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A Longitudinal Study of Hardiness as a Buffer for Posttraumatic Stress Symptoms in Mothers of Children with Cancer

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Abstract

Mothers of children diagnosed with cancer have been found to be at a heightened risk for post-traumatic stress symptoms (PTSS). In an effort to identify a potential buffer, hardiness was examined as a protective factor for PTSS among mothers of children that were diagnosed with cancer in the past 2 weeks. Using a prospective design, mothers completed measures of PTSS and hardiness at the time of their child's cancer diagnosis and then again at 6- and 12-months post-diagnosis. Random effects regression analyses revealed that mothers who scored high on hardiness were less likely to experience PTSS after controlling for the effect of time. PTSS cluster-specific relations with hardiness were also examined, which revealed that mothers who scored high on hardiness experienced fewer avoidance/numbing symptoms at the time of their child's diagnosis of cancer and across 12 months; whereas mothers who scored low on hardiness tended to experience more avoidance/numbing symptoms at the time of their child's diagnosis. However, these symptoms declined gradually over the course of 12 months. The present findings support examining hardiness further as a buffer against specific PTSS clusters and exploring options for identifying and treating mothers of children with cancer that may be at risk for PTSS.

It is estimated that 7–14% of parents who have children that are diagnosed with cancer experience PTSD following their child's diagnosis (Kazak et al., 2004; Landolt et al., 2002; Stoppelbein & Greening, 2007). The rates for post-traumatic stress symptoms (PTSS) are even higher, with estimates reaching as high as 50% for parents of children with cancer (e.g., Dunn et al., 2012; Kazak et al., 2004; Landolt et al., 2002; McCarthy, Ashley, Lee, & Anderson, 2012; Stoppelbein, Greening, & Fite, 2012). PTSS is different from PTSD in that the number and severity of symptoms do not reach the level of diagnosis for PTSD (Dunn et al., 2012; Stoppelbein et al., 2012). Although subclinical in intensity, PTSS is as equally disconcerting as PTSD because it is associated with the risk of functional impairment, comorbid mental health issues, and PTSD (Davis et al, 2000; DeVries et al, 1999; Powers, 2011). Hence, the purpose of the present study was to evaluate a potential buffer for PTSS in parents, and more specifically in mothers, of children diagnosed with cancer because women are twice as likely as men to experience PTSS (Kessler et al., 1995). Mothers are also

typically the primary caretaker for children (Gerstel & Gallagher, 1993) and hence, any interference in the mother's ability to meet her child's medical needs poses as a potential obstacle to maintaining the child's physical and mental health.

It is important to note, that while at risk, not all mothers develop PTSD or PTSS after their child is diagnosed with cancer. Hence, there appears to be a subset of mothers that might be more resilient to the potentially negative sequelae of having a child diagnosed with a life-threatening illness like cancer. The definition of resiliency varies across studies but generally refers to exhibiting good adjustment across different domains of life despite significant adversity (e.g., Luthar, Cicchetti & Becker, 2000). A central foundation of resiliency is having a generally hardy personality style (Bartone, Barry, & Armstrong, 2009; Maddi, 2007; Nowack, 1989). As outlined by Kobasa (1979), hardiness is conceptualized as being comprised of three components including control (i.e., beliefs of influence or control over events in one's life), commitment (i.e., commitment to and recognition of the importance of activities and interpersonal relationships), and challenge (i.e., viewing change and potentially stressful events as challenges rather than threats. In short, hardiness is an intrapersonal resource that consists of cognitions and attitudes that might be a buffer for the potentially negative effects of traumatic and severe life stressors on one's health and well-being (e.g., Beasley, Thompson, & Davidson, 2003; King, King, Keane, Fairbank, & Adams, 1998; Nowack, 1989).

