MODELS OF PSYCHOLOGICAL ADJUSTMENT IN ADOLESCENT CANCER SURVIVORS

by

MICHAEL PAUL PAPSDORF

B.A. (Honours), The University of Calgary, 1994
M.A., The University of British Columbia, 1997

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Abstract

Previous research on pediatric cancer populations has reported considerable variability in psychological adjustment. The present study was designed to examine different models of predicting adjustment in adolescent cancer survivors. In particular, this study sought to clarify the role of child factors (i.e., personality, appraisal, and coping) in predicting self-esteem and psychological distress while controlling for more established predictors, such as disease, family, and support variables. Additive and moderated mediational models of prediction were tested in a mail-out questionnaire study with a sample of 65 adolescent survivor-parent dyads. Support was obtained for an additive model in which optimism, peer support, and age at diagnosis predicted significant variance in self-esteem while controlling other factors. Support was also obtained for an additive model in which neuroticism and a disengagement coping strategy, cognitive avoidance, predicted significant variance above and beyond family, support, and disease covariates. The hypothesized moderated mediational models were not supported; however, support for a simpler model, in which cognitive avoidance partially mediated the relationship between neuroticism and psychological distress was obtained. Results of this study underscore the importance of considering child factors, which have largely been neglected in previous research, in predicting adjustment in pediatric cancer survivors. In particular, the results of the present study help to paint a picture of what a more resilient adolescent cancer survivor might look like. This adolescent would be lower in neuroticism, higher in optimism, and would engage in less cognitive avoidance and possibly less protective buffering, as trying to keep his or her distress from others may actually be detrimental to the adolescent. Finally, he or she would have a close and
supportive peer network and a higher functioning, less distressed family. Research and clinical implications of these findings are discussed.
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Dedication

I dedicate my dissertation to:

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Introduction

Rule 29. It's okay to be sad. It's okay to be mad. It's okay to cry. It's okay to laugh.
Ross, age 7, survivor of Burkitt's lymphoma¹

Approximately 1400 Canadians under the age of 20 are diagnosed with some form of cancer every year (Canadian Cancer Society, 1995-2004). Fortunately, this diagnosis is no longer necessarily a death sentence. Over the past three decades, advances in the chemical, surgical, and radiologic treatment of childhood² cancer have dramatically improved the likelihood of survival. For example, the mortality rates of four of the most common types of pediatric cancer, acute lymphoblastic leukemia (ALL), Hodgkin’s disease, non-Hodgkin’s lymphoma, and cancer of the soft tissues, have all decreased by more than 50% since 1973 (Bleyer, 1990, 1993; Canadian Cancer Society, 2003).

Currently, almost 80% of children and adolescents diagnosed with cancer survive into adulthood and as of January 1, 2000, an estimated 1 in every 1500 North Americans was a survivor of childhood cancer (Ries et al., 2003). These developments have precipitated a dramatic shift in psychosocial research in pediatric oncology. The focus has moved from examining the experiences of dying children and their parents to understanding how patients and their families cope with the disease, its treatment, and its long-term sequelae.

Despite significant advances in biological therapies, cancer and its treatment bring a host of stressors and challenges. The children and their families must endure the emotional shock of receiving the diagnosis (Granowetter, 1994) and adapt to the new roles thrust upon them by the diagnosis (Chesler & Barbarin, 1987). The children must

¹ Excerpt from "Kids with Courage: Stories about Growing up with Cancer".
² To date, most of the research on cancer in children has examined participants representing a wide range of ages. For example, it is not uncommon for studies to have an age range from 2 to 17 years (Kazak, 1994). For this reason, unless otherwise noted, the terms, “children”, “childhood”, and “pediatric”, will be used to
endure painful medical procedures, such as lumbar punctures and bone marrow
aspirations, and many unpleasant treatment side effects, including nausea, vomiting,
fatigue, and hair loss (Granowetter, 1994). They also face considerable uncertainty about
their future. Regardless of how optimistic the prognosis, there is always the possibility
that the child might die (Van Dongen-Melman & Sanders-Woudstra, 1986). Moreover,
even when they are “cured”, these children must live with the possibility of a later relapse
or a second malignancy, as they have a 10 to 20 times greater incidence of subsequent
malignancies than healthy children (Byrd, 1985).

Long after treatment has ended, many childhood cancer survivors are still feeling its
effects (i.e., the "late effects" of treatment). For example, problems with several major
organ systems, as well as reproductive and growth impairments, are not uncommon (see
There is also an extensive literature on cognitive, neuropsychological, and academic late
effects in children who have been treated for cancer, especially when the treatment
involves the central nervous system (see Brown & Madan-Swain, 1993, for a review).
These effects include impairments in memory, expressive and receptive language skills,
psychomotor problem solving, attention, and concentration. In addition, a sizable
percentage of survivors develop learning disabilities (Brown & Madan-Swain, 1993).

**Psychological Adjustment**

Although there is a wealth of knowledge regarding biological, cognitive, and
neuropsychological late effects, much less is known about the short- and long-term
impact of cancer on the psychological adjustment of children. What research has been

indicate both children and adolescents in this paper.
done in this area has examined both the global construct of psychological adjustment and some of the more specific components of the construct, including symptoms of anxiety and depression, and self-concept or esteem (Eiser, Hill, & Vance, 2000; Langeveld, Stam, Grootenhuis, & Last, 2002). This research is reviewed below.

Global Adjustment

At present, there is considerable disagreement in the field about how well children adjust to cancer. Much of the controversy surrounds the relatively large number of studies that find children with cancer to be at least as well adjusted psychosocially as healthy children, and in many cases, better adjusted (e.g., Elkin, Phipps, Mulhern, & Fairclough, 1997; Kazak, Christakis, Alderfer, & Coiro, 1994). For example, some research examining global psychological functioning has found no differences between children with cancer or survivors of childhood cancer and healthy controls (e.g., Fritz & Williams, 1988; Gray et al., 1992; Noll et al., 1999; Wasserman, Thompson, Willmas, & Fairclough, 1987). Similarly, several studies have found normative or lower levels of psychiatric symptomatology in children and adolescents with cancer (Brown et al., 1992; Elkin et al., 1997). Survivors have also been reported to worry less about general health and self-image than healthy controls (Weigers, Chesler, Zebrack, & Goldman, 1998). Moreover, there is evidence to suggest that the positive adjustment of child and adolescent survivors of cancer can be observed over multiple follow-ups. For instance, a longitudinal study that followed a group of children and their families from diagnosis found positive adjustment scores at repeated follow-up assessments up to 10 years after treatment had ended (Kupst et al., 1995; Kupst & Schulman, 1988).
In marked contrast to the research discussed above, many studies find childhood cancer survivors to have significantly more adjustment difficulties than their healthy peers. For example, in a landmark study, Koocher and O'Malley (1981) conducted an extensive investigation of 117 long-term survivors of childhood cancer and their families. This study included multiple interviews and a battery of objective and projective assessment measures. Koocher and O'Malley found that almost half of the survivors (47%) reported at least “mild” adjustment problems and that, on average, the survivors scored significantly lower on measures of overall adjustment than a control group of survivors of other conditions (e.g., congenital cardiac defects, gangrene, thyroid toxicosis). The survivors also reported being less satisfied with themselves relative to the comparison group. Other studies of global psychological functioning in current pediatric patients and in survivors have also found significant problems in their samples (Boman & Bodegard, 1995; Madan-Swain et al., 1994). Finally, even studies that report generally favourable results estimate that 25 to 33 percent of pediatric oncology patients develop short- or long-term adjustment problems (e.g., Chang, Nesbit, Youngren, & Robison, 1987; Kupst et al., 1995).

In summary, studies of the global psychological adjustment of child and adolescent cancer patients have found very mixed results. Research examining more specific domains of functioning tends to find a similar pattern. The literature on several important aspects of psychological adjustment, including anxiety, depression, and self-esteem, is reviewed below.

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3 Such findings seem especially counterintuitive in light of the extensive literature on how difficult it is for
Anxiety

Research on anxiety in pediatric oncology samples has also found mixed results. For example, a number of studies have found no differences in state or trait anxiety levels between children with cancer, including children currently on treatment and long-term survivors, and their healthy peers (Allen, Newman, & Souhami, 1997; Radcliffe, Bennett, Kazak, Foley, & Phillips, 1996; Zeltzer & LeBaron, 1985). Several studies have even found significantly lower levels of anxiety in children and adolescents with cancer, relative to norms (Pfefferbaum, Adams, & Aceves, 1990) and to a healthy control group (Elkin et al., 1997). In a longitudinal study, Fife and colleagues (1987) followed a sample of children and adolescent cancer patients for a year after diagnosis and found consistently low levels of state and trait anxiety. Other research has found that child and adolescent survivors exhibited no more symptoms of posttraumatic stress disorder (PTSD; e.g., intrusive thoughts about the experience, distress associated with reminders) than a healthy comparison group, although parents of survivors reported more of these symptoms than parents of healthy children (Barakat et al., 1997; Kazak et al., 1997).

By contrast, some research suggests that children and adolescents with cancer are more anxious than they appear in the research discussed above. For example, different samples of survivors have reported experiencing more anxiety than healthy controls (Bauld, Anderson, & Arnold, 1998) and than an illness comparison group (Koocher & O’Malley, 1981). Similarly, following a specific cancer stressor, a bone marrow transplant (BMT), children and adolescents described themselves as significantly "more anxious" than they were before the transplant (Phipps, Brenner, et al., 1995; Phipps &
Converging evidence has also been reported in the literature on PTSD in children with cancer. A recent study found a significantly higher lifetime prevalence rate of PTSD in adolescent cancer patients (35%) than in physically abused (7%) or healthy “nonabused” adolescents (4%; Pelcovitz et al., 1998). Likewise, Butler and colleagues (1996) reported that 21% of their mixed sample of current patients and longer-term survivors met diagnostic criteria for PTSD. A more recent study of young adult survivors of childhood cancer reported a similar percentage (20.5%) who met diagnostic criteria for PTSD (Hobbie et al., 2000). Finally, elevated symptoms of PTSD have been reported at least a year after a BMT (Stuber, Nader, Yasuda, Pynoos, & Cohen, 1991).

**Depression**

The pattern of findings for depression is very similar to that of anxiety. Using a variety of measures, several studies have found few differences in depressive symptomatology or diagnoses between pediatric cancer patients (and long-term survivors) and age-matched controls (Allen et al., 1997; Gray et al., 1992, Mackie, Hill, Kondryn, & McNally, 2000; Noll et al., 1999). There is also some evidence that pediatric cancer patients may experience fewer symptoms of depression than both adults with cancer and healthy children (Canning, Canning, & Boyce, 1992; Kaplan, Busner, Weinhold, & Lenon, 1987; Radcliffe et al., 1996; Worchel et al., 1988). Moreover, some epidemiological studies have found the incidence of depression in adolescent cancer patients to be the same as adolescents in the general population, approximately 8% (Fritz & Williams, 1988; Mulhern, Fairclough, Douglas, & Smith, 1994). Finally, a frequently cited interview study by Teta and colleagues (1986) found the same incidence of
depression in long-term survivors of childhood cancer as their siblings, though this study was somewhat problematic⁴.

In contrast to the research discussed above, there is evidence that symptoms of depression may be more common in survivors of childhood cancer than was previously thought. An early study of these survivors (Kashani & Hakami, 1982) reported that a significantly higher percentage (17%) of the sample was depressed than in the general population of children (1.9%) and adolescents (4%; according to the Diagnostic and Statistical Manual of Mental Disorders – Third Edition [DSM-III; American Psychiatric Association, 1980] criteria). A more recent study also found elevated rates of depression, as well as alcoholism and suicide attempts, in young adult survivors relative to the general population (Lansky et al., 1986), though the authors regarded the absolute rates as low. Zeltzer and colleagues (1997) reported a similar finding based on a large sample (N=580) of adult survivors of childhood cancer. In that study, survivors exhibited significantly more symptoms of depression (as well as tension, anger, and confusion) than their siblings, though not enough to meet criteria for clinical depression. This result suggests that the symptoms of depression experienced by many children with cancer may endure for many years.

**Self-Concept / Self-Esteem**

In the past decade and a half, much of the research on the adjustment of pediatric cancer patients has come under criticism for its heavy emphasis on psychopathology and

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⁴ Although this study is among the most widely cited in the area, it had very significant limitations, most notably a sample that ranged in age from approximately 14 to 63 years and included individuals who had had cancer as far back as 1945. Individuals who had cancer such a long time ago are more likely to have been misdiagnosed and probably had very different illness and treatment experiences than they would have in the present.
negative aspects of adjustment (Chang, 1991; Eiser, 1998; Kazak, 1994; Zeltzer, 1993). It has been argued that healthy psychological adjustment is more than just the absence of distress (Kazak & Nachman, 1991; Luthar & Zigler, 1991) and that the focus on distress is only capturing a small part of the experience of these children. As such, it is important to examine positive aspects of adjustment or psychological well-being, such as self-concept and esteem.

Self-concept refers to an individual's "self-perceptions formed through experience with and interpretations of his or her environment" (Marsh & Hattie, 1996, p. 58). This construct, generally regarded as multidimensional and hierarchical (see Marsh & Hattie, 1996, for a review), is comprised of a global perception of oneself and perceptions of oneself in a number of more specific domains (e.g., academic, social, physical). These perceptions have both a descriptive (e.g., "what am I like?", "what qualities do I have?") and an evaluative component to them (e.g., "how positive or negative are these qualities?", "what am I good at?"). "Self-esteem", a term that is often used interchangeably with self-concept, refers to the evaluative component of these perceptions (Shavelson, Hubner, & Stanton, 1976).

Like the research on psychological distress (i.e., anxious and depressive symptoms) discussed above, much of the research comparing the self-esteem of children and adolescents with cancer to their healthy peers (or norms) has found few differences between the groups (Bauld et al., 1998; Felder-Puig et al., 1998; Gray et al., 1992; Noll, Bukowski, Davies, Koontz, & Kulkarni, 1993; Spirito et al., 1990). Several studies have even reported improvements in the self-concept of young cancer patients over the course of their illnesses (e.g., Chesler, Weigers, & Lawther, 1992). In one such study, over half
of the sample indicated that positive changes in themselves occurred because of their illness experience (Fritz & Williams, 1988). These changes included increased empathy, maturity, and confidence. Almost 75% of this sample also scored in the upper 3rd of the normative scale for Piers-Harris Self-Concept Scale (Fritz & Williams, 1988). Finally, survivors of childhood cancer have been found to report less self-criticism than controls (Madan-Swain et al., 1994).

In contrast, a number of studies have found a higher prevalence of self-concept concerns in children and adolescents with cancer. Body image concerns seem to be especially prevalent (Madan-Swain et al., 1994), even among individuals with relatively high global adjustment ratings (Fritz & Williams, 1988). Similarly, there is evidence to suggest that adolescents with cancer have less positive social and sexual self-concepts than their healthy peers (Stern, Norman, & Zevon, 1993). Longitudinal studies of child and adolescent BMT recipients describe similar results across a variety of self-concept domains. For example, patients saw themselves as less competent intellectually and less popular with their peers after their BMT (Phipps, Brenner, et al., 1995). They also reported an overall decline in happiness and self-esteem from pre-transplant levels. More generally, adolescents with cancer score significantly lower on measures of ego identity development (Gavaghan & Roach, 1987), suggesting that they may have difficulties even forming a coherent self-concept, let alone a positive one.

In sum, the results of the literature on the psychological adjustment of childhood cancer patients and survivors are extremely mixed. Some studies find significant adjustment difficulties, whereas others find few problems. A sizable number of studies even find these children to be better adjusted than their healthy peers. Nonetheless, even
authors who argue that these children are as well adjusted or better adjusted than their healthy peers acknowledge that their conclusions are based on comparisons between group means and as such, do not reflect the substantial variability between individuals within the groups. Moreover, as noted above, these authors agree that a significant subset (25-33%) of cancer survivors develops short or long-term adjustment difficulties (e.g., Chang et al., 1987; Kupst et al., 1995). However, relatively little is known about what characteristics distinguish this subset from the larger population of pediatric cancer survivors (i.e., what factors predict different adjustment outcomes).

The purpose of the present study was to examine different models of predicting psychological adjustment in adolescent cancer survivors and potentially account for some of the variability in outcomes reported in the literature. In particular, this study sought to clarify the role of child factors, which have largely been neglected in pediatric cancer research, in predicting adjustment while controlling for more established predictors. The present study differs from previous research and contributes to the broader pediatric cancer literature in multiple ways. First, this study appears to be among the first to examine personality dimensions in a pediatric cancer population or in children and adolescents with other chronic physical conditions (Wallander & Varni, 1998). Second, while some research has been done on other child factors (e.g., coping), the present study simultaneously incorporated or controlled for the important contextual factors of family functioning, peer support, and disease factors. Third, the present study is the first to apply the concept of protective buffering (discussed below), which has previously only been examined in the adult stress and coping literature, to a pediatric population. Finally, while previous studies have examined basic predictive models of psychological
adjustment in childhood cancer survivors (e.g., Frank et al., 1997), the present study appears to be the first to test a moderated mediational model of prediction, or even a more basic mediational model, in this population.

**Predictors of Adjustment**

Previous research on predictors of adjustment in children with cancer has considered a number of different factors. For example, following the adult cancer literature and the broader literature on predictors of psychological adjustment in children (Epping-Jordan et al., 1999; Garmezy, 1987; Schag et al., 1993), many pediatric cancer researchers have attempted to identify links between demographic variables and adjustment. However, this research has found few significant results. Only gender, socioeconomic status (SES), and ethnic or cultural background have received any noteworthy support and even the research on their effects is largely inconclusive. Of the few studies that have reported gender differences, girls were observed to have more adjustment concerns than boys (e.g., Hudson et al., 2003; Zeltzer et al., 1997). However, multiple studies finding no gender effects (e.g., Bauld et al., 1998; Frank, Blount, & Brown, 1997) and the very large sample sizes of the studies that have found effects (e.g., N=2916 in Hudson et al., 2003; N=580 in Zeltzer et al., 1997) suggest that the latter effects may be statistical artifacts rather than robust and meaningful findings. Similarly equivocal results have been found for SES, with several studies reporting it to significantly predict quality of life and other psychosocial outcomes (Kupst & Schulman, 1988; Zebrack et al., 2002) and several studies finding no such relationships (Bauld et al., 1998; Carpentieri, Mulhern, Douglas, Hanna, & Fairclough, 1993). At least one study found mixed results, reporting that SES did not predict anxious or depressive symptoms, but did predict externalizing symptoms
(Frank et al., 1997). Finally, studies of ethnic or cultural background in pediatric cancer samples typically find no relationship between this variable and adjustment (e.g., Carpentieri et al., 1993; Frank et al., 1997; Zeltzer & LeBaron, 1985).

Based on a comprehensive review of children and families coping with pediatric physical disorders (including cancer), Lavigne & Faier-Routman (1993) outlined four general factors other than demographics that influence children's responses to stressors such as serious illnesses (i.e., either promote or hinder resilience): child factors, family environment factors, social (support) factors, and disease-related factors. Each of these factors is discussed in turn.

