

Cancer, Now What? Approaching Life

With Psychological Flexibility

by

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ABSTRACT

This dissertation examines the influence of psychological flexibility (PF) across several broad areas of life after cancer, including psychological thriving, physical health, employment satisfaction, and romantic relationships. PF is the ability to live life in line with one's values despite obstacles through defusion from thoughts and present moment mindfulness. According to the Canadian Cancer Society (2022), in 2018, over 1.5 million people in Canada who received a cancer diagnosis in the last 25 years were still alive. The "cancer experience" extends beyond diagnosis, treatment, and end-of-life care. New medical interventions have resulted in decreased cancer-related deaths for both males and females, with 63% of people expected to survive more than five years (Canadian Cancer Society, 2022). Relative to individuals who have not had a cancer diagnosis, survivors report increased mental health concerns and lowered physical and psychological well-being (Langeveld et al., 2004). This dissertation includes three studies. Study 1 focused on the pillars of PF related to overall thriving after cancer. Results indicated that higher PF was related to increased well-being and better physical health. In this study, openness to experience and valued action were the most salient predictors of thriving and physical health. In Study 2, the focus was on employment satisfaction after cancer. Results indicated that all three pillars (openness to experience, behavioural awareness, and valued action) significantly mediated relationships between health impacts at work and reported physical symptoms and subjective well-being.

Valued action fully mediated the relationships between anxiety and depression symptoms and overall quality of working life. Study 3 examined the relationships between the pillars of PF, intimacy, sexual dysfunction, and life, sexual and relationship satisfaction in males and females after cancer. Valued Action and Openness to Experience were significant mediators in the relationships between relationship satisfaction and satisfaction with life.

Keywords: Cancer, Survivorship, Satisfaction with Life, Quality of Life, Psychological Flexibility, Employment, Sexual Function, Intimacy.

DEDICATION

This dissertation is dedicated to my Papa.

Even though he is not here to see it,

he never doubted I would make it.

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This dissertation is a representation of my passion for helping people live the best lives they can even when life presents obstacles that seem insurmountable. My supervisor, Dr. Lisa Best made this process not only tolerable, but enjoyable. She has always been there to remind me what is important in life and models flexibility in her supervision. Thank you just is not enough words for walking along side me for all three of my degrees.

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List of Abbreviations

ACT	Acceptance and Commitment Therapy
BA	Behavioural Awareness
CBT	Cognitive Behavioural Therapy
CIT	Comprehensive Inventory of Thriving
CompACT	Comprehensive Assessment of Acceptance and Commitment Therapy
GAD- 7	Generalized Anxiety Disorder 7
GMREL	General Measure of Relationship Satisfaction
GMSEX	General Measure of Sexual Satisfaction
ESAS-R	Edmonton Symptom Assessment Scale Revised
HRQL	Health-Related Quality of Life
OE	Openness to Experiences
PAIR	Personal Assessment of Intimacy in Relationships
PF	Psychological Flexibility
PHQ-9	Patient Health Questionnaire 9
QOL	Quality of Life
SFQ	Sexual Functioning Questionnaire
SWB	Subjective Well Being
SWL	Satisfaction with Life
SWLS	Satisfaction with Life Scale
VA	Valued Action

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Cancer, Now What? Approaching Life with Psychological Flexibility

Chapter One: Program of Research

My interest in health populations began during my undergraduate honours research project that examined the satisfaction with life (SWL) of individuals with a brain injury and their caregivers. I approached Dr. Lisa Best with this research direction, and she supported my interest in health psychology. I was genuinely interested in why some survivors of traumatic brain injury thrived after their injury and why others struggled to complete daily tasks and engage in meaningful relationships. My honours project results indicated that leisure satisfaction was the prominent predictor of SWL (Proctor & Best, 2015). Further studies showed that even one concussion can have long term impacts on SWL, leisure satisfaction, and reported mental health symptoms (Proctor & Best, 2021). I was left with the question of why some individuals effectively adapted their leisure activities to their current level of functioning and how this related to the other components of their lives. This question formed the basis of my doctoral research. For me, it was important that the variables I examined were amenable to change; I did not only want to reveal and describe adverse outcomes. I wanted to know what we could offer to improve the lives of individuals with acute and chronic health conditions.

My interest in the impacts of PF on physical and psychological health began while researching for my Masters Thesis, “Exploring the utility of Acceptance and Commitment Therapy after brain injury: The role of psychological flexibility and reactions to impairment in well-being post-injury (Proctor, 2018).” I was motivated to learn more about why many individuals faced with challenging physical illnesses or

disabilities continue to live what they report to be happy and fulfilled lives. The results of this thesis supported the hypothesis that individuals with higher levels of PF were more satisfied with their life and reported fewer physical and mental health symptoms.

During my doctoral program, my interest in mindfulness and its impact on physical and psychological health grew (Beaulieu et al., 2022). Collaborative lab projects investigated how the mindfulness components of describing, being aware, non-reactive, and accepting mitigate emotional dysregulation. The results from Beaulieu et al. (2022) highlighted how self-regulation can affect health. Being present and practicing mindfulness are key components of PF.

Cancer has touched almost every person in some way, either personally or through close relations with friends or family. Although an increasing number of individuals are surviving cancer, many live with long-term physical and psychological impacts. The shift to exploring these variables in survivors emerged naturally during my doctoral training. From the moment a diagnosis is given, that individual becomes a survivor. While not all individuals who have received a diagnosis of cancer in their lifetime identify with the label of “survivor”, this operational definition was chosen because it is well understood within the cancer research community.

Research highlights the positive influence of PF on the lives of those with chronic illness (Wicksell, 2008), but there are gaps in the literature regarding the role of PF during the period when people return to everyday life after experiencing life-changing health diagnoses such as cancer. It was clear that PF strongly predicted

positive physical and mental health outcomes¹. Still, I was interested in how the components of PF interacted with the daily lives of these individuals.

Specifically, I wanted to know if the pillars of PF relate uniquely to different populations. I approached my doctoral supervisor, Dr. Lisa Best, about the idea, and she recommended that we approach Dr. Anthony Reiman, a medical oncologist with hands-on experience working with patients. Dr. Reiman advocates mental healthcare for his patients and considers psychological research in this area a valuable component of treatment. He was invaluable in creating a demographics form that captured the stage and severity of the participant's cancer diagnosis and helped us choose measures that targeted the most critical variables. The first study we conducted used a population of cancer survivors and we examined medical and online support, leisure activities, social connectedness, and mindfulness and we investigated how these variables related to quality of life. This study highlighted the importance of leisure, family and romantic support, and non- passive leisure activities (Proctor et al., 2021). In addition to these factors, the ability to normalize negative emotions was linked to improved quality of life. In every study I conducted, psychological and behavioural variables emerged as significant predictors of mental and physical health.

It was important to me that my dissertation focused on all aspects of life after cancer which is why I targeted overall well-being (Study 1), employment after cancer (Study 2), sexual functioning, and intimacy (Study 3). The core of the therapeutic work in ACT involves working towards living a life in line with one's established values

¹ Proctor, C. & Best, L. (2019). *The Utility of Acceptance and Commitment Therapy (ACT) after Brain Injury: Psychological Flexibility and Well-Being*. Poster presentation at the International Convention of Psychological Science (ICPS). Paris, France.

across the four areas of life (Relationships, Work/Education, Health/Personal Growth, and Leisure) in a balanced way (Luoma et al., 2007). Research I conducted with my colleagues demonstrates the importance of connections and activity for cancer survivors. Through the following three research papers in this dissertation, I focused on the remaining aspects of life including overall Thriving, Employment Satisfaction, and Intimacy and how they related to the pillars of PF.

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Chapter Two: Introduction

Each year, approximately 1 in 6 deaths result from cancer, making cancer the second leading cause of death worldwide (World Health Organization, 2022). Cancer is the number one cause of death in Canada and is responsible for one in four deaths nationwide (Canadian Cancer Society, 2022). According to the Canadian Cancer Society (2022), in 2018, over 1.5 million people in Canada who received a cancer diagnosis in the last 25 years were still alive. The growing number of survivors highlights that the “cancer experience” extends beyond diagnosis, treatment, and end-of-life care. New medical interventions have led to decreased cancer-related deaths for both males and females, with 63% of people diagnosed with cancer expected to survive more than five years (Canadian Cancer Society, 2022).

Relative to individuals who have not had a cancer diagnosis, cancer survivors report increased mental health concerns and lowered physical and psychological well-being (Langeveld et al., 2004). Nayak and colleagues (2017) found that 82.3% of cancer patients reported below-average Quality of Life (QOL) scores, with lower scores in the general, physical, and psychological well-being domains compared to the familial, cognitive, and economic well-being domains. When compared to other health populations, such as patients with cardiac disease, individuals who had previously received a cancer diagnosis reported more problems related to Functional Health Status, Body Image, Weight Maintenance, Worry, Sexual Dysfunction, Problems Associated with Treatment, and Job-Related problems (Nayak et al., 2017).

Comparing Health Related Quality of Life and Subjective Well Being

It is crucial to make the distinction between Quality of life (QOL) or Health-Related Quality of Life (HRQL) and Satisfaction with Life (SWL), which is a component of Subjective Well Being (SWB). It is not possible to use these terms interchangeably. HRQL is an objective measure of well-being that focuses on physical and psychological symptoms and measures of physical and cognitive functioning while SWB is a personal description about how happy an individual is with their life. When examined in healthy samples, HRQL and SWB are moderately and positively correlated (e.g., Yildirim et al., 2013; $r = .30, p < .05$). In healthy populations, there is still a significant correlation between these measures, but it is lower in magnitude. Severe disability and how an individual adapts to disability-related changes can have long-term negative impacts on SWL (Diener et al., 1999). People who live with chronic illness are more likely to have decreased levels of life satisfaction compared to the general population (Strine et al., 2008). There is a significant relationship between SWL and levels of HRQL in chronic pain populations; compared to those who are satisfied with their life, individuals who are dissatisfied with their life are 5.7 percent more likely to report pain on at least 14 days in the last month (Strine et al., 2008). There are also associations between SWL and low social support, worsening health, mental distress, symptoms of depression/anxiety, and reduced sleep (Strine et al., 2008).

Health-related quality of life encompasses overall physical (energy, fatigue, pain, etc.) and psychological functioning (social, emotional well-being, etc.), as well as general health perceptions (Hays & Morales, 2001). Subjective well-being encompasses cognitive (assessment of life circumstances) and emotional (assessment of positive/negative emotions) factors (Diener et al., 2013) and is related to psychological

health. Health researchers often focus on specific mental health problems (i.e., anxiety, depression) to determine if psychological symptomatology is comorbid with specific medical conditions and associated symptoms (limited mobility, pain, nausea). Although inventories measuring SWB might include items such as, *Overall, I am happy with my life*, or *I feel good most of the time*, they generally focus on the overall assessment of specific areas of one's life (including Personal Autonomy, Mastery of Skills, Social Connectivity, Positive and Negative Emotionality; see Su et al., 2014).

Although there are similarities between how SWL and QOL are measured, differences warrant examination. To illustrate, Tessier et al. (2012) attempted to isolate clinical determinants of HRQL and SWB in long-term breast cancer survivors. Results indicated that the measures were associated with unique variables. For instance, medical factors (e.g., tumour size, cancer stage) negatively influenced SWB. Moreover, patients receiving certain types of treatment (chemotherapy and hormone therapy) were happier compared to those who received neither of these treatments. Specifically, hormone therapy was related to positive feelings while radiation therapy was related to higher levels of negative affect (Tessier et al., 2012). They reported fewer adverse effects regardless of the time that had passed since their diagnosis than those receiving other types of treatment (e.g., radiation therapy without hormone therapy). Treatment type, but not the time since disease onset, influenced SWB, whereas HRQL was directly related to physical health outcomes. Even in cases of declining physical health, other factors impacted the patients' levels of SWB, indicating they were happier with their life compared to individuals who reported better physical health, which could be explained by specific demographic characteristics (ie., living with a partner). This

research highlights the importance of focusing on patient factors beyond cancer-related health variables.

In a study of prostate cancer survivors, Adams et al. (2018) reported that HRQL did not differ as a function of intervention; patients who were being monitored, had surgery, or radiation therapy all had similar HRQL at five and ten-year follow-ups. Types of cancer treatment can have long-term impacts on the affective and cognitive aspects of SWB (Tessier et al., 2012). Together, these results suggest that examining SWB alongside HRQL provides a more complete representation of the impacts of medical interventions because individuals with the same HRQL may have differing levels of SWB. Conversely, physical improvements may relate to increases in HRQL but not affect levels of SWB. Although these constructs are connected, each uniquely contributes to overall well-being and examining them concurrently provides a more holistic assessment of outcomes.

These two outcome measures may also differ regarding malleability. When a patient is motivated and willing to contribute to change, SWB is malleable, with specific interventions leading to positive changes (Diener et al., 1999). Improvements in SWB can lead to improved health and longevity as well as more positive social relationships (Diener et al., 1999); however, these are not one-way causal relationships. For example, married people tend to have higher SWB (Diener et al., 1999) and higher SWB can impact sociability and increase the quality of relationships (Diener et al., 1999). Thus, a full understanding of both SWB and HRQL can elucidate the complex associations between physical and psychological symptoms to inform the development of treatments to improve overall well-being.

Health Related Quality of Life and Subjective Well Being after Cancer

There are associations among many clinical and socio-demographic factors and the QOL of cancer survivors, including employment status, age, gender, education, and other health comorbidities (Annunziata et al., 2015; Chu et al., 2016; Lee et al., 2017; Lowery et al., 2015; Muzzatti et al., 2019; Smith et al., 2010). Age can positively impact mental health despite poor physical health. Compared to younger cancer survivors, older survivors report better mental health but worse physical health (Zebrack et al., 2008). Survivors say the prominent contributors to their QOL was treatment and its side effects (Sekse et al., 2019), including pain (Sekse et al., 2019), and psychological reactions, including depression, anxiety, and fear of reoccurrence (Ellis et al., 2019; Ellis et al., 2022; Sekse et al., 2019).

When asked, terminally ill cancer patients ($N = 218$) said the most important contributors to their QOL were physical ailments, but psychological impacts were also cited (Shahidi et al., 2010). These terminally ill patients often linked their physical conditions directly to their effect on the loss of enjoyed activities, including hobbies, activities, and social interactions. Survivors indicated that it was not only the physical discomfort but also the impact of this discomfort on activities that previously brought them subjective enjoyment that affected QOL (Shahidi et al., 2010). Further, Ellis (2022) linked depression in cancer survivors to fear of reoccurrence, and this relationship was more potent than that linking anxiety and fear of reoccurrence. Although they found that six years after recovery, other factors contributed to poor QOL, including unemployment and comorbid health concerns, the most substantial influence was affected distress linked to a fear of reoccurrence. Similar results were

found in a study that used a Chinese sample and examined affect as a mediator to explain the relationship between QOL and mental adjustments (Yeung & Lu, 2014). Their results showed that fatalism, the submissive belief that all things are predetermined, partially mediated this relationship between QOL and mental adjustments.

Fatalism accounted for a significant amount of relationship between QOL and adjustment; individuals who reported more fatalistic thinking had a stronger relationship between QOL and mental adjustment (Yeung & Lu, 2014). The impact of how we think, how we engage in relationships, and how physical symptoms impact behaviours contribute to QOL. Cancer patients readily report the adverse effects of cancer (Annunziata et al., 2015; Muzzatti et al., 2019; Sekse et al., 2019; Shahidi et al., 2010; Swensen & Fuller, 1992; Zebrack et al., 2008) but are also able to note positives that can result from a cancer diagnosis, including closeness of relationships and spirituality (Swenson & Fuller, 1992), and absence of pain (Muzzatti et al., 2019). These positive impacts did not significantly vary according to demographic or cancer-related variables (Muzzatti et al., 2019). While accepting that demographic factors (e.g., age, marital status) will always play a role in our QOL, the research indicates that overall QOL is affected by factors that are potentially, at least in part, within our control.

Subjective well-being involves many factors, including the perception of happiness, social connectivity, and employment satisfaction (Diener et al., 1999). Measures of SWB, including the Satisfaction with Life Scale (SWLS; Diener et al., 2013) and the Comprehensive Inventory of Thriving (CIT; Su et al., 2014), focus on the overall

perception of one's life, with specific measures focused on the subjective experience of "happiness" (Diener et al., 2013). The perception that life has a purpose, and a continued sense of hope is positively related to SWL in cancer survivors (Wnuk et al., 2012).