The process by which hardiness influences one's post-trauma adjustment is hypothesized to occur in one of three ways. The first hypothesis is that hardiness is uniquely related to resilience in the face of extreme adversity (Andrew et al, 2008; Bartone, 2006). A second hypothesis is that hardiness has a direct effect on PTSD/PTSS; whereas the third hypothesis is that hardiness does not directly affect PTSD/PTSS but instead offsets the consequences of severe stressors on survivors' adjustment, and thereby minimizes the risk of PTSD/PTSS (Escolas, Pitts, Safer, & Bartone, 2013; Jovanovic, Aleksandric, Dunjic, & Todorovic, 2004; King et al, 1998). Research conducted to date has revealed that high-risk populations including active military personnel, war veterans and police officers are less likely to meet diagnostic criteria for PTSD and depression if they report high levels of hardiness (Andrews et al., 2013; Jaksic, Brajkovic, Ivezic, Topic, & Jakovljevic, 2012; King et al., 1998; Escolas et al., 2013; Pietrzak, Johnson, Goldstein, Malley, & Southwick, 2009); however, not all studies, including recent research, has found a relation between hardiness and PTSD/PTSS (Marchand, Nadeau, Beaulieu-Prevost, Boyer, & Martin, 2015). Methodological concerns such as utilizing cross-sectional research designs might have limited finding a significant association. Hence, evaluating the relation between hardiness and PTSS longitudinally might increase the likelihood of identifying a correlation instead of relying on assessing for PTSS at one point in time.

Other methodological shortcomings that might account for the equivocal findings in the literature include failing to examine correlations between hardiness and symptom clusters of PTSD/PTSS. PTSD is conceptualized as a constellation of symptoms that are divided into symptom clusters. Up until 2013, the American Psychiatric Association (APA) identified three clusters of symptoms including re-experiencing (e.g., flashbacks, bad dreams, and frightening, intrusive thoughts), avoidance-numbing (e.g., staying away from reminders of

the traumatic event, feelings of anhedonia, and difficulty remembering details of the event), and hyperarousal symptoms (e.g., feeling easily startled, feelings of being on edge, and proneness to angry outbursts) (APA, 2000). A fourth cluster of symptoms was introduced in the newly revised 5th edition of the Diagnostic of Statistical Manual of Mental Disorders (DSM 5) in 2013 (APA, 2013). This cluster is referred to as “negative alterations in cognition and mood” and includes such symptoms as failing to recall important aspects of the event, persistent and negative beliefs about oneself or the world, markedly diminished interest or participation in significant activities and feeling emotionally detached or estranged from others. While this symptom cluster is clinically relevant, the original three clusters have been replicated in factor analytic research (Asmundson et al., 2000; Boelen, van den Hout, & van den Bout, 2008; Simms, Watson, & Doebbeling, 2002), and hence, have been the subject of research examining risk factors associated with PTSD/PTSS (e.g., Kuijpers, van der Knaap, & Winkel, 2012). Such research has yielded support for evaluating relations between symptom clusters and risk factors or buffers instead of simply examining relations using a sum score for PTSS.

Finding evidence for symptom cluster-specific relations with hardiness could potentially provide discriminating data about which risk and/or protective factors are linked to specific clusters of PTSS. Such data could provide support for suggestions to screen for, cultivate, and/or reinforce buffers for PTSS among mothers soon after their child is diagnosed with cancer, so as to mitigate their risk for PTSS. Hence, in addition to examining the relation between hardiness and the sum PTSS score, we examined hardiness as a potential buffer for specific symptom clusters. The mothers that participated were evaluated at the time of their child’s diagnosis and at two time points during the subsequent 12 months (i.e., 6- and 12-months post-diagnosis). This prospective design enabled us to maximize the opportunity to infer possible cause-and-effect relations. We hypothesized that the mothers who reported a high level of hardiness would report experiencing fewer PTSS at each assessment point and across time compared to mothers who reported a low level of hardiness. Relations between specific PTSS clusters and hardiness were examined to ascertain if hardiness is uniquely linked to specific symptom clusters.