**Disease-Related Factors**

Much of the research on the adjustment of children with cancer has examined a number of disease-related factors that might influence psychological well-being and distress. The first of these is disease severity. For example, the greater the degree of functional impairment or physical disability associated with the cancer, the more adjustment difficulties children tend to experience in the short- and long-term (Langeveld et al., 2002; Mulhern, Wasserman, Friedman, & Fairclough, 1989). In addition, the occurrence of relapses or second malignancies and the need for a second course of treatment also predict greater adjustment difficulties, including lower self-esteem and higher levels of trait anxiety (Fritz & Williams, 1988; Hockenberry-Eaton, Dilorio, & Kemp, 1995; Koocher & O'Malley, 1981; Langeveld et al., 2002). The length of the illness is also positively associated with the presence of such difficulties (Hockenberry-Eaton et al., 1995).
The duration, intensity, and type of the treatment received by the child also represent potential risk factors for adjustment difficulties. Children who require longer or more intense treatment or both have a heightened risk of adjustment difficulties (Mulhern et al., 1989). Related to this, childhood cancer survivors who suffer from more severe cognitive and academic late effects (i.e., impairments in functioning) of treatment appear to have a poorer self-concept and higher levels of depressive symptomatology than survivors who suffer from few or no late effects (Greenberg, Kazak, & Meadows, 1989). Cranial irradiation, which is associated with many such late effects, has also been associated with difficulties in psychosocial functioning (Mulhern et al., 1989). Conversely, children whose treatment is shorter and who experience fewer side effects appear to have fewer problems (Koocher & O’Malley, 1981).

Another related variable that is often cited as a potentially important predictor of adjustment in pediatric oncology populations is the child’s age at diagnosis. A number of studies have found that children who were older at diagnosis report a lower psychological and social quality of life (e.g., Barrera et al., 2003; Felder-Puig et al., 1998; Zebrack & Chesler, 2002), while those who were diagnosed and treated at an earlier age, especially preschool aged or younger, have significantly fewer difficulties than older children (Kazak et al., 1997; Koocher & O’Malley, 1981).

Although multiple studies have found evidence that disease variables predict adjustment in pediatric cancer patients, these findings are not unequivocal. For example, several studies have found no effect of age at diagnosis (e.g., Brown et al., 2003; Kazak et al., 1997) or the reverse effect, with children who were older at diagnosis reporting a more positive view of the present and future than younger children (Bauld et al., 1998).
and less anxiety (Frank et al., 1997). In terms of severity, a series of large-scale mail-out studies of childhood cancer survivors did not find a relationship between “objective” ratings of severity made by oncologists and adjustment⁵ (Hobbie et al., 2000; Stuber et al., 1997). Similarly, Grootenhuis and Last (2001) found no differences in psychological outcome between children who were on-treatment (and thus had a worse prognosis) and those who were in remission (and had a better prognosis). Trask and colleagues (2003) also did not observe a relationship between treatment status and psychological adjustment, nor did they find evidence of differences among the different cancer types, even for cancer types for which the prognosis is typically poor (e.g., Non-Hodgkin’s lymphoma, osteosarcoma). The latter finding replicates previous research in pediatric cancer survivors that has found little evidence for differences between different types of cancer (Apajasalo et al., 1996; Elkin et al., 1997). Some researchers have suggested that brain tumour survivors may have more difficulties (Eiser, Vance, Horne, Glaser, & Galvin, 2003), though the evidence for this is conflicting. In a recent review of the psychosocial adjustment of central nervous system (CNS) tumour survivors, the most robust difference was that these survivors are typically rated as less socially competent than survivors of other forms of cancer (Fuemmeler, Elkin, & Mullins, 2002). Results were mixed for both internalizing and externalizing (acting-out) problems.

Two variables that may have particular relevance for off-treatment survivors are time since diagnosis and time off treatment (Stam, Grootenhuis, & Last, 2002). However, the direction of the relationship between these variables and adjustment is currently unclear.

⁵ Interestingly, although no relationship was found between adjustment and objective severity, perceived severity (as rated by survivors and their parents) was a significant predictor of adjustment. The role of the child’s perception of the severity of their disease, a child factor, is further discussed below.
There is some evidence that the intensity of emotional reactions in survivors may decrease with increased time since diagnosis (Sawyer, Antoniou, Toogood, & Rice, 1997). Similarly, Levin-Newby and colleagues (2000) reported that time since the end of treatment was negatively associated with level of adjustment difficulties, such that fewer difficulties were associated with a longer period of time off-treatment. In contrast, a number of studies have failed to find similar effects (Apasjalo et al., 1996; Gray et al., 1992; Grootenhuis & Last, 2001) and some have found effects in the other direction (Anholt, Fritz, & Keener, 1993; Pendley, Dahlquist, & Dreyer, 1997), with a longer time since diagnosis and time off treatment being associated with more difficulties.

In sum, although they seem intuitively important, as a whole, disease factors play an uncertain role in the psychological adjustment of pediatric cancer survivors. Moreover, recent reviews of the literature have suggested that “objective” disease variables may be less important than more subjective variables like child factors, family functioning, and support in predicting adjustment in this population (Levin-Newby, Brown, Pawletko, Gold, & Whitt, 2000; Taieb et al., 2003; Zebrack & Chesler, 2001), though to date only one study has examined the relative contributions of some of these variables (Frank et al., 1997; discussed below).

**Family Functioning and Peer Support**

In addition to considering disease variables, an examination of psychological adjustment in childhood cancer survivors must take into account contextual factors, such as the family environment and external support network of the child, that may influence adjustment outcome (Compas, 1987; Garmezy, 1987). Of these factors, the impact of the family environment on adjustment has received considerably more attention in the
pediatric oncology literature. Most of this research has examined the functioning of the family as a whole. Not surprisingly, poorer family functioning is associated with higher levels of PTSD and depressive symptoms in pediatric cancer patients and survivors, as it is with children in general (Gizynski & Shapiro, 1990; Kazak et al., 1997). Similarly, family conflict predicts lower social competence following BMT and more behaviour problems both before and after BMT (Phipps & Mulhern, 1995). Conflict between adolescent cancer patients and their mothers appears to be particularly problematic for the patients (Manne & Miller, 1998). Conversely, greater family cohesion and expressiveness predict lower levels of psychological distress, higher self-esteem, and greater social competence among children and adolescents with cancer, including newly diagnosed children and BMT survivors (Phipps & Mulhern, 1995; Rait et al., 1992; Varni, Katz, Colegrove, & Dolgin, 1996). A stable family structure that provides support to the patients also predicts a milder stress response to cancer clinic visits, as measured by urine levels of epinephrine (Hockenberry-Eaton, Kemp, & Dilorio, 1994).

Research has also linked parents' psychological adjustment with the adjustment of child and adolescent cancer survivors (Frank et al., 1997; Sloper et al., 1994). For example, high levels of depressive symptomatology in mothers predicted high levels of symptomatology in their children in a sample of children and adolescents undergoing treatment for cancer (Mulhern et al., 1992). Similarly, mothers' and fathers' PTSD symptoms and self-reported distress are positively associated with their children's PTSD symptoms (Blotcky, Raczynski, Gurwitch, & Smith, 1985). Parents' psychological distress is also positively associated with emotional and behaviour problems in children with cancer (Sloper et al., 1994). On the positive side, parents' efforts to maintain family
integration, cooperation, and an optimistic view of the illness, as well as their own stability, appear to promote resilience in their children (Blotcky et al., 1985; Sanger, Copeland, & Davidson, 1991).

Less research has examined the impact of external support factors on the adjustment of pediatric cancer patients or longer-term survivors. In line with the broader literature on social support and adjustment in children (see Compas, 1987, and Sandler, Wolchik, MacKinnon, Ayers, & Roosa, 1997, for reviews), the psychological functioning of children with cancer is positively related to the perceived amount and quality of support received from individuals outside the family, especially their peers (Goodell, 1984; Hockenberry-Eaton et al., 1994). Children with cancer who believe that they have fewer close friendships and are less socially accepted tend to have more adjustment difficulties (Sloper et al., 1994). For example, in a group of children newly diagnosed with cancer, perceived support from classmates was strongly associated with fewer symptoms of depression and anxiety, and higher self-esteem (Varni, Katz, Colegrove, & Dolgin, 1994). A similar relationship has been found between social support and symptoms of PTSD in longer-term survivors of childhood cancer, with less support predicting more symptoms (Barakat et al., 1997). Thus, the support of others, in conjunction with support from the family, seems to attenuate the effects of cancer-related stressors.

In sum, much of the research on predictors of psychological adjustment in pediatric oncology populations has examined external variables, such as family functioning and peer support, and internal disease variables. The research on the external variables paints a relatively clear and coherent picture of the relationship between these variables and
adjustment; the research on disease variables is considerably murkier. And a key element in the prediction of the children’s adjustment is missing from much of this research – aspects of the children themselves.

**Child Factors**

It is somewhat surprising that research on children with cancer has paid so little attention to the relationship between child factors, such as personality, appraisal, and coping, and psychological adjustment (Stam, Grootenhuis, & Last, 2002). The small body of literature examining such factors in this population is reviewed below. Research from the broader literature on the role of child factors in other illnesses, as well as in “normal” populations, is also drawn upon where needed to provide a starting point for formulating predictions about the impact of these factors on the adjustment of pediatric cancer survivors.

**Personality**

Personality research on children and adolescents in general is in its infancy, so it is not surprising that to date no published studies have examined normal personality characteristics in a pediatric oncology population. The one study that purported to examine personality characteristics in this population (Chang et al., 1987) used a measure of “personality”, the parent-rated Personality Inventory for Children (PIC; Wirt, Lachar, Klinedinst, & Seat, 1984), that is actually a measure of psychological maladjustment (e.g., anxiety, depression, psychosis) rather than “normal personality”. Not surprisingly, these authors found that scores on the PIC predicted symptoms of anxiety (on the Minnesota Multiphasic Personality Inventory [MMPI], Hathaway & McKinley, 1967) in

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6 Interestingly, perceived support from parents and from teachers was not related to these outcomes.
their sample; however, because the PIC assesses maladjustment, this finding is more a reflection of the convergent validity of the PIC rather than a theoretically interesting relationship.

A recent study by Barrera and colleagues (2003) offered somewhat more relevant information in its examination of temperament, which is “often considered one of the early building blocks of personality” (Mash & Wolfe, 2002, p. 38), in pediatric cancer patients. Temperament has been defined as a child’s organized style of behaviour that appears early in development and shapes his or her interactions with the environment and vice versa (Rothbart & Bates, 1998). The primary finding of the Barrera and colleagues study was that an “easy” temperament (i.e., describes a child who is generally approachable, adaptable, and adequately self-regulated; Rothbart & Mauro, 1990) predicts better psychological adjustment. Conversely, in the broader literature on temperament, a “difficult” temperament, which is characterized by high levels of negative affect and a heightened sensitivity to negative environmental cues, has been shown to predict higher levels of internalizing and externalizing problems (Eisenberg et al., 2000; Lengua, West, & Sandler, 1998; Rothbart & Bates, 1998). This finding closely parallels observations from the work with neuroticism discussed below.

The “Five Factor” Model of Personality. An examination of the small but growing literature on personality in healthy children may shed some light on the relationship between personality variables and adjustment in children with cancer. Recent work in this area has applied the dominant model of personality in adults, the Five Factor model (McCrae & Costa, 2003), to adolescents and provides a starting point for such an examination. As the name implies, this model is composed of five personality
dimensions, neuroticism, agreeableness, extraversion, conscientiousness, and openness (Lounsbury et al., in press). Neuroticism reflects a continuum from individuals who are more emotionally stable and resilient with low levels of negative affect, to individuals high in negative affect and emotional lability. The dimension of agreeableness ranges from a general lack of concern for interpersonal harmony, along with more oppositional and argumentative behaviour, to a tendency to interact with others in a harmonious manner, and to be more accepting, helpful, cooperative, and easygoing. The third dimension, extraversion, represents a continuum from introverted, quiet, and reserved individuals with smaller, but more intense social networks, to more sociable, outgoing, and talkative individuals who have larger and more diverse social networks. Individuals low on the fourth dimension, conscientiousness, tend to be characterized as non-conforming, more spontaneous, and preferring a lack of structure; in contrast, individuals who are high on conscientiousness are described as reliable, trustworthy, disciplined, and organized, with a preference for structured settings. The final dimension, openness, ranges from a strong preference for stability and convention, to a willingness or desire to experience change, new learning, and novel experiences.

Studies of the links between the Five Factors and adjustment have focused mostly on neuroticism, and found a robust association between this dimension and adjustment difficulties, particularly anxiety and depression, in children (Hoffman, Levy-Shiff, & Malinski, 1996; Richman, Sallee, & Folley, 1996) and adolescents (del Barrio, Moreno-Rosset, Lopez-Martinez, & Olmedo, 1997; Hoffman et al., 1996; Lackovic-Grgin & Dekovic, 1991), as well as in adults (Bolger, 1990; Bolger & Zuckerman, 1995). Not surprisingly, higher levels of neuroticism also predict lower levels of happiness (Cheng &
Furnham, 2002). These findings are consistent with the research on difficult temperaments described above, which is not surprising given the similarities between this dimension and neuroticism.

The other Five Factor dimension that has received some attention in children and adolescents is extraversion. This dimension has been found to predict adjustment in the opposite direction to that of neuroticism, with higher extraversion predicting better adjustment. In particular, adolescents who score highly on extraversion tend to report greater happiness and higher self-esteem (Cheng & Furnham, 2002). In terms of maladjustment, Richman and colleagues (1996) conducted a study comparing children who had been diagnosed with an anxiety disorder to nonanxious control children and noted that the anxiety disorder group scored significantly lower on extraversion than the controls. Similarly, the few studies of extraversion and depression have found an inverse relationship between the two constructs with higher levels of extraversion predicting lower levels of depressive symptomatology (e.g., del Barrio et al., 1997).

Relatively little research has been done on the remaining three factors, even in adults (Hewitt & Flett, 1996), and there appear to be few if any published studies linking agreeableness, openness, and conscientiousness to adjustment in younger populations. Of the research that has been done, most studies have focused on other forms of psychosocial adjustment. For example, agreeableness has been associated with social adjustment and behavioural conduct in adolescents, particularly lower rates of aggression and interpersonal conflict (Gleason, Jensen-Campbell, & Richardson, 2004; Hair & Graziano, 2003). Openness and conscientiousness have been linked primarily to academic adjustment outcomes (e.g., Barbaranelli, Caprara, Rabasca, & Pastorelli, 2003), rather
than psychological adjustment outcomes. Because these three Five Factor dimensions
tend to be linked to different outcomes than those considered in the present study, they
were not used in this study.

Dispositional Optimism / Pessimism. A personality dimension from “outside” the
Five Factor model, optimism, may also be relevant to the psychological adjustment of
pediatric cancer survivors. Optimism and pessimism have been conceptualized as
opposite ends of a unidimensional continuum of expectations for the future.
Dispositional optimism is a stable tendency to expect that one will generally experience
positive instead of negative outcomes in life; conversely, dispositional pessimism is a
tendency to expect future outcomes to be more negative than positive (Chang, 2001;
Scheier, Carver, & Bridges, 2001).

As with the literature on other personality characteristics, there have been few studies
that have looked at optimism in pediatric oncology populations. The results of these
studies have found a positive outlook on life and the ability to identify positive aspects of
the cancer experience to be related to better global adjustment and fewer general health
worries in adolescent and young adult long-term survivors (Fritz & Williams, 1988;
Zebrack and Chesler, 2001). Conversely, a pessimistic attributional style, in which
internal, stable, and global attributions for negative events are made, was associated with
more symptoms of anxiety and depression in both on and off-treatment children (Frank et
al., 1997).

Research on the relationship between dispositional optimism and psychological
adjustment in other populations has been remarkably consistent, as well as being similar
to the research mentioned above. For example, in the small body of research on the
broader adolescent population, optimism has been linked to fewer symptoms of depression and higher self-esteem (Chang & Sanna, 2003; Puskar, Sereika, Lamb, Tusae-Mumford, & McGuinness, 1999; Scheier, Carver, & Bridges, 1994). A recent review of empirical studies in adults concluded that this link holds in adults as well, suggesting that optimists are generally better adjusted psychologically than pessimists (Scheier et al., 2001). More specifically, research with adult oncology populations, including breast and prostate cancer patients, has also documented a positive association between dispositional optimism and psychological adjustment, both concurrently and across time (Carver et al., 1993; Christman, 1990; Johnson, 1996).

Appraisal

Within the literature on stress and coping, appraisal is considered to be a key mediator of the link between a stressor and an individual’s response to it (Lazarus & Folkman, 1984). An important distinction is made between primary and secondary appraisal. Primary appraisal refers to an individual’s assessment of the significance of a situation for his or her well-being (Lazarus & Folkman, 1984; Smith & Lazarus, 1990). Situations in which the individual perceives a threat, some form of harm or loss, or a challenge are experienced as stressful. Secondary appraisal is the process of evaluating what one can do to manage the stressful stimulus or one’s emotional responses to the stimulus, and the extent to which one has the resources to implement the potential coping options (Lazarus & Folkman, 1984; Smith & Lazarus, 1990). The two types of appraisal interact to determine the level of stress experienced by an individual. For example, situations that are perceived as severe (primary appraisal) and as taxing one's coping resources (secondary appraisal) are associated with higher levels of stress. Conversely, when
situations are deemed less severe or one's coping resources are deemed sufficient or both, they will be experienced as less stressful.

Primary appraisals in pediatric cancer patients involve a subjective evaluation of the severity of the disease and the aversiveness of treatment. There is some evidence that this evaluation plays a role in psychological adjustment. For example, the perceived severity of the illness is positively correlated with the level of PTSD symptomatology in both children with cancer and their parents (Barakat et al., 1997; Hobbie et al., 2000). Not surprisingly, individuals who see the cancer as being more severe are more apt to be disturbed by it. Similarly, appraisals of the cancer experience as severe predict lower levels of hope and higher levels of anxious and depressive symptoms in pediatric oncology patients (Fearnow-Kenney & Kliwer, 2000), and higher levels of anger and depressive symptoms in adolescent cancer survivors (Burgess & Haaga, 1998).

To date, only one study has directly assessed secondary appraisal in a pediatric cancer population. In this study, adolescent cancer survivors were asked to rate how much influence they believed they could assert over their cancer and its associated stressors (Burgess & Haaga, 1998). They were also asked to indicate how much influence they could assert over their emotional reactions. Contrary to expectations, no relationship was found between these secondary appraisals and adjustment (anger, anxiety, and depressive symptoms in this study). However, because these are the results of a single study, conclusions based on them are necessarily tenuous.

Coping

The coping efforts of children with cancer have received somewhat more attention than their appraisals. Within the stress and coping literature, coping is defined as
"cognitive and behavioural efforts to manage specific external or internal demands (and conflicts between them) that are appraised as taxing or exceeding the resources of the person" (Lazarus, 1991, p. 112). More specifically, there are many different ways of conceptualizing coping and distinguishing among different types of coping efforts. Two of the more prominent distinctions, problem-focused versus emotion-focused coping and engagement versus disengagement coping, are reviewed below.

