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Social Support in Parents of Children who had Cancer: Relationships with Demographics, Cancer-Related Factors, and Posttraumatic Growth

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Social Support in Parents of Children who had Cancer: Relationships with Demographics, Cancer-Related Factors, and Posttraumatic Growth

by

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Under the Direction of Lindsey Cohen, PhD

A Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree of

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ABSTRACT

Parents of children with cancer experience stress and hardship during their child's cancer journey and after their child has entered into their survivorship phase. Previous research demonstrates that parents of children with cancer have benefited from social support; however, few studies have examined parents' social support specifically from friends and during the phase when their child is a young-adult in survivorship. This study examined a population of parents whose young adult children are in the survivorship phase of their cancer, and evaluated parents' social support from friends in relation to demographic and cancer-related factors, as well as parents' posttraumatic growth. Results indicated that fathers report less social support from friends than mothers, but differences in social support according to other factors (e.g., race, SES, cancer treatment intensity) did not emerge. Parents' social support from friends was positively related to their posttraumatic growth as expected. A tertiary aim examined how parents perceive their social support to have changed from before their child's diagnosis, to during their child's cancer, to the current time in survivorship. Parents endorsed several trajectories of change in their social support from friends, (e.g., trajectories of resilience, growth, and depreciation); although many parents endorsed no change in their social support over time. Overall, findings suggest that social support from friends is relatively similar for parents of different races, ethnicities, incomes, and experiences of cancer treatment, with the exception of fathers being at risk for worse social support from friends during their child's survivorship phase. Social support is related to posttraumatic growth, an adaptive outcome for parents; thus, clinicians working with these families are encouraged to assess for social support from friends in parents even after their child has entered into the survivorship phase of their cancer.

INDEX WORDS: Pediatric Cancer, Parents of Children with Cancer, Social Support

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DEDICATION

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1 INTRODUCTION

1.1 Pediatric Cancer

Pediatric cancer impacts families across the globe. Worldwide, approximately 400,000 children and adolescents are newly diagnosed with cancer each year (Steliarova-Foucher et al., 2017), and incidence rates continue to rise (Miller et al., 2019). Youth can be diagnosed with pediatric cancer at any age from infancy through age 19 and often require treatment regimens that may differ from those for adult cancer patients (National Cancer Institute, 2021). The most common types of pediatric cancers in the United States include leukemias, lymphomas, and tumors of the brain or central nervous system, all of which may involve different prognoses and courses of treatment (National Cancer Institute, 2021). In the United States alone, it was estimated that 15,590 children and adolescents would be newly diagnosed with cancer in the year 2021 (Siegel et al., 2021). Due to improved treatments, it is likely that most of these children and adolescents will experience remission of their cancer, with approximately 483,000 survivors of pediatric cancer in the United States in 2018 (National Cancer Institute, 2021).

Being the parent of a child with cancer is among the most stressful life experiences a parent can have, given the emotional (Battles et al., 2018; Ljungman et al., 2014), uncertain, and potentially traumatic (Kazak et al., 2004) nature of the child's life-threatening condition. As pediatric cancer continues to impact more youth and their families, and a greater number of youth experience remission after treatment of their cancer, the importance of identifying risk and protective factors for parents of youth who have had a child with cancer has become increasingly important for promoting wellbeing during and after a family's experience with pediatric cancer (Kazak et al., 2012). Social support is a factor that is broadly linked to wellbeing (Haase et al., 1999; Henry et al., 2015; Mullins et al., 2015) and has been associated with positive adaptation

in parents of children who have had cancer (Rosenberg et al., 2014; Toledano-Toledano et al., 2020; Ye et al., 2017b). The purpose of this project is to expand the current understanding of social support for parents of youth who have had pediatric cancer, specifically by investigating how social support differs for parents based on unique demographic and cancer-related variables, and how social support might contribute to parents' adaptation as they navigate the ongoing difficulties of parenting a child who has had pediatric cancer.

1.2 Parents' Experiences with Pediatric Cancer

Parents experience stress across the multiple phases of their child's cancer including diagnosis, treatment, and remission, also referred to as the survivorship phase. When a child is initially diagnosed with cancer, parents understandably report experiencing sadness, helplessness, fear (Demirtepe-Saygili & Bozo, 2018), loss of control, and uncertainty related to their child's illness (Cox, 2018). Stress and symptoms of psychopathology are also common for parents as they navigate the various phases of pediatric cancer (Dunn et al., 2012; Ljungman et al., 2015; Vrijmoet-Wiersma et al., 2008). Functioning and day-to-day routines are disrupted as parents become more involved in their child's care during treatment (Cox, 2018; Earle et al., 2006; Long & Marshland, 2011). As well, many parents report feeling alone with the hardship of raising a child with cancer (Battles et al., 2018) as they can be forced to relocate, travel long distances for treatment purposes, or physically isolate themselves from others when their child's immune system is weak (Cox, 2018). All of this has the potential to disrupt parents' ability or willingness to rely on social supports for coping and wellbeing as they are dealing with their child's health difficulties.

The survivorship phase of pediatric cancer, defined as the time wherein a child has been off treatment for at least two years, presents its own set of challenges for parents, such as

reacclimating to previous ways of life (Inhestern et al., 2020), fear of cancer recurrence, and worries about late-effects of cancer (Greenberg & Meadows, 1991; Yeung et al., 2021). Some parents also experience posttraumatic stress symptoms once their child has completed treatment and is in the survivorship phase (Bruce, 2006; Ljungman et al., 2014). Still, parents also report indicators of wellbeing (Habibpour et al., 2019; Vrijmoet-Wiersma et al., 2008), such as optimism (Fayed et al., 2011; Fotiadou et al., 2008), self-efficacy in caring for their child (Oktaviani & Allenidekania, 2020), good quality of life (Quast et al., 2021), and use of adaptative coping strategies (Gage-Bouchard et al., 2013; Han et al., 2009; Quast et al., 2021) once their child is off treatment. Overall, many parents appear to have less distress and anxiety during survivorship than when their child is in active treatment (Quast et al., 2021). Adaptive outcomes, such as resilience (Phipps et al., 2015; Rosenberg et al., 2014; Ye et al., 2015), benefit finding (Gardner et al., 2017a), and posttraumatic growth (PTG: Barakat et al., 2006) are also commonly experienced by parents during their child's survivorship phase.

Given the growing number of children who will become survivors of pediatric cancer, it is critical to better understand factors that are associated with wellbeing and psychological growth in parents of children who are in the survivorship phase of their cancer. Social support is one factor that has been considered important for promoting wellbeing in parents of children with cancer (Haase et al., 1999). However, it is important to understand more about how parents perceive their social support during the unique timeframe when their child is in the survivorship phase, as well as to explore how social support might differ for parents based on personal, demographic, or cancer-related factors, and to what extent parents' social support is linked to parents' adaptation and outcomes of wellbeing.

1.3 Social Support

Social support is defined as the availability of others who one can rely on for love and care (Sarason et al., 1983). It is typically measured via self-report and examines individuals' perceptions of the availability and satisfaction with their social support (Sarason et al., 1983; Varni et al., 1994). Generally, social support is received from family, spouses, and friends. Social support has long been associated with wellbeing and psychological growth broadly (Haase et al., 1999), and has been related to resilience in the face of family adversity among parents of healthy children (Henry et al., 2015; Mullins et al., 2015). Kazak et al.'s Social Ecological Model posits that social support impacts parents' adjustment, and may promote resilient outcomes, in parents of children with pediatric medical conditions (Kazak et al., 1995; Kazak et al., 2006). For parents of children with cancer, research has suggested that social support may be an important target for preventing psychological maladjustment throughout and after a child's illness (Kazak et al., 1998).

1.4 Social Support in Parents of Children with Cancer

There is an abundance of recent literature indicating that parents of children with cancer benefit from social support. Throughout this literature, parents' social support is most often measured by their perception of the availability of their social support and their satisfaction with it; and, some studies also examine the extent to which parents use social support seeking as a coping mechanism (Gise et al., 2022). Social support in parents of children with cancer has been linked to many mechanisms of wellbeing, such as optimism (Fayed et al., 2011; Gardner et al., 2017a), self-efficacy in caring for their ill child (Peterson et al., 2014), quality of life (Ben-Zur et al., 2017; Gardner et al., 2017a; Khoury et al., 2018), and adaptive coping (Gardner et al., 2017b; Ye et al., 2017a). Social support has also been positively related to outcomes of wellbeing such

as resilience in parents of children with cancer (Rosenberg et al., 2014; Toledano-Toledano et al., 2020; Ye et al., 2017b), and benefit finding (Gardner et al., 2017a).

Alternatively, social support has been negatively related to several indicators of maladaptation in parents of children with cancer, such as distress (Ben-Zur et al., 2017; Castellano-Tejedor et al., 2017; Kazak et al., 2018a&b; Marshland et al., 2013; Ye et al., 2017a), fear and uncertainty about the future (Ben-Zur et al., 2017; Ye et al., 2017a), and maladaptive coping strategies (Gelkopf et al., 2019). Social support has also been negatively associated with outcomes of psychopathology, such as depression (Cusinato et al., 2017; Gelkopf et al., 2019), anxiety (Cusinato et al, 2017), and posttraumatic stress (Gardner et al., 2017b) in parents of children with cancer.

1.5 Social Support in Parents of Young Adult Children During Survivorship

Though the literature highlights an abundance of evidence for the protective role of social support in parents of children with cancer, parents may face difficulties related to accessing or receiving social support during their child's illness, given the unique needs of being the parent of a child with a life-threatening illness (Battles et al., 2018; Cox, 2018). Parents whose children are in the survivorship phase of cancer might face different challenges related to social support than parents whose children are currently on treatment, and it should be recognized that parents' burden does not automatically end once their child has ended treatment (Inhestern et al., 2020). More specifically, parents of young adult children in the survivorship phase may likely be navigating a new developmental phase of parenting their young adult child (Aquilino, 1997) who has been through cancer treatment and requires ongoing medical follow-up. On the one hand parents may find that they have more time to engage in social activities with their friends given that their young adult child is now older and less dependent on them; however, parents of young

adults who had cancer may also feel different from fellow parents. For example, parents who have experienced pediatric cancer may feel unresolved anger and sorrow, as well as jealousy toward other parents who have not faced this adversity with their child (Hardy et al., 2008). Parents may also potentially struggle to foster independence in their young adult who has experienced this life-threatening medical condition, continuing to accompany them to their survivor follow-up appointments even once their child has entered adulthood (Hardy et al., 2008), which may make social relationships different for these parents compared to parents of healthy young adults. Parents of young adults who had cancer are likely acclimating back to a new sense of normal after their child's cancer treatment, and may experience added worry about their child's ability to handle their ongoing survivorship medical care independently.

Thus, whereas social support is generally linked to wellbeing, it is important to understand how parents perceive their social support during the uniquely challenging time of their child's survivorship phase. In a review of 37 recent studies on social support in parents of children with cancer (Gise et al., 2022), only two studies compared social support of parents with children in the off-treatment or survivorship phase to a general population of adults. Of these two studies, result were mixed, with some parents endorsing less support (Veracasson et al., 2020) and others endorsing more social support (Rosenberg et al., 2014) compared to a normed sample. Generally, for parents with children in active treatment, parents endorsed similar amounts (Ben-Zur et al., 2017; Cusinato et al., 2017; Nicolaou et al., 2015) or more social support (Abu-Raiya et al., 2015; Dolan et al., 2021; Kim et al., 2017; Marshland et al., 2013; Ye et al., 2017a) when compared to general populations. This suggests that social support might change for parents over time, and also highlights the need to understand more about social support for these parents specifically when their child is post-treatment and in the survivorship phase.

A handful of studies highlight the positive relationships between social support for parents with a child in survivorship and adaptive functioning. For mothers in this phase, social support has been related to less fear that their child's cancer would progress or recur (Clever et al., 2019). Social support has also been negatively associated with maladaptive factors and outcomes for parents in this phase, such as avoidant coping and posttraumatic stress (Gardner et al., 2017a). Social support has been positively related to optimism, acceptance coping, benefit finding, and higher quality of life (Gardner et al., 2017a). Parents who had less social support, however, endorsed less resilient resources (Rosenberg et al., 2014). Though less is known about parents' social support during the unique phase of their child's survivorship and young adult years, what is known is largely positive and additional research may further corroborate this association between parents' social support and adaptive outcomes when their child is in survivorship. Learning more about parents' social support during this phase would also aid clinicians working with these parents as they navigate the new and unique stage of survivorship, face challenges granting independence to their young adult with their follow-up medical care, and heal from their previous experiences with pediatric cancer.

1.6 Sources of Social Support in Parents of Children with Cancer

Who parents receive social support from is also critical to understand given the unique challenges faced by parents of children who have had cancer. The literature indicates that social support for parents of children with cancer is received primarily from family (Altay et al., 2014; Cusinato et al., 2017; Kim et al., 2017; Nicolaou et al., 2015) and significant others (Enskar et al., 2010; Gelkopf et al., 2019; Okada et al., 2015), understandably given that parents might have more access to family members and may feel more understood by family members who share some of the difficulties of caring for the cancer patient. There is less research, on social support

from friends for parents of children who have faced pediatric cancer. Social support specifically from friends is important. In fact, in a study of social support and wellbeing in adults, perceived social support from friends was the only source of social support that was significantly related to wellbeing (Brajsa-Zganec et al., 2018). Friends can provide important sources of support to parents as they navigate the difficulties of pediatric cancer and reacclimate to life after pediatric cancer. Friends may also provide a uniquely important type of support for parents as friends tend to be less involved in the child's cancer care and less connected to the direct experience of raising a child with a life-threatening illness. Of the handful of studies from the past decade that investigated the sources of social support in parents of children with cancer, four out of eight studies reported that parents endorsed support from friends as the second most prevalent source of social support (Gelkopf et al., 2019; Islam et al., 2021; Kim et al., 2017; Nicolaou et al., 2015) and of those four, two specifically described parents of other children with cancer as the second most prevalent source (Kim et al., 2017; Nicolaou et al., 2015). This may be an important distinction when considering parents with children in the survivorship phase, as social support from friends who are parents of other children with cancer may be less prevalent when the children are no longer in active treatment and parents do not regularly see each other for treatment purposes. Thus, examining parents' social support from friends, particularly when their child is in survivorship, will provide a more robust understanding of social support for parents of children with cancer in this unique phase of their pediatric cancer journey. This study will expand the current literature by evaluating parents' social support specifically from friends when their young adult child is in survivorship.

1.7 Social Support and Unique Parent, Child, and Cancer-Related Factors

Literature over the previous decade on social support in parents of children with cancer has yielded minimal or mixed evidence about how unique parent- and cancer-factors are related to parents' social support. To best identify parents in need of social support, it would be helpful to understand how parent and child demographic factors, as well as cancer-related factors, might be associated with parents' perceptions of their social support from friends. Several key factors that might be at play include parents' role as mother or father, socioeconomic status (SES) or family income, parents' race and ethnicity, as well as their child's gender, age, and intensity of cancer treatment. Gaining a deeper understanding of potential group differences in parents' social support from friends during their child's survivorship phase will guide clinicians working with these families to promote social support and adaptation for those who may need it more based on their or their child's personal and cancer factors.

1.7.1 Parent Role

Mothers and fathers of children with cancer tend to differ on levels of distress (Pai et al., 2007), anxiety (Gerhardt et al., 2007), acute stress disorder (Poder et al., 2008), and resilience (Habibpour et al., 2019) as they navigate their child's illness. Mothers of children with other medical conditions reportedly perceive more social support than fathers (Altiere & von Kluge, 2009); however, studies examining differences in social support for mothers versus fathers of children undergoing cancer treatment have yielded primarily nonsignificant findings (Enskar et al., 2010, Ye et al., 2017a, Veracasson et al., 2020). Mothers of children with cancer report they are more likely than fathers to use active coping strategies and seek instrumental and emotional support (Gage-Bouchard et al., 2013), suggesting that they may behave in ways that would increase the availability of their social support. Only one recent study has specifically looked at

differences between mothers' and fathers' use of social support as a coping mechanism when their child was posttreatment, as opposed to in active treatment, and found that there were nonsignificant differences (Clever et al., 2019). Thus, it is important to further examine how mothers and fathers may differ in their perception of social support, particularly as mothers and fathers journey with their young adult child into the survivorship phase of pediatric cancer. Understanding differences based on parent role may highlight unique social support needs of mothers versus fathers during the survivorship phase of their child's cancer which will be helpful for clinicians working with these parents.

1.7.2 SES and Family Income

In the broad literature, there are mixed findings regarding the relationship of social support and SES or family income; however, some studies have linked lower quality social support with financial burden (Hefner & Eisenberg, 2009). Within the literature examining child illness, parents of children with congenital heart disease have not been found to differ in social support based on SES (Tak & McCubbin, 2002). However, parents of children with cancer typically report that SES or family income is positively related to their perceptions of social support throughout diagnosis, treatment, (Altay et al., 2014; Nicolaou et al., 2015; Veracasson et al., 2020) and survivorship (Gardner et al., 2017a&b). Pediatric cancer often has a profound impact on families' financial situation and income, due to cancer-related expenses (Roser et al., 2019). Thus, the need to understand the relationship between parents' current family income and perceived social support from friends may be important for supporting families who are recovering from the negative financial impacts of cancer, even long after their child has entered survivorship. Understanding the relationship between parents' social support and family income

may identify families who are at risk for less social support in survivorship, or who may benefit from additional social support from friends during this phase of their child's cancer trajectory.