Method

Participants

Thirty-two mothers of children diagnosed with cancer were recruited from a pediatric oncology service in a large university-based medical center. One mother declined to participate because of lack of interest/time and two women were excluded because they were not the biological mother. Other exclusion criteria included the child had a past history of cancer, the mother had a history of psychiatric diagnoses or substance abuse within the past year or the mother was exposed to an event in the past month that is considered traumatic other than her child’s diagnosis of cancer within the past month. These exclusion criteria helped to control for potential confounding effects of psychiatric diagnoses including PTSD in the past year and acute stress disorder in the past month. Two mothers were excluded for one of these latter criteria, leaving a total of 27 participants. As shown in Table 1, the participants ranged from 22–43 years of age (M age = 30.13, SD = 5.74), and their children

were on average 7.5 years old at the time of their diagnosis ($SD = 5.90$). Approximately half (52%) of the mothers were African-American; the remaining were Caucasian (48%). Most of the women (48%) were married to the child's father, the others were either separated/divorced (26%), never married (17%), or remarried (9%). The mean SES was 3.83 ($SD = 0.49$), which falls in the middle class range. Over half the children were diagnosed with acute lymphoblastic leukemia (56%); the remaining were diagnosed with lymphomas (25%), neuroblastoma (10%), and the remaining 3 children were diagnosed with either osteosarcoma, rhabdomyosarcoma, or lung cancer. At the conclusion of the study, all of the children had been treated with chemotherapy and 14% had also received radiation.

Measures

Demographic and health interview—Participants completed a brief interview about their child's disease and demographic information (e.g., age, marital status, etc.). Participants were also interviewed to determine the presence of mental health diagnoses within the past year. Demographic data were used to compute a Hollingshead Index (1975) as a measure of socioeconomic status (SES).

Life events checklist (LEC)—The LEC is a 16-item list of events that are considered traumatic. The list was patterned after Breslau's (2001) measure of exposure to stressful traumatic events. This measure includes items such as experiencing or witnessing the death of a loved one, a natural disaster, physical abuse or assault, etc. The events have been linked to PTSD/PTSS (Breslau, 2001; Ruggiero, Del Ben, Scotti, & Rabalais, 2003) and are considered by the American Psychiatric Association (2013) to be qualifying events for a PTSD diagnosis. Respondents indicated whether they personally experienced or witnessed someone experience the listed event and how long ago the event occurred. Test-retest reliability has been found to be high, .82, $p < .001$, and the mean kappa for all the items has been found to be .61 (Gray, Litz, Hsu, & Lombardo, 2004). Gray et al. also found significant correlations between the LEC and other measures of exposure to events identified as traumatic (e.g., Traumatic Life Events Questionnaire) as well as to measures of PTSD (e.g., Mississippi Scale for Combat-Related PTSD). The LEC was included in the present study to assess for past exposure to events that are considered traumatic, because past exposure has been found to be a significant predictor of future PTSD/PTSS (Davidson, Hughes, Blazer, & George, 1991). The mean number of events endorsed (4.04) by the present sample was found to be consistent with published epidemiological data (Breslau, 2001).

Posttraumatic stress disorder checklist-civilian version (PCL-C)—The PCL-C is a 17-item self-report measure of PTSS for adults (Weathers, Litz, Herman, Huska, & Keane, 1993). Mothers indicated on a 5-point Likert scale ranging from 1 (*not at all*) to 5 (*extremely*) how much they agreed with statements pertaining to PTSD symptomatology in response to their child being diagnosed with cancer (APA, 2000). A cut-off score ≥ 50 suggests a diagnosis of PTSD should be considered (Weathers et al., 1993). Cronbach alphas were high to acceptable for each of the PTSD symptom clusters across the 12-month assessment period ($\alpha = .80 - .94$). Construct validity is supported by high correlations, $r_s > .75$, with other established measures of PTSD (Conybeare, Behar, Solomon, Newman, & Borkovec, 2012; Ruggiero et al., 2003).

Hardiness scale—The Hardiness Scale is a 45-item questionnaire designed to measure three dimensions of hardiness including control, commitment, and challenge (Bartone, Ursano, Wright, & Ingraham 1989). Respondents rated on a 4-point scale ranging from 0 (*not at all true*) to 3 (*completely true*) how true each statement was for them. Item responses are summed to yield a total score. Higher scores indicate higher levels of hardiness. Internal consistency for the measure has been found to be high (.85) and was equally high for the present study (Cronbachs $\alpha = .82$).