**Problem-focused and emotion-focused coping.** Historically, much of the research on coping in the pediatric oncology literature has divided the construct into two broad subtypes: problem-focused and emotion-focused coping. Problem-focused coping involves attempting to alter the source of an individual's distress. The primary types of problem-focused coping strategies are planful problem solving, in which attempts are made to identify and execute the most appropriate course of action to directly prevent or attenuate the stressor, and confrontive coping, in which more aggressive attempts are made to alter a situation (DeLongis & Newth, 1998). In contrast, emotion-focused coping involves a conscious attempt to change one's perceptions of a situation or to regulate one's affective reaction to it, rather than altering the situation itself (Lazarus & Folkman, 1984). Examples of emotion-focused strategies include emotional expression, seeking social support, positive reappraisal, and avoidance (DeLongis & Newth, 1998).

Within this conceptualization, research suggests that both healthy children and childhood cancer survivors tend to use a balance of problem-focused and emotion-focused coping. Band and Weisz (1988) make a distinction between primary control coping and secondary control coping, which are conceptually and functionally similar to problem-focused coping and emotion-focused coping, respectively.
focused coping in dealing with daily “non-cancer-related” stressors (Bull & Drotar, 1991). In contrast, when coping with cancer-related stressors, survivors engage in significantly more emotion management (Bull & Drotar, 1991). The emotion management strategies most frequently used by children with cancer are distraction, “intrapsychic coping” (e.g., prayer, wishful thinking), and support seeking, especially from their parents (Bull & Drotar, 1991).

A more in-depth study of the coping efforts of adolescents with cancer examined the specific coping strategies they used during and after treatment (Weekes & Kagan, 1994). Although this study was an exploratory investigation with only 13 participants, their findings were consistent with those of Bull and Drotar (1991) in that adolescents with cancer tended to use more emotion-focused coping both during and after treatment. Other studies have found that adolescents with cancer use more emotion management and less problem solving than younger children with cancer when the stressors are disease-related (Brown et al., 1992; Bull & Drotar, 1991). Such age differences were not found when the stressors were not related to the cancer (Bull & Drotar, 1991).

Thus, there is evidence that children and adolescents with cancer generally use coping strategies that target their emotions more often than strategies that target the problem, especially for managing illness-related stress. However, a closer examination of these studies reveals a striking variability in strategies that are defined as emotion-focused. For example, Weekes and Kagan (1994) reported that during treatment, adolescents used a combination of different strategies, including positive thinking, reinterpretation (i.e., focusing on positive changes associated with the cancer, such as becoming closer to one’s family), and adopting a philosophical stance (e.g., “keeping cool”, “taking things one day
at a time"), all of which were considered to be emotion-focused. After treatment, the adolescents primarily employed three different strategies, (1) negotiation, which specifically targeted obtaining autonomy from “overprotective and hypervigilant parents”8, (2) “selective forgetting” of negative aspects of their experience (a form of cognitive avoidance), and (3) “cognitive reliving”, a strategy that involves replaying the illness and treatment experience in one’s mind, which were also classified as emotion-focused. Classifying all of these strategies as emotion-focused seems conceptually problematic given the differences between them. For example, combining strategies that involve approaching (e.g., cognitive reliving) with those that involve attempts to avoid (e.g., selective forgetting) engenders a diffuseness of definition that seriously limits the utility of this category and of the problem-focused versus emotion-focused distinction more broadly.

These observations echo criticisms in the broader stress and coping literature regarding the clarity and utility of the problem-focused versus emotion-focused distinction (Compas, Connor-Smith, Saltzman, Harding Thomsen, & Wadsworth, 2001). For example, Coyne and Gottlieb (1996) have also raised concerns that these two general categories of coping are too broad and “lump” together too many dissimilar types of coping. Another concern with this approach to categorizing coping efforts is that a single strategy can be used to simultaneously accomplish both problem-focused and emotion-goals (Compas, Worsham, Ey, & Howell, 1996; Rosenberg, 1990). An example of this would be seeking information about the management of treatment-related side effects,

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8 During the treatment experience, many of the adolescents were forced to rely quite heavily on their parents for emotional and tangible support. Upon completing their treatment, many of the patients attempted to achieve a degree of autonomy from their parents. However, the parents were often reluctant to grant this
which might serve the problem-focused goal of reducing the negative impact of the side effects and the emotion-focused goal of gaining a sense of control and calming oneself down.

Finally, the distinction between problem- and emotion-focused coping may be of particularly limited utility in pediatric oncology populations. Unlike children facing other stressors, childhood cancer survivors may have little opportunity to engage in problem-focused coping, as many cancer stressors cannot be directly altered by the patients (van Dongen-Melman, Pruyn, van Zanen, & Sanders-Woudstra, 1986). For example, in most children with cancer, bodily changes such as hair and weight loss are inevitable side effects of treatment and ones over which little direct control can be asserted (Bull & Drotar, 1991). In contrast, although cancer has much in common with a number of chronic illnesses (discussed below), such as diabetes, children can generally exercise a great deal more control with such illnesses (e.g., through diet modifications and other lifestyle changes). Thus, most of what children can do to cope with cancer is emotion-focused and distinctions among emotion-focused strategies may shed greater illumination on coping and its impact on psychological adjustment.

Engagement and Disengagement Coping. In a landmark review of the literature on pediatric stress and coping over the past 15 years, Compas and colleagues (2001) suggested that the fundamental distinction between engagement and disengagement
coping is conceptually and empirically important, particularly in regards to understanding the relationship between coping and adjustment. This distinction may be especially germane to pediatric cancer populations, as it incorporates both problem- and emotion-focused coping and addresses many of the weaknesses described above (see Figure 1; Ebata & Moos, 1991; Tobin, Holroyd, Reynolds, & Wigal, 1989). In particular, this distinction more effectively differentiates amongst emotion-focused coping strategies in terms of their function and relationship to adjustment. Engagement coping responses are oriented toward the stressor, which is analogous to problem-focused coping (e.g., problem solving, seeking information), or toward one’s emotional or cognitive reactions to the stressor, which is analogous to some forms of emotion-focused coping (e.g., emotion regulation, seeking emotional support; Connor-Smith et al., 2000). Conversely, disengagement coping responses are oriented away from the stressor or one’s reactions to it (Compas et al., 2001); examples of disengagement coping include cognitive avoidance (attempting to not think about or not think realistically about the problem), acceptance of the problem (or resignation), and behavioural withdrawal, all of which have been previously classified as emotion-focused coping (DeLongis & Newth, 1998).

The engagement-disengagement distinction parallels the distinction between approach and avoidance (Krohne, 1996; Roth & Cohen, 1986; Suls & Fletcher, 1985), but is considerably broader in that avoidance is viewed as a subtype of disengagement coping. There are other forms of disengagement, such as distraction, which “are not purely avoidant, because they include redirecting attention toward an alternative target and reflect awareness and acknowledgement of the stressor” (Compas et al., 2001, p. 92).
Empirical research examining the factor structure of coping measures supports the separation of avoidance and distraction as the two strategies tend to load on separate factors (Connor-Smith et al., 2000). Further evidence comes from studies linking these strategies to different adjustment outcomes—distraction is generally associated with better outcomes and avoidance with worse outcomes (discussed below; Connor-Smith et al., 2000; Wadsworth & Compas, 2002).

Research on children with cancer, particularly on-treatment children, suggests that they engage in relatively more disengagement coping, especially avoidant coping, than their healthy peers in response to daily stressors and the challenges of adolescence (Bauld et al., 1998; Phipps, Fairclough, & Mulhern, 1995). Unfortunately, there is very little research on the outcomes associated with disengagement coping in this population. Theoretically, some authors have suggested that this coping style may be useful to children with cancer in dealing with certain stressors (e.g., the initial diagnosis), at least until they can mobilize other coping resources (Van Dongen-Melman et al., 1986; Weisz, McCabe, & Dennig, 1994; Worchel et al., 1988). Similarly, there is a growing body of research suggesting that disengagement may be an effective means of managing certain circumscribed stressors and situations. For example, several studies have found that distraction, a disengagement coping strategy, is an effective technique for children to cope with painful medical procedures (e.g., Manne, Bakeman, Jacobsen, & Redd, 1993; Smith, Ackerson, & Blotcky, 1989) and chemotherapy-induced nausea (Tyc, Mulhern, Jayawardene, & Fairclough, 1995). Finally, several studies of depression in children and adolescents with cancer have found one disengagement coping strategy, denial, to be related to better self-reported adjustment outcomes (e.g., Kaplan et al., 1987; Tebbi,
Bromberg, & Mallon, 1988). However, given the nature of this strategy, these studies could not ascertain whether these findings reflected genuinely high levels of adjustment or a reporting bias.

In contrast, the limited research on the use of disengagement coping and psychological adjustment to the broader cancer experience in children and adolescents suggests that it is associated with poorer adjustment. For example, Frank and colleagues (1997) reported that the use of avoidant coping predicted higher levels of anxiety and depression in children and adolescents with cancer, both on treatment and remission. More recently, Trask and colleagues (2003) reported that disengagement coping more broadly did not significantly predict maladjustment (internalizing and externalizing problems) in their sample of adolescent cancer patients; however, the relatively small sample size (N = 28) and the relatively large magnitude of the correlation between measures of the two constructs in that study (r = .5) suggest that the lack of significance was likely reflective of a lack of power, rather than a lack of association.

The few studies of engagement coping and adjustment in pediatric oncology samples tend to find relationships in the opposite direction. For example, the use of this coping style has been found to significantly predict lower levels of both internalizing and externalizing problems (Trask et al., 2003). Van Dongen-Melman and colleagues (1986) have suggested that certain types of engagement coping may be particularly effective for pediatric cancer survivors. For instance, they argued that seeking information about cancer and its treatment might reduce some of the uncertainty and anxiety surrounding the experience, as "fear of the unknown is worse than fear of the known" (p. 153). This is consistent with the finding that children with cancer who are informed about their
diagnosis earlier report better adjustment than those who are informed later (Slavin, O’Malley, Koocher, & Foster, 1982). However, information seeking appears to be one of the lesser-used strategies in the child and adolescent cancer population (Bull & Drotar, 1991). Van Dongen-Melman and colleagues (1986) also suggested that seeking social support, another engagement strategy, might have a beneficial effect for childhood cancer patients, which is consistent with the research on the stress-reducing effects of social support discussed below.

It should be noted that one study has reported the use of multiple different behavioural strategies, which seem to be engagement strategies, for dealing with medical treatments and daily activities (e.g., deep breathing or holding a parent’s hand during medical procedures) to be associated with higher levels of depression and somatic complaints (Worchel, Copeland, & Barker, 1987). However, the authors of this study noted that “engaging in many different behaviors does not seem to connote flexibility in adapting to a situation; rather, it appears to suggest ineffectiveness in coping” (pp. 35-36). In other words, the use of multiple different strategies may reflect an unfocused, “shotgun” approach to coping, which may be less effective than a more targeted approach. Conversely, children who were more focused and asserted some control by making decisions regarding more controllable aspects of their lives, such as whether or not to attend school on a given day or what time of the day they wished to see the doctor, tended to report fewer emotional difficulties (Worchel et al., 1987).

Thus, the research on engagement and disengagement coping in pediatric oncology suggests that children tend to use both approaches while navigating the challenges of cancer, though many of them tend to favour disengagement. This research also provides
evidence that engagement strategies are generally associated with better psychological adjustment and disengagement strategies with worse adjustment, though the latter may have limited utility in coping with certain circumscribed stressors.

Because empirical studies of coping with pediatric cancer are relatively few in number, some investigators have turned to the literature on other illnesses in order to inform the development of hypotheses about coping-adjustment relationships. Given increased survival rates, childhood cancer has recently been likened to a chronic illness spanning several years, rather than a fatal disease (Kazak & Nachman, 1991). More specifically, cancer has been compared to arthritis, asthma, diabetes, and sickle-cell disease, among others (Kliewer, 1997). Some authors have suggested that these illnesses, including cancer, have more common elements than differences in terms of the disease-related stressors their sufferers must face, such as general distress, pain or discomfort, and family reorganization (Kazak & Nachman, 1991; Spirito, Stark, Gil, & Tyc, 1995). In general, the literature on these illnesses suggests that primary control coping, a form of coping that conceptually and functionally falls under the engagement coping umbrella (Compas et al., 2001; Connor-Smith et al., 2000), is associated with higher levels of adjustment (e.g., Band & Weisz, 1990; Ebata & Moos, 1991; Lewis & Kliewer, 1996). Conversely, certain forms of disengagement coping, particularly avoidance, are associated with lower levels of adjustment and higher levels of anxiety and depression (Ebata & Moos, 1991; Grey, Cameron, & Thurber, 1991; Lewis & Kliewer, 1996).

More recently, the review of the broader literature on coping in children and adolescents by Compas and colleagues (2001) painted a similar picture, with disengagement coping generally predicting worse psychological outcomes and
engagement coping predicting better outcomes. These authors noted a particularly consistent relationship across studies between the use of engagement coping and fewer internalizing (e.g., anxiety, depression) and externalizing ("acting out") problems, as well as higher social competence. Similarly robust associations between disengagement coping and increased internalizing problems, and between disengagement coping and decreased social competence were described. A less consistent relationship between disengagement coping and externalizing problems was reported (Compas et al., 2001), with some studies reporting fewer externalizing problems (e.g., Chaffin, Wherry, & Dykman, 1997; O'Brien, Bahadur, Gee, Balto, & Erber, 1997) and some studies reporting more externalizing problems (e.g., Connor-Smith et al., 2000; Lengua & Sandler, 1996) accompanying the use of these strategies. Among disengagement coping strategies, avoidant coping was perhaps the strongest and most consistent predictor of both global psychological maladjustment (including internalizing and externalizing symptoms; Gomez, Bounds, Holmberg, Fullarton, & Gomez, 1999) and symptoms of PTSD, general anxiety, and depression in particular (Ebata & Moos, 1991; Gil, Williams, Thompson, & Kinney, 1991; Herman-Stahl, Stemmler, & Petersen, 1995; Hoffman, Levy-Schiff, Sohlberg, & Zarizki, 1992). These results held across general worries and stress (Gomez, 1998b), acute traumatic events (e.g., a flood; Boksztzanin, 2003), and chronic stressors, such as economic strain and family conflict (Wadsworth & Compas, 2002) or a parent's chronic physical illness (Steele, Forehand, & Armistead, 1997).

In sum, there are relatively few studies on the coping efforts of children with cancer and even fewer studies that linking coping to adjustment. What research does exist parallels the literature on other chronic illnesses, as well as the broader pediatric stress
and coping literature, thus providing strong support for the relationships between engagement versus disengagement coping and psychological adjustment. In particular, engagement coping strategies are reliably positively associated with adjustment and disengagement strategies are negatively associated with adjustment. And among disengagement strategies, avoidant coping appears to be an especially strong predictor of negative adjustment outcomes.

Relationship-Focused Coping and Protective Buffering. The studies of coping and adjustment described above emphasize relatively direct efforts to ward off or escape the experience of stress. More recently, research in the adult stress and coping literature has called attention to another form of coping, relationship-focused coping. This type of coping is designed to manage and maintain relationships during times of stress (DeLongis & Newth, 1998), and appears to be conceptually and empirically distinct from the other types (Coyne & Smith, 1991; O’Brien & DeLongis, 1997). In particular, both stress and adjustment are likely to be affected by this type of coping, though in a somewhat less direct manner (discussed below).

Three relationship-focused coping strategies have been examined. The first strategy, and the one that has received the most attention, is empathic responding. Empathic responding involves attempting to gain a better understanding of another’s perspective and to validate the other person’s experience (O’Brien & DeLongis, 1997). Several studies using adult samples have linked the use of this strategy to decreased psychological distress and increased relationship satisfaction in both members of the relationship (Burleson, 1990; Notarius & Herrick, 1988). The second relationship-focused strategy, active engagement, encompasses constructive attempts to solve interpersonal problems
such as discussing the situation with others who are involved and negotiating compromises (Coyne & Smith, 1991).

Although empathic responding and active engagement strategies have proven to be highly relevant to research on couples coping with stressful life events, they are somewhat less relevant to the study of children coping with their own stressful life events (e.g., being diagnosed with cancer). The third relationship-focused coping strategy, protective buffering (Coyne & Smith, 1991), is more relevant for this population. This strategy involves attempting to conceal worries and problems from the other member of the relationship, and there is evidence that some children and adolescents with cancer engage in this strategy as a means of “protecting” their parents and other loved ones. In an in-depth qualitative study of the experiences of more than 75 children and adolescents with cancer, Bearison (1991) spent several months getting to know and developing rapport with the children he interviewed. And one theme that emerged repeatedly in the narratives of the participants in his study was feeling unable to talk about things that upset them. In particular, many of the children expressed a desire to protect their emotional support network, especially their parents, by being "strong" and suppressing their negative affect. Children in other pediatric oncology studies have expressed a similar desire and also reported attempting to hide their grief from their parents (e.g., van Veldhuizen & Last, 1991).

There is evidence to suggest that for some children, this motivation to protect their parents may be a response to parents’ openness. For instance, van Veldhuizen and Last (1991) found a small, but significant, positive correlation between the extent to which mothers disclosed their distress to their children and the children’s attempts to conceal
their grief from their mothers. However, there is also evidence that these "protective" behaviours may be being unwittingly reinforced (Bearison, 1991). For example, parents and others are often reluctant to discuss their feelings around children with cancer (van Veldhuizen & Last, 1991), which may serve to model such reluctance. In addition, in trying to reassure children, adults often discourage them from acknowledging their fears (e.g., "Don’t be afraid. It’ll be all right."). More broadly, some have argued that the reluctance of these children to disclose may reflect a response to the societal norm that equates being strong with not being afraid (Bearison, 1991).

Unfortunately, while the motive to protect those around them may be a noble one, it is potentially quite detrimental to these children. One of the few studies to have looked at protective buffering found that while the use of this strategy by wives of myocardial infarction patients was associated with higher levels of self-efficacy for the patients, it was also associated with higher levels of distress in the wives themselves (Coyne & Smith, 1991). Suls and colleagues (1997) replicated the finding of wives’ protective buffering predicting wives’ distress and also observed that greater use of protective buffering by the patients predicted higher levels of distress in the patients themselves.

More broadly, there is considerable evidence from the self-disclosure literature to support the proposition that protective buffering may not be helpful to those who engage in it. For instance, there is an extensive body of research on the psychological health benefits (e.g., increased positive affect, decreased negative affect) of disclosing about distressing or traumatic events (Kelley, Lumley, & Leisen, 1997; Pennebaker, 1997; Pennebaker, Colder, & Sharp, 1990). Emotional self-disclosure has also been linked to improved physical health. For example, in studies of psychosocial support groups for
women with advanced-stage breast cancer, the disclosure of negative information was associated with longer survival rates (Spiegel, Bloom, Kraemer, & Gottheil, 1989; Spiegel & Kato, 1996). Similarly, Pennebaker and Beall (1986) reported that university students who disclosed about traumatic or distressing experiences visited the university health centre significantly less often during the six months following the disclosure than individuals who had not made such disclosures. There is also strong evidence that such disclosure enhances the functioning of the immune system, which may account for some of its health benefits (Pennebaker, Kiecolt-Glaser, & Glaser, 1988; Petrie, Booth, Pennebaker, Davison, & Thomas, 1995). Finally, there is a large literature on the psychological and physical health benefits of disclosure in the context of psychotherapy (Lambert & Bergin, 1994).