Lorenzo-Seva et al. (2019) found that cancer survivors had slightly elevated SWL scores compared to healthy controls. Many participants in this study endorsed that "life has given them a second chance." The lowest SWL in this study was reported by participants under the age of 49 years compared to those older than 60 years. Within the sample of cancer survivors, the lowest SWL scores were from participants who reported that they were divorced, widowed, or unmarried (Lorenzo-Seva et al., 2019). Results from a large sample ($N = 6,389$) of cancer survivors show a lowered satisfaction with health and sex life, but satisfaction with all other domains remained the same or even improved over three periods spanning 20 years (Ellis et al., 2019). Compared to those without cancer, individuals with cancer express more pessimistic predictions about life; however, their health predictions were more accurate than those who have never received a cancer diagnosis (Ellis et al., 2019).

Similar to Lorenzo-Seva et al. (2019), Zlator et al. (2015) reported that older cancer survivors had similar SWL, cognitive factors (e.g., memory, executive function), and psychosocial factors (e.g., loneliness) compared to age-matched healthy controls. Despite having a long history of cancer, more stressful life events, and hospitalizations related to cancer, they were comparably happy with their lives. Their results indicated that higher SWL was related to greater mental functioning, resilience, optimism, and mastery. As SWL decreased, there were increases in depression, stress, and the number

of stressful life events (Zlatař et al., 2015). Thus, decreased SWL has widespread consequences and interventions to improve SWL may improve various components associated with wellness.

Social Connection and Support After Cancer

Social support is a broad term used to describe the supportive ways in which people behave in a social context (Helgeson, 2003). There is a strong relationship between perceived social support, physical health, and psychological well-being (Kahn et al., 2003). Individuals who have higher perceived social support have lower levels of depression (Sayal et al., 2002), as well as long-term health benefits, including better immune functioning, physical mobility, lower blood pressure, and a faster recovery time from health problems. In a comprehensive meta-analysis, Pinguart and Duberstein (2010) examined the effects of social support on cancer mortality and focused on the efficacy of interventions to increase social connectivity and support. They reported a negative association between mortality and perceptions of social support, the size of a support network, and marital status (individuals who are married had lower mortality), with an overall decrease in mortality of 12 – 25% (Pinguart & Duberstein, 2010). In a preliminary study that included over 9,000 breast cancer survivors who participated approximately two years after diagnosis, various social supports were examined and included intimate partners, relatives, friends, religious/social, and community relationships (Kroenke et al., 2001). Lower social support was associated with behaviours related to health, including lower physical activity and higher rates of smoking, drinking, and obesity. Further, socially isolated survivors had a higher risk of cancer recurrence, cancer mortality, and overall mortality (Kroenke et al., 2001).

Research suggests that various positive lifestyle variables, including social connectedness, leisure activity, and mindfulness practices, are associated with increased QOL in cancer patients (Courtens et al., 1996; Fangel et al., 2013; Garland et al., 2017). Many studies have found that social connectedness is related to improved cancer outcomes, including decreased risk of cancer mortality and favourable prognosis (Garssen, 2004; Kroenke et al., 2001). Cancer patients often report moderate to moderately high loneliness levels, which increase with time since the initial diagnosis (Deckx et al., 2014). Further, leisure satisfaction is "the positive perceptions or feelings an individual forms, elicits, or gains as a result of engaging in leisure activities and choices" (Beard & Ragheb, 1980, p. 22). Due to its debilitating consequences, there are negative relationships between cancer treatment, survivorship, and participation and satisfaction with leisure activities (Shipp et al., 2015). Despite these negative associations, there is a link between optimism and engaging in meaningful activities for older cancer survivors. This engagement in meaningful activities, such as volunteering, is linked to higher SWL and improved psychological health (Heo et al., 2016). In contrast, in younger cancer survivors, decreased social support, more parenting concerns, and fertility issues predict adverse reactions and adjustments, including depression, anxiety, and cancer-related stress. Thus, in Study 1, I examined social connection as it relates to psychological thriving in cancer survivors.

Employment and Physical Health after Cancer

Cancer survivors are less likely to be employed (Timperi et al., 2013), with only 25 to 50% of survivors returning to work in some capacity (Shim et al., 2021). Compared to other health populations, including individuals with cardiac disease,

cancer survivors reported more job-related problems (Schag & Heinrich, 1986). Further, factors related to their cancer diagnoses, such as comorbid conditions, treatment type, and worse prognosis, negatively impacted employment status. Depending on the type and severity of cancer, the impact of a cancer diagnosis on employment status is variable (Mols et al., 2009). Not having changes in work status was related to being younger, having a medium level of education, having a living spouse, a lower than stage four cancer prognosis without progression, and no reported comorbidities. Treatment factors (e.g., combined therapies), physical symptoms (e.g., pain, neuropathy), and psychological factors (e.g., anxiety, depression) all predicted a reduced likelihood of a return to work two years post-diagnosis (Mols et al., 2009). Compared to "cancer-free" individuals, across gender and age groups, survivors are more likely to lose their job and are less likely to be re-employed (Park et al., 2009).

Despite a relatively high number of survivors who return to work after treatment, Mols and colleagues (2009) reported that almost half of survivors had changes in their employment, ranging from loss of employment, reduced hours, and job modification. Although work changes were related to more physical limitations, these changes were positively associated with social well-being (Mols et al., 2009) indicating that change is not always negative.

Although there are issues associated with re-employment after cancer, compared to survivors who were unemployed, women with a breast cancer diagnosis who were employed had higher overall well-being (Blinder et al., 2012). Further, at a 6-month follow-up, breast cancer survivors who reported working a minimum of 20 hours per

week had higher physical and psychological wellness, suggesting that fostering a return to work may positively impact well-being.

Cancer survivors are often motivated to continue working or return to work after their diagnosis (Bártolo et al., 2021; Greidanus et al., 2019; Mols et al., 2009); however, various issues related to the employee's workplace and mental, physical, and psychosocial functioning may hinder cancer patients' work participation (Bártolo et al., 2021; Greidanus et al., 2019; Rasmussen & Elverdam, 2008). Given that returning to work is a financial necessity for some survivors, research focused on removing barriers and creating a positive and flexible (i.e., part-time hours, hybrid schedules, work from home) for survivors is essential and was the focus of Study 2.

Romantic Relationships After Cancer

Despite increased survival rates, cancer is a severe illness that significantly impacts the physical, emotional, and social lives of both survivors' and their loved ones (Hawkins et al., 2009; Manne et al., 2011). Survivors, their relatives, and close connections often experience disruptions in daily life, increased anxiety and depressive symptoms, fear of recurrence, and the fear of loss and death (Gilbert et al., 2010). The impact of cancer on marriage rates is variable and based on gender, but overall, marriage after cancer is becoming more common. Men with cancer have a 5% higher probability of being married than cancer-free men; in fact, having testicular cancer significantly increases this rate. For females, individuals diagnosed with skin cancer were more likely to be married, but breast and brain cancer decreased the chance of being married. Further, cancer survivors reported being happier in their relationships overall. Considering that unmarried survivors report lower SWLS and dissatisfaction

with sex after cancer (Gilbert et al., 2010), maintaining current romantic relationships could contribute to improved SWL.

Cancer significantly impacts women's sexuality, sexual functioning, intimate relationships, and sense of self (Bártolo et al., 2021; Canavarro et al., 2015). These feelings can lead to resentment, withdrawal from their partner, and overall relationship discord (Creasman, 2005). Many issues persist over time, with approximately 50% of sexually active women who had survived an average of 8 years after their first breast cancer surgery reporting that they still had sexual difficulties that they attributed to the disease (Burbie & Polinsky, 1992). These difficulties included issues with sexual arousal, orgasm, and lubrication. Same-sex partners of women with cancer often experience similar changes in sexuality (Flynn et al., 2011). Thus, women are living longer after cancer but are experiencing sexual difficulties years after diagnosis.

Long-term testicular cancer survivors reported changes in their intimate relationships ranging from strengthened relationships for married men to strained relationships with sexual partners for single men (Schepisi et al., 2019). Men reported feeling a sense of “failure” when unable to engage in sexual activities that they were previously able to perform. Male response and perception of sexual dysfunction or loss of sexual function vary. For couples in the survivorship phase, one of the most challenging tasks is resuming a sexual relationship. Many long-term testicular cancer survivors and their wives believe their cancer experience brings them closer (Schepisi et al., 2019). Men who were in a relationship at the time of a testicular cancer diagnosis reported better physical and emotional adaptation (Schepisi et al., 2019). The relationship between sexual functioning and intimacy is complex. Although there is an

association between these variables, there is evidence in the literature to support avenues to target improved intimacy in partners where sexual function is diminished.

Intimacy and Sexual Functioning After Cancer

Sexual function assessment is a vital component of QOL for survivors as it can help identify treatment side effects and improve QOL (Ananth et al., 2003). Individuals with cancer experience changes in sexual functioning as significant and impairing. For example, 43 percent of all females suffer from some form of sexual dysfunction and this number is between 80-90 percent for survivors of gynecologic and breast cancers (Laganà et al., 2001). Sexual dysfunction can lead to emotional distance between couples, feelings of isolation, anxiety, depression, or inadequacy (Gilbert et al., 2010). Reported disruptions include sex drive decreases, fear of initiating sex, difficulty recapturing "normality," and feeling unwanted or unattractive because of a lack of sex (Gilbert et al., 2010).

Some male respondents in Flynn et al.'s (2011) qualitative study described a tendency to push away from their partners with an increased desire to be alone, citing shame and failure as feelings associated with the changes in sexual function. Conversely, some respondents reported a positive relationship change and described increased affectionate touch, including hand-holding and intimate conversations. This decreased focus on sexual activity shifted the direction of the partner interactions (Flynn et al., 2011), and led to increased relationship satisfaction.

Overall, factors that contribute to sexual functioning include medical variables (surgery, side effects of treatment), psychological variables (body image and emotional distress), and relationship variables (partner's reaction to the illness and treatment;

Kinsinger et al., 2011). Many psychosocial aspects of cancer and its treatment affect intimate relationships (Flynn et al., 2011; Gilbert et al., 2010). Although most couples facing cancer fare well in the long term, the experience can strain relationships and lead to marital discord (Gilbert et al., 2010). Often neglected in research are patients and their partner's experiences regarding sexuality and intimacy after cancer; however, there is growing recognition of these unmet relational needs (Burbie & Polinsky, 1992; Hawkins et al., 2009; Manne et al., 2011).

Sexuality and intimacy are essential aspects of QOL, and cancer leads to tremendous changes in sexuality, sexual functioning, relationships, and sense of self (Ratner et al., 2010). As Schafer and Olsen (1981) described, intimacy is a collection of emotional, social, sexual, intellectual, and recreational intimacy; there is not one component that completely encompasses intimacy. Schafer and Olson specified that intimacy is not a destination but a process of growth in these categories that can change over time. Sexual dysfunction refers to physical limitations to sexual activity. Sexual intimacy is only one aspect of intimacy; it is possible to have intimacy without sexual function (Schaefer & Olson, 1981).

Intimacy is considered a primary psychological need and has received significant focus in the psychological literature (Moreira & Canavarro, 2013). It is crucial to examine the impacts intimacy can have on SWL in populations known to experience sexual dysfunctions and relationship stress. Cancer treatments significantly impact sexual relationships, with 30% of men and 33% of women reporting that physical barriers to sex made it difficult or impossible to have sex (Hawkins et al., 2009). In a survey study, more than half of cancer survivors (62%) reported a desire for

sexual intimacy, and 57% indicated that physical limitations impaired their sexual function (Bond et al., 2019).

The effects of cancer diagnosis and treatment on sexual functioning and intimacy are significant. Still, cancer survivors sometimes have limited knowledge of the impact of their diagnosis and treatment on sexual function and intimacy, and healthcare professionals, patients, and partners are sometimes reluctant to discuss the impact of cancer and treatment on sexual functioning (Burbie & Polinsky, 1992; Naaman et al., 2009; Park et al., 2009). Examining sex differences in this population is vital, given the varied impact of sex-specific cancers on sexual functioning. To my knowledge, there is no existing literature examining sex differences in the relationship between sexual dysfunction and intimacy after cancer and how these variables related to SWB. Thus, Study 3 focused on how sexual function and intimacy are related to psychological distress (anxiety, depression) and relationship, sexual, and life satisfaction in both males and females.

Acceptance and Commitment Therapy

The Acceptance and Commitment Therapy (ACT) process helps individuals live a life that aligns with their values (Luoma et al., 2007). Although ACT is a behavioural therapy, it differs from Cognitive Behavioural Therapy (CBT) because there is no direction to change distorted cognitions, for example, catastrophizing or black-and-white thinking. Instead, ACT helps individuals learn to interact flexibly with their positive and negative thoughts without judgment. This process allows for behaviours that align with personal values despite negative internal or external experiences (Kashdan & Rottenberg, 2010). ACT is a module-based but incredibly flexible model

that can be viewed more generally as an approach to therapy, rather than a therapy in itself (Luoma et al., 2007). Because effective ACT clinicians are psychologically flexible (Luoma et al., 2007), clinicians are encouraged to apply the processes and principles of ACT in both therapy and their own lives. Clinicians who are more psychologically flexible can be present in the moment with clients and sit with them while they experience uncomfortable emotions.

The value-based action at the core of ACT benefits individuals living with chronic conditions such as pain (Wicksell et al., 2008) and has conceptual utility for cancer survivors. A cancer diagnosis can cause severe psychological distress and influence how one perceives and copes with life circumstances (Boykin et al., 2020). These changes impact overall wellness during the stages of diagnosis, treatment, and recovery (Boykin et al., 2020). Research supports the use of ACT in individual therapy with late-stage ovarian cancer survivors (Rost et al., 2012) and in group settings for cancer survivors transitioning from treatment to post-treatment (Arch & Mitchell, 2016).

An extensive meta-analysis published in 2021 indicated that ACT presented both in-person and through telephone-based delivery was efficacious and decreased overall distress for those who have received a cancer diagnosis (Li et al., 2021). In this meta-analysis, the number of treatment weeks ranged from 4 – 12, with longer iterations yielding more positive outcomes; however, Kahotala et al. (2017) reported sustained improvements in depressive symptoms over five years after engaging in a brief, four session ACT intervention. Younger individuals were more likely to benefit from this type of intervention; however, the method of delivery (in person, group, online) did not

significantly impact the outcomes (Li et al., 2021). Hospitalizations of patients with psychosis over one year were lower in individuals who had exposure to ACT (Bach et al., 2012). Another longitudinal study reported a sustained reduction in anxiety, and stress related to increased cognitive defusion and decreased experiential avoidance skills over one year (Ruiz & Odriozola-González, 2017). When applied, the ACT process can have long term impact on positive outcomes.

ACT can help cancer patients increase their overall PF, effectively lowering physical and psychological symptoms (Hulbert-Williams et al., 2015). Increased PF is associated with lower levels of psychological distress and higher QOL (Francis et al., 2016; Swash et al., 2017). Given these positive effects, this practice can help cancer patients reduce psychological distress, including depression, anxiety, hopelessness, and suicidal ideation.

Psychological Flexibility

PF is being consciously present in the moment and engaging in behaviours or changing behaviours that are in alignment with personal values. PF is a process amenable to change (Francis et al., 2016; Swash et al., 2017) through ACT. This change occurs by increasing resilience and teaching individuals to prevent negative thoughts and feelings from driving their behaviour (Swash et al., 2017). Individuals with high PF can engage with thoughts, emotions, and behaviours that align with personal values and goals and react nonjudgmentally to internal and external experiences. Because this process does not involve dismissing negative thoughts, it helps individuals actively engage with their trauma and bolster self-awareness, preventing a cancer diagnosis from fully defining their sense of self (Boykin et al., 2019). Daily incorporation of PF allows

individuals to focus on the present moment and more effectively cope with trauma while engaging in meaningful lives (Droutman et al., 2018).