Procedure

After obtaining approval from the medical center's Institutional Review Board, mothers were informed about the study, provided written consent, and then completed all measures 1–2 weeks after their child was diagnosed with cancer. Follow-up assessments were performed again at 6- and 12-months post-diagnosis. Only the PCL-C and Hardiness Scale were completed at follow-up assessment points. Participants were compensated for their participation.

Data Analyses

Preliminary analyses included examining the participant's mean PCL-C and hardiness score at each assessment. The relation between PTSS, hardiness, demographic variables, and life events were examined in correlational analyses as possible covariates to include in regression analyses.

A series of random effects regression models were estimated to examine the primary hypothesis that high levels of hardiness would predict lower levels of PTSS across time. Separate analyses were performed for PTSS as a whole as well as for each of the three PTSS clusters. Random effects regressions were estimated because the data were nested (repeated measures nested within mothers). When considering the sample size for random effects models that examine individual change over time, it is recommended that the person-by-time observations be used to determine power (Muthen & Curran, 1997). The present study's 81 person-by-time observations offer more than adequate power to detect effects in spite of the relatively small sample size (Raudenbush & Bryk, 2002). Models were estimated using SAS Proc Mixed version 9.3 with Maximum Likelihood Estimation (Littell, Milliken, Stroup, & Wolfinger, 1996).

Models that examined hardiness as a predictor of PTSS and again for each symptom cluster were estimated. These models were estimated in three steps. First, linear and quadratic effects of time were estimated to determine how the dependent variable (PTSS) changed over time. After the best fitting model for time was established, hardiness was added as a time-varying predictor to determine whether the independent variable predicted the dependent variable within time. Finally, the Time X Hardiness interaction was tested to examine whether change in the dependent variable across time depended on the level of the independent variable. When a significant interaction was detected, the regression model was conditioned at high and low levels of the independent variable (1 *SD* above and below the sample mean) to examine the nature of the interaction as recommended by Aiken and West (1991).

Results

Mean scores on all measures are included in Table 1. Preliminary analyses revealed that the mean score on the PCL-C fell below the clinical cut-off score of 50. The mean score on the LEC was 4.04 ($SD = 2.40$). The majority of participants (73%) reported less than four events having occurred in the past and on average these events occurred more than two years prior to the child's diagnosis of cancer ($M = 2.72$ years, $SD = 1.11$). The most commonly occurring event was the death of a loved one. Correlational analyses (see Table 2) revealed no significant relations between PTSS at each of the three assessment points and SES, race, age, and past exposure to life events at the time of initial data collection. However, PTSS was found to be significantly related to hardiness at the time of the child's medical diagnosis ($r = -.65$, $p = .003$) and at the 6- and 12-month follow up ($r_s = -.48$ to $-.49$, $p = .05$). Hardiness was not significantly related to any of the demographic variables or stressful life events. Thus, none of the demographic variables or stressful life events were included as covariates in further analyses. Tests of differences between the children's type of cancer diagnosis and the mother's PCL-C and hardiness scores yielded statistically nonsignificant findings ($F_s = 1.47 - 3.12$, $p_s > .05$).

Predicting Change in PTSS

Random effects regression analyses were performed to predict PTSS (see Table 3). Change in symptomatology followed a linear trend with symptoms decreasing across time. ($B = -.68$, $p < .001$). The addition of the quadratic effect was not significant ($B = .19$, $p = .11$). Therefore, only the linear effect of time was retained in subsequent models for predicting PTSS. The model included a significant random intercept ($z_s = 2.17 - 2.61$, $p < .01$), thus suggesting individual variability in overall levels of symptoms. Next, hardiness was added to the model and found to be a significant predictor of PTSS after controlling for the effect of time, with higher levels of hardiness predicting fewer PTSS ($B = -.67$, $p = .001$). The Time X Hardiness interaction was added as the final step to the model, which yielded a marginally significant relation to PTSS ($B = .17$, $p = .10$).