In contrast, Pennebaker (1985) noted that "the act of not disclosing or confiding the event with another may be even more damaging than having experienced the event per se" (p. 82). This suggests that protective buffering may even be harmful to individuals who choose it. For instance, the inhibition of negative thoughts and the suppression of the urge to disclose them have been linked to impaired immune functioning (Petrie, Booth, & Davison, 1995). More broadly, individuals whose interpersonal relationships lack the sense of "emotional connectedness" provided by mutual self-disclosure tend to be at greater risk for psychological difficulties, such as depression (Beach, Sandeen, & O'Leary, 1990; Hammen, 1992), anxiety (Baumeister & Leary, 1995), and guilt (Coyne, 1989). This emotional connectedness is believed to be one of the key factors that helps people persevere in their coping attempts in the face of adversity (DeLongis & O'Brien, 1990; Sarason, Pierce, & Sarason, 1990). Thus, to the extent that children with cancer try
to protect their parents by suppressing their “negative” disclosures, they may be cutting themselves off from that which they need most.

In summary, although the research on protective buffering has primarily used adult samples, the construct itself is relevant to the study of children coping with cancer. The available evidence suggests that this strategy, while possibly beneficial to the target, may be deleterious to those who use it; as such, these children may be “protecting” their parents at a considerable cost to themselves.

Overall, research suggests that different forms of coping have an influence on a child’s adjustment, regardless of the stressor. Moreover, there is considerable evidence to suggest that a person’s choice of coping strategies in a given situation is not random.

**Personality and Coping**

Theory and research in adults have suggested that personality variables exert a strong influence on the coping styles people employ in response to stress. Indeed, coping has been referred to as “personality in action under stress” (Bolger, 1990, p. 525). One of the most robust findings to emerge from this research in older adolescent and adult populations is that neuroticism consistently predicts greater use of disengagement coping strategies. For example, neuroticism predicts the use of wishful thinking, self-blame, and avoidant (both mental and behavioural) coping in dealing with interpersonal and general daily stressors (Bolger, 1990; Parkes, 1986, 1990; Scheier et al., 1994).

There is little research on personality as a predictor of coping in children and adolescents in general and none in a pediatric cancer population. What research has been done suggests that the link between these two constructs, especially between neuroticism and disengagement coping, holds in older children and adolescents as well. For example,
studies of adolescents and older children coping with stressful life events and daily
hassles have found neuroticism to predict both disengagement coping (Kardum & Krapic,
2001; Medvedova, 1998; Rehulkova, Blatny, & Osecka, 1995) and maladaptive coping
efforts more generally (Fickova, 2001). In addition, several studies have reported
conscientiousness and extraversion to be strong predictors of engagement coping in
adolescents (e.g., Fickova, 2001; Kardum & Krapic, 2001; Medvedova, 1998).

The few studies of the relationship between optimism and coping in adolescents have
found optimism to be positively associated with the use of engagement strategies and
negatively associated with the use of disengagement strategies (Chang, 1996; Puskar et
al., 1999). Research in adults has reported similar relationships between optimism and
engagement and disengagement coping (Scheier et al., 2001), both in healthy populations
(e.g., Scheier, Weintraub, & Carver, 1986; Strutton & Lumpkin, 1992) and illness
populations (e.g., breast cancer patients; Carver et al., 1993). As with much of the
research discussed above, however, there are no published studies of optimism and
coping in pediatric oncology populations.

More broadly, there is little empirical research on the ways in which personality and
coping strategies might relate to each other independently or interactively in the context
of predicting adjustment in pediatric oncology populations. However, conceptual models
of the potential relationships between personality, coping, and adjustment have been
described in the broader personality literature.

Models of the Personality, Coping, and Adjustment Relationship

Hewitt and Flett (1996) describe three models of how personality and coping are
related to psychological adjustment. The first of these is an additive, or direct effects,
model in which personality and coping each independently predict adjustment (Figure 2 - top). In this model, personality influences distress or well-being above and beyond the influence of coping and vice versa. The second model is a moderational model in which personality and coping interact to predict adjustment (Figure 2 - middle). In this model, the magnitude and direction of the relationship between one of the predictors and adjustment is contingent on the level of the other predictor. For instance, engagement coping might be associated with less distress and higher self-esteem, but only when the individual is dispositionally optimistic. The final model is a mediational model in which personality influences adjustment indirectly through its direct effect on coping (Figure 2 - bottom). In other words, personality traits influence the types of coping efforts that are employed under conditions of stress and in turn, these efforts to reduce or eliminate distress influence the individual’s adjustment. For example, neuroticism may make individuals more likely to choose disengagement coping strategies, which may then have a negative impact on their adjustment.

These models are not mutually exclusive, though each of them has different conditions that must be met to obtain support. In the simplest variant, the additive model, personality and coping must each predict significant independent and unique variance in adjustment. More specifically, each predictor must remain significant when the other predictor is being statistically controlled. A moderational model contains personality and coping as individual predictors and a term representing the interaction between the two (which is the cross-product of the individual predictors once they have been centered – discussed below). For this model to hold, the interaction term must predict unique variance in adjustment when the individual predictors are being controlled. The final
model, a mediational model, is somewhat more complex.

In their seminal paper, Baron and Kenny (1986) outlined four conditions that must be met to establish a mediational relationship. First, the independent variable must predict the dependent variable – there must be a relationship to mediate (path c in Figure 2c). Second, the independent variable must predict the hypothesized mediator (path a in Figure 2c). Third, the mediator must predict unique variance in the dependent variable controlling for the independent variable (path b in Figure 2c). Lastly, the ability of the independent variable to predict the dependent variable must be significantly reduced when the effects of the mediator are removed (i.e., the indirect path, ab, must be significant). If removing the effects of the mediator reduces the relationship between the independent and dependent variable to zero, support for complete mediation is obtained.

In practice, given that most psychological and social phenomena are multiply determined, complete mediation does not often occur; thus, most research on mediational models tests for partial mediation.

**Mediational Model**

Given the relationships described above between personality (neuroticism, extraversion, and optimism/pessimism), appraisal (primary and secondary), and coping (engagement and disengagement coping) on the one hand, and psychological adjustment on the other, there is support for at least an additive model for predicting adjustment in children and adolescents, although these links have not yet been firmly established in pediatric oncology populations. The addition of the link between personality and coping suggests that a mediational model might hold in which the relationship between particular personality dimensions and adjustment (i.e., distress and self-esteem) may be mediated by
the use of disengagement coping strategies and by the use of engagement strategies.

Although such a model has not been tested with pediatric cancer patients or survivors, similar models have been proposed and examined in other pediatric populations. For example, Gomez and colleagues (1999) examined the relationships between neuroticism, disengagement coping, and maladjustment in a sample of healthy 12- and 13-year-old adolescents (Gomez et al., 1999). Interestingly, these researchers only found partial support for this model; they did not find a significant relationship between disengagement coping and maladjustment, which would have been required to support a mediational model. The lack of a relationship between disengagement coping and maladjustment is surprising given the research discussed above and the support for this model obtained in adult research (e.g., Bolger, 1990); however, Gomez and colleagues sampled a very narrow range of disengagement coping behaviours (i.e., emotional discharge and behavioural withdrawal) and used parent ratings of maladjusted behaviour (problems with parent reports of maladjustment are discussed below). A study of older adolescents (14 to 17-year-olds) conducted by the same first author (Gomez, 1998a), which used adolescent-reported maladjustment and sampled disengagement coping more broadly, did find support for a model in which disengagement coping mediated the relationship between a personality variable, locus of control, and psychological distress (on a global anxiety and depression scale).

There appears to be little research examining mediational models of optimism, coping, and adjustment in children and adolescents. One of the few studies to examine such a model found strong support for the mediational role of avoidant coping in the relationship between dispositional optimism and adjustment to college in 16 to 19-year-old college
freshmen (Aspinwall and Taylor, 1992). The same study also found engagement coping to mediate the optimism-adjustment relationship, with optimism predicting greater use of active (engagement) coping strategies, which in turn predicted better adjustment.

Similar results have been obtained in the rich literature on optimism, coping, and adjustment in adults. A recent review by Scheier and colleagues (2001) found consistent and considerable support for coping, especially disengagement coping, partially mediating the optimism-adjustment relationship. Specifically, lower levels of optimism (i.e., higher levels of pessimism) were associated with greater use of disengagement strategies, which was in turn related to higher levels of distress. Support for this model was obtained in a variety of adult populations, including breast cancer patients (Carver et al., 1993), women undergoing coronary bypass graft surgery (King, Rowe, Kimble, & Zerwic, 1998), and law school students (Segerstrom, Taylor, Kemeny, & Fahey, 1998). Support for mediational models of optimism (and other personality variables), engagement coping, and adjustment has been less consistent. At least one study found support for such a model (in pregnant woman; Park, Moore, Turner, & Adler, 1997), but many of the adult studies discussed above did not find evidence of a mediational effect of engagement coping.

In sum, converging evidence suggests that a mediational model of personality, disengagement coping, and adjustment might effectively account for some of the variability in adjustment. A similar model including engagement coping instead of disengagement coping may also hold, but the evidence for this model is less conclusive. In addition, what both these child-factor based models are lacking is a consideration of contextual variables of established relevance, including family functioning, peer support,
and disease factors. A model that incorporates these variables is proposed below.

*A Moderated Mediational Model*

Given the buffering effects of family functioning and social support on adjustment (described above), several pediatric cancer researchers have described these variables as potential moderators (Brown et al., 2003; Kazak et al., 1997), though they have yet to be tested as such in a pediatric oncology population. These buffering or moderational effects may be integrated with the mediational model outlined above and are likely relevant in relation to both (a) the link between the independent variable (personality) and the mediator (coping), and (b) the link between the mediator and the outcome (adjustment). The rationale is that higher functioning families may exert more influence on choice of coping approach towards the use of more adaptive strategies (e.g., engagement coping), thus attenuating the effect of personality, and may also reduce the deleterious impact of any disengagement coping on adjustment. Peer support may play a similar moderational role, such that children who feel more supported may be less likely to choose maladaptive coping strategies (e.g., disengagement) and be less vulnerable to the negative effects of these strategies on adjustment.

In summary, the research discussed above provides evidence of theoretical and empirical links between (a) personality and adjustment, (b) personality and coping, and (c) coping and adjustment, and suggests a potential buffering or moderating role for family functioning and peer support. Integrating these findings, the present study proposed a moderated mediational model (James and Brett, 1984), in which the relationship between personality (neuroticism, optimism, and extraversion) and psychological adjustment (distress and self-esteem) is mediated by coping style.
(particularly disengagement), particularly in lower functioning families and with lower levels of peer support (Figure 3). Higher functioning families or higher levels of peer support act as buffers and attenuate the mediational effect of coping in this model. This model was expected to hold even when controlling for the influence of relevant disease and demographic variables.

**Hypotheses**

The objective of the present study was to test several integrated models to account for variability in adjustment outcomes in a sample of adolescent cancer survivors. Based on the research discussed above, this study tested the following hypotheses:

1. **Additive model.** Child factors, including personality, appraisals, and coping, will predict independent and unique variance in adjustment after controlling for disease and demographic factors, family functioning, parent adjustment, and social support. Thus, it is hypothesized that relationships consistent with an additive model of prediction will be observed for both self-esteem and distress.

   a. Neuroticism will be positively associated with distress and negatively associated with self-esteem.

   b. Dispositional optimism will be negatively associated with distress and positively associated with self-esteem.

   c. Primary appraisals will be positively related to distress (i.e., appraisals of the disease as more threatening will be associated with higher levels of distress).

   d. Secondary appraisals will be negatively related to distress (i.e., appraisals of one’s ability to influence the disease and one’s emotional responses to the disease as higher will be associated with lower levels of distress).
e. The use of disengagement coping strategies, particularly cognitive avoidance, will be positively associated with distress and negatively associated with self-esteem.

f. The use of engagement strategies, particularly seeking information and support, will be negatively associated with distress and positively associated with self-esteem.

g. The use of protective buffering will be positively associated with distress and negatively associated with self-esteem.

2. Moderated mediational model – Disengagement coping. The pattern of interrelationships will be consistent with the moderated mediational model of personality, disengagement coping, and adjustment outlined above (Figure 3) while controlling for disease variables.

a. The relationship between neuroticism and psychological adjustment will be partially mediated by the use of disengagement coping. More specifically, higher neuroticism will be associated with higher levels of disengagement, which will be related to lower levels of adjustment (i.e., lower self-esteem and more distress). These mediational models will be moderated by family functioning and peer support.

b. The relationship between optimism and psychological adjustment will also be partially mediated by the use of disengagement coping, with higher levels of optimism being associated with less disengagement, which in turn will be related to better adjustment. These mediational models will be moderated by family functioning and peer support.
3. Moderated mediational model – Engagement coping. The pattern of interrelationships will be consistent with the moderated mediational model of personality, engagement coping, and adjustment outlined above (Figure 3) while controlling for disease variables.

   a. The relationship between neuroticism and psychological adjustment (both distress and self-esteem) will be partially mediated by the use of engagement coping in that higher neuroticism will be associated with lower levels of engagement, which will be related to lower levels of adjustment. These mediational models will be moderated by family functioning and peer support.

   b. The relationship between optimism and psychological adjustment will also be partially mediated by the use of engagement coping, with higher levels of optimism being associated with more engagement, which in turn will be related to better adjustment. These mediational models will be moderated by family functioning and peer support.

   c. The relationship between extraversion and psychological adjustment will be partially mediated by the use of engagement coping, with higher levels of extraversion predicting greater use of engagement coping, which will predict better adjustment. This mediational model will also be moderated by family functioning and peer support.

Summary of the Present Study

The present study was designed to examine different models of predicting psychological adjustment in adolescent cancer survivors and potentially account for some of the variability in outcomes reported in the literature. In particular, this study sought to clarify the role of child factors, which have largely been neglected in pediatric cancer
research, in predicting adjustment while controlling for more established predictors. The present study differs from previous research and contributes to the broader pediatric cancer literature in multiple ways. First, this study appears to be among the first to examine personality dimensions in a pediatric cancer population or in children and adolescents with other chronic physical conditions (Wallander & Varni, 1998). Several studies have examined related constructs in children with cancer, including temperament (Barrera et al., 2003) and attributions (Frank et al., 1997), but established personality models such as the Five Factor model have not been investigated. Second, while some research has been done on other child factors, notably appraisal and coping (Trask et al., 2003), only the present study simultaneously incorporated or controlled for the important contextual factors of family functioning, parental adjustment, and peer support. Third, the present study is the first to apply the concept of protective buffering, which has previously only been examined in the adult stress and coping literature, to a pediatric population. Finally, while previous studies have examined less complex additive models (Frank et al., 1997), the present study appears to be the first to test a moderated mediational model, or even a more basic mediational model, in a sample of pediatric cancer survivors.

**Methods**

**Adolescent Cancer Survivors**

Cancer is perhaps even more difficult for adolescents than it is for younger children or adults (Cella et al., 1987; Eiser, 1996). Kazak and colleagues (1997) have argued that the limited ability of preschool and school-aged children to understand the threat posed by cancer facilitates their adjustment. Unlike children, adolescents do possess the capacity
to both understand and remember; however, they tend to have fewer sources of social support and may be less able to tolerate uncertainties than adults (Eiser, 1996).

Developmentally, adolescence is a time when individuals begin to seek independence from their parents and to develop a sexual identity and relationships (Garrison & McQuiston, 1989). Adolescents who have experienced cancer have a series of additional challenges superimposed on these important developmental tasks. At a time when individuals are exploring their capabilities and pursuing independence, these adolescents must often contend with the restrictions of highly protective parents (and on-treatment adolescents are forced to become more dependent on their parents; Eiser, 1996; Van Dongen-Melman & Sanders-Woudstra, 1986). During adolescence, individuals also begin to develop plans for the future, such as what career they will pursue and whether or not they will have a family. For adolescent cancer survivors, this process occurs within the context of an uncertain future where they must face the possibility that they may relapse or that their treatment has left them infertile (Granowetter, 1994).

Adolescence is also a time when perceived differences in appearance or abilities can be a source of considerable distress and a threat to the child’s self-esteem (Kazak et al., 1994; Van Dongen-Melman et al., 1986). Changes in appearance associated with the treatment of cancer, such as hair loss and weight loss or gain, and frequent functional impairment make such differences inevitable. The disruption of the adolescent’s peer relationships and academic development resulting from the frequent absences from school may also be detrimental to his or her self-esteem and emotional well being (Evans, 1996).

The sample in the present study was restricted to adolescents for two reasons. First, as
noted above, the age range in many of the previous studies in the area has been very wide (Kazak, 1994). Limiting the age range of the participants in this study likely helped reduce the impact of developmental differences. The second reason for choosing adolescents is that adolescents are better able to identify and articulate their motives and internal states than younger children.

The sample in the present study was also limited to off-treatment survivors, defined as adolescents who had been successfully treated for some form of cancer and were currently off-treatment for any period of time (Zebrack & Chesler, 2001). The rationale for the focus on off-treatment survivors was twofold. First, at any given time, there is a considerably larger population of off-treatment survivors than on-treatment patients. As such, it was deemed more practical and feasible to draw from this group, and the use of off-treatment survivors permitted the collection of a large enough sample to test more complex models for predicting adjustment. Second, research comparing on-treatment patients to survivors in remission suggests that there are no significant differences in adjustment (Frank et al., 1997; Grootenhuis & Last, 2001). Thus, the results of the present study using off-treatment survivors should be broadly generalizable to adolescents currently in treatment.

Participants and Procedure

Ethical consent was obtained from the University Of British Columbia’s (UBC) Behavioural Research Ethics Board, the C&W Research Review Committee, the University of Alberta Health Research Ethics Board, and the Capital Health Authority Regional Research Administration. Subsequently, two hundred and two off-treatment adolescent (12 to 20 years) cancer survivors from the pediatric hematology / oncology
program database at Children’s and Women’s Health Centre (C&W) of British Columbia in Vancouver, Canada, were identified as potentially eligible for participation (i.e., met the age criterion). Parents or guardians\(^{10}\) of these adolescents were sent questionnaire packages containing the measures described below. Consent forms for both the adolescent and the parent (see Appendices A and B), as well as a letter explaining the study (see Appendix C) and contact information for obtaining more information, were sent with this package. Families who wished to participate were asked to have one parent and the adolescent complete the measures independently and return them to the Department of Psychology at UBC in a self-addressed, stamped envelope provided by the researchers. Families who sent in completed packages were sent a brief letter and a small honorarium to thank them for their time and assistance.

Of the 202 potentially eligible families, 15 had moved and not provided C&W with a forwarding address and 3 were excluded because the parents could not read or write enough English to complete the study measures, thereby reducing the pool to 184 families. Sixteen families formally declined to participate in the study, most commonly citing a lack of time or a desire to not relive the experience as their reasons for not participating. Forty-eight packages were returned (either shortly after they were received or after two rounds of follow-up calls) for an overall response rate of 26.1\% (48 out of 184).