Moderate correlations exist between PF and depression, anxiety, anxiety sensitivity, behavioural inhibition, and the personality factors of neuroticism (negative correlation) and extraversion (positive correlation; Kashdan & Rottenberg, 2010). Applying PF transdiagnostically helps explain complex mental health presentations (Francis et al., 2016; Swash et al., 2017). PF significantly predicts functioning and impairment in clinical samples (panic disorder with Agoraphobia, Anxiety/Social Phobia), even when controlling for depressive symptoms, neuroticism, and anxiety sensitivity (Gloster et al., 2011). Generally, PF predicts levels of functioning and not specific symptomatology or diagnostic presentation.

Pillars of PF

There are six processes of ACT that support the development of PF: acceptance; cognitive defusion; self-as-context; committed action; values; and contact with the present moment (Flexibility; See Figure 1.1; Inflexibility; See Figure 1.2). These interconnected processes work together to guide individuals to be more psychologically flexible. Three pillars of PF emerge from the six processes of ACT; Open/Closed; Aware/Mindless; Engaged/Disconnected (See Figure 1.3). Each pillar of PF contains two points of inflexibility and two points of flexibility (Luoma et al., 2007). These pillars directly relate to the six processes of flexibility shown in the hexaflex. These three pillars represent the processes that have positive implications for application in ACT. Conceptually, these are response styles; the pillars describe how individuals

navigate and process internal and external experiences. The following sections will explore these three pillars and their corresponding points related to cancer survivors.

Figure 1.1

ACT Model of PF (Hayes et al., 2013)

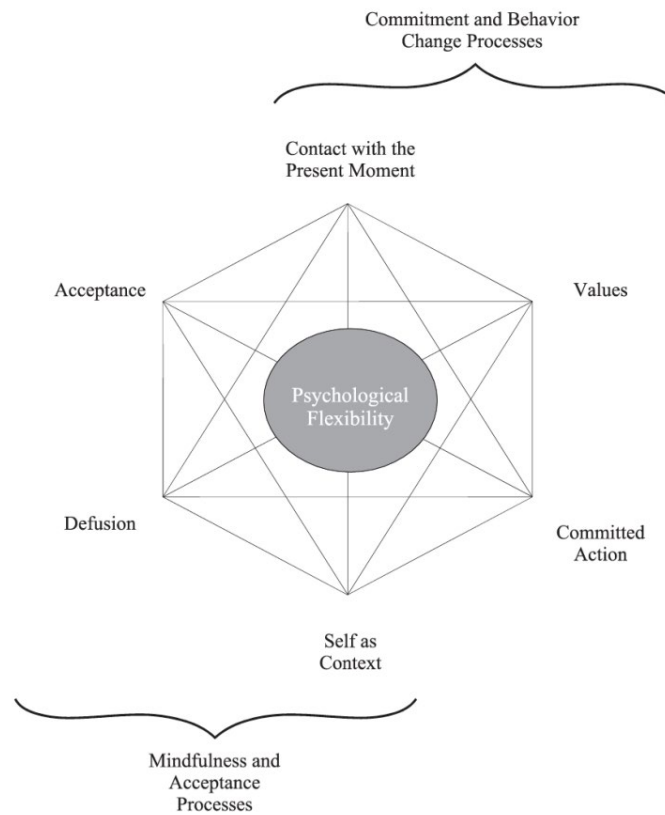


Figure 1.2

ACT Model of Psychological Inflexibility (Hayes et al., 2013).

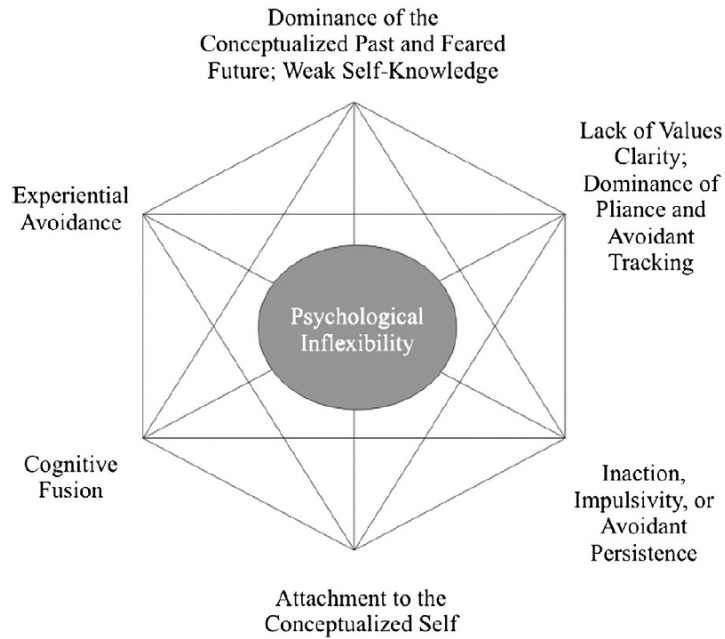


Figure 1.3

ACT Pillars of PF and Inflexibility (Luoma et al., 2007).

<i>Psychological Flexibility</i>			<i>Psychological Inflexibility</i>		
<i>Acceptance</i>	<i>Being Present</i>	<i>Values</i>	<i>Experiential Avoidance</i>	<i>Inflexible Attention</i>	<i>Lack of Values</i>
Open	Aware	Engaged	Closed	Mindless	Disconnected
<i>Defusion</i>	<i>Perspective - taking Self</i>	<i>Committed Action</i>	<i>Fusion</i>	<i>Attachment to Self-Concept</i>	<i>Disconnected Action</i>

Open/Closed. The Open pillar of PF subsumes the acceptance and defusion processes on the left side of the PF hexaflex model (See Figure 1.1). The two processes in this pillar (Fusion, Avoidance) represent the self-directedness of an individual in which internal experiences (e.g., cognitions and emotions) are awarded more focus and attention than is beneficial for the individual. Attachment to the past and future, represented by rumination and worry, are barriers to fully experiencing positive and negative emotions (Luoma et al., 2017). Being open allows an individual to explore the past, present, and future flexibly without stifling reactions or providing excessive attention.

Defusion/Fusion. Human language influences our cognition (Hayes, 2004). Believing a thought is true can lead to “fusion.” When cognitively fused, an individual cannot distinguish reality from their internal experiences and narratives. In this state of cognitive fusion, individuals use ineffective strategies linked to the assumption that they are “right” or “fair.” This reaction comes at the expense of attending to key external experiences leading to inflexibility in their behaviours and cognitions. Individuals who are cognitively fused find it challenging to gather relevant information from their external environment on which to base their reactions. Because unpleasant cognitions are uncomfortable, when an individual is fused with these thoughts, they exert effort to control and eliminate the internal thoughts or emotions. This reaction creates a vicious cycle of self-monitoring evaluation, emotional response, and control efforts which can lead to further self-monitoring and attempts at control (Whiting et al., 2012).

Shifting from fusion to defusion is the focus of the first pillar of ACT. This mindfulness process from the left side of the hexaflex captures this shift into a state of

mindfulness (See Figure 1.1; Soo et al., 2011). Defusion is accepting thoughts by noticing and not trying to change them but acknowledge them. Both positive and negative cognitions are welcome in a state of defusion; they do not judge what thought is “good” or “bad” but are all, in essence, simply “thoughts.”

The core of this process is accepting that negative thoughts occur as a part of human existence and not emphasizing that one should eliminate or change those thoughts. Instead, noticing a thought without attaching an emotion to it is a core process of PF. The process of defusion is understanding that the attempt to change a thought to avoid the linked emotions will only heighten that emotional experience and amplify the negative effect (Whiting et al., 2012). This process does not only apply to negative thoughts; some situations require negative emotions and thoughts when approaching goals and engaging in behaviours that align with an individual’s values. For example, anger is not always maladaptive (Berkowitz, 2012), and may push an individual towards appropriate values-based behaviours in some situations. The process of defusion involves flexibility in applying emotions for varied contexts instead of labeling emotions as “bad” or “good”.

Experiential Avoidance/Acceptance. Cognitive fusion leads to experiential avoidance, during which an individual attempts to avoid, suppress, or eradicate unwanted internal experiences, such as thoughts, memories, and bodily sensations (Soo et al., 2017). Cognitive fusion is an exaggeration of our inherent human tendency to react with problem-solving strategies that reduce discomfort (Whiting et al., 2012). Humans routinely avoid negative feelings by avoiding situations (experiential avoidance). This avoidance can cultivate isolation or confirmation of the inability to

cope with distressing circumstances (Luoma et al., 2007). When experiential avoidance is the default reaction to distress, individuals tend to make daily and vital life decisions based on avoidance of discomfort and anxiety. For individuals with physical or mental health conditions, this experiential avoidance encourages them to fuse with the “specialness” of their pathology, which further supports the avoidance behaviour (Luoma et al., 2007). For example, an individual with a cancer diagnosis may have thoughts that others do not understand because they do not have cancer, or that their cancer diagnosis is an excuse to avoid activities.

The ACT process encourages acceptance of all experiences, positive or negative, but it is not passive. Acceptance is an active reaction that intentionally shifts the focus from avoiding unwanted thoughts and feelings to moving toward them with interest, curiosity, and, most importantly, non-judgemental observation (Hayes et al., 2012). Much like distress intolerance and emotional suppression, experiential avoidance offers short-term relief from discomfort with the cost of long-term adverse effects (Hayes et al., 2013). By incorporating acceptance, individuals can move beyond avoidance and accept negative experiences as a normal part of survivorship.

For example, cancer survivors who experience anxiety may avoid situations, such as, follow-up appointments, that trigger unwanted arousal or panic. This avoidance decreases tension in the moment but, over time, becomes a way to maintain the feelings of anxiety. Avoidance is not an effective long-term coping mechanism for worry, obsessions, and racing thoughts. Unfortunately, if avoidance of emotion persists, individuals may not only experience an increase in negative emotions, but an inability to fully connect with positive experiences. Inflexibility is reacting to emotions by

attempting to conceal or control them (Avdagic et al., 2014). Flexibility, which is one goal of ACT, involves addressing or approaching unwanted feelings of anxiousness instead of avoiding otherwise rewarding life events.

Aware/Mindless. The Aware pillar of flexibility subsumes the Being Present and Perspective-Taking sense of self processes in the center of the PF hexaflex model (See Figure 1.1). This pillar contains perspective taking and being in the present moment so that individuals can observe internal and external experiences as they happen.

Inflexible Attention/Being Present. Life exists in the present moment, but cognitive defusion and avoidance pull us away from those immediate experiences. These inflexible reactions increase attention to the past (rumination) and the future (worry; Luoma et al., 2017). These conceptualizations of past and future dominate our experience of the present moment making it difficult to engage meaningfully with life as it happens genuinely. To be present in the moment, an individual must interact with the moment in a flexible, open, and, most importantly, non-judgemental way. Being present is important for positive and negative moments and accepting the full spectrum of human emotions is part of the whole experience of human existence (Whiting et al., 2012). Mindfulness techniques (e.g., focusing on the tone of voice) involve being present in the moment and require less problem-solving (e.g., “How do I change this thought/feeling?”) and more observation (e.g., “I have this thought or feeling.”; Hayes et al., 2012). Being present can be a valuable reaction for cancer survivors. Removing the focus from cognitions about the future or ruminating about the past allows one to conserve their mental energy for the present moment, even when the present moment is

filled with discomfort. When an individual is focused on the past and future, not the present moment, intimacy and connection in the moment are difficult because minor hurts, inserting assumptions, or generally being inattentive to the interaction are highlighted (Luoma et al., 2007).

Attachment to Self-Concept/Perspective-Taking Self. The ACT process encourages a sense of self based on the present context, which involves detachment from a conceptualized self. The conceptualized self is a rigid and fused sense of who we are (Soo et al., 2017). Viewing the current environment as someone else or an older and wiser version of themselves can help individuals gain this new perspective outside their current environment and emotions (Hayes et al., 2012). Cancer survivors may have conceptualized themselves as a “positive person” and now find that their cancer diagnosis becomes a focus of conversations creating a negative tone to social interactions. To avoid the negative tone, an individual may avoid making plans with friends, which results in increased isolation and feeling of inadequate support. Most importantly, self as the context allows detachment from labels (e.g., cancer patient as an identity) and understanding their diagnosis and health concerns as one component of life (e.g., a person with a cancer diagnosis). This leaves a survivor room to still see themselves as a positive person who can enjoy diverse experiences.

Disconnected/Engaged. The Engaged pillar of flexibility subsumes the Values and Committed Action processes on the left side of the PF hexaflex model (See Figure 1.1). The values established in the ACT are not predetermined but embody the values held by the individual.

Lack of Values /Values. In ACT, personal values are identified that define how an individual wants to live their life. This process guides them to determine what is important to them (Hayes et al., 2012). An individual is not given values, which are not a “thing” to obtain but rather values focus on the direction of an individual’s life and what motivates them to move forward (Lundgren et al., 2008). For example, a cancer survivor may hold "family" as a core value and must work towards participating in behaviours and actions that align with those values (e.g., not skipping family events when feeling sad about the future).

Disconnected Action/Committed Action. Finally, the culmination of the ACT process is to increase patterns of reaction and behaviours connected to the individual's chosen values. The change takes place through the short, medium, and long-term goals of the individual’s life that are in line with their selected values. A focus on being present helps individuals make these value-aligned choices (Soo et al., 2017). Skills of cognitive defusion and acceptance, as well as being present in the moment, all contribute to the ability to choose behaviours that align with your values, despite whether these actions or situations cause distress or discomfort.

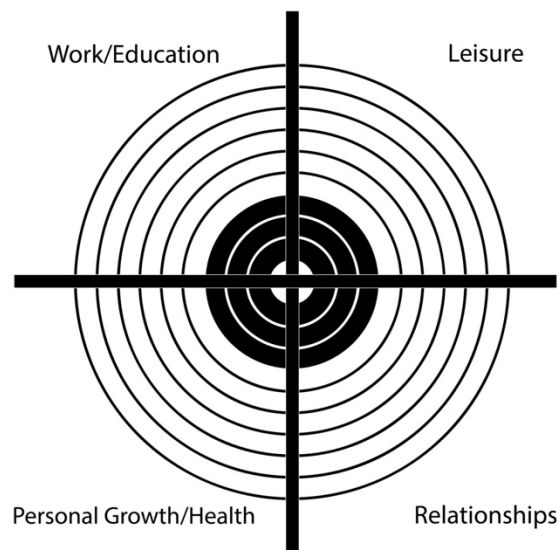
ACT In Practice

Now that I have defined the three pillars of the ACT process, I will discuss what ACT looks like in practice. ACT can be delivered in individual therapy and group setting with similar reported outcomes (Li et al., 2021). ACT is a behavioural-based therapy that uses mindfulness, behavioural change techniques, and acceptance to promote PF in everyday life. ACT is a psychological intervention and daily functioning approach that can be considered a transdiagnostic intervention to promote overall

positive personal growth (Luoma et al., 2007). Each ACT process is targeted in therapy differently. For example, values are defined using a visual representation of a bullseye where clients map their alignment with their values in the four areas of life (relationships, leisure, health/personal growth, and work/school; see Figure 1.4). In this process, individuals also have a chance to identify a barrier to living their life in a way that is fully aligned with their personal values. When helping individuals defuse their inner experiences, ACT draws upon the use of metaphors that help them visualize and defuse their thoughts, so they can see them just as thoughts without needing to hold them true. Finally, practicing mindfulness within sessions and as homework helps individuals learn how to be more present in their daily lives (Luoma et al, 2007). Although ACT provides skills, techniques, and metaphors, there is not a specific set of tangible skills to attain, but rather, ACT is a way of approaching life in a psychologically flexible way.

Figure 1.4

Example of the Values Bullseye Exercise Used in ACT.



Individuals begin ACT with different levels of PF; some may have high levels of PF without exposure to formal ACT. Individuals may find some of the six flexibility processes more challenging than others. Further, it is possible that someone may be inflexible, but because they never faced difficult life circumstances that require a higher level of flexibility, they may not experience a subjective level of distress linked to this inflexibility. To measure an individual's growth through therapy, measures such as the Comprehensive Assessment of ACT Processes (CompACT; Appendix I) that is sensitive to changes throughout psychological treatment with ACT have been developed (Francis et al., 2016). This measure allows a clinician to consider a total score and measure improvements or deficits within each pillar.