Predicting Change in PTSS Clusters

Separate random effects regression analyses were conducted to predict each of the PTSS clusters—re-experiencing, avoidance/numbing, and hyperarousal symptoms. Similar to the findings for the overall measure of PTSS, change in symptomatology followed a linear trend for all three symptom clusters. That is, decreases in symptoms were observed across time for all three clusters ($B_s = -1.06$ to -1.98 , $p < .04$). The addition of the quadratic effect was not significant ($B_s = -.27$ to 1.17 , $p > .05$). Therefore, only the linear effect of time was retained in subsequent models for predicting each symptom cluster. The models for each cluster included a significant random intercept ($z_s = 3.95$ to 4.18 , $p < .0001$), suggesting that there was individual variability in overall levels of symptoms. Hardiness was then added to the model and was found to be a significant predictor of all three symptoms clusters ($B = -.14$ to $-.26$, $p < .007$), suggesting that higher levels of hardiness were associated with fewer symptoms. Finally, the interaction variable, Time X Hardiness, was included in each model, revealing a statistically significant interaction for avoidance/numbing symptoms only ($B = .13$, $p = .04$). The model for avoidance/numbing symptoms was conditioned at high and low

levels of hardiness to examine the nature of the interaction effect. At low levels of hardiness, avoidance/numbing symptoms started high and tended to decrease across time ($B = -3.69$, $p = .03$). However, at high levels of hardiness, avoidance symptoms were low and remained low across the 12 months ($B = 1.17$, $p = .38$; see Figure 1).

Discussion

As expected, hardiness was found to be negatively related to PTSS among mothers of children diagnosed with cancer in the present study. This finding was replicated for each of the three symptom clusters of PTSD/PTSS including—re-experiencing, avoidance/numbing, and hyperarousal symptoms. That is, the mothers that reported higher levels of hardiness also reported experiencing fewer symptoms. Although these findings support past cross-sectional research findings, past research has largely been conducted with such high-risk populations as military and law enforcement personnel and the findings have not necessarily been unequivocal to date (Andrew et al, 2008, 2013; Bartone, 2006; Waysman et al, 2001). We hypothesized that the equivocal findings in the literature might be secondary to operationalizing PTSS as a sum score of symptoms rather than as clusters of symptoms as outlined in the DSM (APA, 2013).

We found support for examining symptom clusters when we observed a hardiness-symptom cluster relation with the mothers. More specifically, we found that mothers who scored low on the Hardiness Scale experienced more avoidance symptoms across time than the mothers that scored high on hardiness. It is important to note that, although the mothers that scored low on hardiness in the present study showed more avoidance symptoms, their level of symptomatology declined over time. This decline in symptoms suggests a possible regression to the mean. In contrast, the mothers that scored high on hardiness experienced few avoidance symptoms at the time of their child's cancer diagnosis and they maintained their low level of avoidance symptoms at each assessment point across 12 months. In other words, while the "hardy mothers" appeared to have been protected from experiencing avoidance/numbing symptoms from the onset of their child's cancer diagnosis and throughout the 12-month follow up, the less hardy mothers exhibited significantly more avoidance/numbing symptoms at the time of their child's cancer diagnosis. The decline in their symptoms over time suggests that symptoms might improve as time passes. Although noteworthy from a clinical perspective, experiencing PTSS at any time after exposure to a traumatic event can increase one's risk for future PTSD and hence, warrants consideration.