One hundred and forty off-treatment adolescent cancer survivors from the pediatric hematology / oncology program database at the Stollery Children’s Hospital (SCH) in Edmonton, Alberta, Canada, were also identified as potentially eligible for participation.

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\(^{10}\) Parents and guardians will hereafter be referred to as “parents” for ease of expression.
Families from SCH were recruited in a slightly different manner from the one described above, in accordance with SCH policy. First, parents of these adolescents were contacted by telephone by a hospital staff member who was not involved in the study and asked if they wished to receive an information and questionnaire package. Families who expressed interest were sent questionnaire and information packages and then recruitment proceeded as it had at CW, including sending families who participated a thank-you letter and small honorarium.

Of the 140 families from SCH, 21 were either unavailable to participate (e.g., the adolescent had passed away, was in the intensive care unit at SCH, etc.) or unreachable (e.g., telephone number not in service, family had moved). An additional 18 families could not be reached by telephone. Of the remaining 101 families, 40 did not respond to telephone messages left for them and 14 formally declined to participate, again most often citing lack of time and not wanting to think about their experience as reasons. Forty-seven families expressed interest during the initial phone contact and were sent information and questionnaire packages. Twenty-one of these packages were returned (either shortly after they were received or after follow-up telephone calls), for an overall response rate of 20.8%\(^{11}\) (21 out of 101).

Only data on the age and sex of the adolescent were available for non-responders (including those who declined to participate and those who did not return questionnaire packages) from each site. There were no significant differences between responders and non-responders for either site on gender (\(\chi^2[1] = 0.011, p > .50\), and \(\chi^2[1] = 0.165, p >\)

\(^{11}\) Although these response rates are low compared to those reported in some literatures, they are comparable to the rates of other Canadian city based studies (e.g., 22%; Trask et al., 2003) and are consistent with the generally low rates of participation in psychosocial pediatric cancer research (Eiser et
Thus, sixty-nine dyads (48 from C&W and 21 from SCH), each consisting of one off-treatment adolescent cancer survivor and one parent, agreed to participate in the present study. Of these 69 dyads, two were excluded because the adolescents had difficulties that made completing the questionnaires by themselves arduous or impossible (one child was blind in both eyes and the other was cognitively impaired). A third dyad was excluded when it was revealed that the adolescent had been diagnosed with Wiskott-Aldrich syndrome, a hematological condition that is not a form of cancer. Finally, one dyad failed to return completed measures of adolescent adjustment and as such, could not included in the analyses. Thus, the final sample consisted of 65 adolescent-parent dyads.

Among the adolescents, the sample was quite balanced in terms of child sex with 31 girls (47.7%) and 34 boys (52.3%). The average age was 15.4 years (SD = 2.6). Most of the adolescents (82.8%) were still in primary or secondary school (grades 6 to 12); eleven (17.2%) had graduated from high school. The most common types of cancer in the sample were acute lymphoblastic leukemia (ALL; n = 21; 32.3%) or some form of central nervous system malignancy (e.g., astrocytoma, medulloblastoma; n = 14; 21.5%). The remainder of the sample reported a diverse mix of diagnoses including Wilm’s tumours (n = 5; 7.7%), acute myelogenous leukemia (n = 4; 6.2%), Hodgkin’s lymphoma (n = 3; 4.6%), and rhabdomyosarcoma (n = 3; 4.6%).

Unlike the adolescents, the vast majority (n=62; 95.4%) of the parents were female, as is the case with much of the research in this area. The mean age of the parents was 44.0
years (SD = 4.9) and their level of education was relatively high with 61.5% (n = 40) having at least some post-secondary education. The remainder of the sample had at least partially completed grade 11 (6.2%; n = 4) or grade 12 (32.3%; n = 21). The sample was predominantly composed of married or cohabitating parents (n=53; 81.1%); the other parents were either separated (n = 5; 7.7%), divorced (n = 4; 6.2%), widowed (n = 2; 3.1%), or single (n=1; 1.5%). The parents reported a range of occupations, with the most common being homemaker (n = 13; 20.0%), healthcare professional (e.g., nurse; n = 7; 10.8%), teacher (n = 6; 9.2%), and accountant (n = 4; 6.2%).

Measures

Disease and Demographic Variables

Ideally, analyses of potential disease-related predictors would include “objective” severity ratings based on the medical records of the children and made by independent oncologists (cf. Brown et al., 2003, who had severity ratings from each child’s primary oncologist and an independent oncologist); however, in the present study, this was not feasible. Thus, proxies of severity that did not require an oncologist’s participation were used, including treatment duration and number of different types of treatment required. Time since diagnosis, time off treatment, age at diagnosis, and type of cancer were also included. An inadvertent error led to questions regarding treatment-related functional impairment and residual handicaps or disfigurement not being included in the questionnaire package. Thus, no data on these variables were collected.

Demographic information was also collected, including (a) child age and gender, and (b) parent age, gender, years of education, occupation, and relationship status. An open-ended question asking participants to identify their “cultural background” was also
included. However, 41.5% (n = 27) of the sample identified their background as
“Canadian” and 16.9% (n = 11) did not complete this question; hence, subgroup analyses
on this variable were not performed. All disease and demographic information was
collected from the parents.

Family Functioning

*Family Adaptability and Cohesion Scale – Second Edition (FACES-II; Olson, Portner,
& Bell, 1982).* The FACES-II is a 30-item self-report measure of two domains of family
functioning, adaptability to change and cohesion. Respondents rate the frequency with
which their family engages in a series of behaviours on a 5-point scale. Scores on the two
domains, as well as a total family functioning score are computed. Only the total score,
which is transformed in the scoring to have a range of values between 1 and 8, was used
in the present study.

The authors report on several studies that demonstrate the reliability (e.g., internal
consistency, test-retest) and validity (e.g., face, content, construct) of the scale to be very
good. For example, they reported internal consistency estimates ranging from .78 for the
adaptability scale to .90 for the total scale. Test-retest reliability over a 4 to 5-week
interval was also good, ranging from .80 for adaptability to .84 for the total score.
Studies of the factor structure of the measure have provided support for the distinction
between the two domains and the FACES-II correlates in the expected direction with
other measures of family functioning (e.g., Hampson, Hulgus, & Beavers, 1991).

Social Support

*Social Support Scale for Children and Adolescents (SSSCA; Harter, 1985).* This 24-
item scale was designed to assess children’s and adolescents’ level of perceived support
from parents, teachers, classmates, and friends. Accordingly, the scale has four subscales, (1) Parent Support/Regard, (2) Close Friend Support/Regard, (3) Classmate Support/Regard, and (4) Teacher Support/Regard (this scale was not used in the present study). Both the overall scale and the subscales have been shown to have adequate psychometric properties (Harter, 1985). The response format of the SSSCA was modified in the present study to make it easier for participants to respond to; this modification parallels the modification to the Self-Perception Profile for Adolescents described below. Scores on each scale are means that may range from 1 to 4.

Psychometric data on the original scale suggests adequate to good internal consistency with estimates ranging from .72 for the Friend scale to .88 for the Parent scale. Validity studies on adolescents have supported the proposed four factor structure and have observed significant relationships between scales on the SSSCA and measures of related constructs (e.g., between the Friend scale and a measure of social skills).

Child Factors

*Adolescent Personality Style Inventory (APSI; Lounsbury, Gibson, & Sundstrom, 2002).* The APSI consists of 128 items and was designed to assess the Five Factor personality traits described above, as well as a number of “narrower” traits. Adolescents are asked to rate on a 5-point Likert scale the extent to which they agree or disagree with a series of descriptive statements. Psychometric data reported by the authors are promising. For example, internal consistency estimates for the Big Five subscales ranged from .77 for Openness to .82 for Conscientiousness and Extraversion. Test-retest data were not presented. In terms of validity, the authors present results of several studies demonstrating relationships in the expected direction between the individual subscales
and other measures of personality and related criteria (e.g., school grades and attendance). As mentioned above, only the Neuroticism and Extraversion scales were used in the present study. Possible values on these scales range between 1 and 10.

*Life Orientation Test – Revised (LOT-R; Scheier, Carver, & Bridges, 1994).* The LOT-R consists of 10 items, 4 of which are filler items, and is designed to measure optimism by assessing generalized outcome expectancies (e.g., “I rarely count on good things happening to me”). Items are rated on a 5-point Likert scale ranging from “strongly agree” to “strongly disagree” and yield a single score ranging from 0 to 24. The psychometric properties of the LOT-R for adolescent populations are considered to be adequate. In particular, the authors reported test-retest reliability estimates ranging from .56 (over 24 months) to .79 (over 28 months), and internal consistency estimates (Cronbach’s alpha) of approximately .78. Evidence for the construct (i.e., convergent and discriminant) validity of the measure was also presented by the authors; notably, the measure correlated positively (as predicted by theory) with perceived internal locus of control, self-esteem, and neuroticism.

*Primary and Secondary Appraisals.* Primary and secondary appraisals were assessed using a series of items developed by Burgess and Haaga (1998). Specifically, for primary appraisals the adolescents were asked to rate how threatening and how challenging they perceived the cancer to be on a 5-point scale anchored with "no threat/not a challenge" and "extreme threat/extreme challenge". The degree of harm or loss was assessed by having respondents rate on a 5-point scale how much their cancer and its associated stressors have disrupted their lives in 10 areas including: relations with parents, relations with siblings, attention from family, freedom, popularity, activities with friends, school
activities, feelings about their bodies, changes in appearance, and plans for the future.

Secondary appraisals were also assessed on 5-point scales. The adolescents were asked to rate how much they believed they could alter their situation and how much they believed they could manage their emotional responses to the situation.

*Coping Responses Inventory – Youth Form (CRI-Youth; Moos, 1993).* The CRI-Youth is a 48-item self-report measure of different types of coping responses designed for youth aged 12 years and older. Respondents are asked to rate on a 4-point scale how often they used each action in response to a particular problem or stressor (their disease and the associated challenges in the present study). Four subscales tap different types of engagement ("approach") coping responses, including logical analysis, positive reappraisal, seeking guidance and support, and problem solving, and four tap disengagement ("avoidance") coping responses, including cognitive avoidance, acceptance or resignation, seeking alternative rewards, and emotional discharge. Scores on each scale can range from 0 to 18.

The internal consistency coefficients among the 8 subscales ranged from .55 (for acceptance or resignation) to .79 (for positive reappraisal) in studies reported by Moos (1993). Test-retest reliability over a 12- to 15-month interval ranged from .29 to .34 (averaged across the 8 subscales) and extensive evidence for the construct, face, and content validity is provided in the manual. For example, the CRI-Y differentiates as predicted by theory between depressed, conduct disordered, and normal youth (the former two groups use more avoidance coping) and correlates with measures of several related constructs (e.g., stress appraisal).

*Protective Buffering.* Given the absence of a measure of protective buffering in
children, a brief measure of the construct was created for this study. Following Jackson’s (1970) construct validation approach, a definition of protective buffering was articulated (i.e., a coping strategy or set of strategies in which the goal is to protect other people from one’s own distress) and items thought to tap this construct were generated. Three items were adapted from the scale used in Coyne and Smith (1991). A total of 31 items were generated by six individuals who were blind to the purposes and hypotheses of the study. Improving or discarding poorly worded or redundant items resulted in a final pool of 20 items (see Appendix D), 5 of which were worded in the opposite direction. Adolescents were asked to rate the extent to which they agreed or disagreed with each statement on a 5-point Likert scale.

Adolescent Adjustment

*Self-Perception Profile for Adolescents (SPPA; Harter, 1988).* The SPPA is a 45-item, self-report scale designed to assess adolescents’ (13 years or older) perceptions of themselves in a number of domains. Mean scores on eight subtests and a Global Self-Worth score are computed. The subtests are: (1) Scholastic Competence; (2) Social Acceptance; (3) Athletic Competence; (4) Physical Appearance; (5) Conduct/Morality; (6) Romantic Appeal; (7) Job Competence; (8) Close Friendship. Only the Global Self-Worth score was used in the present study in order to minimize the number of analyses. Possible values of this score range between 1 and 4.

The SPPA was recently modified to eliminate the “time-consuming and cumbersome item format” (Wichstrom, 1995, p. 100). In the revised version, respondents rate on a 4-point scale how well a series of statements describe them. This modification significantly improved the reliability and validity of the scale (Wichstrom, 1995). For example, in the
The Wichstrom study, the mean internal consistency alpha increased from .67 for the original version to .77 for the revised version. In addition, the correlations between most of the SPPA's subscales and other measures of similar constructs (e.g., between Scholastic Competence and grades) were significantly higher in the revised version. Finally, the revised version replicated the basic factor structure of the original, but exhibited fewer cross-loadings (Wichstrom, 1995).

Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1978). This widely used self-report scale, subtitled "What I Think and Feel", was designed to measure the nature and level of anxiety in children and adolescents. The scale consists of 37 "yes-no" questions. A total anxiety score and scores on four subscales, Physiological Anxiety, Worry/Oversensitivity, Social Concerns/Concentration, and Lie, are provided. Recent reviews of this measure have suggested that the Total Anxiety scale has good internal consistency, test-retest reliability, and construct validity (Perrin & Last, 1992; Rabian, 1994). For example, Cronbach's alpha coefficients have consistently exceeded .80 across a variety of samples (Rabian, 1994) and test-retest reliabilities ranging from .68 (9-month interval; Reynolds, 1981) to .98 (3-week interval; Pela & Reynolds, 1982) have been reported. In addition, scores on the RCMAS tend to correlate highly with scores on the State-Trait Anxiety Inventory for Children (STAIC; Spielberger, 1973) A-Trait scale and to be unrelated to scores on STAIC A-State scale, providing support for the concurrent and discriminant validity of the RCMAS (Reynolds, 1980, 1982, 1985). The subscales of the RCMAS have lower internal consistency coefficients than the Total Anxiety scale, though these are still considered to be adequate (Rabian, 1994). At present, however, little research has examined the other psychometric properties of the
subscales and as such, the authors recommend interpreting them cautiously. Thus, only the Total Anxiety score was used in the present study. This score is transformed into the T score metric (i.e., a distribution of standard scores with a mean of 50 and standard deviation of 10).

*Children's Posttraumatic Stress Scale (CPSS; Foa, Johnson, Feeny, & Treadwell, 2001)*. The CPSS is a 24-item self-report measure of PTSD symptomatology. Respondents rate the frequency (on a 4-point Likert scale) with which they have experienced each of 17 symptoms (which map onto the DSM-IV criteria for PTSD [American Psychiatric Association, 1994]) and whether or not these symptoms have interfered with 7 different areas of their lives in the past month. The 17 symptom items are summed to form a total symptom score and 3 subscale scores corresponding to the 3 DSM-IV symptom clusters, re-experiencing, avoidance, and arousal. The other 7 items are summed to form an impairment score from 0 to 51.

The authors report promising evidence for the reliability and validity of the CPSS. Internal consistency estimates ranged from .70 for the arousal subscale to .89 for both the total symptom score and the impairment score. Test-retest reliability over a 1 to 2-week period was .84 for the total score, .70 for the impairment score, and .63, .76, and .85 for avoidance, arousal, and re-experiencing, respectively. In terms of validity, the CPSS total symptom scale was significantly associated with another measure of PTSD and to a lesser extent, with measures of depression and anxiety. Only the total symptom score (which is highly correlated with the subscale scores) and the impairment score were used in the present study.

*Beck Depression Inventory - Second Edition (BDI-II; Beck, Steer, & Brown, 1996).*
The BDI-II is a 21-item self-report questionnaire designed to assess the intensity of cognitive, affective, and somatic symptoms of depression in adolescents and adults. Respondents rate the severity of each of 21 symptoms on a 4-point scale; these items are summed and produce a total score from 0 to 63. The strong psychometric properties of both the original and the first revision of the BDI (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961; Beck, Rush, Shaw, & Emery, 1979) in both adolescent and adult samples have been well documented (see Beck, Steer, & Garbin, 1988, for a review). In addition, although comparatively little research has been done on the BDI-II at present, there is evidence to suggest that the psychometric properties of this measure are also strong. For example, the authors of BDI-II reported alpha coefficients of .92 and .93 for a group of outpatient psychiatric patients (which included adolescents) and a college student sample, respectively. The one-week test-retest reliability reported by the authors on a subsample of 26 of the patients was .93. There is also promising evidence to support the construct validity of the BDI-II. In particular, this instrument is highly positively correlated with other measures of depression, including the previous revision of the BDI, and with measures of constructs related to depression, such as hopelessness and anxiety. The BDI-II has also been shown to discriminate between individuals with depressive disorders and individuals with nonaffective psychiatric disorders, and between depressed and nondepressed individuals (Beck et al., 1996).

**Parent Adjustment**

*Rosenberg Self-Esteem Scale (Rosenberg, 1965; 1989).* The Rosenberg Self-Esteem Scale is arguably the most frequently used measure of self-esteem in adults. Respondents are asked the extent to which each of 10 items describes them on a 4-point
The psychometric properties of this scale have been well documented and are considered to be very good (Rosenberg, 1986). Test-retest reliability estimates ranging from .82 to .88 and internal consistency estimates ranging from .77 to .88 have been reported, as well as extensive data on the validity of the scale (Blascovich & Tomaka, 1993). Scores on the measure may take on values of 0 to 30.

**Beck Anxiety Inventory (BAI; Beck & Steer, 1990).** The BAI is a 21-item self-report measure of anxious symptomatology. Each of the 21 items represents a different symptom. Respondents are asked to rate on a 4-point scale the severity with which each symptom was experienced over the previous week. As with the BDI-II, these ratings are summed to yield a total score from 0 to 63.

The BAI has excellent internal consistency, with alpha coefficients typically above .90 (Beck, Epstein, Brown, & Steer, 1988; Jolly, Aruffo, Wherry, & Livingston, 1993). The test-retest reliability of the BAI is also good, with correlations ranging from .62 over a 7-week interval (Creamer, Foran, & Bell, 1995) to .75 over a 1-week interval (Beck, Epstein, et al., 1988). Finally, there are extensive data provided by Beck and colleagues (Beck, Epstein, et al., 1988; Beck & Steer, 1990) in support of the validity of this measure. For example, the BAI has been shown to correlate with other measures of anxiety and anxious cognitions. This instrument is also significantly correlated with measures of theoretically related constructs such as depression and obsessive-compulsive symptomatology (Beck, Epstein, et al., 1988; Dent & Salkovskis, 1986). In addition, the BAI has been shown to discriminate between anxiety and other psychiatric disorders (Beck, Epstein, et al., 1988).

*Posttraumatic Symptom Scale – Self-Report (PSSSR; Foa, Riggs, Dancu, &*
Rothbaum, 1993). The PSSR is a 17-item measure of PTSD symptomatology. Respondents rate on a 4-point scale the frequency with which they have experienced each of 17 symptoms (which map onto the DSM-IV criteria for PTSD) in the past month. The psychometric properties of the PSSR are considered to be good (Foa et al., 1993). For example, the authors reported the test-retest reliability of .83 over a 10 to 22-day interval and an internal consistency coefficient of .92. In terms of validity, the PSSR correlated in the expected direction with measures of related constructs, including depression and state and trait anxiety. Scores on this measure may range from 0 to 51.