Purpose of the dissertation

The purpose of this article-based dissertation is to present my program of research related to life after cancer. Following my research with brain injury survivors, my interest on how PF affects subjective well-being and various aspects of life increased. Because there is not a perfect relationship between measures of health and subjective well-being, I hypothesized that PF would mediate these relationships and account for some of the variability in these variables. For populations in which health concerns are at the forefront, these relationships become more important to subjective well-being. To test this theoretical model (see Figure 1.5), my research program was conceptualized to focus on the same areas of life that are a focus of ACT (Luoma et al, 2007; see Figure 1.4). The studies in my dissertation focus on various aspects of subjective well-being and health-related quality of life.

Each of my dissertation studies focused more closely on which pillars of PF emerge as significant predictors in different areas of life. In this dissertation, Study 1 focused on leisure satisfaction and overall well-being. Study 2 focused on factors affecting work and employment. Study 3 focused on relationships, specifically intimate partner relationships. Measures used in each study can be found in Appendices A- I. Table 1 shows the measures used to examine aspects of Physical and Psychological Health across the three studies. Each study built upon previous research that I have conducted and integrates the growing literature in health psychology and PF. Further, as is seen in Table 1.1, I measured satisfaction with life, depression, anxiety, and PF in each study and, thus, will be able to compare psychological wellness across these samples.

Table 1.1

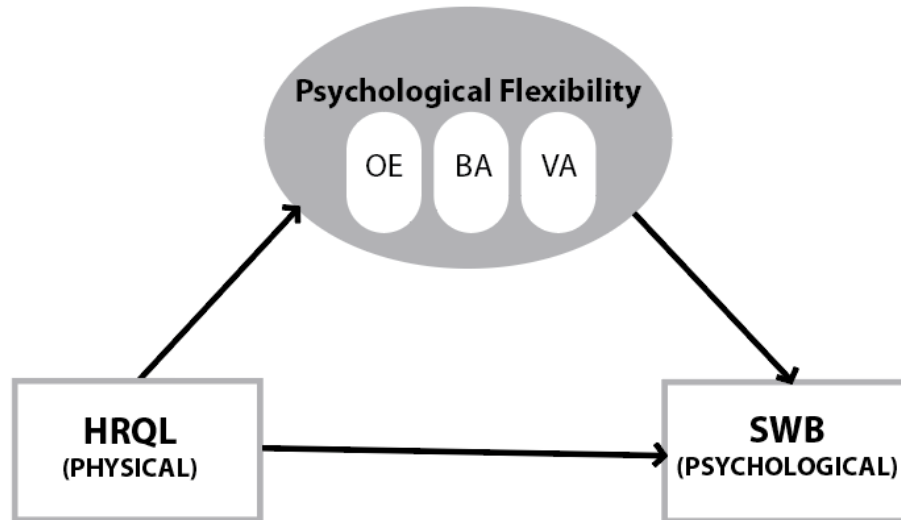
Measures Used in Studies 1 – 3 to Evaluate Variables Associated with Physical and Psychological Health in Cancer Survivors.

Overall Construct	Variable	Measure	Appendix	Study
HRQL (Physical)	Physical Symptoms	ESAS	A	1,2
	Sexual Function	Changes in Sexual Functioning Questionnaire (SFQ)	B	3
SWB (Psychological)	Thriving	Comprehensive Inventory of Thriving (CIT)	C	1
	Satisfaction with Life	Satisfaction with Life Scale (SWLS)	D	1,2,3
	Intimacy	Personal Assessment of Intimacy in Relationships (PAIR)	E	3
	Employment Satisfaction	Quality of Working Life Scale in Cancer Survivors (QWLS-CS)	F	2
	Anxiety	Generalized Anxiety Disorder – 7 (GAD-7)	G	2,3
	Depression	Patient Health Questionnaire (PHQ- 9)	H	2,3
	Sexual Satisfaction	General Measure of Sexual Satisfaction (GMSEX)	J	3
Relationship Satisfaction	General Measure of Relationship Satisfaction (GMREL)	J	3	

This collection of research narrows in on the pillars of PF and explores how these components impact different aspects of life after cancer. Examining these specifically helps narrow in on the individual ACT processes that can be targeted when difficulties emerge in different parts of life in the aftermath of cancer. The program of research depicted here is a representation of my work during my doctoral program.

Figure 1.5

Model Depicting the Mediating Effect of PF on the Relationship Between HRQL and SWB.



Note. PF = Psychological Flexibility; OE = Openness to Experience; BA = Behavioural Awareness; VA = Valued Action; HRQL = Health Related Quality of Life; SWB = Subjective Well Being.

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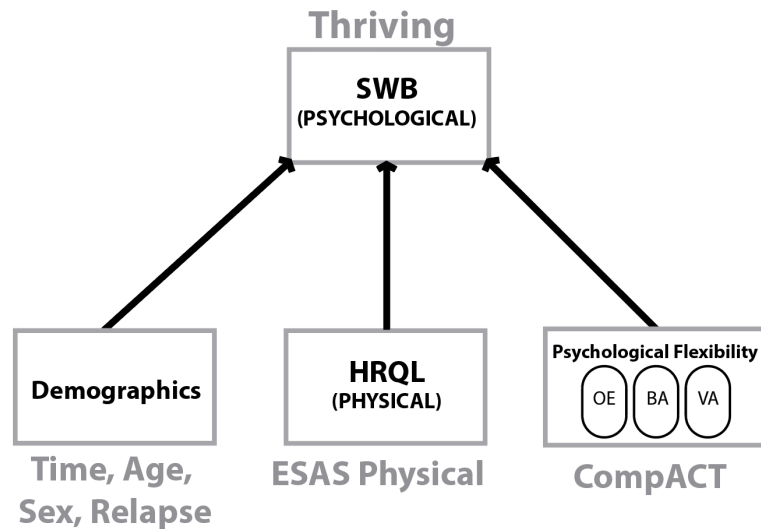
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Chapter Three: A Focus on Subjective Well-being

Study 1 was designed to answer broad questions about the relationships between physical symptoms, SWB, and psychological flexibility (PF) in cancer survivors. This research tested the basics relationships in the theoretical model depicted in Figure 1.5 in detail by examining the relationships between the three pillars of PF and SWB (See Figure 3.1) in cancer survivors.

Figure 3.1

Model Depicting the Purpose of Study 1 to Examine the Influence of the Pillars of PF on Thriving beyond Physical and Demographics Characteristics.



Note. PF = Psychological Flexibility; OE = Openness to Experience; BA = Behavioural Awareness; VA = Valued Action; HRQL = Health Related Quality of Life; SWB = Subjective Well Being.

In this study, we explored how higher PF was related to fewer reported physical symptoms and higher SWB. The conceptualization of this paper was based on the results of my Masters thesis which examined similar relationships in individuals with a

brain injury². To accurately define this population, my supervisor and I invited Dr. Anthony Reiman, an oncologist, to collaborate on this project. The goal was to extend beyond replication of the prior results in a different population. Study 1 examined specifically the pillars of PF. This research was submitted to the journal, *Health Psychology and Behavioral Medicine*, in May 2022 and published in October 2023.

² Proctor, C. & Best, L. (2019). *The Utility of Acceptance and Commitment Therapy (ACT) after Brain Injury: Psychological Flexibility and Well-Being*. Poster presentation at the International Convention of Psychological Science (ICPS). Paris, France.

**Cancer, Now What? A Cross-Sectional Study Examining Physical Symptoms,
Subjective Well-Being, and Psychological Flexibility**

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Note. This paper was originally formatted according to the journal specifications. Some modifications were made to adhere to the formatting of this dissertation.

Abstract

Background: The impact of cancer extends beyond treatment and evaluating the adverse psychological effects in survivors is important. We examined: (1) the relationship between diagnosis, relapse, and subjective well-being using a short and a holistic measure of well-being, including comparisons between our sample and established norms; (2) if reported physical symptoms were related to components of subjective well-being; and (3) if increased psychological flexibility predicted overall subjective well-being.

Methods: In total, 316 survivors completed online questionnaires to assess cancer, physical health (Edmonton Symptom Assessment Scale-R; ESAS-R), subjective well-being (Comprehensive Inventory of Thriving; CIT; Satisfaction with Life Scale; SWLS) and psychological flexibility (Comprehensive Assessment of Acceptance and Commitment Therapy; CompACT).

Results: Relative to ESAS-R cut-points (Oldenmenger et al., 2013), participants reported only moderate levels of tiredness and slightly elevated drowsiness, depression, and anxiety; participants reported more problems with psychological health. SWLS scores were lower than published norms ($M = 18.23$, $SD = 8.23$) and a relapse was associated with the lowest SWLS scores ($M = 16.95$, $SD = 7.72$). There were differences in thriving between participants and age-matched norms (Su et al., 2014). Participants reported lower community involvement, respect, engagement with activities, skill mastery, sense of accomplishment, self-worth, self-efficacy, autonomy, purpose, optimism, subjective well-being, and positive emotions coupled with higher

loneliness and negative emotions. In regression analysis, two components of psychological flexibility, Openness to Experience, $t=2.50$, $p < 0.13$, $\beta=-0.18$, and Valued Action, $t=7.08$, $p < 0.001$, $\beta=-0.47$, predicted 28.8% of the variability in total CIT scores, beyond the effects of demographic and disease characteristics and reported physical symptoms.

Conclusion: Cancer is an isolating experience, with the adverse psychological effects that impact subjective well-being continuing after the cessation of physical symptoms. Specific components of psychological flexibility may explain some variability in thriving beyond disease characteristics and may inform psychological intervention after diagnosis.

Keywords: *cancer, effects of cancer diagnosis, physical symptoms, psychological health, subjective well-being, thriving*

Cancer, now what? Examining physical symptoms, well-being, and psychological flexibility

Each year approximately 1 in 6 deaths result from cancer, making cancer the second leading cause of death worldwide (WHO, 2021). According to the Canadian Cancer Society (2018), almost 50% of Canadians will receive a cancer diagnosis in their lifetime. New medical interventions decreased cancer-related deaths for both males and females, with 63% of people expected to survive more than five years (Brenner et. al., 2020). The “cancer experience” extends beyond diagnosis, treatment, and end of life care. Because an increasing number of patients become cancer survivors, researchers should focus on the complex interplay of physical and psychological factors that impact the long-term effect of a cancer diagnosis on overall physical and psychological health.

Psychological health in individuals with a previous cancer diagnosis is defined by having distress or lack of distress, coupled with levels of “positive well-being and psychological growth” (Andrykowski et al.,2008). This definition extends the importance of psychological health beyond a specific mental health diagnosis. Psychological health in cancer survivors is relevant not only during treatment and immediately following diagnosis but also in the years after treatment. Psychological health of survivors may include anxiety and feelings of hopelessness related to fear of relapse, which can lead to lower psychological health and more serious mental health challenges (Andrykowski, et al.,2008). When cancer and mental health problems, such as depression and anxiety, co-occur, mortality rates are increased and reported quality of life decreases (Pinquart & Duberstein, 2010; Yi & Syrjala, 2017).

Psychological and Physical Well-Being

An individual's sense of well-being involves assessing physical and psychological factors (Diener et al., 1985). Many medical symptoms, such as depression and pain, are affected by both physical (i.e., serotonin levels, injury) and psychological (i.e., lowered social interactions, personality) variables. In general, health-related quality of life is an objective measure that includes an assessment of overall physical and emotional functioning, social engagement, emotional well-being, energy levels, fatigue, pain, and general health perceptions (Hays & Morales, 2001). Quality of life questionnaires ask patients to rate symptoms and include questions such as, *During the past week, have you had trouble sleeping?* or *Did you feel tense?* These questionnaires are modified for specific diseases; for example, a cancer quality of life scale includes cancer-specific questions (i.e., *You worried your family members were at risk of getting cancer*) in addition to questions focused on specific symptoms. In general, quality of life focuses on physical symptoms or limitations in activities of daily life.

Subjective well-being encompasses cognitive (assessment of life circumstances) and emotional (assessment of positive/negative emotions) factors (Tay et al., 2015) that is related to psychological health. Subjective well-being involves the interplay of many factors, including the perception of happiness, social connectivity, and employment satisfaction. Health-related quality of life encompasses overall physical (energy, fatigue, pain, etc.) and psychological functioning (social, emotional well-being), as well as general health perceptions (Hays & Morales, 2001). Measures of subjective well-being focus on the overall perception of one's life, with specific measures focused on the subjective experience of "happiness". Inventories measuring subjective well-being

inventory might include items such as, *Overall, I am happy with my life, or I feel good most of the time* and generally focus on the overall assessment of specific areas of one's life (including Personal Autonomy, Mastery of Skills, Social Connectivity, Positive and Negative Emotionality; see Su et al., 2014). In short, measures of subjective well-being ask how much respondents are bothered or impacted by aspects of their life and thus measure how they currently "feel". An individual may have poor physical health and yet still report that they are happy with their life and adjust their expectations based on their limitations while still being satisfied overall.

Although there are moderate associations between quality of life and satisfaction with life (SWL), researchers consistently report that high health-related quality of life does not necessarily predict SWL. Health researchers often focus on specific mental health problems (i.e., anxiety, depression) to examine if psychological symptomatology is co-morbid with specific medical conditions and associated symptoms (limited mobility, pain, nausea). Examining these specific mental health problems may not give us the whole picture of an individual's overall psychological health (Andrykowski, et al., 2008). In this study, we examined both reported physical symptoms which is an objective measure of HRQL and subjective well-being using a brief and a holistic measure to capture psychological health.

Although the cancer journey begins at diagnosis, it does not typically end after treatment, with psychological effects that can last for years after diagnosis. It is important to consider how outcome factors, such as SWL, change as time passes. For example, cancer patients often report moderate to moderately high loneliness levels, which increase with time since the initial diagnosis (Deckx et al., 2014). It is possible

that it is not only passing time that influences SWL, but events and experiences that occur across different times. Lorenzo-Seva et al. (2019) found that cancer survivors had slightly elevated SWL scores compared to healthy controls, with many participants endorsing the statement “life has given them a second chance”. Using a large sample of cancer survivors ($N = 6,389$) who completed questionnaires over three periods spanning 20 years, Ellis et al. (2019) found lowered satisfaction with health and sex life, but satisfaction with all other domains remained the same or improved suggesting satisfaction with all aspects of life may not always decrease after a cancer diagnosis. Thus, we examined how specific aspects of subjective well-being, such as overall satisfaction, relationships, engagement, and autonomy, varied after a cancer diagnosis.

Can Increased Psychological Flexibility Improve Psychological Health?

A cancer diagnosis can cause severe psychological distress and, for some individuals, change how they perceive and cope with their life circumstances (Boykin et al., 2019). These negative changes impact overall psychological health during diagnosis, treatment, and recovery. Psychological flexibility (PF; Francis et al., 2016; Swash et al., 2017) is a modifiable factor defined by how people focus on present circumstances and prioritize thoughts, emotions, and behaviours aligned with personal values and goals. PF allows individuals to engage with their trauma and increase self-awareness to prevent their diagnosis from defining their sense of self (Boykin et al., 2019). Integrating aspects of PF into daily life may help an individual focus on the present and more effectively cope with trauma (Droutman et al., 2018).

According to Swash et al. (2017), PF can be improved through Acceptance and Commitment Therapy (ACT), which increases resilience and focuses on teaching

individuals how to prevent negative thoughts and feelings from becoming a central part of one's personality. Considering this evidence-based method used to improve PF, it is important to understand how it relates to specific outcomes in this population and which components of PF are related to positive outcomes such as increased subjective well-being. Resiliency represents an individual's ability to adapt in a positive way to challenging experiences (Bonanno, 2004). PF and resiliency share commonalities in their focus on values-based actions despite obstacles, however, PF also includes components of cognitive diffusion, mindfulness, and identity. Unlike Cognitive Behavioural Therapy (CBT), the ACT process is not focused on eliminating or changing negative thoughts; instead, an individual may have persistent negative thoughts and yet be able to interact flexibly with both positive and negative inner experiences to live a life that is in line with their core values (Kashdan & Rottenberg, 2010). This value-based action is beneficial to individuals living with chronic conditions such as pain (Wicksell, et al., 2008) and autoimmune disorders (Hebert & Best, 2021).

