCLA PTSD Index for DSM-IV. UCLA Trauma Psychiatry Service; 1998. Unpublished manual
44. Steinberg AM, Brymer MJ, Decker KB, Pynoos RS. The University of California at Los Angeles post-traumatic stress disorder reaction index. *Curr Psychiat Rep*. 2004; 6:96–100.
45. Crandall VC, Crandall V, Katovsky W. A children's social desirability questionnaire. *J Consult Clin Psychol*. 1965; 29:27–36.
46. Crowne, DP.; Marlowe, D. The approval motive: Studies in evaluative dependence. New York: Wiley; 1964.
47. Spielberger, CD. Manual for the State-Trait Anxiety Inventory for Children. Palo Alto, CA: Consulting Psychologists Press; 1973.
48. Stuber M, Kazak AE, Meeske K, et al. Predictors of posttraumatic stress symptoms in childhood cancer survivors. *Pediatrics*. 1997; 100:958–964. [PubMed: 9374564]
49. Worchel FF, Nolan BF, Wilson VL, Purser J, Copeland DR, Pfefferbaum B. Assessment of depression in children with cancer. *J Pediatr Psychol*. 1988; 13:101–112. [PubMed: 3385573]
50. Phipps S, Fairclough DL, Mulhern RK. Avoidant coping in children with cancer. *J Pediatr Psychol*. 1995; 20:217–232. [PubMed: 7760221]
51. Jurbergs N, Long A, Ticona L, Phipps S. Symptoms of postraumatic stress in parents of children with cancer: Are they elevated relative to parents of healthy children? *J Pediatr Psychol*. 2008 Epub ahead of print, Advance Access published on December 11, 2007.
52. Copeland WE, Keeler G, Angold A, Costello EJ. Traumatic events and posttraumatic stress in childhood. *Arch Gen Psychiatr*. 2007; 64:577–584. [PubMed: 17485609]
53. Barakat LP, Alderfer MA, Kazak AE. Posttraumatic growth in adolescent survivors of cancer and their mothers and fathers. *J Pediatr Psychol*. 2006; 31:413–419. [PubMed: 16093518]

54. Palmer SC, Kagee A, Coyne JC, DeMichele A. Experience of trauma, distress, and posttraumatic stress disorder among breast cancer patients. *Psychosom Med*. 2004; 66:258–264. [PubMed: 15039512]
55. Coyne JC, Thompson R. Posttraumatic stress syndromes: Useful or negative heuristics. *J Anxiety Disord*. 2007; 21:223–229. [PubMed: 17084064]
56. Jones E, Wessely S. A paradigm shift in the conceptualization of psychological trauma in the 20th century. *J Anxiety Disord*. 2007; 21:164–175. [PubMed: 17064877]
57. McHugh PR, Treisman G. PTSD: A problematic diagnostic category. *J Anxiety Disord*. 2007; 21:211–222. [PubMed: 17085011]
58. Storr CL, Ialongo NS, Anthony JC, Breslau N. Childhood antecedents of exposure to traumatic events and posttraumatic stress disorder. *Amer J Psychiat*. 2007; 164:119–125. [PubMed: 17202553]
59. Weinberger DA, Tublin SK, Ford ME, Feldman S. Preadolescents' social-emotional adjustment and selective attrition in family research. *Child Dev*. 1990; 61:1374–1386. [PubMed: 2245731]
60. Gold SD, Marx BP, Soler-Baillo JM, Sloan DM. Is life stress more traumatic than traumatic stress? *J Anxiety Disord*. 2005; 19:687–698. [PubMed: 15927781]
61. Weathers, FW.; Litz, B.; Herman, D.; Juska, J.; Keane, T. The PTSD Checklist (PCL), Reliability, validity and diagnostic utility. Paper presented at: the Annual Meeting of the International Society of Traumatic Stress Studies; San Antonio, TX. October. 1993
62. Kazak AE, Simms S, Alderfer MA, et al. Feasibility and preliminary outcomes from a pilot study of brief psychological intervention for families of children newly diagnosed with cancer. *J Pediatr Psychol*. 2005; 30:644–55. [PubMed: 16260434]
63. Patenaude AF, Kupst MJ. Psychosocial functioning in pediatric cancer. *J Pediatr Psychol*. 2005; 30:9–27. [PubMed: 15610981]

Figure 1. Simultaneous effects of health status and adaptive style on PTSS
Self-reported symptoms of Posttraumatic stress as a function of adaptive style in children with cancer and healthy acquaintance control children.