1.7.3 Race and Ethnicity

There is evidence that social support might differ across cultures and backgrounds (e.g., Radey, 2015; Watt et al., 2012), and that social support buffers the effect of racial discrimination on psychosocial maladjustment (Mougianis et al., 2020). Research on social support and race has yielded mixed results with unique differences. Some have found that Black women report fewer friends, and less emotional support from friends, than White women (Griffin et al., 2006; Stewart & Vaux, 1986). However, although Black people report smaller social networks, they endorse more family members in their networks, and more contact with their supportive others than White people (Ajrouch et al., 2001). In terms of ethnicity, mothers of Hispanic origin have reported lower levels of social support than non-Hispanic Black or White mothers (Radey, 2015). Still, others have found few differences in social support based on race (Silverstein & Waite, 1993). In terms of physical health outcomes, differences among adults based on race were smaller for individuals with higher levels of social support (Bell et al., 2010); whereas others have concluded that social support has the greatest benefit for individuals who possess social and economic advantages, which can be associated with race (Bae et al., 2001). In pediatric obesity, parents' race was a significant indicator of how they perceived their social support; and, social support was considered a protective factor associated with lower rates of obesity in children for certain racial and ethnic groups (Watt et al., 2012). Furthermore, some research suggests that physicians treat parents of children with cancer differently based on race (Ilowite et al., 2017). The majority of studies of parents of children with cancer published over the past couple of decades, however, have not examined differences in social support based on race or ethnicity.

Many studies - for example, studies from countries outside of the United States - have not used diverse samples of participants to be able to investigate differences, and studies with samples diverse in race and ethnicity often do not report if differences in social support were examined. Given that an individual's lived experiences, socialization, and culture can be impacted by their race and ethnicity, it is critical to extend this area of research and investigate social support differences in parents of children with cancer based on unique racial and ethnic factors to inform culturally attentive clinical responses to parents of children with cancer.

1.7.4 Child Gender

Child gender may influence how parents cope with and adjust to their child's cancer (Habibpour et al, 2019). Parents of girls with cancer report higher levels of acute stress disorder particularly closer to diagnosis than parents of boys (Poder et al., 2008). In fact, some have suggested that child gender may influence how healthcare professionals interact with a child (e.g., Earp et al., 2019), demonstrating the importance of considering child gender when examining parents' experiences. In the broader literature on child illness, parents of children with congenital heart disease did not differ in social support based on child gender (Tak & McCubbin, 2002). Across the recent literature on parents of children with cancer, only two studies (Altay et al, 2014; Veracasson et al., 2020) examined differences in parents' social support based on child gender; however, no statistically significant differences by gender were found for parents whose children were in active treatment or survivorship. Clearly, there is a need to conduct additional study of child gender as it relates to parents' perceptions of their social support during their experience with pediatric cancer.

1.7.5 Child Age

Parenting responsibilities and children's needs differ across different ages and phases of child development (Knauer et al., 2019; Mays et al., 2020). Within the recent pediatric cancer literature focusing on social support, there is less research on parents of young adult children and how this particular phase of parenting and human development may impact parents' experiences. Parenting a child during young adulthood is a unique experience that can evolve over time as parents are charged with granting more independence to children entering their early and mid-twenties. Whereas the age span between 18 and 20 is nearer to adolescences and may involve more parental oversight, as young adults age and enter their early and mid-twenties, it is expected that the parent-child relationship might shift somewhat. Parents during this phase of their child's life may be tasked with different demands on their social life. Part of this project will seek to better understand if parents perceive their social support from friends differently depending on if their young adult child is nearer to adolescence (i.e., 18-20) or adulthood (i.e., 21-25), especially given that these age differences could mean different levels of involvement from parents with their child's follow-up medical care and financial independence.

1.7.6 Child Diagnosis and Intensity of Cancer Treatment

A handful of studies have examined parents' social support in relation to their child's specific cancer diagnosis, with mixed findings. In one study, parents of children with leukemia reported less social disruption than parents of children with other types of cancer including lymphomas, sarcomas, and blastomas (Islam et al., 2021). However, other studies which surveyed parents of children in the post-treatment or survivorship phase found no differences in social support across diagnoses (Gardner et al., 2017b) or between different types of leukemias (Veracasson et al. 2020). Overall, there are few studies that examine the relationship between

parents' social support and their child's diagnosis. Diagnosis, location of a cancerous tumor, and severity of the cancer (i.e. stage of the cancer), can all determine the child's treatment regimen, length, and intensity, as well as the likelihood that the child will experience later physical, cognitive, or emotional side effects of the cancer treatment (Pediatric Treatment Editorial Board, 2020). Perhaps a better indicator of the cancer experience, however, has to do with the intensity of the child's cancer treatment. It may be helpful to extend our understanding of whether diagnosis and treatment-related factors, such as the intensity of the child's treatment, is related to parents' social support. This will help identify parents who may be in greater need of support based on the intensity of their child's treatment, which is linked to particular diagnoses.

1.8 Parent Social Support and Adaptation Through Posttraumatic Growth

An aim of working with parents of children who have had cancer is to promote adaptation and wellbeing. As noted throughout this paper, social support is commonly associated with various indicators of wellbeing and resilience. One resilient outcome that is commonly studied in the pediatric cancer literature is Posttraumatic Growth (PTG; Barakat et al., 2006; Picoraro, et al., 2014; Zebrack, et al., 2012) and is frequently evaluated in parents of children with cancer (Nakayama et al., 2017; Phipps et al., 2015; Turner-Sack et al., 2016). PTG is described theoretically as a breakdown of one's world-views during a traumatic experience, followed by a rebuilding of those world-views to positive levels beyond baseline (Tedeschi & Calhoun, 1996; Tedeschi & Calhoun, 2004), meaning that, growth and improvement in several areas of life can follow experiences of adversity depending on one's process of rebuilding world-views. This implies that although an experience with pediatric cancer is extraordinarily difficult for parents, they can experience resilience, psychosocial growth, and positive life changes as a result of their child's cancer. Posttraumatic growth is an important outcome to learn more about

for parents of children who have had cancer considering that the experience of pediatric cancer is considered traumatic and parents experience clinical levels of posttraumatic stress symptoms that are directly related to their child's cancer (Kazak et al., 2001; Ljungman et al., 2014). In fact, some have written that parents are more traumatized and symptomatic than patients themselves and thus efforts to support these parents should be of priority, given that parents' wellbeing has the potential to impact their child's wellbeing too (Stuber, 2006). Many have found posttraumatic stress symptoms and PTG to co-occur (Best, et all, 2002; Ljungman et al., 2014; Yonemoto et al., 2012); thus, by understanding more about parents' capacity to experience PTG during their child's survivorship phase and its relationship to social support, clinicians may be able to further foster PTG in this group of individuals.

Tedeschi and Calhoun (1996; 2004) describe that PTG involves psychological growth, post-adversity and beyond baseline levels, in the following domains: Relating to Others, Personal Strength, Appreciation of Life, New Possibilities, and Spirituality. Growth in the domain of Relating to Others involves the development of more meaningful interpersonal relationships and increases in compassion for others who have also experienced adversity. Enhancements in Personal Strength involve an increased ability to cope and the perception of more strength to survive life's adversities. Growth in the realm of Appreciation of Life represents an increase in one's positive perspective on life, a desire to live life to the fullest, and appreciation for being alive. Growth in the domain of New Possibilities involves recognizing opportunities to change one's life-trajectory or take new paths. Growth in Spirituality involves changes in religious views and existential thinking. PTG encompasses growth across all five of these domains; however, growth in individual domains may differ based on the nature of the adversity and the person's available resources. Whether or not social support is positively related to some or all domains of

PTG in this group of parents will offer additional insights into how social support can promote adaptation for parents of children who have had cancer.

Social support has been linked to PTG in various populations (Prati & Pietrantoni et al., 2009; Rzeszutek et al., 2017; Zhao et al., 2020), including individuals with adverse health experiences and chronic illness (Nenova et al., 2011; Zeligman et al., 2018), as well as caregivers of adult patients with cancer whose social support was more strongly related to growth in domains of Relating to Others and Personal Strength (Nouzari et al., 2019). Only one quantitative study from the past decade (Kim, 2017) has linked social support to PTG in parents of children with cancer, noting a positive relationship between social support from friends and PTG. However, Kim (2017) did not evaluate how social support might relate uniquely to the different domains of PTG, nor did they specifically evaluate parents whose children were in the survivorship phase of their cancer. The phase of cancer is important because it may be more difficult to assess outcomes during ongoing adversity, such as when children are actively being treated for their pediatric cancer which involves repeated challenges or trauma throughout the diagnosis and treatment phases. Assessment of PTG, and how it relates to social support for parents when their child has completed treatment may offer more time for reflection, change, and growth to take place and thus provide a more accurate assessment of growth post-trauma, rather than during-trauma. For parents of a child with cancer, it is likely that social support is linked to PTG, particularly in the realm of Relating to Others, and possibly also in the realm of Personal Strength, and evaluating the relationship between parents’ social support and PTG during survivorship will lend a deeper understanding of how social support might promote PTG for these parents as they live through the end-phase of their child’s cancer trajectory.

1.9 Parent Social Support Over Time

It is evident that social support is associated with wellbeing and might be considered a protective factor for parents of children with cancer. Many of the current gaps in the literature involve a need to better understand social support from friends, social support during the unique phase of survivorship, and how individual parent and child factors may be uniquely related to social support. Another unknown area however, involves how parents' social support might change over time or fluctuate from before their child's cancer, to during, to survivorship. Parents' shifting experiences (Yeung et al., 2021), and changes in levels of fear, uncertainty, depression, anxiety, and posttraumatic stress symptoms (Dunn et al., 2012; Ljungman et al., 2015; Vrijmoet-Wiersma et al., 2008) highlight ways in which parents' social support might also vary across their child's cancer trajectory. It is well documented that parents experience different levels of stress, distress, and other maladaptive psychological symptoms at the various stages of their child's cancer (Kahriman et al., 2020) and their experiences differ from before their child was diagnosed, to more traumatic times in their child's cancer trajectory, to survivorship. For example, parents report fear and uncertainty with varying intensity across their child's diagnosis, treatment, and survivorship stages (Vrijmoet-Wiersma et al., 2008). When a child is first diagnosed, parents report posttraumatic stress, depression, and anxiety (Dunn et al., 2012; Vrijmoet-Wiersma et al., 2008). However, these symptoms tend to decline over time (Ljungman et al., 2015), albeit with considerable variability among parents (Katz et al., 2018). Parents also experience depression, anxiety (Srivastava et al., 2020; Rahmani et al., 2018), and posttraumatic stress symptoms during later stages of their child's cancer and during survivorship as well (Bruce, 2006; Ljungman et al., 2014; Norberg et al., 2011; Poder et al., 2008).

Social support, given its consistent negative relationship with psychopathology and distress, would likely be helpful to parents during the period of time when they are having the most difficulty, and reduced social support, feeling alone (Battles et al., 2018), and needing to isolate from existing supports (Cox, 2018) is part of the experience for parents as their child goes through different phases of their cancer treatment. Thus, it is interesting to consider, in addition to parents' social support from friends in survivorship, how their perceptions of social support might be during their the most traumatic time in their child's treatment - a time when parents might have benefited most from social support – to better guide parents through this stage of treatment and make suggestions about utilizing resources such as social support. Understanding how parents' social support from friends might shift - from before their child was diagnosed with pediatric cancer, to the most traumatic time in their experience with their child's cancer, to the survivorship phase – might highlight patterns that could be attended to by medical care providers as parents navigate various phases of their child's illness. As well, gaining a baseline of parents' social support before their child was diagnosed with cancer, in addition to understanding how it shifts during parents' most difficult time and into survivorship would be helpful for clinicians working with parents impacted by pediatric cancer.

Research has demonstrated that the most adverse or traumatic time during a person's experience with cancer, and how it relates to outcomes, is best understood by their subjective appraisal rather than relying on objective indicators or time periods (Barakat et al., 1997; Kazak et al., 1998; Norberg et al., 2012; Stuber et al., 1997), which may partially explain why a subset of parents experience greater distress, posttraumatic stress, depression and anxiety during the diagnosis phase of their child's cancer (Dunn et al., 2012; Vrijmoet-Wiersma et al., 2008), but not all parents report this pattern, with some experiencing worse symptoms at other phases. The

time when parents experience the most trauma or trauma-related symptoms associated with their child's illness, is likely also the time when they could benefit most from social support (Lee, 2019; Oginsha-Bulik, 2013; Zhou et al., 2017). To assess the time period when parents may be most in need of social support, it might be helpful for researchers to investigate parents' subjective reports about the most traumatic or adverse time during their child's cancer, knowing that this time period could differ for different parents. Data based on parent reports of uncertainty, anxiety, depression and posttraumatic stress symptoms have offered insight into when parents might perceive the most traumatic time in their child's cancer to be; however, parents do not always endorse the same times unanimously across studies (Vrijmoet-Wiersma et al., 2008) For example, some parents endorse the post-treatment phase of their child's cancer as being the most uncertain, with others reporting anxiety and depression to occur closer to the diagnosis phase, and posttraumatic stress symptoms being more prevalent for parents around the time of diagnosis and treatment phases (Vrijmoet-Wiersma et al., 2008). Another reason for assessing social support during the parents' self-identified most traumatic time is that researchers have linked greater accuracy for memory detail to the most critical phase of a person's experience with adversity (Sotgiu & Galati, 2010).

Little is currently known about how parents' social support might shift from before their child's cancer, to the most traumatic time, to survivorship; however, from the literature, we can begin to form hypotheses. Arab et al (2019) demonstrated that treatment duration negatively correlates with parents' social support, suggesting that parents' might perceive more social support closer to their child's diagnosis with decreasing levels over time (Arab et al., 2019). Others have found that parents report needing social support the most immediately following their child's diagnosis (Altay et al., 2014). However, some data have indicated that parents'

social support does not differ based on treatment status (Enskar et al., 2010) or the child's phase of cancer (Veracasson et al., 2020). No single study in the past ten years has asked parents to report on their perceived social support at multiple time-points across their child's cancer trajectory to determine how it might shift at different stages, nor has any study investigated specifically how parents' perceive their social support during the time period they self-identify as being the most traumatic time during their child's cancer.

Literature on trajectories of change following other traumatic events such as natural disaster, war, health events, and traumatic accidents (Galatzer-Levy et al., 2018) suggest that parents might experience a variety of patterns of change in their social support. Common trajectories following an adverse event include resilient patterns (i.e., stress-resistant and recovery), patterns of depreciation (i.e., breakdown without recovery and consistent worsening), and a pattern of improvement (Fan et al., 2015; Galatzer-Levy et al., 2018; Kroneberg et al., 2010; Masten & Obradovic, 2008). In a review of the trauma literature, most people endorse a stress-resistant or recovery pattern regardless of sample size (Galatzer-Levy et al., 2018). Studies evaluating chronic or repeated adverse events – which might be similar to repeated challenges faced by parents of children with cancer – found patterns of depreciation and recovery trajectories to be the most prevalent (Galatzer-Levy et al., 2018). Across this literature, many studies involve children's responses to adverse events, and all studies examine changes in psychological outcomes such as posttraumatic stress, depression, anxiety, or posttraumatic growth (Galatzer-Levy et al., 2018; La Greca et al., 2013; Tillery et al., 2016). Some suggest that contextual variables, such as social support, are highly important in identifying outcome trajectories (La Greca et al., 2013); however, no studies evaluate changes in these daily contextual variables, nor their relationship with psychological outcomes. This highlights a need

to better understand how parents experience their social support at various timepoints during their child's cancer trajectory, with targeted timepoints being before their child's cancer diagnosis, during the most difficult or traumatic time of their child's cancer, and when their child is in the survivorship phase.

It is also possible that parents may have different experiences with perceived social support across their child's cancer journey based on aforementioned demographic and cancer factors, such as parents' race, sex, income, child's race and sex, and child's treatment intensity. However, no studies have provided insight into how personal and cancer-related factors may be related to changes in parents' social support over time. This information would be valuable for clinicians working with these families, to improve understanding of how certain parents might be at risk for particular changes in social support as they navigate the most difficult times of their child's cancer and as they shift back to a new normal during survivorship.

As well, understanding how parents' social support trajectories relate to outcomes of wellbeing and resilience, such as PTG, is also important and currently represents a gap in the vast literature on social support in this population. It would be valuable to understand how parents' social support trajectories relate to PTG, as well as the individual domains of PTG. This would advance understanding about how protective, contextual factors, such as social support, change across the difficult experience of parenting a child with cancer, and how those trajectories of change are associated with adaptive outcomes such as PTG. There is no empirical evidence to suggest which social support trajectories (e.g. resilient, depreciating, improving) might relate most to PTG. However, theory on PTG indicates that patterns of resilience and improvement in social support across pediatric cancer might be related to higher levels of parents' PTG when their child is in survivorship. In other words, parents who experience

recovery or improvement in their social support might report higher levels of PTG than those who experience continuous depreciation in social support over time. Furthermore, given the data that parents' social support positively relates to PTG (Kim, 2017), it is expected that parents who perceive more social support in survivorship, compared to previous timepoints, might experience higher levels of PTG, and those individuals are likely to fall into trajectories of recovery or improvement.