Research suggests that ACT can help cancer patients increase their overall PF, effectively lowering physical and psychological symptoms (Hulbert-Williams et al., 2015). Francis et al. (2016) and Swash et al. (2017) reported that increased psychological flexibility is associated with lower levels of psychological distress and higher quality of life. Given these positive effects, this practice can help cancer patients reduce psychological distress, including depression, anxiety, hopelessness, and suicidal ideation. A recent systematic review concluded that ACT can be a useful component in the future of cancer care by improving depression symptoms, anxiety, stress, fear, and improve overall quality of life (Li et al.,2020). Research supports its use both in late-

stage ovarian cancer survivors (Rost et al., 2012) and in group settings for cancer survivors transitioning from the treatment phase to the post-treatment phase (Arch & Mitchell, 2016). An extensive meta-analysis published in early 2021 shows that ACT presented both in-person and through telephone-based delivery is efficacious at decreasing overall distress in individuals who have received a cancer diagnosis. In this meta-analysis, the number of treatment weeks ranged from 4 – 12, with longer iterations yielding more positive outcomes. Younger individuals were more likely to benefit from this type of intervention; however, the method it was delivered (in person, group, online) did not significantly impact the outcomes (Li et al., 2021). By fostering acceptance and creating more conscious, present, and flexible approaches to psychological experiences, ACT can help cancer survivors navigate their return to everyday life despite the fear of the unknown, anxieties, and depression symptoms. These short, flexible intervention styles are adaptable to challenges individuals may encounter after a cancer diagnosis, including fatigue and reduced mobility. Improving psychological flexibility may help individuals with a cancer diagnosis accept both positive and negative emotions without identifying them as “good” or “bad”. Perhaps most importantly it can foster diffusion (e.g., move from “I am a cancer patient/diseased” to “I am a person with a cancer diagnosis”) and focus on identifying their core values and learning to live their lives in line with those values despite obstacles.

Thus far, research has failed to include adequate analyses on which components of psychological flexibility are most salient to those who have received a cancer diagnosis. Considering diminished physical and mental resources a client may have

after a cancer diagnosis it may be valuable for clinicians to narrow their focus in therapy that are most useful to this specific population. In many ways, ACT is a framework for approaching other forms of therapy, including CBT (Hayes et al., 2006) and understanding the relationships between the components of psychological flexibility and subjective well-being can help inform clinical judgment.

Purpose of the Current Study

The current study was part of a more extensive study designed to examine how cancer affects psychological health at diagnosis, during treatment, and during recovery and remission. In the current study, our objectives were to examine (1) how having a previous cancer diagnosis and relapse relates to subjective well-being, including how the current sample's subjective well-being compares to established norms; (2) how reported physical symptoms are related to components of subjective well-being in this sample, and (3) the positive predictive qualities of psychological flexibility, the targeted outcome of ACT, on overall subjective well-being beyond reported physical symptoms, demographics, and diagnosis variables (time since diagnosis, relapse). Additionally, we were interested in examining how time since diagnosis relates to psychological health; specifically, we were interested in determining whether reported physical and psychological health was different depending on the time that reportedly passed since diagnosis.

Method

Recruitment

Participants were recruited from “private/closed” Facebook support groups. These support groups are open to individuals who have received a cancer diagnosis in

the past or are supporting someone who has received a cancer diagnosis. These groups often have administrators who also have a history of cancer diagnosis. Advertisements were posted in various Facebook groups and participants were offered a chance to win an Amazon gift card for their participation. Participants who were over the age of 18 and reported having a previous cancer diagnosis were invited to take part in the survey. Survey responses were collected using Qualtrics, which is a secure online survey tool. This pool of participants is representative of a group of individuals who have received a cancer diagnosis in the past, are a part of these online support communities, and have the capacity to complete the survey independently.

Materials

Given the long-term physical effects of cancer and its treatment, the completed questionnaire package included measures to assess physical symptoms with the Edmonton Symptom Assessment Scale (ESAS; Chang, et al., 2000), SWL with the Satisfaction with Life Scale (SWLS; Diener et al., 1985) and thriving with the Comprehensive Inventory of Thriving (CIT; Su et al., 2014), which both measure subjective well-being, and PF measured using the Comprehensive Assessment of Acceptance and Commitment Therapy Processes (CompACT; Francis et al., 2016). Using these measures, we will focus on overall psychological (Diener et al., 1985; Su et al., 2014) and physical well-being (Aaronson et al., 1993; Chang et al., 2000) in individuals who have had a cancer diagnosis.

Edmonton Symptom Assessment Scale (ESAS-R; Chang et al., 2000)

This scale is a 9-item questionnaire that uses a 12-point rating scale. This questionnaire has nine symptoms (pain, activity, nausea, depression, anxiety,

drowsiness, lack of appetite, well-being, and shortness of breath) that the individual rates on a scale from 0 (none) to 11 (worst possible). This scale has been widely used in over 20 languages in the last 25 years and has sound psychometric properties. Specifically, the ESAS-R has high internal validity (Cronbach Alpha, .79), test-retest validity ($r = .85$ from day 2-7) and shows convergent validity with pain scales (Hui & Bruera, 2017). The sum of the nine scores becomes the individual's ESAS-R distress score, and a higher score indicates multiple symptoms. The ESAS-R has an overall Cronbach alpha of .79 and test-retest coefficients ranging from .86 to .97 (Chang et al., 2000). In the current study, we used only the physical symptom subscale scores. The reliability of this measure was high when the overall distress score that includes all items was used, Cronbach's alpha = .87.

Satisfaction With Life Scale (SWLS; Diener et al., 1985)

The SWLS is a five-item questionnaire that uses questions such as "I am satisfied with my life," which are scaled on a 7-point Likert-type scale ranging from strongly disagree to strongly agree. The SWLS has a possible range of 5 to 35, with higher scores indicating higher satisfaction. The Cronbach alpha was found to be .87, while the test-retest coefficient was .82 (Diener et al., 1985). In the current study, the reliability of this measure was high, Cronbach's alpha = .91. According to Diener, scores greater than 25 indicate high satisfaction in all areas of life. Scores between 20 and 24 show a general SWL, with some domains that are perceived as needing improvement. Individuals who score less than 20 are dissatisfied with at least one area of their life; individuals with chronic illness typically report lower than average life satisfaction. Including the SWLS in this study allowed us to compare our sample to published norms

on the total score which is not available with the Comprehensive Inventory of Thriving scale, an instrument that provides more breadth to our assessment of well-being.

Comprehensive Inventory of Thriving (CIT; Su et al., 2014)

The CIT is a 54-item questionnaire with a 5-point Likert scale ranging from strongly disagree to strongly agree. This measure has 18 subscales, used to measure the broad concept of well-being and thriving. Each of the 18 subscales assesses an aspect of positive functioning, characterised by seven dimensions of psychological health (i.e., supportive and enriching relationships, interest in daily activities, feelings of meaning and purpose in life, a sense of accomplishment, subjective well-being, feelings of control and autonomy, and optimism). The CIT has been reported as having internally consistent scores, with alpha coefficients ranging from .71 to .96, and this measure was also reported as having good test-retest reliability ($r = .57$ to $r = .83$) over the span of four months. The CIT has demonstrated good convergent validity with other measures of psychological well-being (Flourishing Scale, Satisfaction with Life, Life Orientation Test, Core Self-Evaluation Scales). This holistic view of well-being not only predicts positive functioning and health outcomes beyond other measures of well-being, but also shows higher incremental validity when predicting objective and self-reported health outcomes. In the current study the reliability of all subscales ranged from .70 - .91.

Acceptance and Commitment Therapy Processes (CompACT; Francis et al., 2016)

The CompACT uses a 23-item questionnaire that measures an individual's ability to be psychologically flexible using a 7-point scale from 1 (strongly disagree) to 7 (strongly agree). The CompACT includes three interrelated but distinguishable subscales that contain both negative and positively framed statements; Openness to

Experience (e.g., *Thoughts are just thoughts- they don't control what I do.*); Behavioural Awareness (e.g., *I rush through meaningful activities without being really attentive to them.*); and, Valued Action (e.g., *I can identify the things that really matter to me in life and pursue them.*) that are measured on a 5-point Likert scale (1= *strongly disagree* to 5 = *strongly agree*).

The Cronbach alpha for this measure was found to be .91, showing good reliability and high concurrent and convergent validity. In the current study, the reliability of only two of the three subscales of the CompACT were high: Behavioural Awareness Cronbach's alpha = .84 and Openness to Experience Cronbach's alpha = .88. The Cronbach's alpha for Valued Action was acceptable at .57.

Procedure

The University of New Brunswick Research Ethics Board (REB 013-2019) reviewed and approved this project. All data was collected using Qualtrics, which allows for the secure collection of online questionnaire data. Data was collected between April 2019 and March 2020; data collection ended prior to the start of the COVID-19 pandemic. After reading preliminary information and signing an informed consent form, participants completed the questionnaire package. Demographic and disease specific questions were always presented first. The other questionnaires were presented in randomized order. All measures were provided in English. After completing the questionnaire package, participants had the opportunity to sign up to be included in a random draw for a gift card.

Data Analysis Strategy

Prior to conducting data analysis, the data were examined to identify outliers and missing values. Participants who did not complete more than 20% of items on any given measure were excluded and their scale scores were not included in relevant analyses. Participants were retained for analyses of the measures for which they completed at least 80% of the items. Participants who did not complete the demographics questionnaires were excluded. Prior to data collection, a power analysis was conducted using G-Power to determine adequate sample size. Given the current sample size ($N = 316$) and a medium effect size ($f^2 = .15$) the achieved power was .99. We tested the assumptions underlying all statistical tests (i.e., normality, linearity). To examine how a cancer diagnosis impacts physical and psychological health (Research Objective 1 and 2), descriptive statistics for the overall sample were calculated and t-tests were used to compare the sample scores to published norms. Comparing our results with the published norms gives us a numerical representation of how our sample of individuals with a cancer diagnosis compare to samples drawn from the general population. Pearson Product Moment Correlation Coefficients were used to assess the association between time since diagnosis and variables associated with psychological health. To explore the unique predictive relationship that psychological flexibility and severity of reported physical symptoms has on overall Thriving (subjective well-being) beyond demographics (sex, age) and disease characteristics (time since diagnosis, relapse), a hierarchical linear regression predicting Thriving was conducted (Research Objective 3).

Results

Participants

In total, 316 participants completed the questionnaire package (67% female). In this sample, the females were slightly younger than the males, $M_{\text{female}} = 52.49$, $SD = 13.26$ vs. $M_{\text{male}} = 56.02$, $SD = 12.47$. Individuals reported that, on average, it had been 6.55 years since diagnosis ($SD = 8.01$), and the average age at diagnosis was 46.32 years. A summary of the reported cancer types, relapse, and prognosis is provided in Table 3.1. In total, 83 participants (23.7%) reported a relapse, with almost 80% of relapses occurring within two years of treatment. Most participants reported cancer treatments; 233 had surgery, 176 had radiation therapy, 220 had chemotherapy, 32 had hormone therapy, 43 reported treatments with another form of anti-cancer drugs, 20 were treated through naturopathic or homeopathic methods, and 23 used cannabis-related treatments. Participants were able to select multiple treatment types. In this study we were interested in subjective well-being and quality of life after cancer. In this sample, these variables were similar, regardless of cancer stage at diagnosis and prognosis. A relapse was associated with lower wellness and thus, where appropriate, relapse was considered in statistical tests. Most participants were in a long-term relationship (65% were married), 10.3% were divorced, and 10% were single. Although participants from many countries completed the questionnaire package, most participants lived in the United States ($n = 189$; 54%) or Canada ($n = 60$; 17.1%).

Table 3.1*Summary of cancer types reported by participants (N = 350)*

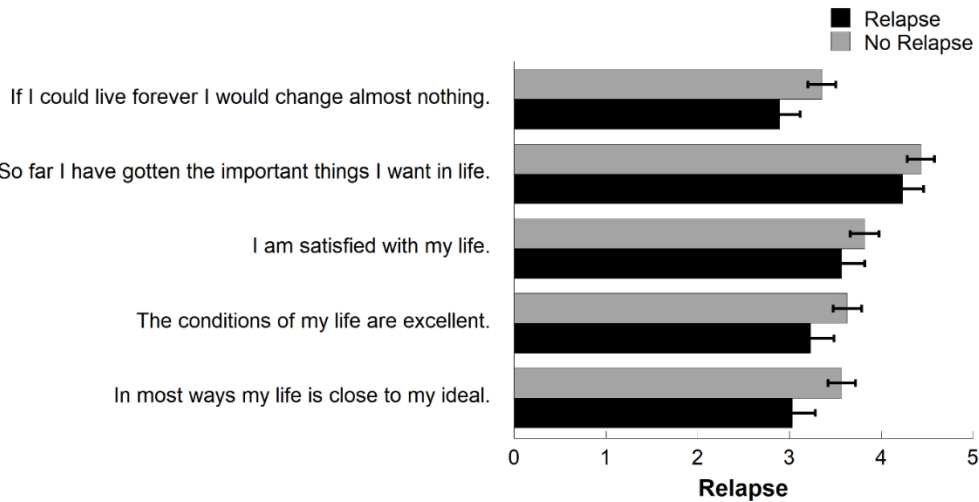
	Number Reported (Percentage)
Cancer Type	
Bladder	11 (3.1%)
Breast	57 (16.2%)
Colon/Rectal	51 (14.6%)
Head/Neck/Throat/Mouth	74 (21.4%)
Kidney	26 (7.4%)
Lung	15 (4.2%)
Prostate	16 (4.4%)
Thyroid	20 (5.7 %)
Ovarian	19 (5.4%)
Cervical	14 (4 %)
Other	54 (15.4%)
Did a Relapse occur?	
Yes	83 (23.7%)
No	242 (69.1%)
At the time of initial diagnosis, how long were you expected to live?	
More than 5 years	132 (18.5%)
5 years or less	47 (13.4%)
I don't know	141 (40.2%)

Research Question 1: Psychological Health in Cancer Patients

To assess our first objective, the average SWLS scores of individuals with a cancer diagnosis were compared to published norms (see Diener, 2006). In this sample, the average SWLS was 18.23, indicating slight dissatisfaction with life. Specifically, 55.6% had scores less than 20, 16.2% were between 20-24, and 28.2% reported SWLS scores above 25. Further, Figure 1 shows the average SWLS scores for each item by relapse. Although scores for individuals who have relapsed were lower on each question, the overlap of the confidence intervals indicate that the differences in scores did not represent statistically significant differences (see Figure 3.1). This was important to investigate if there was a significant difference between these subgroups in this population because there was concern that a relapse would impact overall SWLS scores. Interestingly, the correlation between SWLS and years since diagnosis was not statistically significant ($r = -.01$), indicating that, for this sample, life satisfaction did not change as the reported time since diagnosis increased. Although the lowest SWLS were reported by respondents who reported a relapse ($M = 16.95$, $SD = 7.72$), these scores were not statistically lower than individuals with a single diagnosis.

Figure 3.1.

Mean scores (standard error) on Satisfaction with Life Scale Items as a Function of Cancer Relapse.



Alt text. Bar graph comparing responses on the Satisfaction with Life Scale given by participants reporting a relapse and participants reporting a single diagnosis without relapse. The graph shows lower scores from participants who reported a relapse but overlapping confidence intervals indicate this is not a significant difference.

The CIT provides a multifaceted measurement of positive functioning and recognizes that individuals who thrive do well in different areas of life. Table 3.2 presents the mean subscale scores for the current sample (overall and by time since diagnosis) and includes the published norms for individuals between 40 – 59 years (Su et al., 2014; http://labs.psychology.illinois.edu/~ediener/CIT_BIT.html). Overall, participants with a cancer diagnosis had lower scores on most CIT subscales. Table 3.1 shows the subscales with significant differences from the norms with effect sizes noted.

All effect sizes were small or very small except for engagement (Cohen's $d = .58$) and Negative Feelings (Cohen's $d = .97$). Further, a correlational analysis indicated that time since diagnosis was not associated with most thriving subscales. Although CIT-Engagement scores were higher in the years reported after diagnosis, $r = .15, p = .04$, CIT-Respect decreased, $r = -.18, p = .01$. The lower perceived respect of individuals who had survived more than five years post diagnosis suggests that the effects of a cancer diagnosis are cumulative and extend beyond the period of initial diagnosis and treatment. In addition, a series of t-tests were conducted to examine if a cancer relapse was associated with lower thriving scores. Except for individuals who had a relapse, who reported significantly higher average support, $t(218) = 2.41, p = .02$, thriving subscale scores were not related to the cancer relapse variable.

