

# Chapter 10

## Theoretical Perspectives of Post-Traumatic Stress Disorder and Quality of Life Among Young Adult Survivors of Childhood Cancer



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### Introduction

Children are particularly vulnerable to the effects of exposure to trauma, whether physical or emotional. In “Children and Trauma: An Update for Mental Health Professionals”, a report published by the American Psychological Association, a traumatic event is defined as “one that threatens injury, death, or the physical integrity of self or others and also causes horror, terror, or helplessness at the time it occurs (La Greca et al., 2009, p. 2).” Childhood cancer, from diagnosis to treatment and remission, constitutes such an event. The diagnosis itself is a threat to the child’s physical integrity and engenders fear and uncertainty. Furthermore, the process of undergoing treatment and testing often interrupts a child’s ability to engage in play and disrupts school attendance and other social interactions. Prolonged hospitalizations and the administration of sometimes painful treatments also contribute to a child’s suffering. Given the nature of such an experience and the broad spectrum of diagnoses and treatment modalities, an exploration of the presence, or lack thereof, of post-traumatic stress disorder (PTSD) symptoms in survivors of childhood cancer is warranted. Trauma-related symptoms observed in survivors include “avoidant behaviors, intrusive thoughts and heightened arousability” (Bruce, 2006). The purpose of this chapter is to investigate the prevalence of post-traumatic stress disorder symptoms among young adults who were diagnosed with cancer as children. Additional factors include the type of cancer and the treatment modality, as well as the perceived threat, age at diagnosis, gender, and family functioning. With advances in medical technology and therapies,

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increasing numbers of children survive cancer (Bruce, 2006; Tremolada, Bonichini, Basso, & Pillon, 2016). However, these children seldom receive sustained psychological care and support in the subsequent years. Psychological sequelae of childhood cancer may take years to manifest, and absence of care may result in poorer outcomes. Gaining a better understanding of the effect of childhood cancer on a child's growth and mental health years down the line may inform decisions regarding the care that must be provided to children who survive cancer as they proceed with their transition into early adulthood.

If the prevalence of PTSD symptoms among young adult survivors of childhood cancer is significantly higher than in the general population, this may signal a need for the allocation of resources for psychological care and support for children undergoing treatment and in the years following (Tremolada et al., 2016). Furthermore, a correlation between a treatment modality and a higher prevalence of PTSD symptoms may influence choice of treatment when there isn't a definite indication for a modality. Recognizing potential risks and resilience factors may help health-care workers monitor and moderate modifiable variables. PTSD symptoms are associated with reduced subjective quality of life, and this negative correlation has been demonstrated in both cross-sectional and longitudinal studies (Giacco, Matanov, & Priebe, 2013). Therefore, the importance of this chapter lies in the fact that working toward mitigating or preventing onset of these PTSD symptoms in survivors of childhood cancer will lead to improvements in subjective quality of life.

## Theoretical Perspectives

The relationship between childhood cancer and the development of post-traumatic stress symptoms in young adulthood has been examined within a framework of the *diathesis-stress model*. This model posits that “traumatic events function as stressors that interact with vulnerabilities to influence the development of PTSD” (Elwood, Mott, Williams, Lohr, & Schroeder, 2009, p. 544). Per this model, stressor events are primary activators of PTSD, but pre-trauma individual differences are important contributing factors. It therefore follows that “individuals who possess higher levels of psychological vulnerabilities before the traumatic experience are at a higher risk for the development of PTSD” (Elwood et al., 2009, p. 545). If a causality can be established between preexisting vulnerabilities and the development of post-traumatic stress symptoms, this can have important implications for prevention and treatment of PTSD, as the diathesis-stress model proposes that vulnerability factors also play a role in the maintenance of symptoms (Elwood et al., 2009). The concept of *cognitive vulnerability* emerged from this model, and cognitive theories were developed, notably the *shattered assumptions* theory, which proposes that a traumatic event *shatters* an individual's established worldview and perception of self and that the experience renders it quasi-impossible for the individual to reconcile pre-trauma beliefs with the new reality (Janoff-Bulman, 1992). Perceptions of

control and stability are disrupted by traumatic events, and the *psychological buffering* of the pre-trauma worldview, namely, the belief in “a just, benevolent, predictable world in which the individual possesses competence and worth”, is undermined (Edmondson et al., 2011, p. 1).