Understanding how parents' social support trajectories unfold over the three described critical timepoints (before their child's diagnosis, during the most traumatic time of their child's cancer, and during survivorship), and how parents' trajectories relate to their personal and cancer-related factors, as well as PTG, would improve clinicians' ability to intervene and support parents' who might be at risk for trajectories of depreciation in social support, and promote more resilient trajectories and outcomes.

1.10 Current Study

The current study focused on parents' social support from friends when their young adult child is in the survivorship phase of their pediatric cancer. The primary two aims included examination of: 1) the unique parent, child, and cancer-related factors associated with parents' social support from friends during their child's survivorship; and 2) how parents' social support from friends is related to parents' PTG during their child's survivorship phase. A tertiary aim of this study was to examine how parents perceive changes in their social support from friends across their child's cancer trajectory and to identify common patterns of change. Additionally, this aim examined how patterns of change in parents' social support are associated with parent, child, and cancer-related factors and parents' PTG.

Investigation of the first two aims in this study will add to what clinicians' know about which parents might be in greatest need of social support according to individual demographic or child-disease factors, and how parents' social support is related to their adaptive functioning during the uniquely challenging period of their young adult child's survivorship phase. Additionally, examining changes in social support over time could improve clinicians' awareness of when parents might be at greatest risk for social support deficits and how changes in social support might influence resilient outcomes, such as PTG.

1.10.1 Aim 1

The first aim was to examine how parent-demographic, child-demographic, and child cancer-related factors are associated with parents' perceptions of their social support from friends. It was anticipated that parents' perceptions of social support would be associated with the following parent factors: being a mother or father, current family income, and race and ethnicity. Specifically, it was hypothesized that fathers and Black parents may endorse less social support from friends and that parents with higher incomes would perceive higher levels of social support during survivorship. It was also expected that parents' perceptions of social support would be associated with child-demographic and cancer-related variables, including child gender, age, and type of cancer or intensity of treatment. It was hypothesized that parents of adult children who are on the younger end of the young-adult spectrum (i.e., 18-20) and children who underwent more intense cancer treatments may perceive less social support from friends. There is insufficient evidence in the current literature to establish scientific hypotheses about how the child's gender would be related to parents social support, so this objective was considered exploratory.

1.10.2 Aim 2

The second aim was to examine how parents' social support from friends is related to parents' PTG in survivorship. It was hypothesized that parents who have more positive perceptions of their social support from friends would endorse more PTG. This aim also examined how each individual domain of PTG (e.g., Relating to Others, Personal Strength, New Possibilities, etc.) could be related to parents' social support during survivorship. It was anticipated that the domains of Relating to Others and Personal Strength would be more strongly associated with parents' social support than other domains of PTG (i.e., Appreciation of Life, New Possibilities, Spirituality).

1.10.3 Aim 3

The third aim was to examine, in a subset of parents whose children were diagnosed closer to adolescence, how parents' perceptions of their social support change across stages of their child's cancer experience, from before their child was diagnosed with cancer, to parents' self-identified most-traumatic time during their child's cancer trajectory, to the current time during which their child has completed cancer treatment and is in the survivorship phase. It was hypothesized that several trajectories of social support would emerge, for example, patterns of resilience (i.e., stress-resistant or recovery), improvement, or depreciation (i.e., breakdown without recovery or consistent worsening) (Bonanno & Diminich, 2013; Galatzer-Levy et al., 2018; Kroneberg et al., 2010; Masten & Obradovic, 2008; Tillery et al., 2016) over the course of their child's cancer. See Figures 1-5 for graphical representations of the hypothesized trajectories.

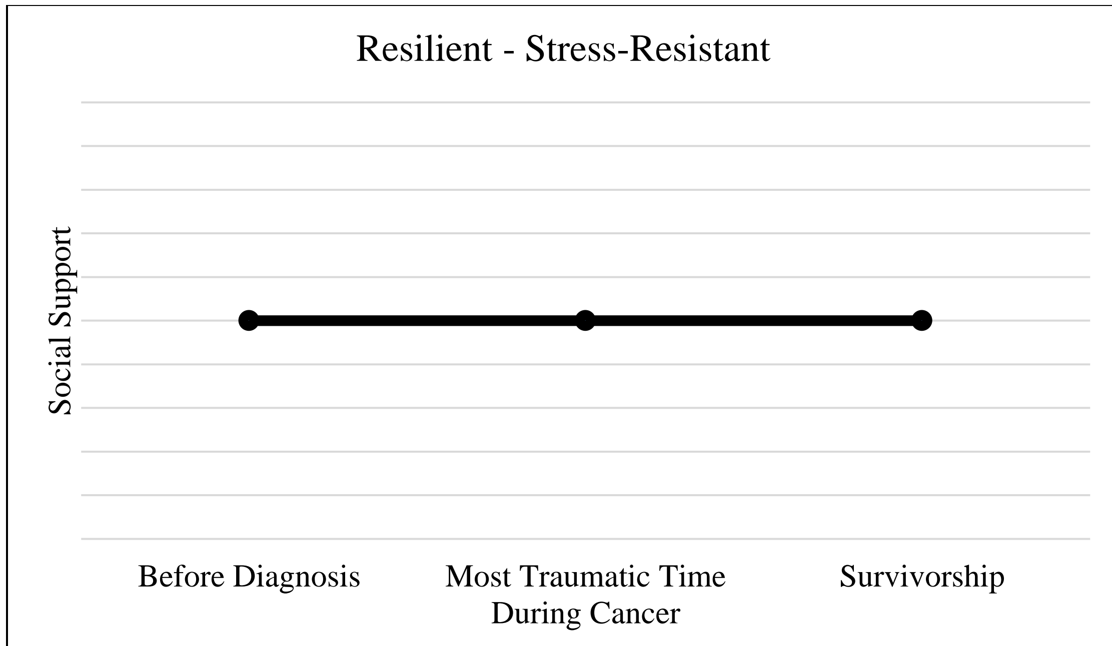


Figure 1. Resilient Stress-Resistant Pattern of Social Support

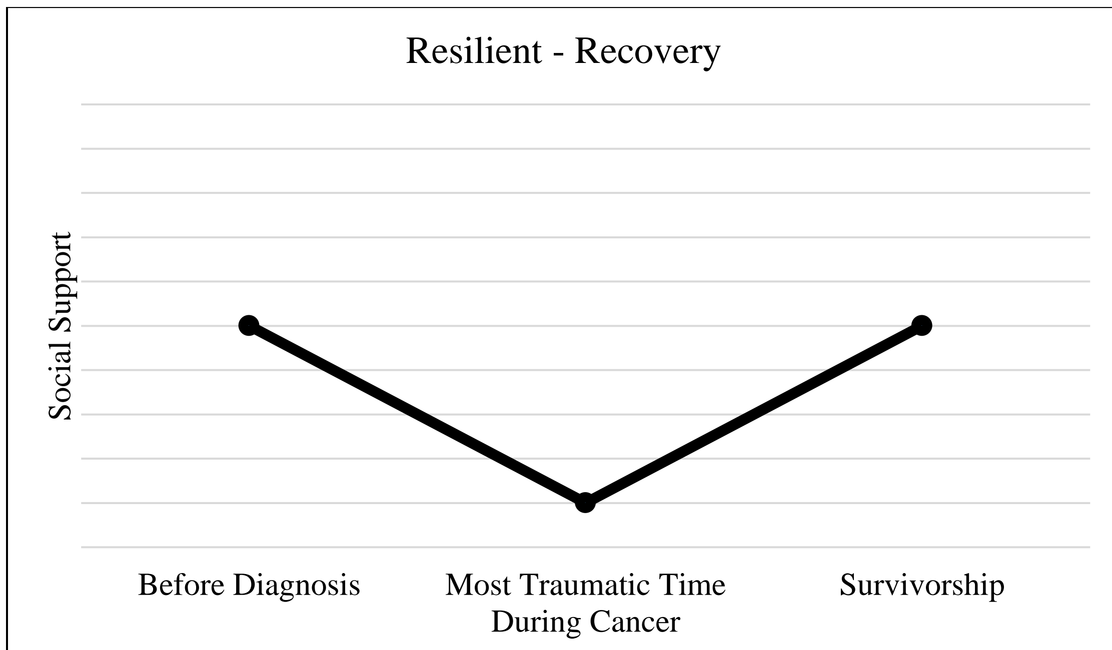


Figure 2. Resilient Recovery Pattern of Social Support

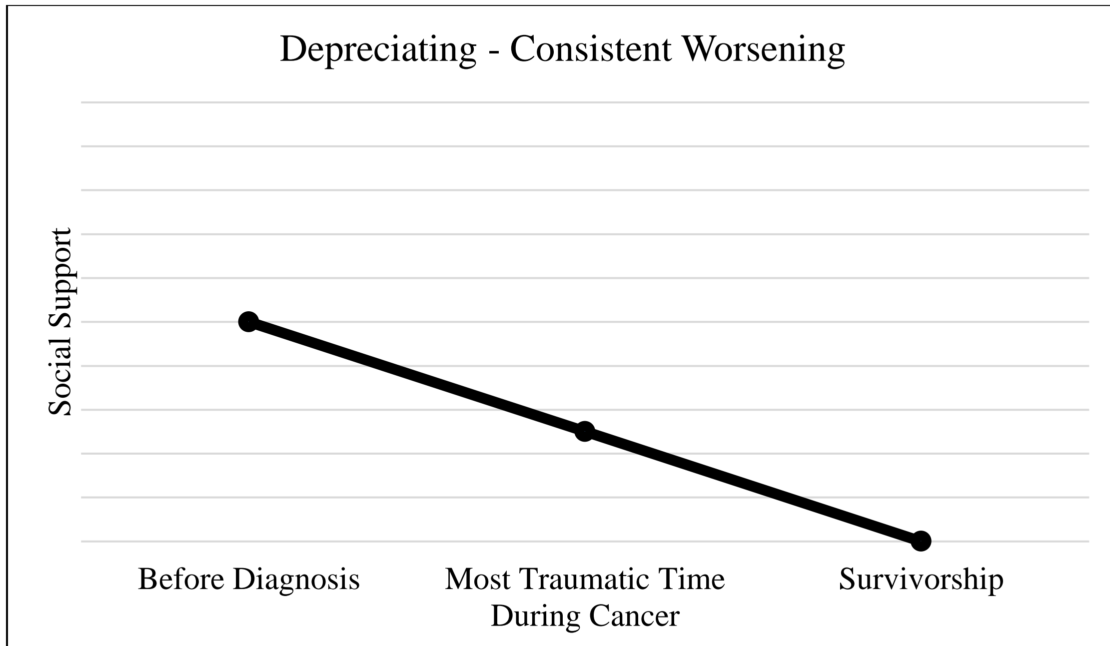


Figure 3. Depreciating Consistent Worsening Pattern of Social Support

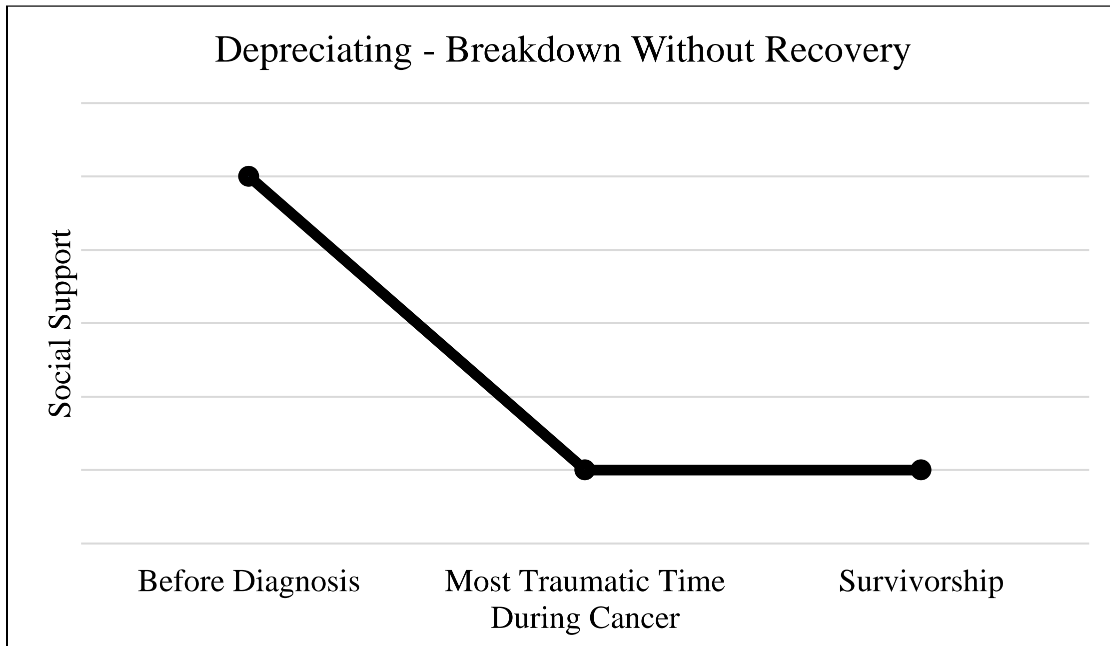


Figure 4. Depreciating Breakdown Without Recovery Pattern of Social Support

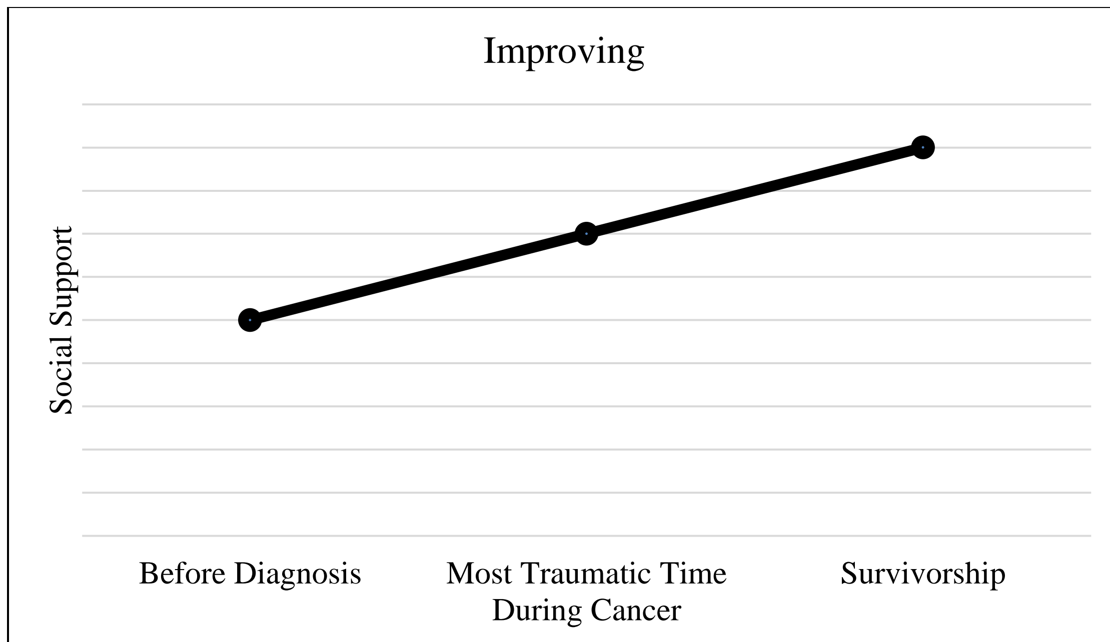


Figure 5. Improving Pattern of Social Support

The third aim also involved examination of how parents' social support trajectories are related to parent-demographic, child-demographic, and cancer-related factors. Similar to Aim 1, parents' role as mother or father, race, and ethnicity, as well as their child's gender and intensity of treatment were examined in relation to their social support trajectory. Because family income is a factor that could change over time, and was only reported for the current time period, the relationship of current family income to social support trajectories was not evaluated. The child's age during the time immediately preceding their diagnosis, as well as the time during the parents' self-identified most traumatic time of their child's cancer journey, were examined to evaluate how the child's age might influence changes in the parents' social support as they navigate their child's cancer. It was hypothesized that fathers and Black parents may be more likely to experience social support trajectories that follow a pattern of recovery or depreciation, which would describe lower social support during the most traumatic time of their experience with pediatric cancer. Furthermore, it was hypothesized that parents whose children were diagnosed at

a younger age and children with higher intensity of treatment may perceive less social support particularly at the time they identify as most traumatic for them during their child's cancer, thus, being more likely to endorse resilient (i.e., recovery and stress-resistant) or depreciating trajectories of social support. The characteristics of parents' social support trajectories according to their child's gender was explored without specific hypotheses to guide this investigation due to current lack of evidence in this area of study.