Table 3.2

Mean scores (standard deviation) on the Comprehensive Inventory of Thriving

Subscales. T-tests were done to examine differences between the overall sample means and CIT norms (Su et al., 2014).

CIT Subscale	Norm s	Time Since Diagnosis				Overall Mean
		< 2 years N = 23	2 – 5 years N = 101	5 – 10 years N = 36	> 10 years N = 37	
Support	4.20 (0.82)	4.17 (0.61)	4.12 (0.77)	4.19 (0.57)	3.92 (0.71)	4.10 (0.71) ^{*a}
Community	3.36 (1.01)	3.00 (0.90)	3.08 (0.96)	2.96 (1.08)	3.25 (0.89)	3.08 (0.96) ^{**} * b
Trust	3.49 (0.84)	3.54 (0.81)	3.47 (0.79)	3.56 (0.68)	3.40 (0.70)	3.48 (0.76) ^{NS a}
Respect	3.98 (0.73)	3.94 (0.37)	3.87 (0.65)	3.85 (0.52)	3.59 (0.64)	3.82 (0.60) ^{**} * b
Loneliness	2.47 (1.09)	2.54 (0.98)	2.60 (1.11)	2.57 (0.91)	2.78 (1.23)	2.62 (1.08) ^{*a}
Belongingness	3.36 (0.97)	3.38 (0.92)	3.42 (0.83)	3.47 (0.87)	3.23 (0.84)	3.39 (0.85) ^{NS} a
Engagement	3.93 (0.73)	3.25 (0.93)	3.41 (0.72)	3.56 (0.68)	3.82 (0.68)	3.50 (0.75) ^{**} *c
Skills	3.68 (0.95)	3.04 (0.89)	3.16 (0.99)	3.42 (1.10)	3.57 (0.92)	3.27 (1.00) ^{**} *b
Learning	3.77 (0.80)	3.59 (0.95)	3.65 (0.86)	3.80 (0.81)	3.67 (0.72)	3.67 (0.83) ^{*a}
Accomplishment	3.18 (1.09)	2.79 (0.98)	2.81 (1.09)	3.22 (0.96)	2.96 (1.03)	2.91 (1.05) ^{**} *b
Self-Efficacy	4.02 (0.84)	3.65 (1.05)	3.73 (0.87)	3.97 (0.81)	3.88 (0.59)	3.79 (0.84) ^{**} *b
Self-Worthy	3.74 (0.92)	3.35 (0.96)	3.38 (0.95)	3.68 (0.91)	3.61 (0.76)	3.47 (0.91) ^{**} *b
Lack of Autonomy Meaning	1.95 (0.94)	2.29 (1.11)	2.13 (0.93)	2.01 (0.80)	2.12 (0.94)	2.12 (0.93) ^{***a}
	3.67 (1.03)	3.06 (0.97)	3.31 (0.93)	3.63 (0.90)	3.44 (0.99)	3.37 (0.95) ^{**} *b
Optimism	3.71 (1.05)	3.38 (0.94)	3.34 (0.99)	3.67 (0.91)	3.56 (0.79)	3.45 (0.94) ^{**} *b

Satisfaction w/ Life	3.29 (0.98)	2.80 (1.13)	2.92 (1.10)	3.25 (0.98)	3.09 (1.09)	3.00 (1.08)** *b
Positive Feelings	3.60 (1.09)	3.02 (1.00)	3.21 (1.05)	3.45 (0.94)	3.40 (0.93)	3.27 (1.01)** *b
Negative Feelings	2.68 (0.54)	3.41 (0.96)	3.46 (1.12)	3.66 (1.00)	3.52 (1.04)	3.50 (1.06)** *d

Note. Higher scores indicate that participants strongly agreed with items (range 1 – 5);

* $p < .05$; ** $p < .01$; *** $p < .001$. ^a effect size Cohens $d < .20$ ^b small effect size,

Cohens $d = 0.20 - 0.49$; ^c moderate effect size, Cohens $d = 0.50 - 0.79$; ^d large effect size, Cohens $d > 0.80$ (Cohen's d interpretation; Sullivan & Feinn, 2012).

Physical Well-Being in Individuals Diagnosed with Cancer

To address our second objective, we used the Edmonton Symptom Assessment Scale (ESAS-R) to assess physical and psychological symptoms. Scores on ESAS-R range from 0 (no suffering) to 10 (worst possible suffering) and are commonly used to describe how specific symptoms affect daily life. Correlations between the ESAS-R subscales and CIT: Thriving and CompACT subscales are reported in Table 3.3.

Overall, as expected, there were statistically significant inverse correlations between CIT subscale scores and all aspects of ESAS-R physical and psychological health.

Further, greater CompACT scores were associated with less severe physical and psychological symptoms. These correlations were moderate to large and were all significant at the $p < .01$ level.

Table 3.3

Correlations between the Edmonton Symptom Assessment Scale (ESAS-R) Subscales and Variables of Interest.

	CIT	CompACT Subscales		
		OE	BA	VA
ESAS-R Total	-.647**	-.541**	-.465**	-.494**
Pain	-.382**	-.297**	-.203**	-.260**
Tiredness	-.541**	-.413**	-.308**	-.419**
Drowsiness	-.463**	-.355**	-.305**	-.308**
Nausea	-.257**	-.325**	-.273**	-.226**
Lack of Appetite	-.331**	-.273**	-.368**	-.301**
Shortness of Breath	-.264**	-.243**	-.199**	-.198**
Depression	-.705**	-.569**	-.460**	-.518**
Anxiety	-.568**	-.512**	-.432**	-.476**
Well-Being	-.601**	-.392**	-.257**	-.473**
CIT Total		.594**	.498**	.726**

Note. ESAS-R Total = Edmonton Symptom Assessment Scale – Revised; CIT = Comprehensive Inventory of Thriving; OE = Openness to Experience; BA = Behavioural Awareness; VA = Valued Action. * $p < .05$; ** $p < .01$; *** $p < .001$

Table 3.4 presents the published cut-off points indicating symptom severity and the potential need for follow-up care (Oldenmenger et al., 2013) and the means of our participants for each ESAS-R item. Overall, current participants reported mild to moderate ESAS-R symptoms. Interestingly, individuals who reported a cancer relapse

did not report more problems on any of the ESAS-R symptoms and had a total distress score that was not significantly higher than individuals who did not report a relapse ($M = 3.32$ vs. 3.39 , $F = .033$, $p = .86$). Further, correlational analyses indicated no statistically significant associations with any ESAS-R scores and time since diagnosis, indicating that ESAS-R scores were stable over time.

Table 3.4

Mean (standard deviation) Scores on the ESAS-R of the Current Sample as a Function of Time Since Diagnosis. Oldenmenger et al. (2013) Cut-off Points are Included for Comparison Purposes.

	CUT POINTS	Time Since Diagnosis				Total Score
		<2 Yrs. N = 23	2 – 5 Yrs. N = 101	5-10 Yrs. N = 36	>10 Yrs. N = 37	
Pain	Mild = 1 -4	2.88	2.97	2.89	2.38	2.83
	Mod = 5-6	(2.54)	(2.28)	(2.58)	(2.59)	(2.66)
	Severe = >7					
Tiredness	Mild =<4	6.21	5.21	4.76	4.21	5.05
	Mod = 4	(2.32)	(2.63)	(2.69)	(2.99)	(2.72)
	Severe = 7-8					
Nausea	Mild =<4	1.12	1.18	0.70	0.85	1.02
	Mod = 4	(1.39)	(2.23)	(1.73)	(1.84)	(1.99)
	Severe = 5-7					
Depression	>4 further screening	3.46	3.82	2.49	3.23	3.43
		(2.89)	(3.21)	(2.85)	(3.20)	(3.13)
Anxiety	Mod = 4	3.46	4.02	3.11	3.56	3.70
	Severe = 6-7	(2.87)	(3.23)	(2.69)	(3.24)	(3.10)
Drowsiness	Mod = 5	5.54	5.06	4.59	4.58	4.94
	Severe = 7	(2.27)	(2.81)	(2.63)	(3.00)	(2.76)
Appetite	>4 further screening	3.46	2.42	1.97	1.74	2.33
		(3.30)	(2.90)	(3.02)	(2.59)	(2.93)
Shortness of Breath	Mod = 4	2.71	3.13	2.30	2.95	2.90
	Severe = 6	(2.20)	(2.49)	(2.18)	(2.51)	(2.41)
Well-Being	Mod = 6	5.33	4.59	3.89	3.67	4.38
	Severe = 7	(2.20)	(2.67)	(2.55)	(2.25)	(2.57)
ESAS-R Total		3.80	3.60	2.97	3.01	3.40
		(1.62)	(1.91)	(1.97)	(2.00)	(1.92)

Note. ESAS-R Total = Edmonton Symptom Assessment Scale – Revised; Higher scores are indicative of more problems.

The Influence of Psychological Flexibility

A hierarchical linear regression was conducted to examine how psychological flexibility was related to subjective well-being beyond the effects of physical health. For this analysis, the total score on the CIT was calculated and used as the criterion variable. Biological sex, age, years since diagnosis, and relapse (yes, no) were entered in Block 1. The ESAS-R subscale scores related to physical health (pain, tiredness, drowsiness, nausea, lack of appetite, shortness of breath) were entered in Block 2, and CompACT subscales were entered in Block 3. The overall model was statistically significant, $F(13, 173) = 20.88, p < .001$, and accounted for 62.2% of the variability in Thriving (see Table 3.5). Block 1 was not statistically significant ($p = .95$), indicating that neither basic demographic nor cancer-related variables accounted for significant variance. Block two variables contributed significantly to the model (R^2 change = 33.2%), with Tiredness (lack of energy) emerging as a significant predictor, $t = -3.78, p < 0.001, \beta = -0.38$). In Block 3, an additional 28.6% of the variability was accounted for, with Openness to Experience, $t = 2.50, p = .03, \beta = -.18$, and Valued Action, $t = 7.08, p < .001, \beta = -.47$, contributing to the model.

Table 3.5*Summary of the Hierarchical Regression Analysis for Predicting Thriving (N = 173)*

Variable	Model 1			Model 2			Model 3		
	<i>B</i>	<i>SE</i> <i>B</i>	β	<i>B</i>	<i>SE</i> <i>B</i>	β	<i>B</i>	<i>SE</i> <i>B</i>	β
Constant	3.328	.202		4.210	.199		4.695	.185	
BLOCK 1									
Sex	.053	.108		-.028	.091	-.020		.071	
			.038				.001		.001
Age	.001	.004		-.002	.003	-.041		.003	
			.029				.004		.087
YSD	-.001	.006		-.001	.005	-.007		.004	
			.007				.004		.052
Relapse (Y/N)	-.030	.106		-.017	.090	-.013		.069	
			.022				.053		.039
BLOCK 2									
Pain				-.030	.017	-.130		.013	
							.019		.085
Tiredness				-.086	.023			.018	
						.382*	.037		.165
Drowsiness				-.022	.021	-.104		.016	
							.023		.105
Nausea				.004	.025	.012		.019	
									.035
Lack of Appetite				-.016	.016	-.073		.013	
									.001
Shortness of Breath				-.010	.020	-.039		.016	
							.005		.018
BLOCK 3									
Openness to Experience								.038	
							.085		.164*
Behavioural Awareness								.029	
							.010		.024
Valued Action								.037	
							.269		.486**
<i>R</i> ²	.003			.335			.615		

<i>F</i> for Change	.124	13.555**	38.732**
in R^2			

Note. YSD: Years Since Diagnosis; Significant F and β values are in boldface * $p < .05$,
 $p < .001$

Discussion

Overall, current results suggest that the psychological effects of a cancer diagnosis extend beyond the period of initial treatment. We found that survivors' average SWL and psychological thriving was somewhat lower than published norms with the largest differences seen in the Engagement and Negative Feelings subscales of the Comprehensive Inventory of Thriving (see Diener et al., 1985; Diener, 2006; Su et al., 2014). The Comprehensive Inventory of Thriving includes subscales to provide a more detailed assessment of different aspects of psychological health, including relationship satisfaction, skill mastery, autonomy, and emotionality. Compared to age norms published by Su et al. (2014), survivors reported lower community support, respect, social engagement, higher loneliness, and more negative emotions. Likely due to their lower community support and tendency to not engage in social activities, survivors reported less skill mastery and had a lower sense of accomplishment, self-efficacy, and self-worth than individuals who have not faced a cancer diagnosis. Overall, the participants who reported having a previous cancer diagnosis reported lower subjective well-being compared to norms. This result was not surprising. This study aimed to further examine variability within this sample; a cancer diagnosis is not a modifiable factor, however psychological factors such as psychological flexibility may be.

As would be expected, individuals who reported a relapse had similar (and lower) psychological health than survivors who had a single diagnosis. Further, analyses indicated that overall reported psychological health did not change based on the reported years since diagnosis, suggesting that the psychological consequences of a cancer diagnosis are often present at all stages, even after the cessation of treatment.

These results extend the findings of Schumacher et al. (2013) who reported long-lasting psychological distress, specifically anxiety, in survivors. Although Schumacher et al. did not find lower subjective well-being in the years after treatment, the differences could be due to the composition of the sample; 42% of Schumacher et al.'s participants were within four years of diagnosis, compared with approximately 64% of the current sample. Thus, it is possible that with a broader time frame results would differ. Overall, the current results suggest that, relative to normative samples, psychological health is lower in cancer survivors at all points after diagnosis.

In the current study, participant's ESAS-R scores (Chang et al., 2000) were indicative of mild to moderate physical symptoms (Oldenmenger et al., 2013). Symptom severity did not vary based on the reported time since initial diagnosis. Further, and contrary to expectations, a disease relapse was not associated with increased reported symptom severity. As expected, we found moderate correlations between physical symptoms and psychological health. Our results replicated Avis and their colleagues (2005) who reported that, in the years after treatment, regardless of physical health improvements, levels of psychological distress do not necessarily improve (Avis et al., 2005). Even though survivors reported only mild to moderate medical symptoms (see Table 3.2; Oldenmenger et al., 2013), they reported lower subjective well-being (SWL, psychological thriving) than normative samples (Diener et al., 1985; Su et al., 2014). These findings support large-scale studies that highlight direct and indirect links between physical and psychological wellness (see Ohrnberger et al., 2017). Ohrnberger and colleagues used a mediation model and reported that the

relations between psychological and physical health are mediated by lifestyle factors, including increased physical activity and social connections.

The Benefits of Psychological Flexibility

We focused on how the components of psychological flexibility are related to overall psychological thriving in the years that follow a cancer diagnosis. Current results indicate moderate correlations between psychological flexibility and physical and psychological symptoms, which replicate the meta-analysis conducted by Hayes et al. (2006) suggested that the change process that occurs through ACT by increasing psychological flexibility is related to positive physical and psychological outcomes. In addition to higher psychological distress, cancer survivors report a variety of concerns, including fear of recurrence (van de Wal et al., 2016), worries about the health of family members (Avis et al., 2005), and side effects of treatment (i.e., urinary and bowel incontinence; Chambers et al., 2017). The way individuals approach their lives and engage with their environments dramatically impacts their overall well-being despite the effects of inevitable variables, such as the passing of time, cancer relapse, or severity of physical ailments related to health. ACT aims to increase psychological flexibility through targeting three specific areas: Openness to Experience; Valued Action; and Behavioural Awareness (Soo et al., 2011).

In the regression model predicting overall thriving, we found that demographic variables (age, sex) and disease related variables (time since diagnosis, relapse) did not contribute significantly to the model. Further, after controlling for disease and demographic variables, the only physical variable contributing to the model was ESAS-R: Tiredness (lack of energy), which suggests a significant physical barrier for

individuals. Tiredness is a symptom of many medical illnesses and psychological ailments. It can often be challenging to tease apart which tiredness (lack of energy) results from physical conditions and which components are related to psychological distress. Despite the contribution of tiredness, it is important to note that drowsiness/sleepiness was not a significant contributor to this model. Patient perspectives on the ESAS-R have indicated that there are physical and psychological components to both descriptors, leading to some confusion about how to differentiate these two symptoms (Watanabe, et al., 2009).