Similarly, the *terror management theory* suggests that individuals’ world views are protective and impart a sense of meaning, purpose, and invulnerability (Pyszczynski, Greenberg, & Solomon, 1999). The theory proposes a *psychological conflict* between the desire to live and awareness of one’s mortality and posits that “human awareness of the inevitability of death exerts a profound influence on diverse aspects of human thought, emotion, motivation, and behavior” (Pyszczynski, Solomon, & Greenberg, 2015, p. 2). The *anxiety disruption buffer theory* is an extension of the terror management theory, as “one of the most straightforward implications of TMT is that if a psychological structure serves an anxiety-buffering function, then increasing the strength of that entity should reduce anxiety in threatening situations” (Olson & Zanna, 2015, p. 9). Edmondson et al. (2011) tested the degree to which anxiety buffer parameters are disrupted in individuals who report clinically significant trauma symptoms. The results indicated compromised worldview functioning in individuals with significant trauma symptoms and revealed an inverse relationship between the degree of trauma symptoms and worldview functioning indicators such as self-esteem and meaning, implying impaired anxiety buffer functioning in individuals exhibiting trauma symptoms (Edmondson et al., 2011).

The *hopelessness theory* is one of the most prominent cognitive models of depression and has been employed extensively in the study of depression and cognitive vulnerability since its publication in 1989 by Abramson and colleagues (Liu, Kleiman, Nestor, et al., 2015). The hopelessness theory was initially a reformulation of the *learned helplessness hypothesis*, which postulates that “repeated exposure to uncontrollable and aversive environmental stimuli leads gradually to the belief that the aversive situation is inescapable and a sense of helplessness ensues regarding the situation” and that this sense of helplessness results in depression (Liu et al., 2015, p. 2). The learned helplessness theory did not explain, however, why the same stressors result in depression in some individuals and not others. The hopelessness theory was based on the premise of *negative attributional style* being a predictor of the development of psychopathologies like depression and PTSD. Abramson and colleagues hypothesized that “individuals form causal attributions along three different dimensions, from internal to external, stable to unstable, and from global to specific” and individuals who attribute negative events to internal, stable, and global causes are more susceptible to developing depression (Liu et al., 2015, p. 2). The association of negative attributional style with depression, supported by studies demonstrating increased frequency and severity of depressive symptoms, was then extended to include post-traumatic stress symptoms (Elwood et al., 2009, p. 546).

The concept of *anxiety sensitivity*, or *trait anxiety*, is concordant with the *cognitive vulnerability model* and describes a “stable, trait-like characteristic that functions as a vulnerability to the development and maintenance of anxious symptoms,”

which precipitates and maintains symptoms of PTSD (Elwood et al., 2009, p. 546). Therefore, not only does anxiety sensitivity predispose an individual to PTSD, but the anxiety prompted by the development of symptoms amplifies the feelings of fear and the need to avoid stimuli perceived as threatening, thus effectively exacerbating the panic symptomatology of PTSD (Fedroff, Taylor, Asmundson, et al., 2000). This theory has been supported by consistent findings of a strong association between anxiety sensitivity and PTSD symptoms and higher levels of reported anxiety sensitivity in PTSD groups compared to non-PTSD groups, establishing anxiety sensitivity as a predictor of PTSD (Elwood et al., 2009).