Lastly, this aim examined how parents' social support trajectories, as well as their perceptions of social support at each of the three critical time points, were related to parents' PTG during survivorship. It was hypothesized that parents who experience patterns of resilience or improvement in their social support would endorse more PTG than those who experience patterns of depreciation. This hypothesis was based on the theoretical notion that PTG occurs when individuals experience a breakdown of their world views immediately following a traumatic experience, and a subsequent rebuilding of world views (Tedeschi & Calhoun, 2004). Conceptualizing social support as a factor that may contribute to worldview, and thus breakdown in the face of trauma, it was expected that parents who experience a breakdown and recovery in their perceptions of social support (e.g., similar to a Resilient trajectory pattern) would endorse more PTG. Furthermore, it was hypothesized that perceptions of social support at the survivorship time-point would be most related to parents' experiences of PTG in survivorship. Additionally, how each individual domain of PTG (e.g., Relating to Others, Personal Strength, etc.) is related to each of the social support trajectories was explored. It was anticipated that parents who endorse social support trajectories of Improvement or Resilience would have higher scores in PTG domains of Relating to Others and Personal Strength.

Because this project focuses on evaluating social support in parents of young adults who had cancer as children, parents included in this third aim were limited to parents of children who were diagnosed primarily in adolescence, excluding parents of children who were diagnosed at less than 10 years old. Parents of younger children may have different demands on their time, given the developmental stages of their child, compared to parents of older children who are developing more independence with school, friends, activities of daily living, and medical care. Parenting responsibilities and children's needs also differ across different ages and phases of child development (Knauer et al., 2019; Mays et al., 2020). As well, parents caring for younger children with cancer may experience challenges unique from those caring for adolescent children. For example, in younger children with cancer, sleep disturbances and possible relocation for specialty care are more common (Junkins et al., 2020), and parents of younger children sometimes report higher levels of distress (Nam et al., 2016). Parents of adolescent children may struggle to promote child autonomy throughout the cancer trajectory (Junkins et al., 2020; Kim et al., 2020), yet report higher parent self-efficacy in caring for their sick child (Harper et al., 2012), a developmental time frame that is likely more similar to what parents face when their child enters young adulthood. Thus, for the third aim, only parents of children older than 10 years at the time of their cancer diagnosis were asked to reflect on their previous social support so as to prevent any confounding differences in social support that may be perceived by parents related to the age of their child rather their experience with pediatric cancer.

2 METHODS

2.1 Participant Sample

Participants included parents or primary caregivers of young adults who were diagnosed and treated for cancer as children. Criteria for inclusion involved English speaking parents of

young adult patients ages 18 through 25 years, who were diagnosed with cancer between birth and 17 years of age, and are currently in the survivorship phase (i.e., off treatment and in remission for at least two years). As noted above, participants in Aim 3 included parents from this sample whose children were diagnosed with cancer between ages 10 and 17 years old. Participants were recruited and data were collected between 2017 and 2019 from a children's hospital survivor program as part of a larger study evaluating survivorship factors and transition from child to adult care. Participants were recruited via phone or email by research staff for participation in this study. Participants' contact information was collected from the young-adult patients' electronic medical records in EPIC®.

2.2 Procedure

Participants who agreed to participate in the study received an email link with information about how to access the secure electronic consent and survey battery via the Research Electronic Data Capture (REDCap®) platform. Consent was completed online before completing study questionnaires. All participants who agreed and signed the consent were directed to the survey battery. The survey contained questionnaires from the larger study aims and completion of the study battery took approximately 20-40 minutes. As compensation for their time, participants were offered a $20 gift card or the opportunity to donate $20 to a family for a meal at the children's hospital.

Participants responded to survey questions about how they currently perceived social support from friends. Participants received the prompt, "Think about the present time and respond to each statement considering how things have been in the past two weeks." Participants also responded to survey questions about their current PTG as well as questions about theirs and

their child's demographic factors. Information about their child's cancer factors was extracted from the medical chart by research personnel.

Participants who were included in Aim 3 responded to survey questions about how they perceived social support from friends during two previous time points as well: 1) Retrospectively for the time right before their child was diagnosed with cancer (T1); and 2) Retrospectively for the time they identified as the most traumatic time for them during their child's cancer trajectory (T2). For T1 participants were told, "Recall the time-period right before your child's cancer diagnosis." For T2, participants read, "Recall the most traumatic cancer-related time-period during your child's cancer experience." Thus, reports about social support from friends for T1 and T2 necessitate that the participant retrospectively reflect on and answer questions representative of their experience and feelings during periods in their past. Participants were asked to report their age, their child's age, and the year associated with T1 and T2 by responding to "How old were you?", "How old was your child?", and "What year was it?" before completing the social support measure to help mentally anchor the participants in the past time periods.

When completing the survey battery, parents first completed the measure of PTG, then completed measures of their social support from friends for the current time period (T3). Parents who continued to Aim 3 then completed questionnaires for the time right before their child's diagnosis (T1), and lastly for the most traumatic time during their child's cancer trajectory (T2).

2.3 Measures

2.3.1 Parent and Child Demographic Factors and Child Cancer Factors

Demographic information about the parents and their children were gathered via the online survey. Parents reported on their own gender, age, race and ethnicity, and total family

income. Parents also reported on their child's age, and age at each of the three time points for those parents who were included in Aim 3. Their young-adult children who had cancer reported on their own gender. Cancer diagnosis (i.e., type of cancer) and intensity of treatment were abstracted from the patients' electronic medical record. An intensity of treatment rating of 1, 2, 3, or 4 was determined for each participant based on their diagnosis and treatment modalities (Kazak et al., 2011), with more intense treatments being represented by higher numbers. Parent gender was used to determine whether the parent was the child's mother or father. Family income was reported in terms of income bracket.

2.3.2 Social Support from Friends

Parents' perceived social support was measured using the National Institute of Health (NIH) Toolbox Item Bank v2.0 – Friendship (Ages 18+) Fixed Form (Cyranowski et al., 2013; Gershon et al., 2013). The Friendship form is an eight-item measure with a 5-point Likert response format that asks participants to report how often they have experienced an item in the past month, ranging from *never* to *always*. This measure evaluates parents' perceptions of their support from friends in terms of availability, reliance, and closeness (Cyranowski et al., 2013). This scale was developed and evaluated with NIH funding to be psychometrically sound and appropriate for use with the general population (Gershon et al., 2013). The Friendship form has been validated with a population of typical adults who were predominately white (82%), female (57%), and married (46%), and was deemed to be a valid indicator of companionship and support from friends, with strong psychometric characteristics, and excellent internal consistency (Cronbach's $\alpha = .945$) (Cyranowski et al., 2013). Internal consistency for the current sample was excellent (Cronbach's $\alpha = .952$).

The Friendship form was completed by all participants for the current time period. Participants included in Aim 3 also completed it retrospectively for before their child was diagnosed with cancer (T1), and retrospectively for the parents' self-identified most traumatic time during their child's cancer trajectory (T2). Item scores were added to generate a total score for each time point. Higher scores indicate a more favorable perception of parents' social support from friends.

2.3.3 Posttraumatic Growth

Parents' perception of their current PTG was measured using the Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996). The PTGI is a 21-item scale with a 6-point Likert response that asks respondents to report the extent to which they perceive positive changes because of an adverse or traumatic experience. Responses range from *I did not experience this change as a result of my child's cancer* to *I experienced this change to a small*, *moderate*, *great*, or *very great degree as a result of my child's cancer*. The PTGI is a widely used measure and a validated tool for evaluating PTG across studies with a variety of populations (Tedeschi & Calhoun, 1996; Shakespeare-Finch & Barrington, 2012; Smith & Cook, 2004). Test-retest reliability is acceptable (r = .71) and internal consistency of the PTGI is excellent (Cronbach's α = .90) (Tedeschi & Calhoun, 1996). Internal consistency for the current sample was excellent (Cronbach's α = .944). The 21-item PTGI can be summed to provide a measure of total PTG. The PTGI can also be observed in terms of five domains, that are combined to form the total score, or evaluated separately to describe growth in five unique areas including: Relating to Others, Personal Strength, Appreciation of Life, New Possibilities, and Spirituality (Linley et al., 2007; Taku et al., 2008).

The PTGI was completed by participants for the present time to evaluate parents' current perception of their PTG as a result of their experience with the adverse nature of raising a child with cancer. All scores were summed to create a total with higher scores indicating greater PTG; additionally, the five individual PTGI domain scores were individually summed with higher scores indicating more growth in that particular domain.

2.4 Data Analytic Plan

All data were collected from the REDCap® platform and coded into Excel and SPSS statistical software programs for analyses. Eighty-five percent of eligible parents who were recruited consented to participate. To handle missing data, parents with complete rows of missing questionnaire data were excluded from the data set. This included parents who completed demographic data questions, but did not complete any questions related to social support. Thereafter, two duplicates were removed from the dataset when parents completed the survey twice, but at different times; only the parents' first entry was retained and used in data analyses. The remaining data resulted in a 78% survey completion rate among parents who initiated the survey questionnaires. The remainder of missing data for all survey questions was less than .02% per column; thus, missing data were imputed using the series mean for each question. Afterward, participants' totals for each survey were computed using the sum of all questions in each survey.

2.4.1 Preliminary Analyses

Frequencies were computed to characterize the sample in terms of parent and child race, ethnicity, sex, family income, and child cancer diagnosis. Means, standard deviations, and ranges were calculated to characterize the sample based on primary variables including social support and PTG.

2.4.2 Primary Analyses

2.4.2.1 Aim 1. Information about parents' demographic characteristics and child's demographic and cancer-related factors were gathered. For Aim 1 the relationships between parents' current social support and unique parent, child, and cancer factors were examined. Specifically, the following variables were examined in relation to social support: parents' role as mother or father (determined by parent gender); parents' family income (determined by family's reported yearly income bracket and treated as an ordinal variable); parents' race and ethnicity; child's current age; child's gender; and child's intensity of cancer treatment (i.e., categorical representations of least to most intense, rated 1-4).

Assumptions of linearity, normality, and homogeneity of variance were tested prior to comparing means. Parents' social support scores revealed Skew of -.582 and Kurtosis of -.330. The Kolmogorov-Smirnov test of normality demonstrated that parents' social support scores were not normally distributed, violating assumptions of parametric tests, $D(182) = .097$; $p < .001$. Thus, non-parametric tests were used to compare social support means across variables of interest.

Mann-Whitney U tests were conducted to examine the relationships between social support and parent gender, as well as social support and child gender, given that all parents and patients identified as either male or female. Non-parametric Kruskal-Wallis tests were used to examine the relationships between parents' social support and the following variables: parents' race and ethnicity, parents' family income, and child's intensity of treatment (Field, 2013). Where relevant, follow-up contrasts, or simple effects analyses, were conducted to examine the effects of race, ethnicity, and cancer-related differences on social support perceptions (Field, 2013). The relationship between child's age and parent's social support were examined using

correlation analyses. The patients were also categorized into younger (18-20 years) versus older (21-25 years) young-adults, and the parents' social support was evaluated based on whether they were the parent of a younger versus older child using a Mann-Whitney U test.

2.4.2.2 Aim 2. Parents reported on their PTG for the current time during which their child was off cancer treatment and in survivorship. The relationship between parents' social support from friends during survivorship and their PTG was evaluated using correlation analyses. As part of Aim 2 the relationship of parents' social support to individual domains of PTG were also evaluated using correlation analyses to determine which individual domains of PTG (e.g., Relating to Others, Personal Strength) were significantly associated with parents' social support.

Five domains of PTGI were calculated using sums of individual items (Taku et al., 2008). The Relating to Others domain was composed of PTGI items 6, 8, 9, 15, 16, 20, and 21, and New Possibilities domain was the sum of PTGI items 3, 7, 11, 14, and 17. The Personal Strength domain was formed from PTGI items 4, 10, 12, and 19. The Spiritual Change domain was composed of PTGI items 5 and 18, and the Appreciation of Life domain was the sum of PTGI items 1, 2, and 13.

2.4.2.3 Aim 3. Parents' who participated in Aim 3 reported on their social support for the three time points described (i.e., T1, immediately before their child's diagnosis; T2, during their self-identified most traumatic time of their child's cancer; T3, the current time when their child is in survivorship). Reports about parents' social support from friends at the three time-points were plotted to form patterns of change in parents' social support across their child's cancer trajectory. The patterns that emerge were then categorized into groups based on likeness of trend, using visual analysis (Cohen et al., 2014; Parsonson & Baer, 1986) to categorize participants' patterns into common trajectories. Two independent coders categorized individuals into trajectory groups

using visual analysis. Results were evaluated and discussed for agreement. For any patterns with small degrees of change between time points, a meaningful unit of change of three points or greater was used to guide final decisions about categorizing patterns and ensure pattern categorization was consistent across the sample.

Parents' social support scores at each of the three timepoints were also categorized as being either low, medium, or high. Scores between 0 and 14 on the social support measure were classified as low; scores between 15 and 29 were classified as medium; scores between 30 and 40 were classified as high. The low, medium, and high cut points were decided based on the current sample's range of social support scores.

Relationships between parents' social support trajectory group and demographic and cancer-related factors were then examined. Patterns of change identified in the first step of Aim 3 were used for this analysis. Each social support trajectory group was characterized based parents' race, ethnicity, and the number of parents in each category who were mothers versus fathers; additionally, trajectories were characterized based on the child's gender and intensity of treatment. When trajectory groups contained enough parents from these various demographic factor-groups (i.e., parents' gender, race, ethnicity, and child's gender and intensity of treatment) to statistically evaluate differences by social support trajectory, chi-square and fisher's exact tests were conducted. Relationships between social support trajectories and child's age at Time 1 and Time 2 of the trajectories were examined via ANOVA tests.

Parents' social support trajectory groups were then compared on parents' PTGI scores. Levene's tests of parents' PTGI scores demonstrated equal variances across trajectory groups $F(4, 67) = .515$, $p = .725$. Parents' PTGI scores however, indicated negative skew (-.583) with minimal kurtosis (.020). Thus, non-parametric Kruskal-Wallis tests were conducted to evaluate

differences among PTGI scores according to which social support trajectory group parents were a member of. Additional Kruskal-Wallis tests were conducted to evaluate the relationship between parents' social support trajectory group and individual domains of PTG (i.e., separate tests for Relating to Others, Personal Strength, Appreciation of Life, New Possibilities, and Spirituality). Lastly, correlations among parents' social support at T1, T2, and T3 and the PTGI scores were examined to better understand at what time points parents' social support is associated with PTG.

2.4.3 Sample Size and Statistical Power Considerations

Power analyses were conducted to determine the number of participants needed to statistically evaluate study aims. Previous pediatric cancer literature, involving both PTG and social support, suggests medium to large effect sizes might be expected (Arab et al., 2019; Barakat et al., 2006; Choi et al., 2015; Gardner et al., 2017b; Koutná et al., 2017; Toledano-Toledano et al., 2020; Zebrack, et al., 2012). Power analyses revealed that at least 168 participants were needed to detect a .35 medium effect in a comparison of means with up to 6 groups.

For Aim 3, to evaluate relationships between categorical variables using chi-square tests, no more than 20% of cells should contain less than five participants (Field, 2013); thus, Fisher's exact tests were used, with no cells (i.e., mothers who endorsed resilient trajectories; fathers who endorsed increasing depreciating trajectories, etc.) containing zero participants.

3 RESULTS

3.1 Preliminary Analyses Results

The total sample included 182 parents of young adults (18-25 years old) who had cancer as children and were diagnosed any time prior to age 18. Aim 3 included 72 participants from the

total sample whose children were diagnosed at ten years or older, and are described in further detail in the Aim 3 Results section. Parents from the total sample were approximately 50 years old and were primarily White (73%) and Black or African American (20%). Characteristics of the sample based on parent and child race, age, ethnicity, sex, family income, and child cancer diagnosis, as well as parents' average PTG and current social support scores are presented in Tables 1 and 2.

Table 1. Characteristics of the total sample based on parent and child demographic variables

Key Variables	**Frequency**	**Percent**
Parent Race		
African American or Black	36	20.0%
Asian	5	3.0%
White	133	73.0%
Other or Multiracial	8	4.0%
White and Asian	1	0.5%
White and Native American	2	1.1%
Parent Ethnicity		
Hispanic/Latinx	11	6.0%
Non-Hispanic/Latinx	171	94.0%
Parent Sex		
Female	169	92.9%
Male	13	7.1%
Parent Family Income		
Under $9,999	3	1.6%
$10,000-24,999	10	5.5%
$25,000-49,999	30	16.5%
$50,000-74,999	28	15.4%
$75,000-99,999	27	14.8%
$100,000-124,999	15	8.2%
$125,000-149,999	20	11.0%
Above $150,000	35	19.2%
Declined to answer	10	5.5%
Did not know income	4	2.2%
Adult Child Lives in Home with Parent?		
Yes	137	75.3%
No	45	24.7%
Adult Child Race		
African American or Black	35	19.2%
Asian	3	1.6%
White	131	72.0%
Other	8	4.4%

Multiracial		
White and Asian	3	1.6%
White and Other	2	1.1%
Adult Child Ethnicity		
Hispanic/Latinx	15	8.2%
Non-Hispanic/Latinx	167	91.8%
Adult Child Sex		
Female	92	50.5%
Male	90	49.5%
Adult Child Cancer Diagnosis		
Leukemia	71	39.0%
Hodgkin's Lymphoma	17	9.3%
Non-Hodgkin's Lymphoma	18	9.9%
Kidney Tumors	13	7.1%
Neuroblastoma	13	7.1%
Soft Tissue Sarcoma	7	3.8%
Ewing Sarcoma	8	4.4%
Osteosarcoma	13	7.1%
Other Sarcoma	5	2.7%
Other Malignancy	11	6.0%
Non-Malignant Disease	6	3.3%
Adult Child Intensity of Treatment Rating		
Level 1: Least Intensive Treatments	4	2.2%
Level 2: Moderately Intensive Treatments	68	37.4%
Level 3: Very Intensive Treatments	73	40.1%
Level 4: Most Intensive Treatments	37	20.3%

Table 2. Means, Standard Deviations, and Ranges of Demographic and Study Variables

Key Variables	**Mean (SD)**	**Range**
Parent Age	49.58 (5.89)	36-67
Child Age	20.59 (2.39)	18-25
Parent Current Social Support	23.04 (6.91)	5-32
Parent Current PTG	71.88 (23.25)	1-105

3.2 Aim 1 Results

Parents' current social support scores were evaluated based on various demographic and cancer-related factors and are presented in Table 3.