In this study, Openness to Experience and Valued Action significantly predicted overall thriving beyond demographic, cancer, and physical symptom variables. Openness to Experience is defined by one's ability to accept all positive and negative thoughts without attaching a positive or negative label to them. ACT therapy programs focuses on this ability and teaches individuals to discriminate between constructive and non-constructive thoughts. Skills such as these encourage individuals to change their focus from using maladaptive problem-solving coping strategies to descriptive-engaged styles of coping (Soo et al., 2011). Cognitive defusion is defined by the ability to be aware of thoughts while not trying to change them. Cognitive defusion involves the acceptance of both positive and negative emotions and in this state, individuals do not focus on the modification or labelling of any thought process. The development of cognitive defusion skills has the potential to help survivors manage fears of relapse, sickness, and death. This non-judgemental process could help break the common cycle of rumination. When thoughts are allowed to occur without conscious effort to change the "bad" thought, the negative impact on well-being is diminished. Our results indicate

that, when demographic and physical symptom variables were controlled, Openness to Experience predicted approximately four percent of the overall variability in psychological thriving, providing potential clinical utility of this concept.

Moving forward with life activities that bring meaning and value to one's life is highly related to thriving. This model is even more significant in the relationship between Valued Action, which accounted for almost 24% of the variability in psychological thriving. This component of Psychological Flexibility measures the degree to which an individual can identify their core values and can live life in line with those values, even when obstacles are present. ACT guides an individual through identifying their values and helps them objectively evaluate how their actions align with those values in all quadrants of their life. This component of Psychological Flexibility is also an important part of resiliency. Bonanno (2004) describes a resilient individual as one who may not show a reduction in symptoms or negative life experiences but that they are showing signs of thriving or "doing well". This study highlights the importance of these skills in a population that has been faced with mortality and physical difficulties.

Behavioural Awareness, which was not a significant predictor in current models, is a component of psychological flexibility that embodies present moment mindfulness. Current results suggest that in this population, openness to all internal experiences is a more salient predictor of thriving than being present in the moment and not rushing through meaningful activities. Although an essential component of mindfulness, it is possible that focusing on the present moment is not enough to improve psychological outcomes after a cancer diagnosis. After a cancer diagnosis, there are many periods

where anxiety and the potential for bad news are inevitable; individuals who can experience these negative thoughts and emotions without judgement and do not work to suppress them may report better psychological outcomes both immediately after a cancer diagnosis and as the years pass in their remission. Previous research has indicated that ACT therapy models that incorporate all three aspects of psychological flexibility improve well-being; this research highlights the aspects of psychological flexibility that may be most important to target when working with individuals who have received a cancer diagnosis.

Clinical Utility of Results

The results of the current study highlight the ACT processes, specifically openness to experience and valued action, are significantly related to subjective well-being after cancer. Individuals enter therapy with different levels of PF; some individuals may have high levels of PF without exposure to formal ACT-based approaches. Individuals may find some of the pillars of flexibility more challenging to foster than others. Further, it is possible that someone may be inflexible, but because they never faced difficult life circumstances that require a higher level of flexibility, they may not have experienced a subjective level of distress linked to this inflexibility.

ACT is a psychological intervention and daily functioning approach that can be considered a transdiagnostic intervention to promote overall positive personal growth (Luoma et al., 2007). Each ACT process is targeted in therapy differently. For example, values are defined using a visual representation of a bullseye that allows clients map their alignment with their values in four areas of life (relationships, leisure, health/personal growth, and work/school). In this process, individuals also have a

chance to identify a barrier to living their life in a way that is fully aligned with their personal values. When helping individuals defuse their inner experiences, ACT draws upon the use of metaphors that help them visualize and defuse their thoughts, so they can see them just as thoughts without needing to hold them true.

Although ACT provides skills, techniques, and metaphors, there is not a specific set of tangible skills to attain, but rather, ACT is a way of approaching life in a psychologically flexible way. This research suggests that for cancer survivors, being open to positive and negative experiences and engaging in behaviours that move them toward a values-based life are valuable additions to creating an individualized therapeutic approach.

Limitations and Directions for Future Research

Although this research reveals some meaningful relationships between physical and psychological outcomes after a cancer diagnosis, it is important to note limitations. This sample was a non-probability, convenience sample. As is typical of questionnaire research, there was an unequal balance of males and females, affecting the generalizability of results. This sample was not gender balanced which limited our ability to conduct gender-based analyses. Although gender was controlled for, when possible, this is a limitation of the study because controlling for gender does not allow us to examine if differences exist based on sex or gender. Future research could explore how the sex and gender of survivors affect variables, such as psychological flexibility and social connectedness, that are associated with overall psychological health. Highlighting resources that focus on concerns specific to males or females could inform

the development of programs or therapeutic interventions that take differences such as these into account.

We collected from an online sample of individuals who self-reported a previous cancer diagnosis and were a part of a cancer support group. General distress may be higher among these individuals, explaining mild physical symptoms and lower psychological health. Further, the self-report design of this study does not allow for objective classification of patients based on the stage of cancer or actual prognosis; however, we would argue that subjective levels of physical distress are also a valid measurement of an individual's perceived distress. We would suggest that future researchers recruit survivors from sites that focus on specific interests rather than survivor support. A broader sample would allow the generalization of the current results to the wider population of cancer survivors. In future research, using a more controlled sample and using a longitudinal design would expand these findings.

Finally, in future studies, to reduce extraneous variables such as location, inclusion in a support group, treatment type, quality of medical care, and geographic location, researchers could recruit survivors from a single clinic (or region). The inclusion of qualitative methodologies would allow for a more nuanced examination of the concerns of survivors. Current participants likely had varied medical care and healthcare providers; for example, participants in the United States of America have a vastly different healthcare system than patients in Canada. Thus, future research should focus on mixed methods analyses to explore differences associated with health care systems and psychological concerns. Given the mean 6.55 years since initial diagnosis, it is important to note that many confounding life variables could have occurred

between diagnosis and questionnaire completion. In this study the sample is compared to population norms which does indicate lower psychological wellness than normative samples.

Future research should also examine the components of psychological flexibility in individuals with a previous cancer diagnosis more closely. Researchers could further investigate these relationships in large scale studies of individuals with a previous cancer diagnosis such as Ohrnberger et al. (2017) who used mediation models to examine factors related to wellness in more depth in general populations. This study shows that the Openness to Experience and Valued Action components of psychological flexibility are related to higher levels of thriving. It would be interesting to investigate the impacts of Behavioural Awareness in this population to investigate if its inclusion has positive impacts on other outcomes, has a neutral impact, or if it is potentially detrimental to the therapeutic process.

Conclusions

In the past, health professionals and researchers have focused primarily on the impact of cancer on physical health. Given recent medical advances, novel treatments have been developed that improve long term survival. Thus, many survivors eventually return to everyday activities at some point after treatment. Traditionally, the goal of many patients and their medical team have focused on getting through treatment and return to “normal” life. Research does show that ACT can help improve psychological health in individuals with chronic conditions (Wicksell et al., 2008) and is efficacious in cancer patients (González-Fernández et al., 2019). This research helps isolate the components of ACT that can be emphasized in treatment for individuals who had

received a cancer diagnosis regardless of how long it has been since it was received.

With this knowledge researchers can begin to examine which components of psychological flexibility should be a focus in therapy for this population. For example, considering that Valued Action is such a significant predictor of subjective well-being, a clinician may choose to start with identifying values helping their client balance their values circle by engaging in more behaviours that are in line with these values.

Although the psychological effects of diagnosis and treatment are not as immediately necessary, their importance increases in the months and years after diagnosis and treatment. This increased awareness of how psychological health impacts health highlights the importance of the current study. Our goal was to understand the complex relationship between physical and psychological health to, ultimately, provide information that will help clinicians and future researchers find ways to improve the life satisfaction of cancer patients and survivors.

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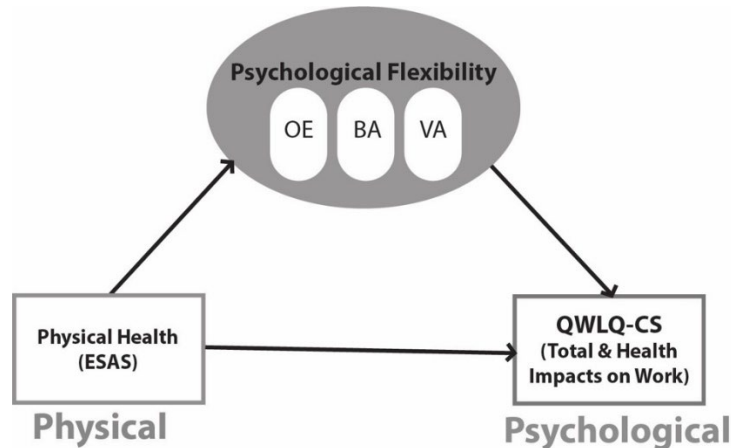
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Chapter Four: A Focus on Employment

The results of Proctor et al. (2023; Study 1) unveiled that each pillar of PF had a unique relationship with thriving and physical health, indicating that it is important to look at the individual ACT processes. I am also interested in how PF was related to other aspects of life and curious about whether the impact of the individual pillars would vary based on the context. In Study 1, our demographic questionnaire included basic questions about the employment status of survivors before and after their cancer diagnosis, but we did not specifically ask participants about employment satisfaction. I wanted to narrow in on the subjective experience of work and investigate if PF mediated the relationships between reported physical symptoms and how these physical symptoms impacted the work experience of survivors (see Figure 4.1).

Figure 4.1

Theoretical Model Depicting the Mediating Effect of PF Between Reported Physical Health and the Reported Impact Pillars Have on Work

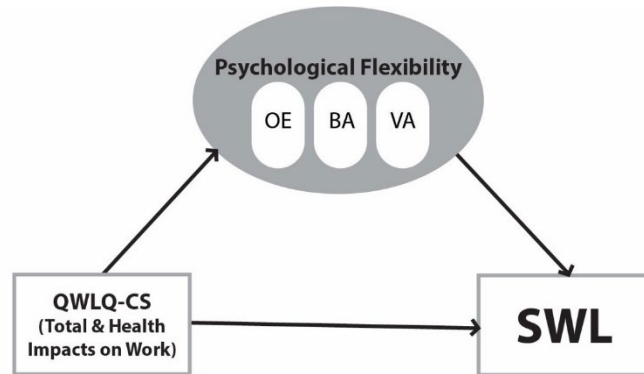


Note. PF = Psychological Flexibility; OE = Openness to Experience; BA = Behavioural Awareness; VA = Valued Action; ESAS= Edmonton Symptom Assessment Scale; QWLQ-CS= Quality of Working Life Questionnaire – Cancer Survivors.

I also wanted to know if this relationship was similar when looking at how individuals report health impacting their work and overall satisfaction with life (SWL) (see Figure 4.2). Further, I wanted to know if PF would mediate the relationships between the impact of physical symptoms on work and SWL as well as symptoms of anxiety and depression (see Figure 4.3). As shown in the figure, this is an extension of the theoretical model outlined in Figure 1.5. The important connection that I was trying to make in Study 2 was that individuals who are more psychologically flexible will navigate their work experiences differently even when presented with physical limitations.

Figure 4.2

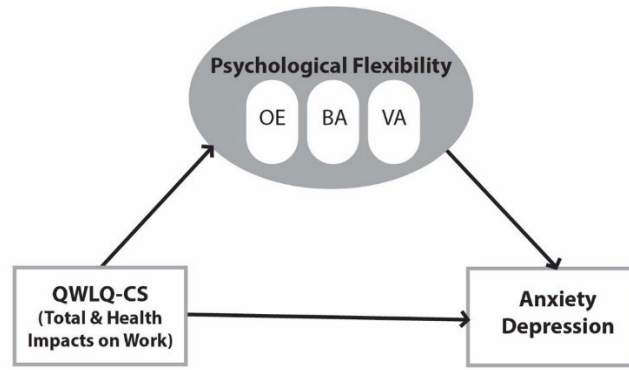
Theoretical Model Depicting the Mediating Effect of PF Between Reported Impact Health Problems Have on Work and Overall SWL



Note. PF = Psychological Flexibility; OE = Openness to Experience; BA = Behavioural Awareness; VA = Valued Action; QWLQ-CS= Quality of Working Life Questionnaire – Cancer Survivors; SWL = Satisfaction with Life.

Figure 4.3

Theoretical Model Depicting the Mediating Effect of PF Between Reported Impact Health Problems Have on Work and Symptoms of Anxiety and Depression



Note. PF = Psychological Flexibility; OE = Openness to Experience; BA = Behavioural Awareness; VA = Valued Action; QWLQ-CS= Quality of Working Life Questionnaire – Cancer Survivors.

One obstacle to examining issues related to employment after cancer is that we needed research participants who (1) had a previous cancer diagnosis and (2) were currently employed. To fund participant recruitment, we applied for a Work Safe NB grant. We received the 2019 Work Safe Chief Medical Officer (CMO) Occupational Medicine Research Grant to fund this project. This grant allowed us to recruit a specific population through Qualtrics, an online research service.

To ensure questionnaire completion, we narrowed our research focus to include only those variables that directly focused on employment satisfaction in survivors. I wanted to understand how the pillars of PF related to professional life and how individuals with varied levels of each pillar of PF may experience employment after cancer. In this study, mediation analyses were conducted to determine if the pillars of

PF mediated the associations between employment satisfaction and psychological outcomes. This research was published in the journal, *Journal of Cancer Survivorship*, in March 2023.

Chapter Four: Study Two

Working after Cancer: Psychological Flexibility and the Quality of Working Life.

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Note. This paper was originally formatted according to the journal specifications. Some modifications were made to adhere to the formatting of this dissertation.

Abstract

Purpose: Our purpose was to examine associations between the pillars of psychological flexibility (Valued Action, Behavioural Awareness, Openness to Experience) and aspects of quality of working life after a cancer. We examined how the pillars of psychological flexibility mediated relationships between quality of working life and anxiety, depression, and overall life satisfaction. Examining psychological flexibility allows interventions to be targeted for cancer survivors and account for unique, individual needs. **Methods** In this cross-sectional study, 230 cancer survivors who were currently employed completed a questionnaire package that included demographic information and measures of Physical Health Problems, Satisfaction with Life, Quality of Working Life in Cancer Survivors, psychological flexibility, Anxiety, and Depression. **Results** The mediational analyses illustrated how specific pillars of psychological flexibility mediated the relationships between quality of working life and anxiety, depression, and overall satisfaction with life. Overall, psychological flexibility mediated the relationships between physical health and health-related work problems, quality of working life, and satisfaction with life. Further, the Valued Action pillar of psychological flexibility fully mediated the relationship between Quality of Working Life and reported symptoms of depression and anxiety. **Conclusions:** Higher psychological flexibility was related to higher satisfaction with working life. Physical and psychological challenges during employment may be improved through interventions that improve psychological flexibility. Active engagement with activities aligned with personal values is related to more positive outcomes. **Implications for Cancer Survivors:** The value of examining the pillars of psychological flexibility is

that interventions can be targeted for this population, considering this population's unique needs.

Keywords

Post treatment Wellness, Psychological Flexibility, Quality of Life, Employment Satisfaction

Working after Cancer: Psychological Flexibility and the Quality of Working Life.

Employment After Cancer

Cancer survivors are less likely to be employed (Timperi et al., 2013), with only 25-50% of individuals who receive a cancer diagnosis returning to work in some capacity (Kingma et al., 2020). Further, compared to "cancer-free" individuals, across gender and age gaps, survivors are more likely to lose their job and are less likely to be re-employed (Park et al., 2009). Compared to those unemployed, women with a breast cancer diagnosis who were employed had higher overall well-being (Blinder et al., 2012). Further, at a 6-month follow-up, breast cancer survivors who reported working a minimum of 20 hours per week had higher physical and psychological wellness, suggesting that fostering a return to work may positively impact well-being. Compared to other health populations, including individuals with cardiac disease, cancer survivors reported more job-related problems (Schag & Heinrich, 1986). When compared to other age and sex groups of cancer survivors, males in their 50s are more likely to return to work after a cancer diagnosis (Park et al., 2009). Despite a relatively high number of survivors who return to work after treatment, Mols and colleagues (Mols et al., 2009) reported that almost half of survivors had changes in their employment, ranging from loss of employment, reduced hours, and job modification. Although work changes were related to more physical limitations, these changes were positively associated with social well-being (Mols et al., 2009) indicating that change is not always negative. Further, factors related to their cancer diagnoses, such as increased age, comorbid conditions, treatment type, and prognosis, impacted employment status.