The *social causation* and *social erosion* hypotheses are two models that are alternately used to interpret the relationship between social support and PTSD. Shallcross and colleagues tested these competing models by conducting separate analyses on measures of perceived social support and PTSD components of intrusion, avoidance, hyper-arousal, and dysphoria, as well as overall PTSD symptoms, and obtained results that supported both models, thus suggesting that “PTSD-specific symptom dimensions may both erode and be influenced by social support, whereas general psychological distress erodes social support” (Shallcross, Arbisi, Polusny, Kramer, & Erbes, 2016, p. 167). *Social causation* infers that lack of social support predisposes individuals to PTSD symptomatology. This model is based on “the fundamental assumption that support resources are critical antecedents of well-being, and a lack of social support precedes, and contributes to, increases in psychological distress” (Shallcross et al., 2016, p. 167). *Social erosion*, on the other hand, theorizes that “social support is itself determined by mental health and distress” (p. 167). The *social erosion hypothesis* is also referred to as *social selection*, as the supposition is that individuals are *selected*, or more importantly *not selected*, for inclusion in social groups based on determinants like mental health and overall well-being. Kaniasty and Norris (2008) summarize this concept aptly:

In the domain of social support, social selection means that healthy individuals are selected (or welcomed) into thriving social relationships. Conversely, persons with psychological distress may experience a decline in their social support resources. (p. 274)

The *drift hypothesis* is analogous to the social erosion/social selection hypothesis in that it emphasizes the effect of mental illness on the individual’s social relationships and ultimately the individual’s downward shift in socioeconomic strata. Untethered to strong social relationships and forced to endure loss of income due to their illness, individuals experience a marked downward social mobility. In fact, “the inverse relationship between social class and the occurrence of mental disorders is one of the most well established in the field of mental health epidemiology” (Perry, 1996, p. 17). Goldberg and Morrison (1963) conducted a study to examine the effect of schizophrenia on patients’ socioeconomic status and documented a “drift toward inactivity” as they observed that “Slowly their occupational status worsen[ed] and the breadth and mixture of jobs shrink[ed] continually” (p. 796). The study also examined the distribution of the fathers of schizophrenic patients by occupation and found a normal distribution; however, the authors note that “the finding that the fathers of schizophrenic patients represent a

typical occupational cross section of the community in which they live and that they have, on the whole, steady and solid work careers, does not imply that they are particularly well adjusted in other respects; that family relationships were undisturbed or, in particular, that their relations with their sick sons were positive” (Goldberg & Morrison, 1963, p. 798).

## Gender and Trauma

Being female is often positioned as a putative risk factor for PTSS in childhood cancer survivors, and its association with trauma-related symptomatology is meticulously analyzed. This is to be expected given the long history of research regarding gender and trauma. In a quantitative review of 25 years of research on sex differences in trauma and PTSD, a twofold risk of PTSD among female participants compared with male participants was observed (Tolin & Foa, 2006). In this study, a meta-analysis of sex differences in the prevalence of potentially traumatic events (PTE) revealed that male participants were significantly more likely to report a PTE than female participants. It was hypothesized that “compared with male participants, female participants are more likely to experience certain types of PTE that are disproportionately likely to lead to PTSD” (p. 964). Tolin and Foa (2006) concluded their analysis as follows:

With regard to the question of whether female participants are more likely than male participants to meet diagnostic criteria for PTSD, we found that regardless of the type of study, population, type of assessment, or other methodological variables, women and girls are more likely than men and boys to meet criteria for PTSD. This is consistent with epidemiological research showing a higher prevalence of fear- and anxiety-based disorders in general among female respondents. (p. 977)

In regard to young adult survivors of childhood cancer, numerous studies have confirmed female gender as a strong predictor of PTSS (Hobbie et al., 2000; Kamibeppu et al., 2015; Langeveld et al., 2004; Tremolada et al., 2016). In a study aimed at identifying factors associated with post-traumatic stress symptoms among 185 young adult Japanese childhood cancer survivors, multiple regression analysis revealed an association between being female and an increased risk of PTSS (Kamibeppu et al., 2015). These findings are consistent with the portrait of PTSD in the general population, as “one of the most consistent findings in the epidemiology of post-traumatic stress disorder (PTSD) is the higher risk of this disorder in women” (Olf, Langeland, Draijer, & Gersons, 2007, p. 183). Kamibeppu et al. (2015) found that “although being female, older at the time of diagnosis, and having late effects emerged as risk factors for PTSS, symptoms were maintained at low levels if family functioning was high” (p. 539). This observation suggests that family functioning also plays an important role in predicting post-traumatic stress symptoms, which will be discussed in the next section.