*Beck Depression Inventory - Second Edition (BDI-II; Beck, Steer, & Brown, 1996).*

This measure is described above.

**Socially Desirable Responding**

*Marlowe-Crowne Social Desirability Scale – Short Form (MCSD-SF; Reynolds, 1982).* This scale is comprised of 13 items from the original, 33-item scale (Crowne & Marlowe, 1960) that describe culturally approved behaviours. This scale is used to assess socially desirable responses or responses that make the respondent “look good” (Paulhus, 1991, p. 17) rather than accurate responses to other self-report instruments. Results of several studies suggest that this short-form is a reliable and valid substitute for the original scale, in that it correlates highly with the original and moderately with other measures of socially desirable responding (e.g., Ballard, 1992; Reynolds, 1982; Robinette, 1991; Zook & Sipps, 1985). The author reported the internal consistency to be comparable to that of the 33-item scale (Kuder-Richardson coefficients of .76 for MCSD-SF vs. .82 for MCSD). Scores on the MCSD-SF may range from 0 to 13.

Socially desirable responding is a potential problem with any self-report measure, but
some studies have reported survivors of childhood cancer score significantly higher on measures of social desirability than healthy controls (Madan-Swain et al., 1994). Potentially more problematic is the report that this response style was significantly correlated with survivors’ psychological adjustment, with higher social desirability scores being associated with appearing more well-adjusted (Kazak et al., 1994). Thus, the MCSD-SF was included in the present study as a potential covariate.

**Results**

**Descriptive Statistics**

Descriptive statistics (means and standard deviations) for all variables are presented in Tables 1 to 4. Cronbach’s alpha coefficients for each scale are also reported.

**Preliminary Analyses**

**Demographics and Cancer Types**

Pearson chi square tests and independent samples t-tests were conducted to examine whether there were any differences between the two sites (CW and SCH) on the other demographic or disease variables, or on the dependent measures. The only significant differences were on age at diagnosis ($t[61] = 3.62; p = .001$) and time since diagnosis ($t[61] = 2.99; p = .004$). On average, the CW group was younger at diagnosis ($M = 6.2$ years vs. $M = 10.7$ years for the SCH group) and further from diagnosis ($M = 8.9$ years vs. $M = 5.3$ years for the SCH group). However, as the differences between the two groups on the adjustment measures were highly nonsignificant ($p > .45$ for all comparisons), it was deemed acceptable to combine the data from the two sites.

Independent samples t-tests and univariate analyses of variance (ANOVAs) were conducted to examine mean differences on the predictors or dependent measures based on
the categorical demographic variables. There were no significant differences between male and female adolescents, except on the Neuroticism scale of the PSIA, with girls scoring significantly higher than boys ($t[62] = 2.94; p = .005$). This difference is consistent with the gender differences in neuroticism found in the broader personality literature (Lynn & Martin, 1997). There were also no significant differences on the predictors and dependent measures based on parental relationship status. Given the lack of demographic differences, it was considered appropriate to analyze the data for the whole sample together.

Analyses of the bivariate correlations between the continuous demographic variables, including adolescent age, parental age, and parental years of education, revealed no significant associations between these variables and the outcome variables ($p > .05$ for all correlations). Adolescent age was significantly positively associated with the use of two coping strategies, positive reappraisal ($r = .36, p = .005$) and seeking guidance and support ($r = .37, p = .004$). These relationships are consistent with findings in the stress and coping literature that age is associated with increased use of such “emotion-focused” engagement coping strategies (Band, 1990).

Given the possible differences between children with cancers of central nervous system (CNS) and other types of cancer (discussed above), univariate ANOVAs were performed with cancer type (CNS malignancy, ALL, other) as the independent variable and the other disease variables and adjustment measures as the dependent variables. The only significant difference between the diagnostic categories was on number of different types of treatment required ($F[2,59] = 9.19; p < .001$). Post hoc Tukey’s tests revealed that the ALL group required fewer different types of treatment on average than both the
CNS and other cancer type groups (1.5 different types of treatments vs. 2.4 types for each of the other 2 groups). The lack of other significant differences between the categories made it possible to analyze the groups' data together.

A final note concerns the relationships between social desirability and other constructs assessed in the present study. Of these relationships, social desirability was significantly related to neuroticism \( r = -.35, p = .004 \), but not to measures of distress or self-esteem. As such, MCSD-SF scores were excluded from subsequent analyses.

**Intercorrelations among Predictors**

The intercorrelations among the hypothesized predictors and covariates (presented in Table 5) were examined to identify and potentially remove redundant variables that might increase the problem of multicollinearity in the regresional analyses. Several pairs of variables were highly correlated, warranting the removal of one member of the pair. For example, emotional discharge was omitted from subsequent analyses because of its high correlation with cognitive avoidance \( r = .63; p < .001 \), the latter of which was more highly correlated with distress, more internally consistent, and more theoretically meaningful. Parent support, which overlapped significantly with family functioning \( r = .55; p < .001 \), was omitted for the same reason. Finally, time in remission was excluded from subsequent analyses, as it was very highly correlated with time since diagnosis \( r = .84; p < .001 \) but had more missing values.

**Intercorrelations among Dependent Measures**

Correlations between the dependent measures are presented in Table 6. As expected, the four measures of distress were significantly positively correlated with each other and each was moderately correlated with self-esteem.
Composite Scores

A principal components analysis (PCA) was performed on the four adolescent-rated indices of psychological distress and symptomatology, general anxiety (RCMAS), PTSD symptom level and associated impairment (CPSS), and depressive symptoms (BDI-II), to reduce the number of subsequent analyses (by creating a composite score) and provide some protection for the family-wise Type I error rate. As expected, given the relatively high intercorrelations among these dependent variables, a one component solution reflecting psychological distress was obtained that accounted for a significant percentage of the total variance (67.1%). The sample size in the present study is relatively small for a PCA (Comrey & Lee, 1992), but the presence of only a single component and the high component loadings (.791, .889, .728, and .859 for RCMAS, CPSS symptoms, CPSS impairment, and BDI-II, respectively) suggest a stable solution. Sorgen and Manne (1998) performed a similar analysis on similar variables in a sample of 76 on-treatment pediatric cancer patients and also obtained a single component solution reflecting psychological distress.

Self-esteem (the Global Self-Worth scale of the SPPA) was not included in the PCA because it is an index of psychological well-being, not psychological distress (discussed above). Conceptually, self-esteem should be inversely related to psychological distress, but the overlap should only be partial (Kliwuer, 1997). Support for this distinction in the present study comes from the moderate negative correlations between self-esteem and the distress indices noted above (Table 6). As expected, self-esteem was also moderately negatively correlated with the adolescent psychological distress component (r = -.45, p < .001).
A similar PCA was performed on the corresponding parent measures of their own distress, the BAI, PSSSR\textsuperscript{12}, and BDI-II, to obtain a composite index of parents' psychological distress. As with the PCA on the adolescent measures, a one component ("parent psychological distress") solution was obtained that accounted for a significant percentage of the total variance (78.7%) and the component loadings for the three variables were high (.873, .894, and .894 for BAI, PSSSR, and BDI-II, respectively), again suggesting a stable solution.

In an effort to reduce the number of potential predictors in subsequent analyses, a PCA was also performed on the conceptually related Friend and Classmate Support scales of the SSSCA. A single "peer support" component was extracted and accounted for 74.0% of the total variance. Component loadings were .860 for both Friend Support and Classmate Support.

\textit{Protective Buffering}

Finally, an exploratory PCA with a Varimax rotation was performed on the 20 items developed to tap protective buffering. The maximum number of components suggested by this analysis was six (i.e., six had eigenvalues greater than 1). However, retention of so many components was considered problematic so an examination of the scree plot was conducted. This examination suggested that a 3-component solution accounting for 46.6% of the total variance would be most appropriate. Component loadings for each item are presented in Table 7. Of the remaining 20 items, eight loaded at least fairly highly (> .45; Comrey & Lee, 1992) on the first component. These items primarily reflected attempts to prevent others from observing or otherwise becoming aware of the

\textsuperscript{12}Unlike the CPSS, which has separate scales for symptoms and impairment, the PSSSR only has a
adolescents' distress. The seven items loading heavily on the second component were more disparate in content, but generally reflected positive attitudes towards self-disclosure when one is distressed. The five items loading on the third component were also quite disparate in content, but reflected a general theme of trying to keep one's parents (and others to a lesser extent) from worrying.

Based on the results of this PCA, a scale was created for each component by summing the standardized values of the items\textsuperscript{13} that loaded heavily on the components (8, 7, and 5 items, respectively). Examination of the psychometric features of the three scales indicated that the internal consistency was adequate for the scale based on the first component (Cronbach’s alpha = .80), but very poor for the other two scales (alphas of .23 and .12, respectively). The consistency estimates could be improved to .47 by dropping item 10 from the second component scale and to .53 for the third component scale by dropping item 1. However, even these higher levels of internal consistency are relatively poor, likely reflecting the somewhat disparate content of the items that comprise each scale. Thus, only the first scale, which was labeled “protective buffering”, was used in subsequent analyses.

**Predicting Psychological Distress**

**Bivariate Analyses**

Pearson product-moment correlations between the predictors and the psychological distress composite are presented in Tables 8 and 9. Given the number of analyses and potential for Type 1 error rate inflation, a more conservative alpha of .01 was used to determine statistical significance in all bivariate analyses (including those predicting self-
esteem). Bivariate scatterplots were inspected for the presence of curvilinear relationships; none were observed.

Child Factors

As predicted, significant positive associations were found between the adolescent psychological distress composite and neuroticism, protective buffering, and disengagement coping, specifically cognitive avoidance and emotional discharge. The predicted negative association between distress and optimism was also significant. Contrary to predictions, none of the engagement coping strategies were associated with distress, nor were primary or secondary appraisals, though the appraisals approached significance (p = .036 for primary and p = .045 for secondary appraisal of ability to alter one's emotions). In addition, two of the disengagement strategies, acceptance or resignation and seeking alternative rewards, were not significantly related to distress.

Family Factors and Peer Support

The parent psychological distress composite was positively associated with adolescent distress, whereas family functioning and peer support were negatively associated with distress. Parent self-esteem was not significantly related to distress.

Disease and Demographic Factors

None of the disease variables used in the present study were significantly associated with adolescent distress. Similarly, none of the demographic variables examined (e.g., adolescent or parent age, parent level of education) were significantly related to distress.

Additive Model

A hierarchical linear regression was conducted to evaluate an additive model for

13 After reverse scoring items that were worded in the opposite direction.
predicting distress. Most of the variables that were significant at the bivariate level were included in the model, save those that were noted above (See “Intercorrelations among Predictors” section). The more established covariates, family functioning, parent distress, and peer support, were entered in the first block, followed by the child predictors, neuroticism, optimism, protective buffering, and cognitive avoidance. Age at diagnosis, though it was not statistically significant, was also included as a covariate (in the first block) because of its theoretical relevance and to provide a more stringent test of the child factors.

An examination of the Studentized residuals, leverage values, and Cook’s Distance revealed no multivariate outliers (Tabachnick & Fidell, 2001). Examinations of the residuals scatterplots were also conducted to evaluate the tenability of the assumptions of normality, linearity, and homoscedasticity between predicted scores and the errors of prediction. No significant violations of these assumptions were apparent. An alpha of .05 was used to determine statistical significance for all of the regression models (including those predicting self-esteem) to maximize power (given the relatively small predictors to cases ratios).

The standardized regression coefficients (β), squared semi-partial correlations with the criterion, and the statistical significance of the individual predictors, as well as the $R^2$ and $R^2$ change, are presented in Table 10. In the final model, two child factors remained

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14 The results change very little if age at diagnosis is left out. The significant predictors become slightly more significant and the nonsignificant variables become slightly less nonsignificant.

15 The squared semi-partial correlation between each predictor and the dependent variable (with the other variables partialled out of the predictor) is equal to the decrement in $R^2$ that would result from removing that predictor from the model (Howell, 2002). It represents an estimate of the proportion of total variance “uniquely” accounted for by each predictor or what Darlington (1968) referred to as a predictor’s “usefulness”.
significant, neuroticism and cognitive avoidance, \( t[55] = 2.91; p = .006 \), and \( t[55] = 2.33; p = .024 \), respectively). The remaining child factors became nonsignificant, as did age at diagnosis, family functioning, parent distress, and peer support. Thus, support for an additive model for predicting distress, in which neuroticism and cognitive avoidance predict variance above and beyond that predicted by other factors, was obtained.

**Moderated Mediation Models**

The hypothesized moderated mediational models involving engagement coping strategies were not tested because of the absence of significant associations between personality or adjustment and these strategies. The models involving disengagement coping (operationalized as cognitive avoidance on the basis of its bivariate relationships with personality and distress) were tested using the procedure outlined by James and Brett (1984), who integrated the techniques for testing moderators and mediators later described by Baron and Kenny (1986). To test the moderational effects, interaction terms were created that represented the cross products of each putative moderator and the predictor variables. Prior to creating these terms, all variables were centered (i.e., the mean of each variable was subtracted from the individual observations) to reduce collinearity between the individual variables and their corresponding cross products (Cohen, Cohen, Aiken, & West, 2003).

These interaction terms are then entered into a series of three regressions used to test the mediational effect. The first regression involves regressing the mediator on the independent variable (IV), the hypothesized moderator, and their interaction (i.e., IV * moderator). In the second regression, the outcome is regressed on the mediator, the hypothesized moderator, and their interaction (mediator*moderator). Finally, in a multi-
step regression, the outcome is regressed on (a) the mediator, moderator, and mediator by moderator interaction in the first block and (b) the IV and IV by moderator interaction are added in the second block. Support for a moderational effect is obtained by the presence of significant interaction terms whereas support for mediation is indicated by a nonsignificant increase in the $R^2$ when the IV is added to the model.

In the present study, family functioning and peer support, the hypothesized moderators, were analyzed separately to maximize the power of the analyses and to avoid interpretational complexity. In addition, the interaction terms were evaluated against a more liberal alpha of .15 to determine statistical significance, given the well documented difficulties in finding significant interactions in nonexperimental designs (McLelland & Judd, 1993).

Contrary to this study's hypotheses, support for the moderational effects of family functioning or peer support was not obtained for any of the models, even using the more liberal alpha ($p > .15$ for all interaction terms). Given the nonsignificance of these variables, the hypothesized models were considered as potential mediational models. However, the patterns of correlations between the predictors (i.e., the independent variables and potential mediators) and adjustment (Table 9) and between the independent variables and the mediators (presented in Table 11), revealed that key links needed to meet criteria for mediation are missing in most of the models (e.g., optimism was only significantly related to one of the coping strategies and engagement coping strategies were not significantly related to distress). Support was obtained for a model in which a disengagement coping strategy, cognitive avoidance, partially mediated the relationship between neuroticism and psychological distress (Figure 4). All of the direct paths were
significant (Tables 9 and 11), as was the path between avoidance and distress controlling for neuroticism (Baron & Kenny, 1986). The indirect path, which was tested using a procedure described by Sobel (1982, 1987), was also significant (t[60] = -2.15; p = .032). Thus, controlling for cognitive avoidance significantly reduced the magnitude of the relationship between neuroticism and distress, though this relationship remained statistically significant. This model also held while simultaneously controlling for age at diagnosis, family functioning, parent distress, and peer support.

Predicting Self-Esteem

Bivariate Analyses

Pearson product-moment correlations between the predictors and self-esteem are presented in Tables 8 and 9. Again, an alpha of .01 was used to determine statistical significance for these analyses. In addition, bivariate scatterplots were inspected for the presence of curvilinear relationships and none were observed.

Child Factors

As predicted, significant positive associations were found between self-esteem and optimism, and between self-esteem and extraversion. The predicted negative association between self-esteem and neuroticism was also significant. Contrary to predictions, none of the other child factors, including appraisals and coping, were associated with self-esteem.

Family Factors and Peer Support

Among the family factors, only overall family functioning approached significance (p = .035), with higher family functioning being associated with higher adolescent self-esteem. In contrast, peer support was a highly significant predictor of self-esteem.
Disease and demographic factors

Among the disease variables, age at diagnosis closely approached significance (p = .013), with older age being associated with lower self-esteem. As with distress, none of the demographic variables examined were significantly related to self-esteem.

Additive Model

A hierarchical linear regression was conducted to test an additive model for predicting self-esteem. Variables that were significant at the bivariate level were included in the model, as were family functioning and age at diagnosis. The latter variables, though deemed statistically nonsignificant at an alpha of .01, were included as covariates because of their theoretical relevance and to provide a more stringent test of the child factors. The order of entry into the regression was peer support, family functioning, and age at diagnosis in the first block, and neuroticism, extraversion, and optimism in the second. As with predicting distress, an examination of the Studentized residuals, leverage values, and Cook’s Distance for predicting self-esteem revealed no multivariate outliers, and examinations of the residuals scatterplots revealed no significant violations of the normality, linearity, and homoscedasticity assumptions.

The standardized regression coefficients, squared semi-partial correlations, and the results of the significance tests on the individual predictors, as well as the $R^2$ and $R^2$ change, are presented in Table 12. In the final model, only one child factor, optimism, remained significant ($t[59] = 2.71; p = .009$). The remaining child factors in the model became nonsignificant, as did family functioning. Peer support also remained significant ($t[59] = 2.68; p = .010$). Interestingly, age at diagnosis, which was included for theoretical reasons rather than statistical significance (though it approached significance),
became more significant in this model (t[59] = -3.5; p = .001). Thus, support for an additive model, in which optimism, peer support, and age at diagnosis predict self-esteem while controlling for each other and other child, family, and disease variables, was obtained.

**Moderated Mediational Models**

As in the prediction of distress, neither of the hypothesized moderators were statistically significant (p > .15 for all interaction terms). In addition, because none of the engagement or disengagement coping strategies were significantly related to self-esteem (Table 9), none of hypothesized mediational models for self-esteem remained tenable.

**Discussion**

The purpose of the present study was to examine different models of predicting psychological adjustment in adolescent cancer survivors. The results of the literature on the psychological adjustment of survivors have been extremely mixed, with some studies finding significant adjustment difficulties, some finding few problems, and some even finding these children to be better adjusted than their healthy peers. However, the conclusions of these studies have been based on comparisons between group means and have only partly addressed the substantial variability between individuals within the groups. Moreover, even authors who report primarily favourable outcomes acknowledge this variability and agree that a significant number of patients and survivors experience significant adjustment difficulties. The primary objective of the present study was to examine factors than might account for the variability in adjustment outcomes, with a particular emphasis on clarifying the predictive role of previously neglected child variables, including personality, appraisal, and coping, relative to more established
predictors like family functioning, peer support, and disease variables.

Two theoretical models for predicting adjustment were proposed and examined. The first was an additive model of prediction in which it was hypothesized that child factors would predict significant variance in adjustment (defined as psychological distress and self-esteem) above and beyond the variance predicted by the other variables. This hypothesis was supported for both distress and self-esteem, though different child factors were significant in the two models, namely, neuroticism and cognitive avoidance for distress and optimism for self-esteem. Support was especially strong for the association between child factors and distress, as family, peer support, and disease factors were all rendered nonsignificant by the inclusion of neuroticism and cognitive avoidance in the model. Thus, although multiple factors predicted distress, only child factors did so uniquely and independently. For self-esteem, a more balanced combination of independent predictors, including optimism, peer support, and to a lesser extent, age at diagnosis, seemed to fit best.