3.2.1 Parent Demographic Factors.

Non-parametric, Mann-Whitney U tests revealed significant differences between mothers' and fathers' current social support with a small effect size. Mothers (Mean Rank = 93.79) endorsed significantly higher social support scores than fathers (Mean Rank = 61.77), $U = 712$, $z = -2.117$, *Asymptotic Sig.* = .034, $r = -0.161$. Hispanic parents' social support compared to non-Hispanic parents' social support was not significantly different, $U = 762.50$, $z = -1.05$, *Asymptotic Sig.* = .292. Non-Parametric Kruskal-Wallis tests revealed no significant differences in social support based on parent race, $H(3) = 4.052$, *Asymptotic Sig.* = 0.256, nor on family income, $H(9) = 15.592$, *Asymptotic Sig.* = 0.076.

3.2.2 Child Demographic and Cancer-Related Factors.

Non-parametric, Mann-Whitney U tests revealed there were no significant differences in parents' social support between parents of male children (Mean Rank = 94.23) versus female children (Mean Rank = 88.83), $U = 4385.00$, *Asymptotic Sig.* = .488. Correlation analyses revealed that child-age was not significantly related to parents' current social support ($r = -.004$, $p = .953$). The sample was categorized into parents of younger adult children (ages 18-20, $n = 107$) and older adult children (ages 21-25, $n = 75$) and compared on social support in this way; however, no significant differences were detected via Mann-Whitney comparisons either, $U = 4087.00$, $z = .214$, *Asymptotic Sig.* = .831. Non-Parametric Kruskal-Wallis tests were conducted to evaluate differences in social support based on the intensity level of the child's cancer treatment, and revealed that parents' social support did not differ based on the intensity of their child's cancer treatment, $H(3) = .736$, *Asymptotic Sig.* = 0.865.

Table 3. Parent Social Support Scores by Parent and Child Factor

	n	Mean	Median
Parent Role			
Mothers	169	23.33_a	24

Fathers	13	19.31_b	19
Parent Race			
White	133	22.70	24
African American or Black	36	23.97	26
Asian	5	20.40	20
Other or Multiracial	8	26.13	27
Parent Ethnicity			
Hispanic/Latinx	11	25.55	27
Non-Hispanic/Non-Latinx	171	22.88	24
Parent SES			
Under $9,999	3	32.00	32
$10,000-24,999	10	19.70	19
$25,000-49,999	30	22.30	23.5
$50,000-74,999	28	21.07	22
$75,000-99,999	27	21.93	22
$100,000-124,999	15	23.93	25
$125,000-149,999	20	23.95	24
Above $150,000	35	24.26	24
Declined to answer	10	26.90	27
Did not know income	4	23.25	25.5
Child-Age			
Younger (18-20)	107	22.99	24
Older (21-25)	75	23.11	24
Child Gender			
Females	92	22.64	24
Males	90	23.44	24
Child Cancer Intensity of Treatment			
Level 1: Least Intensive Treatments	4	25.00	27.5
Level 2: Moderately Intensive Treatments	68	23.07	24
Level 3: Very Intensive Treatments	73	23.11	23
Level 4: Most Intensive Treatments	37	22.62	24

Note: Means in columns with different superscripts are significantly different, $p < .05$.

3.3 Aim 2 Results

A correlation analysis revealed that parents' current social support ($M = 23.04$) was significantly related to parents' total PTG ($M = 71.88$), $r = .240$, $p = 0.001$. The domain of Relating to Others was significantly related to parents' current social support, $r = .281$, $p<.001$, as were the domains of New Possibilities, $r = .210$, $p = .004$, and Personal Strength, $r = .211$, $p = .004$. Spiritual Change and Appreciation of Life were not significantly correlated with parents' social support. (See also Table 4 with 95% confidence intervals included).

Table 4. Correlations Between Parents' Current Social Support and Posttraumatic Growth Domains

	Posttraumatic Growth Inventory Domain					**PTG Total**
	Relating to Others	**New Possibilities**	**Personal Strength**	**Spiritual Change**	**Appreciation of Life**	
Parents' Social Support	.281** (.141/.410)	.210** (.067/.345)	.211** (.068/.346)	.120 (-.026/.261)	.110 (-.036/.251)	.240** (.098/.372)

Note: * $p < 0.05$; ** $p < .01$ Correlation is significant at the 0.01 level (2-tailed); Lower and upper confidence intervals are presented in parentheses.

3.4 Aim 3 Results

Seventy-two participants were included in the third aim. These 72 participants' average age was 50 and their child's average age was 21 during the present time period (T3). The child's average age immediately preceding their diagnosis (T1) was 13.61 years old, and child's average age at the time their parents self-identified as most traumatic (T2) was 14.07 years old. Of these parents, 53% had a child who was currently in the older age bracket of 21-25 years old, 47% had a child who was currently in the younger age bracket of 18-20 years old. Parents' and children's age, race and other demographic characteristics are described in Table 5.

Table 5. Characteristics of the Aim 3 Sample

Key Variables	Frequency	Percent
Parent Race		
African American or Black	16	22.2%
Asian	1	1.4%
White	51	70.8%
Other or Multiracial	4	5.6%
Parent Ethnicity		
Hispanic/Latinx	3	4.2%
Non-Hispanic/Latinx	69	95.8%
Parent Sex		
Female	66	91.7%
Male	6	8.3%
Parent Family Income		
$10,000-24,999	7	9.7%
$25,000-49,999	11	15.3%
$50,000-74,999	11	15.3%
$75,000-99,999	12	16.7%
$100,000-124,999	5	6.9%
$125,000-149,999	8	11.1%
Above $150,000	14	19.4%
Declined to answer	3	4.2%
Did not know income	1	1.4%
Adult Child Lives in Home with Parent?		
Yes	55	76.4%
No	17	23.6%
Adult Child Race		
African American or Black	16	22.2%
White	51	70.8%
Other	2	2.8%

Multiracial		
White and Asian	2	2.8%
White and Other	1	1.4%
Adult Child Ethnicity		
Hispanic/Latinx	5	6.9%
Non-Hispanic/Latinx	67	93.1%
Adult Child Sex		
Female	33	45.8%
Male	39	54.2%
Adult Child Cancer Diagnosis		
Leukemia	18	25.0%
Hodgkin's Lymphoma	15	20.8%
Non-Hodgkin's Lymphoma	12	16.7%
Kidney Tumors	0	0%
Neuroblastoma	0	0%
Soft Tissue Sarcoma	2	2.8%
Ewing Sarcoma	4	5.6%
Osteosarcoma	8	11.1%
Other Sarcoma	3	4.2%
Other Malignancy	7	9.7%
Non-Malignant Disease	3	4.2%
Adult Child Intensity of Treatment Rating		
Level 1: Least Intensive Treatments	1	1.4%
Level 2: Moderately Intensive Treatments	24	33.3%
Level 3: Very Intensive Treatments	37	51.4%
Level 4: Most Intensive Treatments	10	13.9%

3.4.1 Patterns

Initial categorization of the patterns of change in social support yielded eight distinct trajectory groups based on coder visual analysis. Nearly half of this sample (43%) were classified as Stress-Resistant, with fewer participants in each of the remaining seven groups: Recovery (14%), Posttraumatic Growth (10%), Decreasing (8%), Partial Recovery (7%), Slight Decreasing (7%), Slight Increasing (7%), and Depreciation Post-Increase (4%). The Stress-Resistant pattern indicates that parents did not endorse a substantial change in their social support from immediately before their child was diagnosed, to the most traumatic time in their child's illness, to the current time period or their child's survivorship phase. The Recovery

pattern indicates that parents experienced worse social support during the most traumatic time in their child's cancer, but then a return back to baseline during their child's survivorship phase. Decreasing indicates that parents experienced a consistent worsening of their social support from friends over the course of time, as does the Slight Decreasing pattern with slightly less worsening. Some parents indicated a small, but consistent improvement in their social support from friends across the three timepoints, represented by the Slight Increasing pattern. Parents who endorsed the Posttraumatic Growth pattern indicated a worsening in their social support from before their child's diagnosis to the most traumatic time in their child's cancer, and a subsequent improvement beyond baseline levels during the survivorship period. A few parents endorsed the unique Depreciation Post-Increase pattern, which depicts an improvement in social support during the parents' most traumatic time of their child's cancer, and then a worsening back to baseline during survivorship (See Figure 6).

Among these eight trajectory groups, the level of social support was also examined and classified as being Low, Medium, or High via cutting the social support scale into low, medium, and high scores. Participants classified as having Low social support scored between 0 and 15 on the Friendships questionnaire; those classified as having Medium social support scored between 15 and 30; and those with High social support scored between 30 and 40. Certain trajectory groups indicated change across the levels of social support, and these shifts (e.g., Low to Medium) were also observed and reported in Table 6.

Table 6. Correlations Between Parents' Current Social Support and Posttraumatic Growth Domains

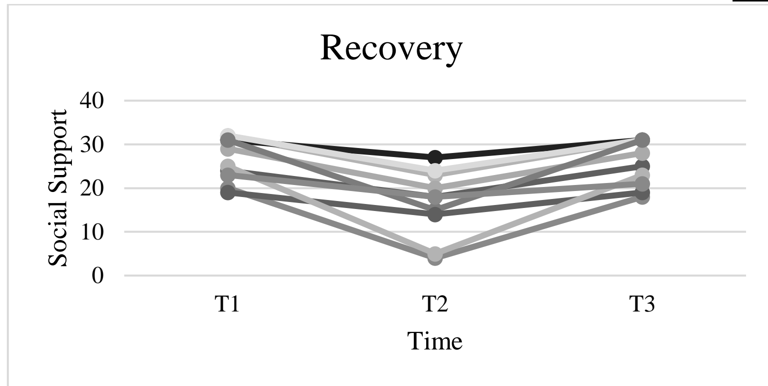
		Social Support Level			**Change in Level**			
Pattern	*n*(%)	High	Med	Low	High→ Med	Med→ Low	Low→ Med	Med→ High
Stress-Resistant	31(43)	13	13	5	-	-	-	-
Recovery	10(14)	4	6	-	-	-	-	-

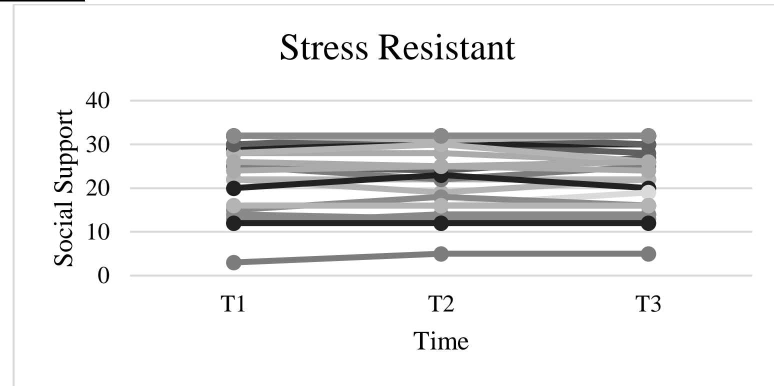
Decreasing	6(8)	-	-	2	-	4	-	-
Slight Decreasing	5(7)	-	3	1	1	-	-	-
Slight Increasing	5(7)	-	3	1	-	-	1	-
Posttraumatic Growth	7(10)	1	2	1	-	-	1	2
Partial Recovery	5(7)	1	1	-	3	-	-	-
Depreciation Post Increase	3(4)	-	2	1	-	-	-	-

Note: The Social Support Level column represents the number of participants who were classified as having High, Medium, or Low social support consistently from T1 to T3; The Change in Level column represents the number of participants who changed from one level to another level from T1 to T3.

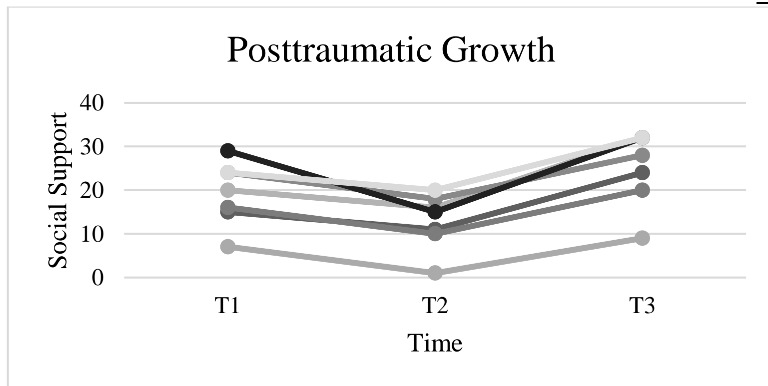
Five sub-categories were formed based on overall trend of patterns, with particular attention to the trend from T1 to T3: a Resilience category was formed to encapsulate the Stress-Resistant and Recovery patterns, a Depreciation category was formed to describe Decreasing and Slight Decreasing patterns, a Growth category was formed to explain Slight Increasing and Posttraumatic Growth patterns, and Partial Recovery and Depreciation Post-Increase trajectories remained stand-alone categories, given the uniqueness of their patterns (See Figure 6). These sub-categories were used for the remaining analyses due to power considerations.

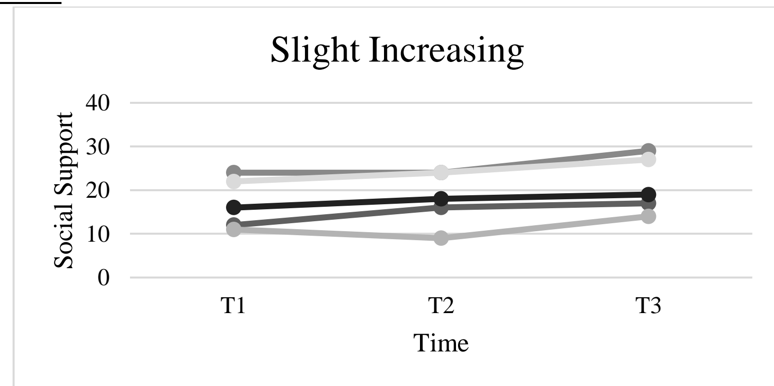
Resilience





Growth





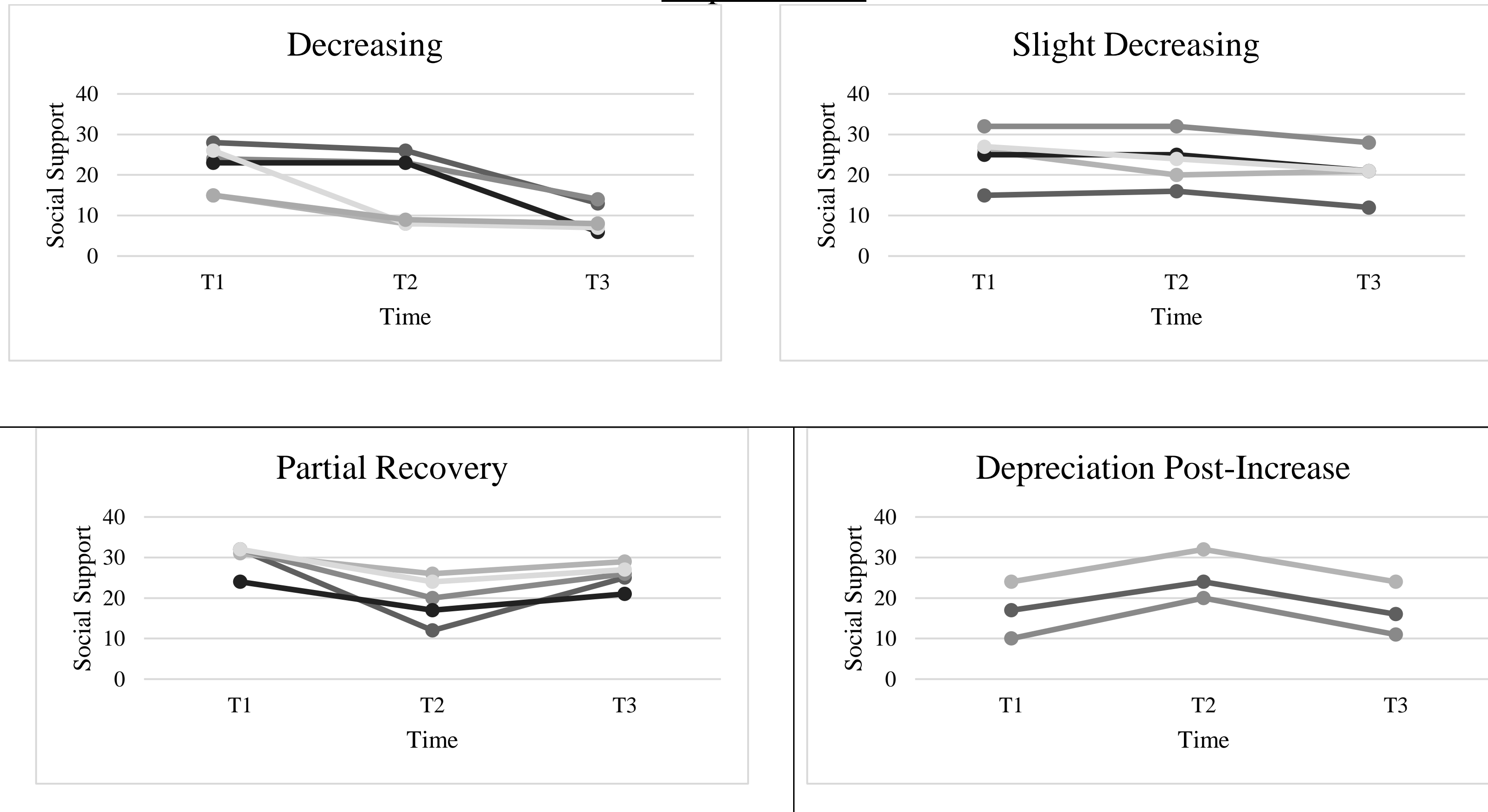


Figure 6. Social Support Trajectory Groups and Sub-Group

3.4.2 Patterns by Unique Parent and Child Factors

The number of parents in each social support trajectory group are described below, and also in Table 7, according to their unique demographic factors and child's cancer factors. When possible due to sufficient sample size, tests of significance in differences among groups are described below in respective sections.