## Family Functioning and Perceived Social Support

The inverse association between perceived social support and PTSD has been documented extensively in trauma research (Brewin, Andrews, & Valentine, 2000; Clapp & Beck, 2009; Ozer, Best, Lipsey, & Weiss, 2003). Furthermore, the literature on social support suggests that individuals' perceptions of their social networks and the support offered to them by these networks play a role in whether these individuals seek out and make use of social resources (Tolsdorf, 1976). The results that have solidified the association between PTSD and social support, for example, the meta-analysis conducted by Ozer et al. (2003), have been interpreted within the framework of the *stress-buffering model*, which was elaborated by Cohen and Wills in 1985 (Clapp & Beck, 2009). In their article, Cohen and Wills sought to determine whether the association between social support and overall well-being is attributable to the overall benefit derived from the support (direct model) or the process of the support protecting individuals from the effects of stressful experiences (buffering model) (Cohen & Wills, 1985). The *direct effect model* implies that the positive effect of social support on well-being is derived irrespective of whether the individual is under stress, whereas the buffering model implies a protective effect; the "theoretical and practical implications" of these processes on the design of interventions are what led Cohen and Wills (1985) to analyze the evidence supporting each theory (p. 313). Although the buffering model is not specific to traumatic stress as such, the premise of the stress-buffering model is that support offered by one's social networks helps the individual cope with stressful events and "buffer against the development of stress-related psychopathology" (Clapp & Beck, 2009, p. 2).

In light of the aforementioned, many studies evaluating the predicting factors of post-traumatic symptoms in young adult survivors of childhood cancer include social support and family functioning as potential contributing factors. In the study conducted by Kamibeppu et al. (2015), family functioning was determined to be "the strongest predictor among several factors found to be associated with PTSS" (p. 539). Tremolada et al. (2016) used the Multidimensional Scale of Perceived Social Support (MSPSS) to measure the "instrumental and emotional social support provided by family, friends, and significant others" (p. 5). The results of this study identified global perceived social support reported by the former patients as an important modifiable predictor of PTSS; single relationship status was associated with higher risk of avoidance symptoms, suggesting that "fewer relationships with others impacted negatively on psychological wellbeing" (Tremolada et al., 2016, p. 6).

In a study aimed primarily at investigating family functioning as well as the relationship between family functioning and post-traumatic stress disorder in young adolescent survivors of childhood cancer, Alderfer, Navsaria, and Kazak (2009) administered a structured diagnostic interview to 144 adolescent cancer survivors (1–12 years post-cancer treatment) and instructed all 144 participants and their parents to complete a Family Assessment Device. The results indicated that 47% of the adolescents, 25% of the mothers, and 30% of the fathers reported poor family

functioning; family functioning was poorer in families in which the adolescent cancer survivor met PTSD diagnostic criteria (8%) and three-fourths of the adolescents with PTSD belonged to families with low family functioning scores, making adolescents with PTSD five times more likely to emerge from a poorly functioning family (p. 1). The authors concluded that family functioning plays a role in traumatic stress reactions of adolescent childhood cancer survivors (Alderfer, Navsaria, & Kazak, 2009). Although this study pertained strictly to the potentially traumatic experience of childhood cancer, the trauma literature suggests that family functioning plays a role across a range of traumatic events (Meiser-Stedman, Yule, Dalgleish, et al., 2006).