Finding a symptom cluster-specific relation between avoidance/numbing and hardiness, and not with other symptom clusters, is not necessarily surprising given that there is some empirical support for differential effects of buffers and risk factors on different PTSS clusters. For example, avoidance/numbing symptoms, but not re-experiencing and hyperarousal symptoms, have been found to be related to cortisol levels (Stoppelbein & Greening, 2015). Others have found that emotional acceptance may be specifically related to avoidance symptoms and not to re-experiencing symptoms (O'Bryan, McLeish, Kraemer, & Fleming, 2015). One hypothesis for the symptom cluster-specific relation between hardiness and avoidance/numbing symptoms could be the behavioral nature of avoidance symptoms. It may be, for example, that perceiving life events as challenges (i.e., a component of

hardiness) that can be overcome allows survivors to confront event-related stimuli and not engage in avoidant behaviors; whereas hardiness may not be as influential for other symptom clusters that do not involve voluntary motor responses, such as intrusive thoughts or hyperarousal symptoms. These latter symptoms might be contributed to biologically, for example, due to increased stress hormones. Alternatively, they may not be as easily manipulated because they are conceptualized as physiological symptoms.

Methodological Limitations

This is the first prospective study, to our knowledge, that examined a resiliency factor such as hardiness in relation to PTSS and specific PTSS clusters from the onset of exposure to an event that is considered stressful and/or traumatic. Hence, the findings provide information about possible causal relations that are otherwise difficult to glean from cross-sectional studies. Nevertheless, there are some methodological limitations with the present study that need to be considered. Although the relatively small sample size might be regarded as a limitation, the present sample size is consistent with studies using similar populations (Glover & Poland, 2002; Stoppelbein et al., 2010). Furthermore, the current study has 81 person-by-time observations. Experts have argued that person-by-time observations are most important when considering power of random effects regression models (e.g., Muthen & Curran, 1997). Other methodological limitations include the homogeneity of the sample. Women were the only participants in the present study and hence, limit generalizing the findings to men. Although women are twice as likely as men to be diagnosed with PTSD (Breslau & Anthony, 2007; Kessler et al, 1995; Olff et al, 2007), further research with men is recommended to maximize generalizations of the findings.

It is further recommended that future hypotheses about hardiness and PTSS be tested with victims of traumatic events other than pediatric cancer. It is noted that the participants in the present study continued to experience secondary stress reactions due to their child's ongoing medical treatment as well as from the uncertainty of their child's medical prognosis. Hence, the chronicity of the stressful/traumatic event that was the subject of the present study precludes generalizing the present findings to victims of a single acute event such as a serious motor vehicle accident. Finally, although a history of life events that are considered stressful and/or traumatic was obtained at the time of the child's diagnosis of cancer, an assessment of life events was not obtained at the 6- and 12-month follow-up assessments. Therefore, the influence of other types of traumas/life events that occurred over the 12-month period and that could have influenced the mothers' adjustment is unknown. Additionally, although research supports having a child diagnosed with a life-threatening illness as being a traumatic event (APA, 2000), the mothers in the present study were not asked to indicate if they considered their child's life-threatening diagnosis as the most disturbing event they experienced. It is recommended that future research include assessing the parents' perceptions of the threat of a child's life-threatening diagnosis. Maintaining ongoing assessments of life events throughout a study is further recommended to evaluate how these events might influence the mothers' adjustment after their child's cancer diagnosis, as well as how they influence the relation between PTSS and hardiness.

Although the present participants did not endorse exposure to many stressful events in the past, research has borne out that past exposure to events that are considered threatening and traumatic, as well as past psychiatric diagnoses, increase one's risk for future PTSD/PTSS. Hence, it is recommended that mothers with a past history of exposure to a number of stressful/traumatic events and/or mental health issues be included in future research to help ascertain if cumulative exposure to a number of stressful/traumatic life events, as well as any past mental health issues, increase the mothers' risk for PTSD/PTSS. Furthermore, any treatment received for these issues in the past or currently could also potentially influence the mothers' risk for PTSD/PTSS and/or their hardiness, and should also be considered as possible confounds in future research.