Parent role. Of the six fathers who participated in this aim, four of them endorsed Resilience patterns, with half (n = 2) indicating Stress-Resistant and half (n = 2) indicating Recovery trajectories. The other two fathers endorsed patterns of Depreciation, with both of these fathers endorsing a Slight Decreasing trajectory. No fathers from this sub-sample of participants endorsed patterns of Growth, Partial Recovery, or Depreciation Post Increase. There were far more mothers in this sample than fathers, with mothers comprising 92% (n = 66) of this sub-sample. The most common pattern that mothers endorsed was a Resilience pattern, with 37 of the 66 mothers reporting a resilient trajectory of change in their social support from friends over the course of their child's illness. Of these 37 mothers, 29 endorsed No Change in their social support, and 8 endorsed a Recovery pattern in their social support. Twelve mothers endorsed patterns of Growth, with seven endorsing a trajectory of Posttraumatic Growth and five indicating Slight Increasing trajectories. Nine mothers endorsed patterns of Depreciation, with six endorsing Decreasing and three endorsing Slight Decreasing. Five mothers indicated a Partial Recovery pattern. Three mothers endorsed a pattern of Depreciation Post-Increase. Because so few fathers were included in this sub-sample, power was insufficient to statistically examine differences between mothers and fathers by pattern-group membership.

Parent race and ethnicity. Most White parents (n = 30) endorsed patterns of Resilience, with 21 endorsing a Stress-Resistant pattern, and 9 endorsing a Recovery pattern. Seven White

parents endorsed patterns of Growth, with four endorsing a Posttraumatic Growth pattern and three reporting a Slight Increasing trajectory of change in their social support. Eight White parents endorsed patterns of Depreciation, with five endorsing a Decreasing trajectory and three following a Slight Decreasing trajectory. Four White parents endorsed Partial Recovery and three endorsed Depreciation Post Increase in their social support over time.

Of the 16 African American or Black parents in this sub-sample, 10 endorsed a pattern of Resilience, with 9 endorsing a Stress-Resistant pattern, and 1 endorsing a Recovery pattern. Four African American or Black parents endorsed patterns of Growth, with two reporting a Slight Increasing trajectory of change in their social support, and two endorsing a Posttraumatic Growth pattern. Two African American or Black parents endorsed patterns of Depreciation, with one of them following a Slight Decreasing trajectory and the other endorsing a Decreasing trajectory. No African American or Black parents endorsed patterns of Partial Recovery or Depreciation Post Increase in their social support.

Only one Asian parent was represented in this sub-sample, and this parent endorsed a pattern of Depreciation Post-Increase. Four participants identified their race as Other, and they were evenly distributed across the Resilience (Stress-Resistant), Growth (Posttraumatic Growth), Depreciation (Slight Decreasing), and Partial Recovery patterns, with one participant endorsing each of those patterns (primary pattern is indicated in parentheses of this paragraph).

In terms of ethnicity, the vast majority of participants identified as Non-Hispanic. Of the three participants who identified as Hispanic or Latinx from this subsample, one endorsed a primary pattern of Stress-Resistant, and sub-pattern of Resilience. Two Hispanic or Latinx participants endorsed the Partial Recovery pattern of change in their social support from friends. Given insufficient representation of all races and ethnic groups in each of the five sub-pattern

categories, it was not possible to statistically evaluate differences in pattern membership according to race or ethnicity.

Child gender. Parents of a male versus female child were relatively balanced across the sample, and across the social support patterns. Parents of female children comprised 69% of this sub-sample (n = 33), and most of them endorsed patterns of Resilience (n = 20), with 14 endorsing a Stress-Resistant pattern, and 6 endorsing a Recovery pattern. Five parents of females endorsed patterns of Growth, with three endorsing a Posttraumatic Growth pattern and two reporting a Slight Increasing trajectory of change in their social support. Three parents of females endorsed patterns of Depreciation, with two endorsing a Decreasing trajectory and one following a Slight Decreasing trajectory. Three parents of females endorsed Partial Recovery and two endorsed Depreciation Post Increase in their social support over time.

Twenty-one parents of male children endorsed patterns of Resilience, with seventeen endorsing a Stress-Resistant pattern, and four endorsing a Recovery pattern. Seven parents of males endorsed patterns of Growth, with four endorsing a Posttraumatic Growth pattern and three reporting a Slight Increasing trajectory of change in their social support. Eight parents of males endorsed patterns of Depreciation, with four following a Slight Decreasing trajectory and four others endorsing a Decreasing trajectory. Two parents of males endorsed Partial Recovery and one endorsed Depreciation Post Increase in their social support.

There were sufficient numbers of parents with either a female or male child represented in each of the five sub-patterns; thus, a Fisher's Exact test was conducted to statistically evaluate whether differences in pattern membership by child's gender were significant. The Fisher's Exact test statistic was used, versus a Chi-Square statistic, because of the small sample and 40% of the cells contained an expected count less than five (Field, 2013). Results revealed that there

was not a significant association between parents' social support patterns and their child's gender (p = .648).

Child intensity of treatment. A Fisher's Exact test was conducted to examine if there were differences in parents' social support patterns based on the intensity of their child's cancer treatment; however, results revealed there was not a significant association between parents' social support patterns and their child's treatment intensity level (p = .319). The majority of parents had children who received either moderately intensive treatments (Level 2) or very intensive treatments (Level 3). Given the high number of parents who endorsed resilient patterns of change in their social support, the majority of parents with children who received moderately or very intensive treatments did endorse resilient patterns of social support (see Table 7); yet, statistically, parents were not more likely to endorse any pattern of social support based on their child's treatment intensity.

Table 7. Characteristics of Participants from Each Social Support Trajectory Group

		Count of Participants			
Pattern	***n*(%)**	**Parent Role**	**Parent Race and Ethnicity**	**Child Gender**	**Child Intensity of Treatment**
Resilience	41(57)	Mother = 37 Father = 4	White = 30 AA = 10 Asian = 0 Other = 1 Hispanic/Latinx = 1 Non-Hispanic = 40	Female = 20 Male = 21	Level 1 = 1 Level 2 = 13 Level 3 = 23 Level 4 = 4
Growth	12(17)	Mother = 12 Father = 0	White = 7 AA = 4 Asian = 0 Other = 1 Hispanic/Latinx = 0 Non-Hispanic = 12	Female = 5 Male = 7	Level 1 = 0 Level 2 = 3 Level 3 = 8 Level 4 = 1
Depreciation	11(15)	Mother = 9 Father = 2	White = 8 AA = 2 Asian = 0 Other = 1 Hispanic/Latinx = 0 Non-Hispanic = 11	Female = 3 Male = 8	Level 1 = 0 Level 2 = 5 Level 3 = 2 Level 4 = 4
Partial Recovery	5(7)	Mother = 5 Father = 0	White = 4 AA = 0 Asian = 0 Other = 1 Hispanic/Latinx = 2 Non-Hispanic = 3	Female = 3 Male = 2	Level 1 = 0 Level 2 = 2 Level 3 = 3 Level 4 = 0
Depreciation Post Increase	3(4)	Mother = 3 Father = 0	White = 2 AA = 0 Asian = 1 Other = 0	Female = 2 Male = 1	Level 1 = 0 Level 2 = 1 Level 3 = 1 Level 4 = 1

			Hispanic/Latinx = 0 Non-Hispanic = 3		
Entire Sample	72	Mothers = 66 Fathers = 6	White = 51 AA = 16 Asian = 1 Other = 4 Hispanic/Latinx = 3 Non-Hispanic = 69	Female = 33 Male = 39	Level 1 = 1 Level 2 = 24 Level 3 = 37 Level 4 = 10

Child age at T1 and T2. ANOVA tests were conducted to evaluate whether there are differences in parents' social support trajectory based on the age of the parents' child at T1 and T2. Results revealed that there was not a significant relationship between child-age and parent's social support pattern at either T1, $F(4,67) = .932$, $p = .451$, or T2, $F(4,67) = .919$, $p = .458$.

3.4.3 Social Support Patterns by PTG.

PTGI scores from each of the five social support categories were examined. Parents from the Resilience patterns endorsed an average PTGI score of 69.81 (SD = 22.50, Median = 70). Parents from the Growth patterns reported a mean PTGI of 82.83 (SD = 17.55, Median = 85). Mean PTGI scores for parents from the Depreciation patterns was 63.04 (SD = 26.67, Median = 65), 71.80 (SD = 23.29, Median = 78) from the Partial Recovery pattern, and 62.00 (SD = 12.12, Median = 64) from the Depreciation Post-Increase pattern. Kruskal-Wallis tests, however, revealed differences in parents' PTGI scores across the social support trajectory groups were not statistically significant, $H(4) = 5.584$, *Asymptotic Sig*. = 0.232.

3.4.4 Social Support Patterns by PTG Domain.

Five Kruskal Wallis tests were conducted to evaluate the relationships between social support trajectory group and scores from each of the five PTGI domains (i.e., Relating to Others, New Possibilities, Personal Strength, Spirituality, and Appreciation of Life). Mean ranks of PTGI domain scores were calculated for each of the five social support patterns and are displayed in Figures 7-11 for visual comparison. Results of Kruskal Wallis tests revealed there were no significant relationships between the five social support patterns and any of the five domains of PTG (see Table 8). See also Table 9 which summarizes PTGI averages by social support trajectory group and PTG domain.

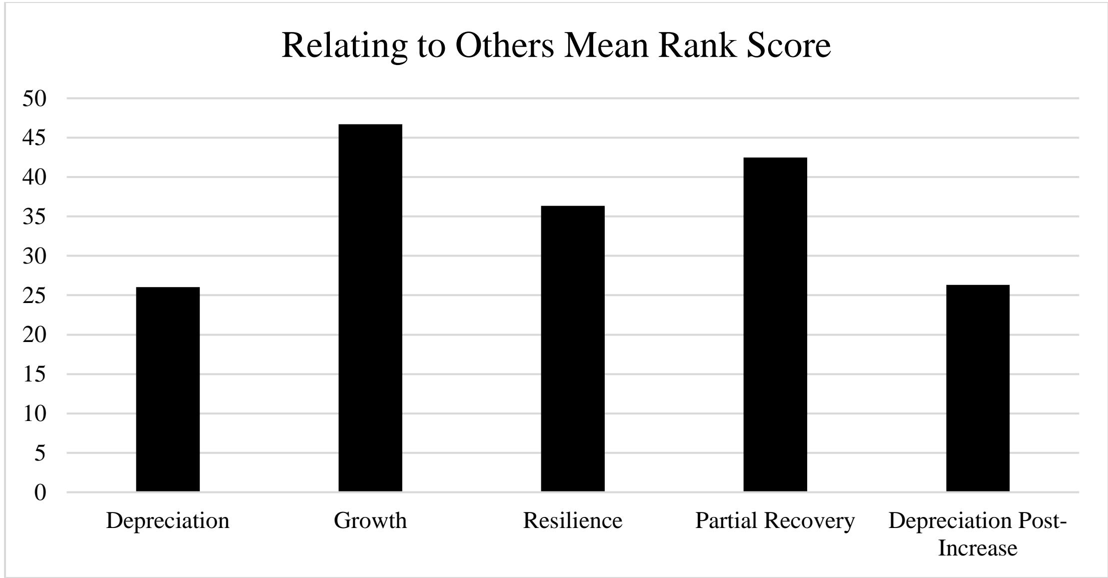


Figure 7. Mean Ranks of Social Support Trajectory Group by Relating to Others PTG Domain

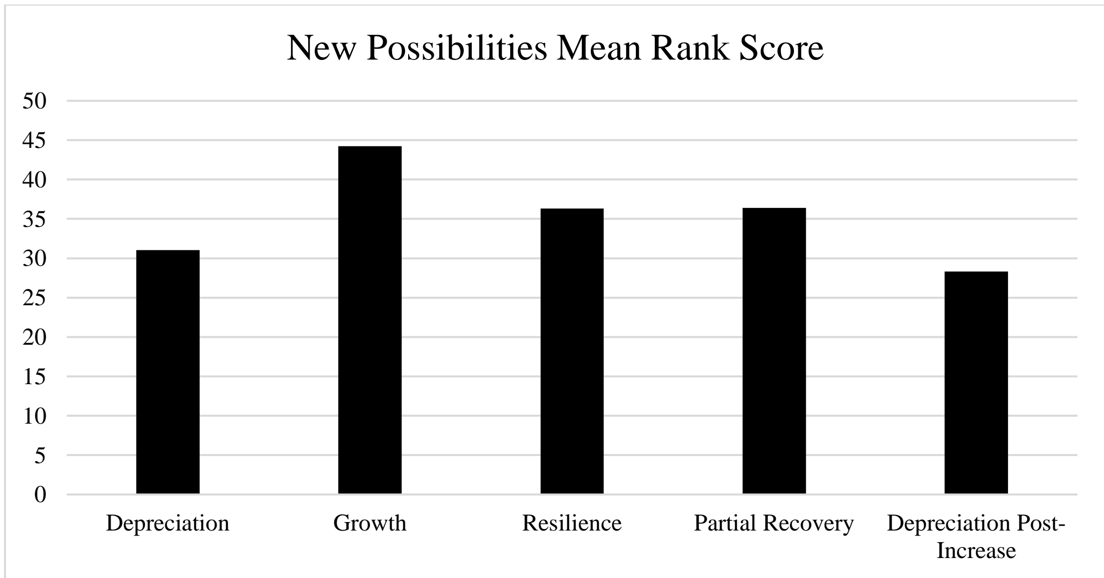


Figure 8. Mean Ranks of Social Support Trajectory Group by New Possibilities PTG Domain

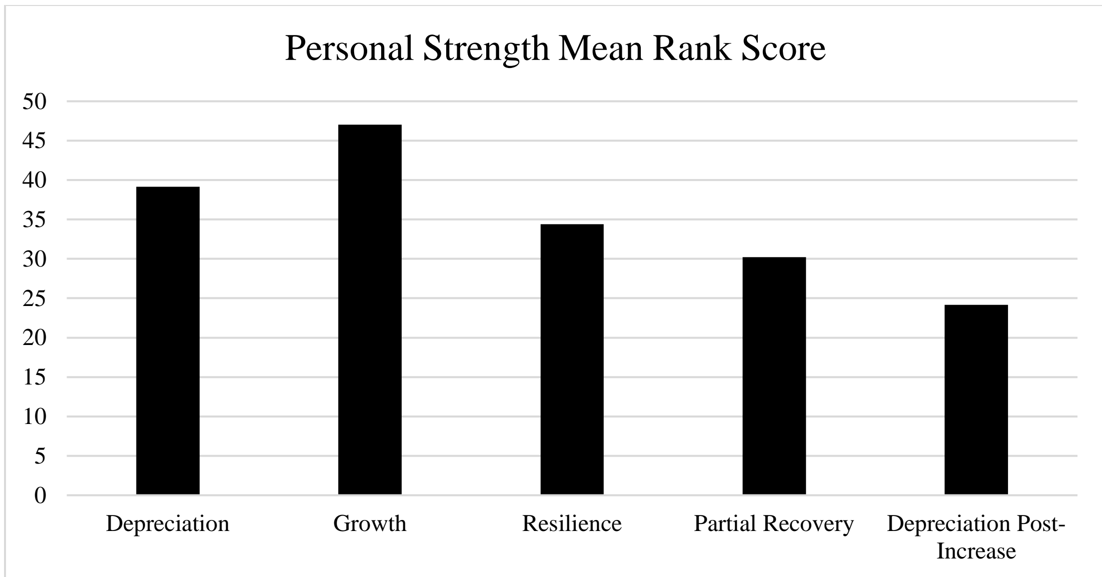


Figure 9. Mean Ranks of Social Support Trajectory Group by Personal Strength PTG Domain