Table 1
Demographic and Medical Variables

Characteristic	Control (n = 108)	Cancer (n = 199)
<u>Age</u> [mean (SD)]	12.38 (3.0)	12.32 (3.4)
<u>Gender</u> [n (%)]		
Male	44 (40.7)	104 (52.2)
Female	64 (59.3)	95 (47.8)
<u>Race</u> [n (%)]		
Caucasian	99 (91.7)	152 (76.4)
African-American	6 (5.6)	39 (19.6)
Other	3 (2.7)	8 (4.0)
<u>SES^a</u> [n (%)]		
I & II	79 (73.8)	98 (49.5)
III	18 (16.7)	53 (26.8)
IV & V	10 (9.3)	47 (23.7)
<u>Parent Participant^b</u> [n (%)]		
Mother	98 (90.7)	160 (81.2)
Father	9 (8.3)	33 (16.8)
Other ^c	1 (0.9)	4 (2.0)
<u>Diagnostic Category</u> [n (%)]		
ALL ^d		47 (23.6)
Other leukemia		11 (5.5)
HD/NHL ^e		30 (15.1)
Solid Tumor		67 (33.7)
Brain Tumor		44 (22.1)
<u>Time Since Diagnosis</u> [n (%)]		
≥ 1 month to 6 months		52 (26.1)
> 6 months to 18 months		47 (23.6)
> 18 months to < 5 years		47 (23.6)
> 5 years		53 (26.6)
<u>Relapse/Recurrence</u> [n (%)]		30 (15.0)

^a Socioeconomic status per Hollingshead 4-factor index (Hollingshead, 1975);

^b Two cancer patients did not have a parent participate;

^c stepparent or grandparent as custodial guardian;

^d Acute lymphocytic leukemia;

^e Hodgkin's disease/Non-Hodgkin's lymphoma

Table. 2
Main Effects of Health Status and Adaptive Style on Child Self-Report of Posttraumatic Stress

	Repressors			Low Anx.		High Anx.		Def. High Anxious		F		Health Status
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Adaptive Style	F	
Re-experiencing/Intrusion (Total)	2.27 (2.7) ^a	2.52 (3.2) ^a	6.65 (5.7) ^b	5.25 (4.2) ^b						17.67 ^{**}		
Cancer	1.96 (2.8)	1.81 (2.4)	6.40 (5.9)	4.76 (3.6)								4.17 [*]
Control	3.19 (2.4)	3.49 (3.8)	7.06 (5.3)	6.70 (5.5)								
Avoidance/Numbing (Total)	3.76 (4.1) ^a	3.11 (4.3) ^a	9.00 (7.2) ^b	7.66 (5.8) ^b						18.73 ^{**}		
Cancer	4.33 (4.4)	3.65 (4.4)	9.55 (6.8)	8.52 (5.4)								5.75 [*]
Control	2.16 (2.4)	2.32 (3.9)	8.00 (7.9)	4.89 (6.5)								
Arousal (Total)	4.65 (3.1) ^a	4.09 (3.2) ^a	8.16 (4.1) ^b	7.15 (3.8) ^c						19.53 ^{**}		
Cancer	4.83 (3.3)	3.94 (2.9)	8.1 (3.7)	7.56 (3.9)								<i>ns</i>
Control	4.13 (2.6)	4.31 (3.7)	8.25 (4.6)	6.00 (3.4)								
Total Score (Total)	11.24 (8.5) ^a	10.21 (9.2) ^a	25.84 (15.7) ^b	20.44 (12.2) ^c						26.66 ^{**}		
Cancer	11.65 (9.2)	9.73 (7.8)	25.84 (15.0)	21.59 (11.4)								<i>ns</i>
Control	9.89 (5.9)	10.88 (10.9)	25.83 (17.0)	16.78 (14.4)								

a,b,c Indicates a significant group difference where means with different subscripts are significantly different.

* $p < .05$;

** $p < .001$;

ns = not significant.

Table 3
Health Status, Adaptive Style, and PTSD Cases

Health Status	Adaptive Style	non-Cases	Cases	Total
Cancer	Repressor	47	0 (0%)	47
	Low Anxious	51	0 (0%)	51
	High Anxious	59	5 (7.8%)	64
	Def. High Anxious	29	2 (6.5%)	31
	Total	186	7 (3.6%)	193
Healthy	Repressor	17	0 (0%)	17
	Low Anxious	34	1 (2.9%)	35
	High Anxious	35	3 (7.9%)	38
	Def. High Anxious	9	1 (10%)	10
	Total	95	5 (5%)	100