Clinical Implications

Having a child diagnosed with a life-threatening illness such as cancer can be a stressful event, and for some mothers could lead to PTSS (e.g., Dunn et al., 2012; Kazak et al., 2004; Landolt et al., 2002, McCarthy, Ashley, Lee, & Anderson, 2012; Stoppelbein & Greening, 2007), which is associated with a heightened risk for functional impairment and comorbid mental health issues (Davis et al., 2000; DeVries et al., 1999; Powers, 2011). These potential risks underscore the potential clinical benefits of preventing PTSS among mothers of children diagnosed with cancer. We suggest that mental health professionals might partner with medical providers to help identify mothers that might be at risk for PTSS at the time of their child's diagnosis of cancer. Early screening might help mitigate the mothers' risk of developing PTSS. It is documented that prevention is more efficacious and cost-effective than intervening after the development of symptoms and thus, warrants some consideration (Currie, 2010). Perhaps, screening measures such as the PCL-C could be routinely and easily administered to mothers as part of their children's medical intake. The Hardiness Scale could also be used to assess the mothers' hardiness to help ascertain which components of hardiness could be cultivated or reinforced.

Parents identified from screening measures as scoring low on hardiness could be targeted for therapy designed to promote hardiness. Iacoviello and Charney (2014) propose a comprehensive resilience-focused training program with the goal of cultivating resilience/hardiness and thereby, "minimize the risk of negative outcomes following trauma exposure". Their program includes 1) identifying a resilient role model who serves as a model for exercising cognitive flexibility, active coping skills (e.g., confronting instead of avoiding feared stimuli), and adaptive behavior, while also being a support network, 2) establishing and utilizing a support network with the goal of promoting social engagement, optimism and positive self-regard, 3) promote a sense of control and mastery by confronting fears instead of engaging in avoidant behaviors, 4) attend to one's physical well being by engaging in physical activity as this contributes to physical hardiness and emotional strength, and finally 5) identify, utilize, and foster one's particular character strengths to promote facets of hardiness; for example, capitalize on an extraverted person's extraversion to promote social engagement and nurturing a social support network. Resilience-focused training programs offer an integrated, multimodal approach to promoting the facets of hardiness identified in the literature (Iacoviello & Charney, 2014). Rose et al. (2013) provide preliminary empirical support for the efficacy of such a program with non-traumatized populations confronting

daily life stressors. Although designed to promote resilience/hardiness, a subsequent goal of the training program is to minimize the risk of PTSS. Further research is recommended, therefore with populations at risk for PTSS, such as mothers of children with cancer, to help ascertain the generalizability of the initial report of positive results with stressed but non-traumatized populations. Mental health clinicians could be instrumental in providing training programs designed to cultivate and promote hardiness so as to help mothers maximize their opportunities to cope with the stress of pediatric cancer while they balance attending to their daily responsibilities with caring for their ill child. Such support might help prevent the mothers from depleting their emotional resources that they would otherwise utilize to cope with their child's cancer diagnosis and illness (Ozbay, Johnson, Dimoulas, Morgan, Charney, & Southwick, 2007). Social and emotional support provided through resilience-focused training could further enable mothers to approach event- or medical-related reminders and stimuli that they might otherwise be tempted to avoid, which in turn, could help the mothers to manage their risk of any potential PTSS (Romero, Riggs, & Ruggero 2015).

Conclusion

Research has borne out that mothers of children diagnosed with cancer are at a heightened risk for PTSS, which in turn, increases their risk for PTSD (Dunn et al., 2012; Kazak et al., 2004; Kessler et al., 1995; Landolt et al., 2002; McCarthy, Ashley, Lee, & Anderson, 2012; Stoppelbein et al., 2012). Hence, examining possible buffers for PTSS could provide potential clinical implications for mitigating this risk. This is the first study, to our knowledge, that examined hardiness as a potential buffer among mothers of children that were recently diagnosed with cancer. The findings support a PTSS cluster-specific relation between hardiness and the avoidance/numbing symptom cluster. Finding support of a relation between hardiness and PTSS provides some support for such recommendations as screening the mothers' level of hardiness at the time that a child is diagnosed with cancer. Mothers who score low on hardiness might then be referred for interventions designed to fortify components of hardiness including the mothers' social/emotional support systems and adaptive cognitions, with the ultimate goal of minimizing their risk for PTSS.