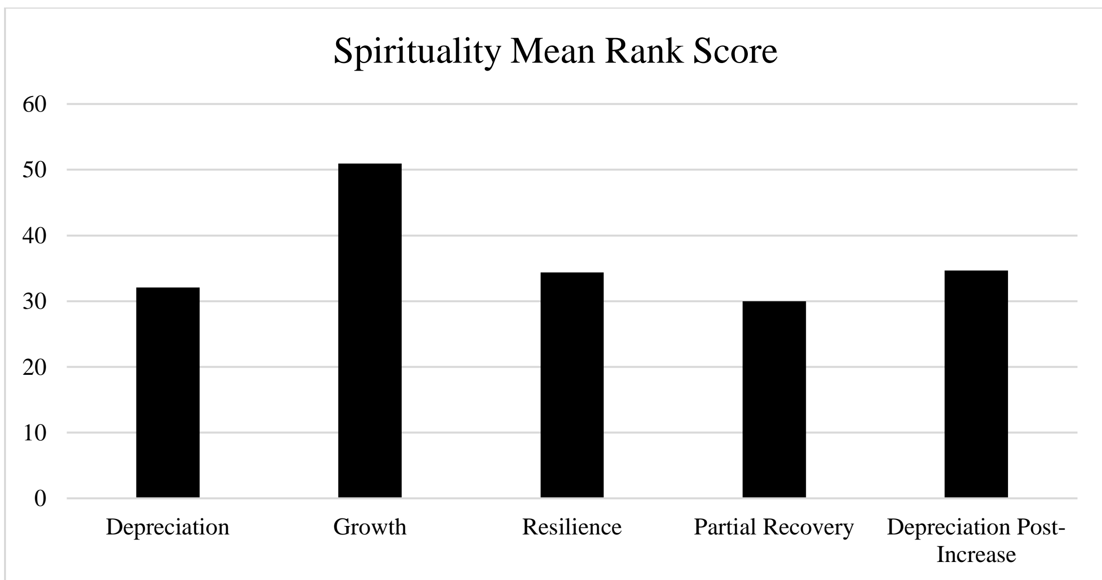


Figure 10. Mean Ranks of Social Support Trajectory Group by Spirituality PTG Domain

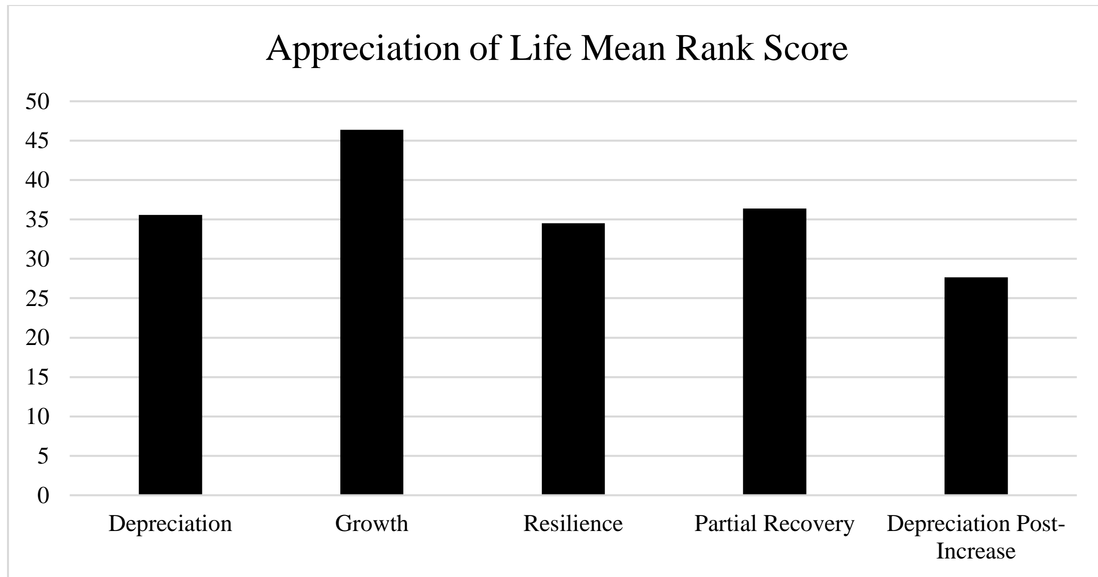


Figure 11. Mean Ranks of Social Support Trajectory Group by Appreciation of Life PTG Domain

Table 8. Results of Kruskal-Wallis Tests for Relationships between Social Support Trajectory Group and Posttraumatic Growth Domain

PTG Domain	***K-W Test Statistic***	***Asymptotic Significance***
Relating to Others	6.737	.150
New Possibilities	2.867	.580
Personal Strength	5.209	.267
Spirituality	7.426	.115
Appreciation of Life	3.701	.448

Note: Degrees of freedom for all tests was 4, $N = 72$.

Table 9. PTGI Averages by Social Support Trajectory Group and PTGI Domain

Pattern	***n***	**PTGI Domain Average (SD)**					**Total Average**
		Relating to Others	*New Possibilities*	*Personal Strength*	*Spirituality*	*Appreciation of Life*	*PTGI*
Resilience	41	23.10(8.64)	13.93(6.52)	14.17(4.70)	7.07(2.74)	11.54(3.13)	69.80 (22.50)
Growth	12	27.58(6.63)	16.42(6.76)	16.75(3.25)	8.92(2.23)	13.30(2.25)	82.83 (17.55)
Depreciation	11	18.27(10.16)	12.68(6.32)	13.91(7.11)	6.45(3.47)	11.73(2.83)	63.04 (26.67)
Partial Recovery	5	25.00(10.15)	14.80(6.83)	13.60(3.78)	6.60(2.70)	11.80(3.27)	71.80 (23.28)
Depreciation Post Increase	3	20.00(6.56)	11.00(6.56)	13.00(2.65)	7.00(3.61)	11.00(1.73)	62.0 (12.12)

3.4.5 Social Support and PTG at Different Time Points.

Correlations among social support at T1, T2, T3, and PTG were examined to better understand how parents' social support at various time points throughout their child's cancer trajectory is associated with parents' PTG in survivorship. Analyses revealed that parents' PTGI scores were correlated with parents' social support during the current time period (T3), $r = .359$, $p = .002$. PTGI scores were also correlated with parents' social support before their child was diagnosed with cancer (T1), $r = .238$, $p = .044$. PTGI scores were not significantly correlated with parents' social support during the most traumatic time of their child's cancer (T2), $r = .146$, $p = .222$. Social support scores were somewhat lower on average among the parents during T2 ($M = 20.68$) than during T1 ($M = 23.47$) and T3 ($M = 22.64$).

4 DISCUSSION

4.1 Purpose and Overview

Pediatric cancer affects more families every year. Fortunately, due to improvements in science and medicine, most children diagnosed with cancer will be successfully treated and live into young adulthood and beyond. The experience of raising a child with cancer is undoubtedly one of the most stressful and scary events a parent can endure. Even once their child has been successfully treated for cancer and is in remission or survivorship, many parents will continue to experience uncertainty related to late effects of their child's treatment and possible recurrence of cancer. Despite the difficulties associated with parenting a child who has had cancer, many parents are resilient (Habibpour et al., 2019; Vrijmoet-Wiersma et al., 2008); some parents report beneficial outcomes, such as better quality of life (Santos et al., 2015), benefit finding (Phipps et al., 2015), and posttraumatic growth (Barakat et al., 2006). Social support is one resource that has been associated with positive outcomes in parents of children who have had cancer (Gise et

al., 2021); however, little is known about parents' social support, specifically from friends during their child's survivorship phase. The literature about social support in parents of children with cancer would also be strengthened by studies that evaluate how social support may differ for parents based on demographic, personal, or cancer-related factors; for example, differences between mothers and fathers, parents from different racial and ethnic groups, families from different income brackets, and parents whose children experience different levels of treatment intensity. Information about the relationship between social support and personal growth in parents raising children with cancer would be valuable to the field. Additionally, how parents' social support changes during and after pediatric cancer is largely unknown; this information would be beneficial to clinicians working with families impacted by pediatric cancer.

In the current study, I evaluated parents' social support from friends during the period when their child is a young adult and in the survivorship phase (i.e., has been off treatment for at least two years). I investigated three specific aims. The first primary aim examined how parents' social support from friends during their young-adult child's survivorship phase may differ based on parent and child demographics. The second aim examined how parents' social support was related to PTG. The third aim examined parents' retrospective view of changes in social support before, during, and after their child's cancer and how changes were related to demographic factors and PTG.

4.2 Aim 1 Findings

The goal of aim 1 was to determine how parents' social support varied based on demographic factors.

4.2.1 Mothers versus Fathers

Consistent with hypotheses, compared to fathers, mothers reported greater social support from friends. Although previous studies have not found differences in perceived social support between mothers and fathers (Veracasson et al., 2020; Ye et al., 2017a); those studies did not specifically examine social support from friends. It is possible that fathers' social support from friends was lower than mothers' in this sample because father's support had decreased over time due to dissatisfaction with support in previous years (Wijnberg-Williams et al., 2006). Additionally, researchers have found that mothers seek social support as a coping mechanism around the time of their child's diagnosis more so than fathers (Gage-Bouchard et al., 2013; Hoekstra-Weebers et al., 2011), which could result in more social support than fathers during later stages of their child's cancer. Longitudinal studies are needed, however, to better understand differences in social support behaviors over time, and social support needs, in mothers versus fathers. Another consideration about the fathers in this sample is related to reasons for their participation in the study. For example, it is interesting to consider if perhaps the 13 fathers in this sample may have been the primary caregiver for their children, and thus may have had less time to receive the type of social support from friends that was measured in this study. Regardless of why fathers endorse less social support from friends, it is important for clinicians to attend to fathers during their child's survivorship phase, as dissatisfaction with their social support has been linked to their distress during later stages of their child's cancer journey (Wijnberg-Williams et al., 2006) as well as their general life and family satisfaction (Melguizo-Garin et al., 2022). Future research might investigate more about fathers' social support, how to increase support from friends, and what sources of support fathers find most valuable for their wellbeing (i.e., friends, family, spouses). Clinicians might also consider assessing mothers and

fathers separately when evaluating social support from friends, as well as other resilience factors, to best support parents as individuals during this unique phase of their child's cancer.

Although social support differences were identified between mothers and fathers, it is worth reiterating that the majority of the sample were mothers. Thus, the remainder of the findings in this study are primarily from the perspectives of mothers, and perhaps might only be generalized to other mothers, rather than all parents. It is possible that other differences in social support by income, race, or other factors that were examined, may have emerged if more fathers had participated.

4.2.2 Family Income Bracket

Parents' social support did not statistically differ by income brackets, which is somewhat inconsistent with the previous literature (Altay et al., 2014; Gardner et al., 2017a&b; Nicolaou et al., 2015; Veracasson et al., 2020), which suggests that income is positively related to perceptions of social support. Although the larger literature suggests that parents with higher incomes might have better social support (Hefner & Eisenberg, 2009), it is encouraging that income was not significantly related to this samples' social support from friends particularly given that pediatric cancer can have a profound burden on families' income due to cancer-related expenses (Roser et al., 2019). The current sample focused solely on parents of young adult survivors, which differed from most of the previous literature that primarily examined parents of children actively on treatment (Altay et al., 2014; Nicolaou et al., 2015; Veracasson et al., 2020). Perhaps financial burden or income-related hardship that is experienced during the child's cancer treatment is more strongly associated with parents' social support given the other stressors associated with active cancer treatment, versus when the child has been off treatment for several

years and parents may experience some relief from the financial burdens of active cancer care, or less impact of income on their social support.

4.2.3 Parents' Race and Ethnicity

The sample reflects the demographics of the community (US Census Bureau, 2021), and was predominately White, followed by Black, with fewer individuals from other racial or ethnic groups; thus, there was limited power to detect potential differences in social support across groups. Based on a few findings suggesting that Black parents' social support sources tend to include more family members than friends (Ajrouch et al., 2001; Griffin et al., 2006; Stewart & Vaux, 1986), social support from friends was expected to differ by race. However, when comparing Asian, Black or African American, White parents, and biracial parents who endorsed the racial category of Other, there were no significant differences. In fact, contrary to hypotheses, Black or African American parents endorsed slightly higher average and median social support scores than White parents. Similarly, there were no significant differences in parents' social support from friends when comparing Latinx parents to Non-Latinx parents. These findings provide updates to the literature on parents of children with cancer and are among the first results to indicate that social support from friends may not differ based on parents' race and ethnicity. Future studies should continue to examine differences with diverse samples of parents, at different stages of the child's cancer, and across various types of social support to continue to learn how racial differences may intersect with parents' social support during their child's cancer.

4.2.4 Child Gender, Age, and Intensity of Treatment

Parents social support did not differ based on their child's demographic or cancer-related variables. Consistent with previous literature, parents' social support ratings did not differ based

on whether their child was male or female (Altay et al, 2014; Veracasson et al., 2020). Previous studies examined parents of children who were in active treatment, and the current study expanded upon previous findings to suggest that child gender is also not related to parents' social support for parents of children in the survivorship phase of their cancer. Social support did not significantly differ for parents of younger (18-20 years) versus older (21-25 years) children from this sample, indicating that parents' social support is not related to possible differences in parenting due to age or developmental differences in their child's young-adult stages of life. Parents' social support also did not differ based on the intensity of their child's treatment, despite the fact that intensity of treatment is indicative of the cancer experience, as well as the likelihood that a child will experience late effects of cancer (Pediatric Treatment Editorial Board, 2020). Previous literature has demonstrated that individual's experiences of their own (e.g., women with breast cancer; Cordova et al., 2001) or their child's cancer (Barakat et al., 2006) is more accurately described by subjective indices of experience, rather than objective markers such as disease severity, which could provide one possible explanation for why social support was not linked to intensity of treatment in this sample. Another possibility is that the parents in this study had time to recover their social support following the time when their child was in active treatment, and current social support in survivorship is simply not associated with parents' previous experiences of their child's cancer treatment.

4.3 Aim 2 Findings

Previous literature has indicated that social support tends to be related to resilient outcomes for parents (Rosenberg et al., 2014; Toledano-Toledano et al., 2020; Ye et al., 2017b), and specifically to PTG (Kim, 2017). The second aim sought to determine if parents' social

support from friends during their child's survivorship phase was related to parents' PTG and to which particular domains of PTG (e.g., Relating to Others, Personal Strength).

Parents' social support from friends during their young-adult child's survivorship phase was positively related to parents' current PTG, as well as the domains of Relating to Others, Personal Strength, and New Possibilities. This is encouraging, considering that the broader literature of parents of children with disabilities has found PTG to be linked to better family functioning (Qin et al., 2021) and resilience (Lu et al., 2022). PTG in parents of children with cancer has even been related to lower posttraumatic stress symptoms in their children (Wurz et al., 2022) highlighting the benefits of fostering PTG in parents who have faced medical adversity with their child. Recognizing that these are cross-sectional findings, and causal directions should not be assumed, clinicians working with parents might help them enhance social support with the possibility that this helps promote growth and adaptation. A recent study concluded that social support from extended family might be improved by educating and providing resources about the needs of parents of children with cancer to extended family members (Kelada et al., 2019), which could potentially translate to enhancing social support from friends for parents as well. Perhaps resources or support groups focused on providing information to friends about the needs of parents of children with cancer could serve to improve the quality and availability of parents' social support, and thus PTG and adaptation for parents in the aftermath of pediatric cancer.

Examination of the factor structure of PTG suggests that it is indeed multidimensional and best explained by the five domains outlined in the measure used for this study (Taku et al., 2008). The Domain of Relating to Others was most strongly correlated with social support from friends, unsurprisingly, given that questions comprising this domain require parents to reflect on the extent to which they can "count on people in times of trouble," feel a "sense of closeness

with others," put "effort into their relationships," and are "better at accepting needing others." Items from the Relating to Others scale describe a construct that is likely closely impacted by a strong sense of social support from friends; thus, a strong positive relationship between this domain and social support from friends is understandable and expected according to the broader literature linking social support and the Relating to Others domain of PTG (Danhauer et al., 2013).

Items from the Personal Strength domain ask parents to reflect on their sense of "self-reliance," their ability to "handle difficulties" and "accept the way things work out," and their sense of being "stronger than (they) thought (they were)." Despite seeming like a construct that might emphasize the self rather than connection to others, the fact that this domain is positively associated with social support from friends, suggests that perhaps friendship and support from valued others can influence an individual's belief in their own personal uniqueness (Demir et al., 2013) and strength to handle the difficulties of life. Alternatively, it is possible that individuals who have a strong sense of personal strength are more likely to seek and have good social support and relationships with friends. In line with these possible explanations, some have theorized that aspects of friendship with others are in fact related to an individual's self-love and ability to reflect on their self and use self-disclosure to strengthen friendships (Cocking et al., 1998).