## Treatment Type and Intensity

Several studies examining the relationship between childhood cancer and PTSD in young adults have also investigated the effect of treatment type and intensity on frequency and severity of post-traumatic stress symptoms, yielding inconsistent results (Brown, Madan-Swain, & Lambert, 2003; Kamibeppu et al., 2015; Rourke, Hobbie, Schwartz, et al., 2007). Brown et al. (2003) computed a disease severity index using medical records, and the average of two independent ratings, one provided by each survivor's primary oncologist and the other provided by another oncologist familiar with the diagnosis and treatment, found that "severity of disease (i.e., number of medical late effects) accounted for a marginally significant portion of the variance in PTSD symptoms for survivors (9%)" (Brown et al., 2003, p. 316). Rourke et al. (2007) examined severable variables relating to treatment and disease, notably diagnosis, time of treatment, and intensity of treatment and severity of medical late effects assessed by the provider. To quantify treatment intensity, the Intensity of Treatment Rating Scale was employed, "rat[ing] the intensity of the cancer treatment protocols based on Children's Oncology Group (COG) protocol number, medications, and treatment modalities" (Rourke et al., 2007, p. 178). The assessment of intensity for each patient was conducted blindly and independently by a pediatric oncologist and a pediatric oncology nurse practitioner, and the raters convened and agreed on a rating in cases where their original assessments were incongruous; data on medical late effects were assessed and rated by the same oncologist and nurse practitioner (Rourke et al., 2007). The results of this study revealed no significant difference between the two groups (survivors with and without PTSD) in terms of objective measurements of treatment intensity, leading the authors to note that "although more intensive treatment protocols might result in more "exposure" to traumatic events (e.g., more intensive treatments, more hospitalizations, and emergency clinic visits or admissions), the findings highlight the important of subjective appraisals of life events as more predictive of distress than objective medical criteria" (Rourke et al., 2007, p. 181). A different study conducted by Kamibeppu and colleagues (2015) did not find a significant association between treatment intensity, as evaluated by the second version of the Intensity of



Treatment Rating Scale (ITR-2), and post-traumatic stress symptoms and also suggested that the perceived treatment intensity, “rather than treatment modalities or objective treatment intensity,” may be associated with PTSS (Kamibepu et al., 2015, p. 540).

## Post-Traumatic Growth

In recent years, investigations of PTSS among young adult survivors of childhood cancer have begun to consider the concept of personal growth resulting from trauma and its association with post-traumatic stress symptoms (Klosky et al., 2014). *Post-traumatic growth*, or PTG, “refers to the positive changes resulting from the struggle with a traumatic event, and not to the changes caused by the event itself,” and has been used interchangeable with the concept of *benefit finding* (Klosky et al., 2014, p. 879). Benefit finding is defined as “the process of deriving positive growth from adversity” and has been a key concept in the development of the positive psychology approach (Cassidy, McLaughlin, & Giles, 2014, p. 268). For there to be post-traumatic growth, the traumatic event must have been sufficiently stressful to “challenge the individual’s worldview and precipitate a rethinking or reordering of priorities” (Klosky et al., 2014, p. 879). This is comparable to the *shattered assumptions theory* in that the traumatic event is considered to constitute a disruption to the individual’s pre-trauma perspective. The Post-traumatic Growth Inventory is used to assess post-traumatic growth through five different components (relating to others, new possibilities, personal strength, spiritual change, and appreciation of life) and generates a total score, in which a higher score delineates greater post-traumatic growth (Klosky et al., 2014). This score was used by Klosky et al. (2014) to evaluate the association between post-traumatic growth and post-traumatic stress symptoms, with results “suggesting a weak, but positive, relationship between these two constructs” (p. 880). A different study evaluating post-traumatic growth and post-traumatic stress symptoms in 223 childhood cancer survivors identified “significant associations between PTG and PTSS” (Tremolada et al., 2016, p. 5).

Yi and Kim (2014) used the Post-traumatic Growth Inventory (PTGI) and the Post-traumatic Stress Diagnostic Scale (PDS) to analyze the relationship between post-traumatic stress and post-traumatic growth and found that “PDS was negatively associated with the total PTGI” with greater levels of PDS related to lower levels of PTGI (p. 464). Yi and Kim (2014) evoked the *stress theory* (recall the diathesis-stress theory) as a potential explanation for these findings, given that the stress theory proposes that post-traumatic stress is detrimental to human functioning and quality of life and thus “cannot be linked to growth experiences” (p. 464). In an exploration of post-traumatic growth in cancer specifically, Sumalla, Ochoa, and Blanco (2009) surmised that “the characteristics of cancer, such as the difficulty in identifying a sole stressor, the internal nature of the illness, the temporal orientation with the subject’s fears focused on the future as well as obvious traumatic memories, the practical impossibility of establishing the onset and termination of the traumatic



event, together with differences in perceived control, all justify the differential clinical setting of cancer as a chronic extreme stressor” (p. 32). Therefore, the fundamental differences between cancer and other kinds of trauma may explain the negative, linear PTSD/PTG relationship observed in this study (Yi & Kim, 2014).