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Figure 1.
Number of Avoidance Symptoms for Mothers at High and Low Levels of Hardiness at the Time of Child's Cancer Diagnosis and at 6-and 12- Months Post-Diagnosis (N =27).

Table 1

Means, Standard Deviations and Percentages for Variables (N = 27).

Parent	<i>M</i>	<i>SD</i>	%
Age	30.13	5.74	
SES	3.83	0.49	
Education	13.61	2.33	
Ethnicity			
African-American			52
Caucasian			48
Marital Status			
Married			48
Separated/divorced			26
Never married			17
Remarried			9
PCL-C at Diagnosis	39.87	15.65	
PCL-C at 6 months	33.11	14.64	
PCL-C at 12 months	28.40	11.21	
Hardiness at Diagnosis	82.83	15.15	
Hardiness at 6 months	80.93	14.98	
Hardiness at 12 months	81.93	11.71	
LEC at Diagnosis	4.04	2.40	
Child	<i>M</i>	<i>SD</i>	%
Age	7.50	5.90	
Diagnosis			
ALL			56
Lymphoma			25
Neuroblastoma			10

Note.

* PCL-C = Posttraumatic Stress Disorder Checklist-Civilian Version; LEC=Life Events Checklist; ALL=Acute Lymphoblastic Leukemia.

Table 2

Correlations Table for Demographic Variables, PTSS and Hardiness (N = 27).

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Race/Ethnicity	--									
2. SES	-.16	--								
3. Age	.02	.02	--							
4. LEC	-.14	-.15	.11	--						
5. PCL-C - Diagnosis	-.08	.28	.15	.17	--					
6. PCL-C - 6 months	-.31	.39	.36	-.25	.53*	--				
7. PCL-C - 12 months	-.07	.25	.12	-.02	.78*	.63*	--			
8. Hardiness - Diagnosis	.02	-.17	.26	-.15	-.65**	-.27	-.45	--		
9. Hardiness - 6 month	.31	-.41	.20	-.29	-.53*	-.48*	-.26	.88***	--	
10. Hardiness - 12 month	-.03	-.39	.03	-.03	.61*	-.55*	-.49*	.87***	.80***	--

Note. PTSS = Posttraumatic Stress Symptoms; SES = Socio-Economic Status (higher scores = lower SES); LEC = Life Events Checklist; PCL-C = Posttraumatic Stress Symptom Checklist – Civilian Version; Diagnosis = At time of child's cancer diagnosis; 6-month = 6 months after child's cancer diagnosis; 12 month = 12 months after child's cancer diagnosis. Race/Ethnicity, 0 = Caucasian, 1 = African-American.

*
p < .05,

**
p < .005,

p < .001.

Table 3

Regression Analyses for Predicting PTSS and PTSS Clusters as a Function of Hardiness and Time (N = 27).

Dependent Variable	Predictor Variable	B	SE B	p
PTSS	Time	−0.68	1.24	.0018
	Time	−4.22	1.22	.0050
	Hardiness	−0.67	0.18	.0012
	Time	−18.47	8.31	.0474
	Hardiness	−0.70	0.18	.0005
	Time X Hardiness	0.17	0.10	.1048
Re-Experiencing	Time	−1.21	0.57	.0415
	Time	−1.55	0.60	.0154
	Hardiness	−0.14	0.04	.0047
	Time	−0.06	3.96	.9877
	Hardiness	−0.13	0.06	.0307
	Time X Hardiness	−0.02	0.05	.7045
Avoidance/Numbing	Time	−1.98	0.71	.0118
	Time	−1.80	0.77	.0267
	Hardiness	−0.26	0.06	.0004
	Time	−12.81	5.09	.0176
	Hardiness	−0.34	5.07	<.0001
	Time X Hardiness	0.13	0.06	.0368
Hyperarousal	Time	−1.06	0.47	.0294
	Time	−0.98	0.54	.0801
	Hardiness	−0.18	0.06	.0071
	Time	−1.13	3.64	.7582
	Hardiness	−0.18	0.07	.0112
	Time X Hardiness	0.01	0.04	.9694