The second proposed model was a moderated mediational model of prediction in which it was hypothesized that coping would mediate the relationship between personality variables and adjustment, but that this effect would be moderated by level of family functioning and peer support. Although the components of this model are consistent with previous findings in both the pediatric oncology literature and the broader stress and coping literature, the integrated model had not been tested in a sample of pediatric cancer survivors. Contrary to predictions, the overall model was not supported in that neither family functioning nor peer support acted as moderators and some of the requisite links were not observed (e.g., engagement coping predicting lower distress).
However, support was obtained for a simpler variant of this model—a model in which a particular disengagement coping strategy, cognitive avoidance, partially mediated the association between neuroticism and psychological distress.

Finally, in this first test of protective buffering in a pediatric population, partial support was obtained for the hypothesized positive relationship between this coping strategy and distress. Protective buffering and distress were significantly associated at the bivariate level, though this relationship became nonsignificant when other child factors were controlled, particularly neuroticism and cognitive avoidance. Thus, the use of protective buffering seems to predict higher levels of distress in adolescent cancer survivors, but not uniquely, suggesting that in general this strategy may be detrimental to the survivors who use it.

The findings of the present study, particularly the bivariate findings predicting distress, are largely consistent with previous research in pediatric cancer survivors and in children and adolescents more generally. For example, two of the more robust findings with both children and adults were replicated, namely neuroticism and avoidant coping predicting distress (Bolger & Zuckerman, 1995; Compas et al., 2001; Frank et al., 1997; Hoffman et al., 1996). Likewise, the significant mediational model of neuroticism, cognitive avoidance, and distress is in line with research in other pediatric and adult populations that has found support for mediational models of personality, coping, and adjustment (e.g., Bolger, 1990; Gomez, 1998a). The significant bivariate relationship between optimism and distress also closely parallels previous findings in children and adults (Scheier et al., 2001). Higher levels of optimism appear to be robust predictors of lower distress in a pediatric cancer sample. In addition, the positive relationship between
protective buffering and distress replicates the findings from the small adult literature on this coping strategy (e.g., Coyne & Smith, 1991) and extends them into the pediatric coping literature. The findings with the non-child factors, including family functioning, parent distress, and peer support, and distress are also consistent with previous research in this area (e.g., Hockenberry-Eaton et al., 1994; Kazak et al., 1997). Finally, the mixed findings with the remaining class of non-child factors, disease variables, are in line with the mixed results of previous research in pediatric cancer populations (detailed above). The role of disease variables in predicting psychological distress in children and adolescents with cancer, particularly off-treatment survivors, remains unclear.

The lack of significant relationships between engagement coping strategies and either distress or self-esteem is not consistent with previous research (reviewed above) on the use of these strategies in pediatric cancer populations and in children in general. It may be that an asymmetry exists wherein the distress-enhancing effects of disengagement coping outweigh, and to some extent counter, the distress-reducing effects of engagement coping. The lack of an association between appraisals (primary and secondary) and adjustment distress is also somewhat surprising, but at least in the prediction of distress, this finding may be partly accounted for by the use of a more conservative alpha level. It may also be linked to the use of a sample of off-treatment survivors, in that the survivors' appraisals of how serious the cancer was and of the extent to which they would be able to cope with the disease and treatment may be offset by the fact that they had “successfully” completed their treatment.

The findings predicting self-esteem at a bivariate level largely parallel previous research, particularly in terms of neuroticism predicting lower self-esteem and optimism.
and extraversion predicting higher self-esteem (e.g., Chang & Sanna, 2003; Cheng & Furnham, 2002). It appears that adolescent cancer survivors who are more emotionally labile have a less positive or at least a less stable self-concept, whereas those who have generally positive expectations about the future also make generally positive appraisals of themselves. Likewise, adolescents who are more outgoing and sociable seem to view themselves in a more positive light, perhaps because people who display these personality characteristics tend to have larger social networks and possibly more opportunity to access peer support. This hypothesis has not been examined in this population, but would be partially supported by the positive relationship between peer support and self-esteem observed in the present study. This latter relationship itself is highly consistent with previous literature, as many have argued that peer support is among the most important predictors of a child’s self esteem (e.g., Harter, 1990, 1999; Robinson, 1995). Children, with or without cancer, who feel more accepted and supported by friends and classmates tend to feel better about themselves. The same authors have argued that parent and family functioning are also important predictors of self-esteem, making the absence of significant relationships between these variables surprising (though these relationships were in the expected direction and family functioning approached significance). It may be that family influences are somewhat less potent than the influence of friends and classmates in an adolescent population. Research on child and adolescent development supports this hypothesis, describing a shift in adolescence in the relative levels of support favouring peers over parents (Rubin, Bukowski, & Parker, 1998).

**Predicting Adjustment**

The results of the present study suggest that different models may be useful for
predicting different facets of psychological adjustment. In particular, these results suggest that an additive model or a mediational model composed primarily of the child factors, neuroticism and cognitive avoidance, may be most effective for predicting distress in this population. Or it may be that distress is best captured by both models, in that neuroticism has a direct influence on distress and an indirect influence by increasing the likelihood that the adolescent will choose a more maladaptive coping strategy like cognitive avoidance. Other factors like family functioning, parental distress, and peer support also likely have an influence on distress, though by definition their influence is less direct than that of child factors. And while disease factors have been shown to predict adjustment in some studies, it may be that their primary relevance is in the short-term (e.g., during treatment) and that over time, more stable and enduring factors like personality and coping have a greater impact. Moreover, because psychological distress is an inherently subjective phenomenon, it is not surprising that disease characteristics may be less important than more subjective factors. As such, it may be that child factors are ultimately the most important determinant of a child’s level of psychological distress.

In contrast, self-esteem seems to be associated with a more balanced combination of factors in pediatric cancer survivors, such that a broader additive model may be required. The findings of this study suggest that such a model would include dispositional optimism and peer support, and possibly age at diagnosis. Although family functioning, adjustment, and support have also been identified as important influences on children’s self-esteem (Harter, 1990, 1999), it may be that they are less important than the influence of friends and classmates in an adolescent population (as mentioned above).

The results of this study also highlight and support the decision to treat distress and
self-esteem separately and suggest that these constructs are influenced by different factors. It is perhaps not surprising that coping strategies predicted distress, but not self-esteem in the present study as coping can be used to manage distress and ward off difficulties, whereas self-esteem may be more about having a stable foundation (both intrapersonally and in relationships) and less within an individual’s control. In essence, distress is something that can somewhat actively be prevented or attended to, with varying degrees of success, and is often associated with stressors that can be specifically targeted (e.g., the cancer treatment). In contrast, self-esteem is generally considered to be a quality that often grows out of reflections of the self from others (Marsh & Hattie, 1996) and of a generally positive view of the world and one’s place in it. As such, a positive self-concept may be more diffuse and difficult to actively influence.

Implications of the Present Study

The results of the present study have implications for identifying and intervening with children and adolescent cancer patients at risk for adjustment difficulties. For example, knowing that neuroticism and pessimism are potential risk factors for distress may allow health care professionals to earlier identify “at risk” children and to help them access the support they need. Similarly, knowing that avoidant coping and protective buffering predict higher levels of distress may inform the psychological interventions that are used with these children (e.g., training in coping skills). Helping pediatric cancer patients understand the limited utility of avoidant coping may be especially important. Research in both the adult and pediatric coping literatures have highlighted the paradox of strategies like cognitive avoidance, namely, that attempts to avoid upsetting thoughts often increase the occurrence of such thoughts (Primo et al., 2000; Wegner, 1994). In
other words, such attempts to disengage from stress may actually magnify its impact. Research on the behavioural avoidance associated with anxiety disorders in children and adults provides further evidence of this phenomenon. Although escaping the triggers of anxiety is powerfully negatively reinforcing in the short-term, over the longer-term, the avoidance becomes more and more entrenched and the individual does not have opportunities to overcome the anxiety or develop more adaptive coping strategies. Thus, it would likely be beneficial to teach pediatric cancer patients to use avoidance sparingly.

The protective buffering results further suggest that teaching these children, and children in general, to “avoid” the use of protective buffering, as well as encouraging the appropriate use of self-disclosure, might be beneficial. Teaching parents to model such behaviour would likely be an effective means of implementing this intervention. This may help to ease survivor’s minds and help them to realize that parents are able to handle their children’s distress and do not require their children’s protection. Moreover, Worchel and colleagues' (1987) finding that children’s confidence in their parents’ ability to look after them predicted both externalizing problems and global adjustment suggests that providing children with such assurances may have broader benefits than just reducing distress. More broadly, redirecting these children towards addressing their own needs and ensuring that they have an environment in which they feel protected and safe to discuss anything may prove exceedingly helpful.

Given the importance of peer support, particularly with regards to adolescents’ self-esteem, setting up a network of adolescent survivors at varying phases in the treatment process and beyond might be useful. This would ensure that the survivors had multiple people to talk to who had had similar experiences. Being able to interact with adolescents
who have successfully navigated some of the later challenges of cancer may also provide hope to those earlier in the process. To this end, setting up a “buddy system” that matches more recent patients or survivors with longer-term survivors may prove fruitful. More locally, having a plan in place for when survivors return to school after treatment would likely prove helpful. Re-entry into school can sometimes be difficult for survivors (Chesler & Barbarin, 1987) and working in advance to educate and prepare the other students for the survivors’ return may help to ensure that valuable peer support is in place.

Limitations

The results of the present study must be considered within the context of the study’s limitations. One potential limitation is the primary reliance on adolescent self-report measures and the possibility that the significant relationships observed could be accounted for by shared method variance (i.e., using the same assessment measures with mostly the same informants; Compas et al., 2001). This does not appear to be the case in the present study in that the differential pattern of relationships suggests that the overlap between constructs is more than just a product of shared method variance (Varni & Katz, 1997). Having most of the measures in the present study based on adolescent self-report (the exception being parents’ ratings of their own distress) may even offer a degree of control over shared method variance. In other words, if the assessment methods and informants are the same for most of the constructs, differences in the associations between measures are unlikely to reflect differences in methods or informants. In addition, other research on some of the variables examined in this study, particularly engagement and disengagement coping, suggests that the effects hold across different
informants. For example, Connor-Smith and colleagues (2000) found significant associations between parents' reports of their adolescents' coping efforts and adolescents reports of internalizing and externalizing problems.

Some authors have argued that the issue of shared method variance can be resolved by using other informants and other assessment modalities (e.g., Compas et al., 2000), and to this end, much of the research on pediatric oncology populations has utilized parent-reports and to a lesser extent, teacher- and medical staff-reports (Mulhern et al., 1992; Radcliffe et al., 1996). Interviews and observations have also been utilized, though less frequently. The problem with using other informants, particularly parents, is that at best their reports are generally only moderately correlated with the reports of adolescents (Achenbach, McConaughy, & Howell, 1987; Thompson & Gustafson, 1996). This discrepancy is particularly pronounced for internalizing phenomena like depression, anxiety, and self-esteem because other informants can only report on overt behavioural indices of these phenomena, which may be unreliable (Quay & La Greca, 1986).

Consistent with this, there is evidence to suggest that parents' ratings of their children's adjustment are systematically and significantly lower than the children's ratings of themselves in childhood cancer survivors (Eiser et al., 2003; Mulhern et al., 1992; Vance, Morse, Jenney, & Eiser, 2001). This possible bias may reflect the higher levels of distress and adjustment problems reported by many parents of patients and survivors relative to parents of healthy children (Grootenhuis & Last, 1997; Trask et al., 2003).

Another concern that is frequently raised with studies using self-report measures is the potential for bias introduced by certain styles of responding, such as socially desirable responding (Compas et al., 2001; Madan-Swain et al., 1994). The present study
attempted to address this issue by assessing socially desirable response tendencies. However, the relationship between this variable and adjustment was nonsignificant, suggesting that it was not biasing adolescents' self-reports of their adjustment.

A second potential limitation of the present study was the relatively high ratio of predictors and covariates to participants and the restrictions this placed on the statistical power of the analyses. This did not seem to pose much of a problem for the tests of the additive model, as the hypothesized relationships and those that were expected on the basis of previous research were generally observed. Power may have been more of an issue with the tests of the moderated mediational models. Despite using a more liberal alpha to increase the power for detecting interactions, the tests of these more complex models may not have been sufficiently sensitive to capture the moderational effects (McClelland & Judd, 1993). As such, an even larger sample may have been required to provide an optimal test of the hypothesized moderated mediational models. For this reason, it may be premature to abandon these models.

A number of limitations of the present study reflected tradeoffs made to obtain a sample size initially deemed large enough to test the complex models proposed in this study. For example, like much of the research in the field, there was considerable heterogeneity in time since diagnosis and since treatment ended among survivors in this sample. While this introduces a potential recall bias and attenuates the internal validity of the study to some degree, it simultaneously enhances the study's external validity. This is especially important as it potentially offsets some of the limits to generalizability imposed by the relatively low response rate. Because of the response rate, it is possible that the results of the present study may not extend to the families who did not participate.
However, even large studies of cancer survivors are subject to such limitations and the most likely impact is a restriction in the range of functioning of participants. In particular, adolescents and families who did not participate are likely among the most distressed (Stuber et al., 1996), which might account for their lack of participation. It may even be the case that not participating may represent a form of avoidance. If these suppositions are true, the findings of this study might (a) underestimate the relationships between the predictors and adjustment because of the restriction of range in adjustment and (b) fail to capture some of the subtleties in the experiences of families in greatest need. However, the generally strong associations with distress found in the present study suggest that the former was not a significant problem.

Another limitation of the present study is its cross-sectional design. It should be noted that implicit in Baron and Kenny's (1986) criteria for mediation (discussed above) is a fifth condition that must be met for mediation to hold, temporal precedence. This condition holds that the independent variable must precede the mediator in time, which in turn must precede the outcome. With the personality, coping, and adjustment mediational models described above, there are logical and theoretical arguments to suggest that this condition holds. In terms of personality and coping, personality has typically been conceptualized as a stable, enduring factor and as discussed above, one that influences the approach to coping an individual takes (e.g., Bolger, 1990). This suggests, at least logically, that personality must precede choice of coping efforts. In turn, adjustment (or maladjustment) is often conceptualized as an outcome of coping efforts, or at least a variable that is affected by them (Bolger, 1990). However, the cross-sectional nature of the present study precludes the establishment of this condition and does not permit causal
hypotheses to be tested because the possibility of bi-directional causality (e.g., that adjustment influences coping) cannot be refuted (Compas et al., 2001). Hence, while the pattern of relationships between neuroticism, cognitive avoidance, and distress are consistent with a mediational model, they do not confirm the implied temporal sequence or causality in the model.

**Directions for Future Research**

Building upon the results of the present study, there are several potentially fruitful avenues for future research. Most importantly, it will be important for researchers to address some of the limitations in the present study by conducting prospective, multi-site studies to allow very large samples to be collected. Only with such large samples could even more complex models of adjustment be tested. In addition to collecting larger samples, researchers could collect more culturally diverse samples in order to cross-validate these models and examine potential cultural differences both in adjustment and in predictors of adjustment. A recent review of the pediatric cancer literature expressed concern about the lack of diversity in previous research (Eiser et al., 2000). A number of studies have examined potential cultural differences in adjustment (Carpentieri et al., 1993; Frank et al., 1997) and other phenomena relevant to pediatric cancer patients, such as the Western tendency towards full disclosure of medical information to the patients versus the traditional Asian model of patient protection (Gotay, 1996); however, research addressing differences across cultures in potential predictors of adjustment, including child, family, and support factors, is lacking.

Future research should further explore the construct of protective buffering and its relationship to adjustment in pediatric samples. The first step in this research might be to
examine the psychometric properties of the scale developed in the present study in a larger sample. The scale will likely need to be refined and will need to be cross-validated in other populations. More broadly, protective buffering should be investigated in other illness populations and with other stressors (e.g., parental divorce). For example, are adolescents coping with interpersonal stressors likely to use this strategy and if so, how does it influence their adjustment? What factors predict the use of protective buffering or under what conditions might the child’s use of this coping strategy be adaptive for either the child or the parents? Under what conditions might it be a useful strategy for parents to employ? Given that protective buffering is a relatively newly developed construct, especially with regard to children and adolescents, there are many possible questions to be answered.

Models of adjustment in other family members could also be explored. In particular, there is a growing body of research on the significant strain having a child with cancer can place on both the parents and any siblings (Grootenhuis & Last, 1997; Murray, 1999). However, there is a relative dearth of information on the variables associated with adjustment in these groups. Do the same factors that predict self-esteem and distress in adolescent survivors predict these outcomes in their parents and siblings? How might various models of adjustment overlap or interact in these populations? An understanding of the various predictors of adjustment and their interrelations may provide useful information to guide intervention efforts, particularly at the level of the family.

Future research should also continue to develop and evaluate psychosocial interventions for pediatric cancer patients and survivors. Guided by knowledge of coping styles and their association with psychological distress, interventions could be developed
and tested to assist survivors and their families in dealing with the short- and long-term psychological sequelae of cancer. For example, support or treatment groups could be developed that focus on teaching children new coping skills and when to employ these skills. These groups would also provide them with opportunities to approach or discuss the sources of their stress. Research on developing, evaluating, and promoting preventative strategies to ward off or reduce adjustment difficulties early in the cancer process (e.g., in the months following diagnosis) would also be a worthy endeavour.

In summary, the results of the present study help to paint a picture of what a more resilient adolescent cancer survivor might look like. This adolescent would be lower in neuroticism, displaying less emotional lability and more resistance to negative affect, and higher in optimism with more positive expectations for how his or her life will unfold. The adolescent would also engage in less cognitive avoidance, attempting to process the stressful experiences of cancer in a more direct and realistic fashion, and perhaps less protective buffering, as in trying to prevent harm to others, the adolescent may be harming him or herself. He or she would have a close and supportive peer network, and more importantly, would perceive the network as being close and supportive. Finally, the results of the bivariate analyses in the present study, as well as a sizable body of previous research, suggest that this adolescent would be situated within a higher functioning, less distressed family.

Overall, the present study offers one possible explanation for the considerable variability in psychological adjustment reported in previous research and highlights the importance of including child factors in predictive models of adjustment in pediatric oncology populations. In particular, understanding the personality characteristics of the
children and the coping strategies they employ in response to the threats and challenges of
cancer, as well as the ways in which these variables may influence adjustment, may
ultimately help healthcare professionals and communities to better help families adjust to
the illness.