## Age at Diagnosis

It is often hypothesized that a younger age at diagnosis of cancer is a risk factor for the development of PTSD, and many studies investigating the prevalence of post-traumatic stress symptoms in young adult survivors of childhood cancer have put this assumption to the test (Tremolada et al., 2016; Rourke et al., 2007; Kunin-Batson et al., 2011; Klosky et al., 2014; etc.). In their study, Kamibeppu and colleagues (2015) obtained a significant association between the interaction of age at diagnosis with family function and PTSS. Rourke et al. (2007) established age at diagnosis as a significant predictor of PTSD in a model combining trait anxiety, female gender, and other variables related to the individual’s subjective perceptions of the impact of cancer (intensity, life threat, etc.), with this model yielding an overall success rate of 89.4% (p. 180). Rourke et al. (2007) stipulate, however, that “odds ratios for the significant predictors are small[,] indicating small changes in the likelihood of a PTSD diagnosis with a one-unit change in each variable” (p. 180). Yi and Kim (2014), while investigating the relationship between post-traumatic stress and post-traumatic growth in childhood cancer survivors, found that “older age and shorter time since diagnosis were associated with the higher levels of the total PTGI” (P. 464). This follows their finding of a negative association between PTGI and PTSD, which may suggest that younger age at diagnosis is associated with a higher severity of post-traumatic stress symptoms. Similarly, Klosky and colleagues found that survivors diagnosed at 5 years old and above “were between 1.4 [to] 2.1 times more likely to report increases in PTG” (Klosky et al., 2014, p. 880). In a study evaluating the independent living status of adult survivors of childhood cancer, it was revealed that “survivors who were at least 12 years of age at diagnosis were more than twice as likely to live independently than those diagnosed and treated prior to 6 years of age” (Kunin-Batson et al., 2011, p. 1200).

## Prevalence of Post-Traumatic Stress Symptoms

A multitude of studies have demonstrated the prevalence of post-traumatic stress symptomatology in young adult survivors of childhood cancer (Hobbie et al., 2000; Brown et al., 2003; Rourke et al., 2007; Yi & Kim, 2014; Klosky et al., 2014; Kamibeppu et al., 2015; Tremolada et al., 2016). Hobbie and colleagues (2000) assessed 78 young adults aged 18 to 40 years and concluded that one-fifth of the sample of survivors met criteria for PTSD diagnosis. Brown et al. (2003)

found that although none of the participants met DSM-III-R criteria for PTSD diagnosis, “survivors endorsed a greater frequency of stressful life events and PTSD symptoms than their healthy counterparts” (Brown et al., 2003, p. 315). Another study, conducted by Rourke et al. (2007), revealed that 16% of the sample of young adult survivors of childhood cancer met the diagnostic criteria of PTSD (Rourke et al., 2007). Yi and Kim (2014) used a sample of relatively long-term survivors to evaluate the relationship between post-traumatic stress and post-traumatic growth in survivors of childhood cancer. Although none of the survivors met clinically significant levels of post-traumatic stress, 64.3% of the sample reported mild symptoms, and 26.3% reported moderate symptoms. Long-term survivors were recruited in order to allow the evaluation of post-traumatic growth, which may explain these findings given that “the prevalence of PTSD symptoms seems to decline considerably for the majority of survivors 3 months post-diagnosis or following treatment completion” (Yi & Kim, 2014, p. 465). A comparable study performed by Klosky et al. (2014) used a sample of long-term survivors of child cancer to determine the association between post-traumatic stress and post-traumatic growth and reported that over 71% of the participants experience some post-traumatic stress symptoms (Klosky et al., 2014). Kamibeppu and colleagues sought to identify predictors of PTSS among adolescent survivors of childhood cancer and found that 20.7% of the sample had IES-R-J (Impact of Event Scale-Revised; a tool used for evaluation of PTSD criteria) total scores that exceeded the cutoff point for diagnosis of PTSD (Kamibeppu, 2015). Tremolada and colleagues recruited 223 young adult survivors of childhood cancer, 9.4% of whom exhibited clinical PTSD symptomatology and 11.2% subclinical symptomatology (Tremolada et al., 2016, p. 5).