New Possibilities, a domain that was not hypothesized to be related specifically to parents' social support, is characterized by "developing new interests," "establishing a new path for (one's) life," feeling "better able to do things with (one's) life," noticing "new opportunities," and being "more likely to try to change things which need changing." The positive association of New Possibilities to social support from friends is encouraging in that perhaps friends can inspire

growth in one's capacity to notice and act on new life possibilities in the aftermath of adversity. One possible explanation for why the domain of New Possibilities was related to social support could be that some have linked growth in the domain of New Possibilities to personality traits of agreeableness and openness to experience (Karanci et al., 2012), which are traits that have been positively related to social support in other populations (Fabio et al., 2016).

4.4 Aim 3 Findings

4.4.1 Patterns

Aim 3 examined how perceptions of social support from friends might change over the course of a parent's experience with their child's cancer, retrospectively from before their child's diagnosis, to parents' self-identified most traumatic time during their child's cancer, to the current time during their child's survivorship phase. Results revealed that parents endorsed eight unique trajectories of change in their social support from friends, which were categorized into sub-patterns of change according to patterns in the previous literature (Bonanno and Diminich, 2013; Galatzer-Levy et al., 2018; Kroneberg et al., 2010; Masten & Obradovic, 2008; Tillery et al., 2016).

Resilient Patterns. The majority of parents endorsed a medium or high level of social support that did not change over time (i.e., the Stress Resistant trajectory). The next most frequent trajectory involved parents who experienced less social support during the most traumatic time of their child's cancer, and a subsequent recovery back to baseline medium or high levels (i.e., the Recovery trajectory). Parents who endorsed either the Stress Resistant or Recovery trajectories were grouped into the Resilience sub-pattern; overall, most of these parents described having at least medium or higher levels of social support from friends at T3. Consistent with previous literature on patterns of change post-adversity (Galatzer-Levy et al.,

2018), as well as patterns of change specifically in social support (Lee et al., 2022; Powers et al., 2014), the majority of parents in this study endorsed resilient patterns in their social support These somewhat stable patterns might be explained by research on autobiographical memory, which suggests that a person's current state of mind may influence how they reflect on their past (Wilson & Ross, 2003). Data also indicate that friendship closeness later in life is predicted by friendships that occurred in previous years (Ledbetter et al., 2007). A handful of parents in the Stress Resistant group did endorse lower social support, reporting social support scores of less than 15 on the scale; however, these parents were still considered to be stress-resistant to the impact of their child's cancer given that their scores did not decrease from baseline. Thus, although they have consistently low social support which may mean they are less likely to be resilient overall, their scores suggest that their social support did not worsen with, or was resistant to, the added stressor of their child being diagnosed with cancer. These parents should still be attended to by clinicians, given that they are consistently low in social support - a resource that may buffer the stress of raising a child with cancer (Cohen & Wills, 1985).

Growth Patterns. Several parents endorsed that their social support improved continuously, falling into the Slight Increase trajectory. Other parents who demonstrated overall improvement in their social support endorsed a Posttraumatic Growth trajectory, indicating that they first experienced a depreciation in their social support during T2, but subsequent growth in T3 beyond baseline levels at T1. All parents from these trajectories were grouped into the Growth sub-pattern, and all but one of these parents grew to medium or high levels of social support at T3. In the larger literature on resilience and trajectories over time, there are often patterns of improvement (Galatzer-Levy et al., 2018); however, the Posttraumatic Growth trajectory appears to follow the theoretical pattern of change described by the process of PTG

(Tedeschi et al., 2004) which involves improvement beyond baseline after first experiencing a decline at the time of adversity. Though few parents endorsed the PTG pattern specifically, it does lend evidence to Tedeschi and Calhoun's (1996; 2004) theory that some individuals will experience a breakdown in their social support during the adversity related to their child's cancer, but can improve their social support beyond levels they experienced before their child's cancer, inevitably describing posttraumatic growth in the face of pediatric cancer.

Depreciation Patterns. Several parents indicated either a slight or substantial amount of decrease in their social support over the course of the three time points, falling into the sub-pattern of Depreciation. Overall, the majority of these parents did not start off with very high social support. Qualitative information about these parents' social beliefs, resources, and proximity to friends could help to understand decreases in their social support; however, none of the variables examined in this study were significantly linked to particular trajectory groups, and thus do not help explain why these parents experienced decreases in social support over time. Medical chart review revealed that three of the ten patients who experienced decreases had a child whose cancer relapsed, which could be one consideration for why social support continued to decline over time; however, their child had still been off therapy for several years (i.e., between approximately 6 and 10 years).

Parents from the Partial Recovery and Depreciation Post Increase trajectories were not categorized into sub-patterns due to their unique journeys, and are generally not well represented in the broader literature on trajectories of change after trauma (Galatzer-Levy et al., 2018). Those who experienced partial recovery, reported less social support from friends during the most traumatic time for them, and a subsequent growth, but not back to baseline. This unique trajectory might be explained by factors that were not examined in this study; for example, social

anxiety or depression may have impacted the recovery of social support for these parents (Piccirillo et al., 2021) and could be examined in future studies to better understand why certain individuals do not realize a full recovery of their social support from friends.

Review of their child's medical chart was conducted; however, no remarkable trends were discovered to explain why some parents may have experienced an increase or decrease in social support during T2. Overall, all but five parents endorsed that T2 occurred within a year or less from the time their child was diagnosed, with many endorsing that T2 occurred very near to the time of diagnosis. Thus, based on what we can tell, most parents identified diagnosis and the beginning of treatment as the most traumatic time for them. However, most parents still endorsed that their social support did not change over time (i.e., a stress resistant pattern in friendships). Still, others reported varying experiences and changes in their social support from friends. Despite the attempt to identify patterns based on cancer experiences, treatments, and dates listed in the chart, these parents appear to have had unique trajectories in their social support based on other factors that were not examined in this study. Social support from friends over time – how we perceive it, seek it, and accept it – may be uniquely personal and individual as far as we can tell from this study.

4.4.2 Demographic and Cancer-Related Factors and Patterns

As noted, social support did fluctuate over time for some parents; however, there were no significant associations between trajectories of social support and parents' demographic or child's cancer-related factors. In terms of race, this sub-sample was primarily White and African American or Black, with most parents from both of these races endorsing Resilient trajectories, and a fewer number endorsing Growth or Depreciation trajectories. Of the fathers in this sample, four endorsed Resilience trajectories and the other two endorsed patterns of Depreciation. The

majority of mothers endorsed Resilience trajectories; however, the second most prevalent patterns of change for mothers were Depreciation. Power to detect significant associations between patterns of change and demographic or cancer-related variables was limited by the small sample size and number of patterns identified, as well as the few individuals from various racial, ethnic, and gender groups. Though power was limited by sample size, it is possible that even in larger samples particular patterns of change would not be more prevalent or unique to certain groups of parents than other patterns, indicating perhaps that change in social support is determined by nuanced and unique personal factors that cannot be characterized by simple demographic or cancer-related markers. To best understand when parents might be at risk for certain trajectories of change (i.e., decreasing patterns), clinicians should assume that all families have the potential to experience the various trajectories of change, with most parents being likely to be resilient, and assess parents' social support as they navigate pediatric cancer with their child regardless of demographic markers.

4.4.3 Posttraumatic Growth and Patterns

Social support trajectories were also not found to be significantly associated with parents' PTG or specific domains of PTG. This finding diverges somewhat from hypotheses and theory on posttraumatic growth, which describes that PTG occurs when one experiences a depreciation of world views and then a subsequent growth in the aftermath of adversity, possibly depicted by patterns of Resilience or Growth. Whereas parents who endorsed Growth patterns also endorsed the highest average total and domain specific PTG, their PTG scores were not significantly higher than parents who endorsed other patterns of changes in social support. Again, small sample size and the very small number of parents representing the Growth, Depreciation, Partial Recovery, and Depreciation Post Increase patterns, compared to the Resilience patterns, may

have limited the power to statistically detect differences in PTG between trajectory groups. Relationships between social support trajectory and PTG are further discussed below, acknowledging that significant differences between trajectory groups did not emerge.

Parents who experienced patterns of Growth in their social support averaged the highest total PTG and highest scores in each domain of PTG. Additionally, parents who endorsed the Growth trajectories averaged higher total PTG than parents of children from several previous studies (Behzadi et al., 2018; Hong et al., 2019; Nakayama et al., 2017), as well as higher scores across each domain of PTG compared to other parents of children with cancer (Hullmann et al., 2014). These higher PTG ratings likely are likely connected to their reports of an improved experience in the unique area of friendships since the time of their child's cancer. Parents in the Resilience and Partial Recovery trajectory groups averaged higher total PTG compared to scores from three studies (Behzadi et al., 2018; Hullmann et al., 2014; Nakayama et al., 2017) and minimally higher scores in each domain of PTG (Hullmann et al., 2014). Parents in the Depreciation and Depreciation Post Increase trajectory groups experienced the lowest PTG, similar to parents of two previous studies (Behzadi et al., 2018; Hullman et al., 2014) and less than parents from one study (Hong et al., 2019); unsurprisingly, given that they did not report an improved sense of friendships since their child's cancer, which is related to several PTG domains. Overall, the total sample of parents included in Aim 3 appears to have endorsed relatively high PTG, and it is clear that parents who experienced Growth, Resilience, and Partial Recovery trajectories of social support perceive more PTG; however, statistically they did not experience significantly more PTG. The parents in Aim 3 of the current study were all parents of children who were beyond active treatment and in survivorship, versus parents from other recent studies whose children were in active treatment and potentially in the midst of their most

traumatic time of their child's cancer; this difference in stage of cancer and distance from time of trauma likely contributed to the higher average PTG reported by parents in the current study versus parents from other recent studies.

4.5 Limitations and Future Directions

4.5.1 Recruitment Rate, Study Completion, and Sample Size.

Recruitment rate among the total sample was good and completion rate was moderate (Jackson & Waters, 2005); however, study recruitment and completion are factors that may influence the generalizability of the results. The moderate completion rate of participants in this study may have been influenced by battery length for the larger study, which required approximately an hour of parents' time (Galesic et al., 2009). It is possible that parents who agreed and completed the survey differed (e.g., available time, access to technology) from those who declined or did not complete the entire survey.

Investigating differences in parents' social support from friends, as well as social support trajectories, based on personal and demographic factors may have been limited by the small sample size and the low number of individuals who represented several demographic groups. Thus, findings may not generalize well to other regions of the United States or other countries, given the specific racial and gender characteristics of this sample. Additionally, the findings of this study may not generalize well to fathers of children with cancer, given that only 13 fathers were included in the total sample; and, the results of each aim in this study might instead be interpreted as applying only to mothers of children with cancer. Larger samples, particularly with greater numbers of fathers may offer important contributions to this current literature. Furthermore, qualitative studies might provider a deeper understanding of some of the nuances

of social support from friends that were revealed in this study (e.g, support for mothers versus fathers).

4.5.2 Measure of Social Support.

This study focused on social support from friends in terms of shared activities and closeness of the relationship. Various types of social support are described in the larger literature, such as emotional, tangible, informational, and affectionate support (Sherbourne & Stewart, 1991) as well as material aid, behavioral assistance, and positive social interaction (Barrera & Ainlay, 1983). The measure used in the current study most likely only taps into constructs of emotional support, which describes feeling care from others, as well as positive social interaction, which describes having others to engage in social interactions for fun or relaxation. Thus, future studies could add to the literature by investigating additional aspects of social support in this population of parents. Furthermore, the measure does not assess virtual social support from friends (e.g., social media, phone calls), which could also provide sources of emotional support or positive social interactions. It is possible that face-to-face support may not fully explain or indicate closeness in friendships (Ledbetter, 2008), and finding ways to assess for the impact of social support gleaned from friends via social media or other virtual mechanisms may be of value. Notably, this data was also collected prior to the global COVID-19 pandemic, which forced many families, especially those dealing with life-threatening medical conditions, to physically isolate away from friends and rely more on virtual methods of interaction and support. Future directions might involve exploring how parents' perceptions of their social support from friends has shifted since the spring of 2020, and whether virtual interactions provide viable methods of social support.

4.5.3 Social Support and PTG.

Although the relationships identified between parents' social support from friends and both their PTG and three unique domains of PTG are important, findings do not suggest predictive associations. It is possible that friendships and support from friends promote growth in domains of relationships, personal strength, and new possibilities; however, it is also just as likely that parents who have experienced growth in these domains tend to seek, have, and maintain better support from friends, particularly as they continue to navigate the survivorship phase of their child's cancer. For future studies to answer questions about the sequential nature of PTG and social support from friends, longitudinal studies should be employed. Furthermore, to better understand social support as a whole and its relationship to resilient outcomes, it would be interesting for future researchers to examine multiple sources of support (i.e., from friends, significant others, family members, community members, and medical personnel) to determine how these sources of support are uniquely related to parents' PTG and the individual domains of PTG. Future researchers might also consider evaluating a moderating role of social support (Cohen & Wills, 1985) by examining if social support buffers the effects of parent stress on parent outcomes during their child's survivorship phase.

4.5.4 Retrospective Reporting.

One limitation of Aim 3 was that it relied on retrospective reporting to capture parents' perceptions of their social support before their child's cancer and during the most traumatic time for them in their child's cancer journey. Research on memory about oneself and ones' experiences suggest that a person's current state of mind may influence how they reflect on their past (Wilson & Ross, 2003). Thus, the data could reflect parents' narratives about how their social support changed over time, based in part on their current mindset or other factors that were

not examined in this study (e.g., beliefs about relationships, experiences with friends, proximity to friends). Nonetheless, working with parents during their child's survivorship phase, and assessing for their narrative about how their social support might have changed over time could be helpful for clinicians given that healing and adaptation can be related to how one makes meaning of their previous experiences (Zeligman et al., 2016) and develops narratives about their lives and growth (Greenberg, 2011; Uy & Okubo, 2018). Moreover, because social support was not significantly related to PTG at the time parents identified as most traumatic (T2), perhaps this further suggests that for positive adaptation to occur, social support matters most during survivorship. Thus, working with parents to foster better social support during their child's survivorship phase may be most important for parents' adaptation during survivorship.

4.5.5 Time Points Assessed.

Another limitation of the third aim was that social support was only assessed at three time points, with only one of the time points occurring when their child was actively being treated for cancer. Because cancer is often conceptualized as a series of multiple adversities, or chronic traumas (Stuber et al., 1996), assessing parents' social support at multiple times throughout their child's cancer treatment may have better improved our understanding of parents' social support. Particularly for parents whose children experience relapse, multiple treatment modalities, longer interventions, or secondary malignancies, surveying parents at multiple time points throughout their child's cancer would strengthen our understanding of how parents experience their child's illness and when they may need social support the most.

4.5.6 Considering Other Sources of Support. As previously discussed, this study examined social support from friendships, which may be conceptually unique to social support from spouses or family members. The nature of friendships and their longevity may involve a

greater level of personal choice to interact, give, and receive support, than in committed spousal or family relationships. Navigating pediatric cancer may be a time during which some parents have less time or ability to choose to interact and receive support from their friendships. However, the data suggest that many parents do not recall substantial changes in the social support they received from friends. Social network analyses or a simple report of which friends provided this support to parents (e.g., parents of other children with cancer) would be helpful to incorporate in future studies. Nonetheless, relationships with valued others, and particularly friends, is linked to resilience as well as physical health and mortality (Holt-Lunstad et al., 2010) so it remains important to consider social support when working with families and parents of children with cancer, even into their child's survivorship phase, to help parents increase social support, reconnect with former supports, and develop their ongoing narrative of the social support in their lives as they heal from previous and current challenges related to their child's cancer.

5 CONCLUSIONS

Given the benefits of social support for parents' adaptive and resilient functioning, and the potentially challenging aspects of parenting a young-adult survivor, it is important to examine social support in parents of young-adults surviving cancer. It was anticipated that these parents might have less access to friends than earlier in life; however, the sample demonstrated that even during this unique phase of their lives and child's cancer-journeys, parents endorse relatively good social support from friends, with the 13 fathers who participated perceiving worse social support than mothers during their child's survivorship. Given that parents' friendships impact their child's friendships (Uhlendorff, 2000), these findings might be valuable in considering social support for youth with cancer. This study indicates that social support is

related to PTG in parents, particularly mothers, and thus clinicians are encouraged to pay attention to parents' social support to foster growth and adaptation after their child's cancer. Although some parents might perceive that social support from friends fluctuates across their journey with their child's cancer, many parents endorsed no changes in their social support from friends over time. This study did not reveal any factors that might indicate why mothers are more or less likely to recall certain changes in their social support from friends; thus, clinicians might incorporate the assessment and encouragement of social support from friends as part of their routine care for all parents navigating pediatric cancer and survivorship with their child. Working with parents to foster good social support from friends, as well as to make meaning of their experiences with friendships, especially during their child's survivorship phase, may increase the likelihood that parents will have better social support from friends, experience PTG in domains of relating to others, personal strength, and new possibilities, and realize other adaptive and resilient outcomes resulting from the previous hardship of their child's cancer.

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