I've beaten cancer. I am the embodiment of hope!
Kristina, age 17, survivor of acute lymphoblastic leukemia
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Table 1

Means and Standard Deviations on Disease, Family, and Social Support Variables by Adolescent Sex and Combined

<table>
<thead>
<tr>
<th></th>
<th>Females (n=31)</th>
<th>Males (n=34)</th>
<th>Combined (N=65)</th>
<th>Cronbach’s α</th>
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<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
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<tr>
<td>Disease variables</td>
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</tr>
<tr>
<td>Treatment duration (years)</td>
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<td>3.5</td>
<td>1.8</td>
<td>1.6</td>
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<td>Time off treatment (years)</td>
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<tr>
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Note. FACES = Family Adaptability and Cohesion Scale; SSSCA = Social Support Scale for Children and Adolescents; SD = standard deviation.
Table 2

*Means and Standard Deviations on Parent Adjustment (Distress and Self-Esteem) and Adolescent Social Desirability by Adolescent Sex and Combined*

<table>
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<td>SD</td>
<td>Mean</td>
<td>SD</td>
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<td>Rosenberg Self-Esteem Scale</td>
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*Note.* BAI = Beck Anxiety Inventory; PSSSR = Posttraumatic Symptom Scale –Self-Report; BDI = Beck Depression Inventory; MCSD-SF = Marlowe-Crowne Social Desirability scale – Short Form; SD = standard deviation.
Table 3

Means and Standard Deviations on Adolescent Predictor Variables by Adolescent Sex and Combined

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<td>54.6</td>
<td>11.5</td>
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<td>CRI Acceptance/Resignation</td>
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</table>

Note. APSI = Adolescent Personality Style Inventory; LOT-R = Life Orientation Test – Revised; CRI = Coping Response Inventory; NA = Not applicable (single item scales) SD = standard deviation
Table 4

Means and Standard Deviations on Adolescent Adjustment (Distress and Self-Esteem) by Sex and Combined

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<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
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<td>7.4</td>
<td>6.3</td>
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</table>

Note. SPPA = Self-Perception Profile for Adolescents; RCMAS = Revised Children’s Manifest Anxiety Scale; CPSS = Children’s Posttraumatic Stress Scale; BDI = Beck Depression Inventory; SD = standard deviation.
### Table 5

**Intercorrelations among Predictors**

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<td>Time since diagnosis</td>
<td>Age at diagnosis</td>
<td># of different treatments</td>
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<td>.07</td>
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<td>.05</td>
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**Family variables**

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*Note. FACES = Family Adaptability and Cohesion Scale.*

† p < .05. * p < .01. ** p < .001.
Table 5 (continued)

Intercorrelations among Predictors

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<tr>
<th>Personality</th>
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<th>Neuroticism</th>
<th>Extraversion</th>
<th>Optimism</th>
<th>Appraisal</th>
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Disease variables

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<th>Extraversion</th>
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<th>Primary</th>
<th>Secondary – alter stressor</th>
<th>Secondary – alter emotions</th>
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<td>0.01</td>
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<td>-0.03</td>
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Family variables

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<th>Neuroticism</th>
<th>Extraversion</th>
<th>Optimism</th>
<th>Primary</th>
<th>Secondary – alter stressor</th>
<th>Secondary – alter emotions</th>
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Note. FACES = Family Adaptability and Cohesion Scale.
† p < .05. * p < .01. ** p < .001.
Table 5 (continued)

**Intercorrelations among Predictors**

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<tr>
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<th>Positive reappraisal</th>
<th>Seeking support</th>
<th>Problem solving</th>
<th>Cognitive avoidance</th>
<th>Acceptance / resignation</th>
<th>Alternative rewards</th>
<th>Emotional discharge</th>
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<td>&lt;.01</td>
<td>.08</td>
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<td>Time off treatment (years)</td>
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<td>-.19</td>
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<td>-.07</td>
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<td>Time since diagnosis (years)</td>
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<tr>
<td># of different treatments</td>
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<th>Acceptance / resignation</th>
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<th>Emotional discharge</th>
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Note. FACES = Family Adaptability and Cohesion Scale.

† p < .05. * p < .01. ** p < .001.
Table 5 (continued)

*Intercorrelations among Predictors*

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† p < .05. * p < .01. ** p < .001.
### Intercorrelations among Predictors

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<th>Problem solving</th>
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<th>Acceptance / resignation</th>
<th>Alternative rewards</th>
<th>Emotional discharge</th>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parent distress</td>
<td>.13</td>
<td>.07</td>
<td>.04</td>
<td>.06</td>
<td>.24</td>
<td>.10</td>
<td>.16</td>
<td>.23</td>
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<tr>
<td>Peer support</td>
<td>-.01</td>
<td>.09</td>
<td>.06</td>
<td>.02</td>
<td>-.15</td>
<td>-.14</td>
<td>.10</td>
<td>-.18</td>
</tr>
<tr>
<td><strong>Personality</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neuroticism</td>
<td>.14</td>
<td>.02</td>
<td>.07</td>
<td>-.09</td>
<td>.39*</td>
<td>.26</td>
<td>.13</td>
<td>.34</td>
</tr>
<tr>
<td>Extraversion</td>
<td>.16</td>
<td>.15</td>
<td>.19</td>
<td>.11</td>
<td>.09</td>
<td>.11</td>
<td>.36*</td>
<td>.06</td>
</tr>
<tr>
<td>Optimism</td>
<td>.14</td>
<td>.19</td>
<td>.12</td>
<td>.31†</td>
<td>-.20</td>
<td>-.03</td>
<td>.05</td>
<td>-.12</td>
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<tr>
<td><strong>Appraisal</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>.08</td>
<td>.08</td>
<td>.10</td>
<td>.16</td>
<td>.24</td>
<td>.02</td>
<td>.17</td>
<td>.24</td>
</tr>
<tr>
<td>Secondary – alter stressor</td>
<td>.16</td>
<td>.05</td>
<td>.17</td>
<td>.18</td>
<td>-.02</td>
<td>.14</td>
<td>.07</td>
<td>.02</td>
</tr>
<tr>
<td>Secondary – alter emotions</td>
<td>.07</td>
<td>.04</td>
<td>.07</td>
<td>.03</td>
<td>-.07</td>
<td>.15</td>
<td>&lt;.01</td>
<td>-.02</td>
</tr>
</tbody>
</table>

† p < .05. * p < .01. ** p < .001.
### Table 5 (continued)

**Intercorrelations among Predictors**

<table>
<thead>
<tr>
<th>Engagement coping</th>
<th>Disengagement coping</th>
<th>Cognitive avoidance</th>
<th>Acceptance / resignation</th>
<th>Alternative rewards</th>
<th>Emotional discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive reappraisal</td>
<td>.69**</td>
<td>.42**</td>
<td>.39*</td>
<td>.65**</td>
<td>.60**</td>
</tr>
<tr>
<td>Logical analysis</td>
<td>.67**</td>
<td>.50**</td>
<td>.37*</td>
<td>.61**</td>
<td>.42**</td>
</tr>
<tr>
<td>Seeking support</td>
<td>.69**</td>
<td>.64**</td>
<td>.29†</td>
<td>.37*</td>
<td>.63**</td>
</tr>
<tr>
<td>Problem solving</td>
<td>.57**</td>
<td>.34*</td>
<td>.36*</td>
<td>.45**</td>
<td>.50**</td>
</tr>
<tr>
<td>Disengagement coping</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive avoidance</td>
<td></td>
<td>.55**</td>
<td>.45**</td>
<td>.63**</td>
<td></td>
</tr>
<tr>
<td>Acceptance / resignation</td>
<td></td>
<td>.25</td>
<td>.51**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alternative rewards</td>
<td>.67**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

† p < .05.  * p < .01.  ** p < .001.
Table 6

**Intercorrelations among Adolescent Adjustment Measures**

<table>
<thead>
<tr>
<th>MEASURE</th>
<th>RCMAS</th>
<th>CPSS Symptom</th>
<th>CPSS Impairment</th>
<th>BDI-II</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPPA Global Self-Worth</td>
<td>-.43**</td>
<td>-.36*</td>
<td>-.31†</td>
<td>-.33*</td>
</tr>
<tr>
<td>RCMAS</td>
<td></td>
<td>.61**</td>
<td>.40*</td>
<td>.58**</td>
</tr>
<tr>
<td>CPSS Symptom</td>
<td></td>
<td></td>
<td>.56**</td>
<td>.71**</td>
</tr>
<tr>
<td>CPSS Impairment</td>
<td></td>
<td></td>
<td></td>
<td>.49**</td>
</tr>
</tbody>
</table>

*Note.* SPPA = Self-Perception Profile for Adolescents; RCMAS = Revised Children’s Manifest Anxiety Scale; CPSS = Children’s Posttraumatic Stress Scale; BDI = Beck Depression Inventory.

* N = 65.

† p < .05. * p < .01. ** p < .001.
Table 7

Component Loadings for Protective Buffering Items

<table>
<thead>
<tr>
<th>Item</th>
<th>Component 1</th>
<th>Component 2</th>
<th>Component 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>.751</td>
<td></td>
<td></td>
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<tr>
<td>5</td>
<td>.697</td>
<td></td>
<td></td>
</tr>
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<td>7</td>
<td>.638</td>
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<td></td>
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<td>16</td>
<td>.610</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>.607</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>.559</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>.532</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>.454</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>.835</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td>.674</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td></td>
<td>.657</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>-.598</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>.543</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
<td>-.528</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>.465</td>
<td></td>
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<tr>
<td>1</td>
<td></td>
<td></td>
<td>-.645</td>
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<tr>
<td>12</td>
<td></td>
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<td>.609</td>
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<td>8</td>
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<td></td>
<td>.571</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td>.528</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td>.519</td>
</tr>
</tbody>
</table>
Table 8

*Bi*variate Correlations between Disease, Family, and Peer Support Predictors and Adjustment Measures

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Distress composite</th>
<th>Self-esteem</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Disease variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment duration (years)</td>
<td>-.15</td>
<td>.27†</td>
</tr>
<tr>
<td>Time since diagnosis (years)</td>
<td>-.20</td>
<td>.23</td>
</tr>
<tr>
<td>Age at diagnosis (years)</td>
<td>.25</td>
<td>-.31†</td>
</tr>
<tr>
<td># of different treatments</td>
<td>.11</td>
<td>-.12</td>
</tr>
<tr>
<td><strong>Family variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family functioning</td>
<td>-.33*</td>
<td>.27†</td>
</tr>
<tr>
<td>Parent distress composite</td>
<td>.37*</td>
<td>.03</td>
</tr>
<tr>
<td>Parent self-esteem</td>
<td>-.12</td>
<td>.06</td>
</tr>
<tr>
<td>Peer Support</td>
<td>-.33*</td>
<td>.41**</td>
</tr>
</tbody>
</table>

* N = 63 to 65 for all predictors, except treatment duration (N = 54).

† p < .05. * p < .01. ** p < .001.
### Table 9

**Bivariate Correlations between Adolescent Predictors and Adjustment Measures**

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Distress composite</th>
<th>Self-esteem</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Personality variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neuroticism</td>
<td>.67**</td>
<td>-.45**</td>
</tr>
<tr>
<td>Extraversion</td>
<td>-.15</td>
<td>.31*</td>
</tr>
<tr>
<td>Optimism</td>
<td>-.52**</td>
<td>.41**</td>
</tr>
<tr>
<td><strong>Appraisal</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>.27†</td>
<td>-.01</td>
</tr>
<tr>
<td>Secondary – alter stressor</td>
<td>-.02</td>
<td>-.12</td>
</tr>
<tr>
<td>Secondary – alter emotions</td>
<td>-.25†</td>
<td>.14</td>
</tr>
<tr>
<td><strong>Engagement coping</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Logical analysis</td>
<td>.15</td>
<td>.03</td>
</tr>
<tr>
<td>Positive reappraisal</td>
<td>.06</td>
<td>.02</td>
</tr>
<tr>
<td>Seeking support</td>
<td>.15</td>
<td>.08</td>
</tr>
<tr>
<td>Problem solving</td>
<td>.08</td>
<td>.03</td>
</tr>
<tr>
<td><strong>Disengagement coping</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive avoidance</td>
<td>.46**</td>
<td>-.13</td>
</tr>
<tr>
<td>Acceptance/resignation</td>
<td>.23</td>
<td>-.18</td>
</tr>
<tr>
<td>Alternative rewards</td>
<td>.11</td>
<td>.12</td>
</tr>
</tbody>
</table>

*a N = 59 to 65 for all predictors, except logical analysis (N = 55).

† p < .05.  * p < .01.  ** p < .001.
### Table 10

**Additive Model for Predicting Adolescent Distress**

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Block 1</th>
<th>Block 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(\beta (SE_\beta))</td>
<td>(p)</td>
</tr>
<tr>
<td>Covariates</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age at diagnosis</td>
<td>.24 (.12)</td>
<td>.056</td>
</tr>
<tr>
<td>Family functioning</td>
<td>-.26 (.12)</td>
<td>.045</td>
</tr>
<tr>
<td>Parent distress</td>
<td>.23 (.13)</td>
<td>.088</td>
</tr>
<tr>
<td>Peer Support</td>
<td>-.19 (.13)</td>
<td>.155</td>
</tr>
<tr>
<td>Child factors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neuroticism</td>
<td></td>
<td>.37 (.13)</td>
</tr>
<tr>
<td>Optimism</td>
<td></td>
<td>-.16 (.11)</td>
</tr>
<tr>
<td>Protective buffering</td>
<td></td>
<td>.16 (.10)</td>
</tr>
<tr>
<td>Cognitive avoidance</td>
<td></td>
<td>.24 (.10)</td>
</tr>
</tbody>
</table>

\[ R^2 = .21, \ p = .003 \]
\[ R^2 = .56, \ p < .001 \]
\[ \Delta R^2 = .35, \ p < .001 \]

*Note. SE_\beta = standard error of the standardized regression coefficient; \(r^2_{Y(1,2)}\) = squared semi-partial correlation.*

*a N = 56.*
Table 11

*Bivariate Correlations between Hypothesized Independent Variables and Mediators*

<table>
<thead>
<tr>
<th>Potential mediators</th>
<th>Independent variables</th>
<th>Neuroticism</th>
<th>Extraversion</th>
<th>Optimism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logical analysis</td>
<td></td>
<td>.14</td>
<td>.14</td>
<td>.16</td>
</tr>
<tr>
<td>Positive reappraisal</td>
<td></td>
<td>.02</td>
<td>.19</td>
<td>.19</td>
</tr>
<tr>
<td>Seeking support</td>
<td></td>
<td>.07</td>
<td>.12</td>
<td>.15</td>
</tr>
<tr>
<td>Problem solving</td>
<td></td>
<td>-.09</td>
<td>.31†</td>
<td>.11</td>
</tr>
<tr>
<td>Cognitive avoidance</td>
<td></td>
<td>.39*</td>
<td>-.20</td>
<td>.09</td>
</tr>
<tr>
<td>Acceptance / resignation</td>
<td></td>
<td>.26</td>
<td>-.03</td>
<td>.11</td>
</tr>
<tr>
<td>Alternative rewards</td>
<td></td>
<td>.13</td>
<td>.05</td>
<td>.36*</td>
</tr>
</tbody>
</table>

a N = 59 to 62 for all predictors, except logical analysis (N = 55).

† p < .05. * p < .01. ** p < .001.
Table 12

Additive Model for Predicting Adolescent Self-Esteem

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Block 1</th>
<th>Block 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\beta$ (SE)</td>
<td>p</td>
</tr>
<tr>
<td><strong>Covariates</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age at diagnosis</td>
<td>-.39 (.11)</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Family functioning</td>
<td>.27 (.11)</td>
<td>.018</td>
</tr>
<tr>
<td>Peer Support</td>
<td>.37 (.11)</td>
<td>.002</td>
</tr>
<tr>
<td><strong>Child factors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neuroticism</td>
<td>-.07 (.13)</td>
<td>.583</td>
</tr>
<tr>
<td>Extraversion</td>
<td>-.02 (.12)</td>
<td>.887</td>
</tr>
<tr>
<td>Optimism</td>
<td>.34 (.13)</td>
<td>.009</td>
</tr>
</tbody>
</table>

$R^2 = .32, p < .001$  
$R^2 = .42, p < .001$  
$\Delta R^2 = .10, p = .010$

*Note. SE$\beta$ = standard error of the standardized regression coefficient; $r^2_{Y(1,2)}$ = squared semi-partial correlation.*

* N = 56.
Figure 1

Theoretical Schematic of Engagement-Disengagement Coping Distinction

Note. Based on Compas et al. (2001) and Connor-Smith et al. (2000) – solid bolded lines represent explicit distinctions; broken lines represent implied distinctions.
Figure 2

Models of Personality and Coping Predicting Adjustment: An additive model (top), a moderational model (middle), and a mediational model (bottom)

Note. Adapted from Hewitt and Flett (1996) and Baron and Kenny (1986).
Figure 3

Hypothesized Moderated Mediational Model of Psychological Adjustment

- Family Functioning
- Personality: Neuroticism, Extraversion, Optimism
- Coping: Disengagement, Engagement
- Psychological Adjustment: Distress, Self-Esteem
- Peer Support
Figure 4

Possible Mediational Model of Psychological Distress

Neuroticism → Cognitive Avoidance

\[ \beta = .39, p = .002 \]

Cognitive Avoidance → Distress

\[ \beta = .28, p = .006 \]

Neuroticism → Distress

\[ \beta = .57, p < .001 \]
_ I would like to take part in this project.

_ I do not want to take part in this project.

Signed ___________________________  Date ___________________________

Please print name here ___________________________
questionnaires in the self-addressed stamped envelope.

If you are not interested in participating in this study, please return the blank questionnaires to us in the envelope provided.

All families who participate in the study will be sent a brief summary of the results and a cheque for $50 to thank them for participating. In addition, families who return their questionnaires within 4 weeks of receiving them will be entered into a draw for $200.

Thank you very much for your time.

Sincerely,

Dr. Barbara Rosen-Harris  Michael Papsdorf, M.A.  Dr. Paul Hewitt
Clinical Psychologist, BCCH  Ph.D. Candidate, UBC  Professor, UBC
Appendix D

Protective Buffering Scale

Please rate the following statements on the scale provided below.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Don't Know</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
</tbody>
</table>

1. † I just brush off my parents' worries. ______
2. *It is important to discuss my feelings and fears about my illness with others. ______
3. Sometimes I tell people that I'm feeling well even when I'm not. ______
4. If I think I'm going to get upset, I go somewhere so that others don't see me. ______
5. I smile even when I'm in pain. ______
6. *It is okay for others to see me upset. ______
7. I make jokes to distract people from the fact that I'm sick. ______
8. † I give in when my parents make an issue of something. ______
9. † I do everything I can to keep my parents from thinking about my disease. ______
10. The best way of dealing with being sick is to pretend I'm not sick in front of people like my family, so they don't worry too much. ______
11. *I usually tell the truth about how upset or scared or worried I am. ______
12. I try to make other people feel better about my illness. ______
13. When I am having trouble, I don't like to bother others with my problems. ______
14. I make sure to tell others I'm doing well so they don't worry. ______
15. No matter how I feel, I don't let others see me down. ______
16. When I am worried or upset, I often joke around instead of talking about my feelings. ______
17. *It helps me to discuss my problems or concerns with others. ______
18. I try to handle my problems on my own rather than troubling others with them.

19. I worry that others would become upset if they knew how I really felt.

20. *When I am worried or upset, I like to talk to others about my feelings.

† denotes items adapted from Coyne and Smith (1991).

* denotes items that are reversed.