## **Implications for Subjective Quality of Life (SQOL) and Independence**

The association between post-traumatic stress disorder and subjective quality of life has been established empirically, with patients with PTSD consistently reporting a poorer subjective quality of life than those with other anxiety disorders (Giacco et al., 2013). Subjective quality of life is defined as “the patient’s satisfaction with life in general and with a number of major life domains” (p. 1). Giacco et al. (2013) documented a progressive and significant improvement of subjective quality of life associated with reduction of PTSD symptoms and discovered a bidirectional association between SQOL and hyperarousal symptoms of PTSD (Giacco et al., 2013). Kunin-Batson and colleagues assessed the independent living status of survivors of childhood cancer and found that “adult survivors of childhood cancer who experience neurocognitive, psychological, or physical late effects are less likely to live independently as adults” (Kunin-Batson et al., 2011, p. 1197). Considering that “a significant subset of young adult survivors of childhood cancer

experience symptoms of post-traumatic stress and other psychological difficulties” and that these symptoms have been shown to affect individuals’ quality of life and their ability to live independently years down the line, “health care providers can alleviate ongoing cancer-related distress and promote competence” by addressing these issues and anticipating the potential psychological sequelae of childhood cancer survival (Hobbie et al., 2000, p. 4065).

## Conclusions

The *diathesis-stress model*, along with the ensuing theories based on *cognitive vulnerability*, succeeds in accounting for both the stressor event and an individual’s vulnerability to stress, as determining factors in the development of post-traumatic stress symptoms. It provides a framework for understanding the development of post-traumatic stress symptoms following a traumatic event while allowing for individual variability in regard to vulnerability and predisposition to anxiety and post-traumatic stress. This model allows us to examine the different factors that precipitate the development of symptoms following the experience of childhood cancer. Although to varying degrees, the studies examined for the purpose of this chapter have all confirmed the prevalence of post-traumatic stress symptoms in young adult survivors of childhood cancer. The results suggest that a younger age at diagnosis may be a predictor of greater severity of symptoms, and one study evaluating the independent living status of adult survivors of childhood cancer found a correlation between age at diagnosis and independent living (Kunin-Batson et al., 2011). Furthermore, the different studies examining the relationship between treatment intensity and post-traumatic stress symptoms concluded that perceived, or subjective, treatment intensity plays a more important role in influencing severity of symptoms than the treatment intensity measured with the use of objective medical criteria (Kamibepu et al., 2015; Rourke et al., 2007).

The *social causation* and *social erosion* models seem to accurately interpret the complex dynamic of social support and psychological stress, as there is evidence to support both models. The inverse association between post-traumatic stress symptoms and social support has been reported on extensively. It stands to reason that individuals with less support following a traumatic experience would fare worse than their counterparts with adequate support and resources available to them. This has been confirmed by Ozer and colleagues (2003) in a meta-analytic study. In their study evaluating the prevalence of post-traumatic symptoms in young adult survivors of childhood cancer, Kamibepu et al. (2015) propose social support and family functioning as potential contributing factors and find family functioning to be “the strongest predictor” of symptoms. Other studies examining this factor reached similar conclusions (Alderfer, Navsaria, & Kazak, 2009; Tremolada et al., 2016).

The studies reviewed overwhelmingly demonstrate a higher prevalence of post-traumatic stress symptoms among young adult survivors of childhood cancer (Hobbie et al., 2000; Brown et al., 2003; Rourke et al., 2007; Yi & Kim, 2014;

Klosky et al., 2014; Kamibeppu et al., 2015; Tremolada et al., 2016). This has serious implications for the quality of life of survivors, given the demonstrated association between post-traumatic stress and poorer subjective quality of life (Giacco et al., 2013). The aforementioned results and their implications on subjective quality of life can inform health policy makers and health-care professionals in regard to the prevention and treatment of post-traumatic stress symptoms with the ultimate goal of improving survivors' subjective quality of life.

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