Depending on the type and severity of cancer, the impact of a cancer diagnosis on employment status is variable.

Barriers to Return to Work

Even when using direct publicly funded medical services, cancer survivors commonly report financial stress (Hanly et al., 2018). Hanly et al. (2018) reported that approximately 40% of surveyed colorectal cancer survivors reported objective stress and subjective strain related to finances (e.g., borrowing money, using savings, debt) and health concerns (e.g., stoma). Dumas and colleagues (2020) examined the impact of breast cancer treatment on employment in a large sample ($N = 1,874$) of patients and found that 21% were not employed two years post-diagnosis. Treatment factors (e.g., combined therapies), physical symptoms, and psychological factors (e.g., anxiety, depression) all predicted a reduced likelihood of a return to work two years post-diagnosis. Given that returning to work is a financial necessity for some survivors, research focused on removing barriers and creating a positive and flexible (i.e., part-time hours, hybrid schedules, work from home) for survivors is essential. Cancer survivors are often motivated to continue working or return to work after their diagnosis (Bártolo et al., 2018). However, various issues related to the employee's workplace and mental, physical, and psychosocial functioning may hinder cancer patients' work participation (Bártolo et al., 2018; Greidanus et al., 2019; Rasmussen & Elverdam, 2008).

The research on the quality of working life among cancer survivors is scant. Blinder et al. (2012) conducted a qualitative study on employment experiences in a diverse sample of women with a previous cancer diagnosis. They reported seven

significant themes related to their experiences: normalcy, acceptance, identity, appearance, privacy, flexibility (or lack of) at work, and employer support. Further, Shim and colleagues (2021) examined how stigma is related to job loss following a cancer diagnosis and reported that individuals who suffered stigma surrounding the "impossibility of recovery" and other more general stereotypes were over two times more likely to experience job loss. Additionally, those who experienced discrimination at work were almost twice as likely to lose their job than those who did not have these experiences (Shim et al., 2021). They highlight how employer and workplace characteristics, including flexibility with schedule, confidentiality regarding disclosure of medical information, and preservation of normalcy within the work environment, affect the quality of working life and overall well-being (Shim et al., 2021).

In addition to medical and stigma-related barriers, individual patient factors and coping abilities should also be considered barriers to returning to satisfactory employment. Van Muijen (2019) investigated the mediating role of passive and active coping on self-reported health complaints, functional limitations, self-rated work ability, and work status in a sample of survivors who recently completed a two-year sick leave. In this study, active coping mediated the relationship between reported health-related complaints and functional limitations. Passive coping was related to higher depression scores, and active coping was related to decreased depression scores. Individual coping strategies may be related to the perception of employer flexibility and the ability to return to work in a productive capacity. The current study explored further how the three pillars of psychological flexibility (PF) are related to the reported Quality of Working Life. Psychologically inflexible individuals have difficulty detaching from

their own inner, often negative, experiences and are stuck in cycles of anxiety and depressed mood (Kashdan & Rottenberg, 2010).

Psychological Flexibility

PF is the targeted outcome of Acceptance and Commitment Therapy (ACT; Kashdan & Rottenberg, 2010) and involves accepting one's current situation, choosing personal values, and engaging in behaviours that align with individual values. PF is a broad and higher-level construct encompassing interconnected processes: acceptance, cognitive defusion, self-as-context, committed action, values, and contact with the present moment. Luoma et al., (2007) described the components of PF using three pillars: (1) "open," which includes acceptance and defusion; (2) "aware," which represents being present in the moment and using a perspective-taking sense of self; and (3) "engaged," which encompasses having identifiable values and living life that is in line with them. These components impact various aspects of life in unique but complementary ways, and the goal of ACT is to move to a place of balance within these three pillars. This paper measured these pillars using the Openness to Experience, Behavioural Awareness, and Valued Action subscales of the Comprehensive Inventory of Thriving (CompACT; Luoma et al., 2007), respectively.

Because PF is measurable and amenable to change, it is a valuable target for research that can inform strategies to enact change. Unlike Cognitive Behavioural Therapy, the focus of the ACT process is not on eliminating or changing negative thoughts; instead, an individual may have persistent negative thoughts and yet be able to interact flexibly with both positive and negative inner experiences to live their life in a way that aligns with their core values (Kashdan & Rottenberg, 2010). This value-based

action benefits individuals with chronic pain (Wicksell et al., 2008) and autoimmune disorders (Hebert & Best, 2021), and thus could benefit cancer survivors navigating employment after diagnosis.

ACT has conceptual utility for cancer survivors, and research supports its use in one-on-one settings for late-stage ovarian cancer survivors (Rost et al., 2012) and group settings for survivors transitioning from treatment to the post-treatment phase of cancer (Arch & Mitchell, 2016). By fostering acceptance and creating more conscious, present, and flexible approaches to psychological experiences, ACT can help survivors navigate their return to everyday life despite the fear of the unknown and symptoms of psychological distress. Li et al. (2021) reported that ACT presented in-person and through telephone-based delivery effectively decreased overall distress in cancer survivors. In this extensive meta-analysis, treatment length ranged from 4 to 12 weeks, with longer iterations yielding more positive outcomes. Although younger individuals were more likely to benefit from this type of intervention, the delivery method (in-person, group, online) did not significantly impact the outcomes.

Although research supports the utility of ACT for cancer survivors, little research focuses on the specific, measurable pillars of PF related to various aspects of well-being, including employment satisfaction. Trindade et al. (2020) investigated experiential avoidance in breast cancer patients. Experiential Avoidance is a maladaptive coping style (Chawla & Ostafin, 2007) that involves an unwillingness to acknowledge inner experiences, including bodily sensations, positive and negative thoughts, or memories. Individuals who report high experiential avoidance attempt to suppress these inner experiences, which often increases the negative experiences being

suppressed or avoided. Although experiential avoidance was not related to physical health, it was associated with self-reported depression and stress (Trindade et al., 2020).

Given that mastery is often central to vocational success and affects other aspects of an individual's life, it is crucial to investigate how the quality of working life impacts life satisfaction. A balance between mastery and pleasure is related to improved mental health (Furukawa et al., 2018). In examining how a cancer diagnosis impacts psychological thriving, Proctor et al. (2022) found that cancer survivors reported lower skills, learning, and accomplishment levels than published norms. Proctor et al. (2022) also investigated how pillars of PF were related to overall psychological and physical well-being in survivors. Results indicated that Openness to Experience and Valued Action significantly predicted overall thriving beyond demographic, cancer, and physical symptom variables. Thus, in the current paper, we examined this relationship and how it relates to the quality of working life and physical symptoms that impact job performance.

Purpose of the Current Study

The current study aimed to examine the relationship between the pillars of PF (Valued Action, Behavioural Awareness, and Openness to Experience) and specific aspects of quality of working life after a cancer diagnosis. Specifically, we examined how the pillars of PF mediated the relationships between elements of quality of working life and anxiety, depression, and overall satisfaction with life.

Methods

Participants

In total, 230 residents of the United States (67% female) completed an online questionnaire package. In the demographic questionnaire, participants reported their assigned sex at birth ($N_{\text{female}} = 136$; $N_{\text{male}} = 94$) and their gender ($N_{\text{female}} = 137$; $N_{\text{male}} = 92$; $N_{\text{other}} = 1$). Individuals reported that, on average, it had been nine years since the reported diagnosis ($SD = 8.65$). The most common types of cancer of the participants were breast (24.3%), non-melanoma (16.5%) and melanoma (12.6%) and prostate (11.3%). In total, 56 participants (24.3%) reported relapse, and most (96.5%) reported cancer treatments.

Materials

Quality of Working Life Questionnaire for Cancer Survivors (QWLQ - CS; de Jong et al., 2016)

This scale is a 23-item questionnaire with a 6-point rating scale (0 = disagree completely) and one "NA" option for questions that may not apply if the respondent is self-employed. This questionnaire has five subscales: (1) **Meaning** of work; (2) **Perception** of the work situation; (3) **Atmosphere** in the work environment; (4) **Understanding** and recognition in the organization; and (5) **Problems** due to the health situation. The Problems scale is reversed such that higher scores represent fewer reported problems. This questionnaire was created using a patient-partner approach and included stakeholders and cancer survivors during creation and testing. The CWLQ-CS has good convergent validity with other quality of working life measures. De Jong et al. (2016) tested discriminant validity. Individuals with a previous cancer diagnosis were

distinguishable from individuals without a cancer diagnosis or other work-impacting illness on the subscale related to Work-Related Health Problems; however, they were comparable on other subscales. In the current study, the Cronbach's alphas for the individual subscales ranged from .75 - .90, with a Cronbach's alpha of .91 for the total score.

Edmonton Symptom Assessment Scale-Revised (ESAS-R; Chang et al., 2000)

The ESAS-R includes nine symptoms (pain, activity, nausea, depression, anxiety, drowsiness, lack of appetite, well-being, and shortness of breath) that participants rate on a scale from 0 (none) to 11 (worst possible). This scale has been widely used in over 20 languages over 25 years and has good psychometric properties. The internal validity for the ESAS-R is high (Cronbach's Alpha, .79), and the test-retest validity is $r = .85$ from day 2 to 7. It also shows sufficient convergent validity with pain scales (Hui & Bruera, 2017). The ESAS-R distress score is composed of a sum of the nine scores, and a higher score indicates multiple symptoms. The current study used physical symptoms to obtain a total symptom score (Cronbach's alpha = .88).

Satisfaction With Life Scale (SWLS; Diener et al., 1985)

The SWLS is a five-item questionnaire with questions such as "I am satisfied with my life," rated on a 7-point Likert scale (1 = strongly disagree), with higher scores indicating higher satisfaction. According to Diener et al., scores >25 indicate high satisfaction in all areas of life. Scores between 20 and 24 show a general satisfaction with life, with some domains needing improvement. Individuals who score <20 are dissatisfied with at least one area of their life; individuals with chronic illness typically report lower than average life satisfaction. The scale is reliable (Cronbach's alpha =

.87), with a test-retest coefficient of .82]. The current reliability was also high, with Cronbach's alpha = .91.

Acceptance and Commitment Therapy Processes (CompACT; Francis et al., 2016)

The CompACT is a 23-item questionnaire that measures an individual's ability to be psychologically flexible using a 7-point scale from 1 (strongly disagree) to 7 (strongly agree). The CompACT includes three interrelated but distinguishable subscales that contain both negative and positively valenced statements; Openness to Experience (OE; e.g., Thoughts are just thoughts - they don't control what I do.); Behavioural Awareness (BA; e.g., I rush through meaningful activities without being attentive to them); and, Valued Action (VA; e.g., I can identify the things that matter to me in life and pursue them.). In this study, the Cronbach's alpha for the total score on this measure was .91, with good subscale reliability, .76 (OE), .85 (VA), and .81 (BA).

The Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001)

The PHQ-9 is a nine-item depression scale created to measure the nine DSM-IV criteria for depressive disorder (Kroenke et al., 2001). Questions such as "Little interest or pleasure in doing things." are rated on a 4-point scale from nearly every day to not at all. Responses to the last question, "Thoughts that you would be better off dead, or of hurting yourself in some way." may indicate suicidal ideation. This measure is valid and reliable not only in diagnosing depression but also in inferring the severity of the symptoms (Kroenke et al., 2001). The current Cronbach's alpha was .92.

General Anxiety Disorder 7-item (GAD-7; Spitzer et al., 2011)

The GAD-7 is a screening tool for generalized anxiety disorder and includes measuring anxiety symptoms and severity (e.g., "Not being able to stop or control

worrying"). The scale consists of 7 items and uses a 4-point Likert scale ranging from not at all nearly every day. A clinically significant score of 10 or greater indicates a clinically significant condition, and this cut-off score has shown a sensitivity of 89% and specificity of 82% (Spitzer et al., 2011). In the current study, Cronbach's alpha was .93.

Procedure

The University of New Brunswick Research Ethics Board (File number 2020-049) reviewed this project. All data was collected using Qualtrics, which allows for the secure collection of online questionnaire data. All participants were survivors over 18 years who were currently employed. After reading preliminary information and providing informed consent, participants completed the questionnaire package. The demographic and disease-specific questions first, followed by the other questionnaires in randomized order. Qualtrics recruited and paid participants for their responses.

Results

Data Analytic Strategy

Before data collection, G-Power was used to determine the target sample size. Assuming a medium effect size, power of .95, the required sample size was $N = 189$. Prior to data analysis, outliers and missing values were deleted. Research Questions 1 and 2 were examined using descriptive statistics and correlational analyses. Mediation analyses were used to address Research Questions 3 through 5. Following Baron and Kenny (1986) we tested the assumptions of the mediation models by examining the correlations between criterion and outcome variables (assumption 1), between the criterion and mediating variables (assumption 2), and between the mediators and the

outcome variable, while controlling the criterion variable (assumption 3). Based on these tests, we determined that a partial mediation model was appropriate. For the mediation analyses, the CompACT subscales were entered as mediators and tested simultaneously. Sex, age, years since diagnosis, and relapse (yes, no) were entered as control variables. The indirect effects were tested using a percentile bootstrap estimation approach with 5000 samples, implemented with the PROCESS macro-Version 4.1 (Hayes, 2022). To assess the statistical significance of the indirect effects, the 95% confidence intervals (CI) were examined to ensure the CIs did not include zero.

Psychological Flexibility and Wellness

Our first research question was: Which pillars of PF, as measured by the CompACT, are significantly associated with subscales of the QWLQ-CS and SWLS?

We expected to see a significant, positive relationship between the pillars of PF and SWLS; however, due to a lack of previous research, analyses of the relationships between these pillars and QWLQ-CS subscales were exploratory. All CompACT subscales significantly and positively correlated with SLWS (see Table 3.1).

CompACT: VA was related to all subscales of the QLWQ-CS. CompACT: BA was significantly associated with QLWQ-CS: Perceptions, QLWQ-CS: Understanding, and QLWQ-CS: Problems due to Health. CompACT: OE was inversely associated with QLWQ-CS: Meaning and positively associated with QLWQ-CS: Understanding and QLWQ-CS: Problems due to Health.

Table 4.1*Correlations Between QWLQ-CS Subscales and CompACT Subscales and SWLS*

QWLQ-CS Work Subscale	Mean (SD)	CompACT Subscales				
		BA	VA	OE	Total CompACT	SWLS
Perceptions	22.11 (7.14)	.236*	.437*	.070	.290**	.446*
Meaning	25.46 (3.86)	-.064	.352*	-.167*	.013	.382*
Atmosphere	23.17 (7.22)	.022	.313*	-.062	.094	.289*
Understanding	27.15 (6.08)	.157*	.256*	.213*	.271**	.279*
Problems due to Health	14.99 (5.83)	.416*	.342*	.330*	.467**	.380*
Total QWLQ-CS	105.70 (19.73)	.052	.455*	-.037	.167*	.504*

Note. * $p < .05$; ** $p < .01$. BA: Behavioural Awareness VA: Valued Action OE: Openness to Experience.

Employment Satisfaction and Health

Our second research question was, “Is employment satisfaction associated with psychological and physical health?” We hypothesized that there would be statistically significant, inverse relationships between QWLQ-CS subscales and the ESAS-R, PHQ-9, and GAD-7 (see Table 4.2). Overall, employment satisfaction in survivors was inversely associated with physical symptoms, depression, and anxiety. QWLQ-CS: Perceptions, QWLQ-CS: Understanding, and QWLQ-CS: Problems due to Health significantly and inversely correlated with ESAS-R, PHQ-9, and GAD-7.

Table 4.2

Correlations Between QWLQ-CS Subscales and Depression (PHQ-9) and Anxiety (GAD-7)

QWLQ-CS Subscale	PHQ-9	GAD-7	ESAS-R Physical Symptoms
Perceptions	-.271**	-.247**	-.173**
Meaning	-.044	.070	-.024
Atmosphere	-.074	-.100	.013
Understanding	-.288**	-.346**	-.250**
Problems due to Health	-.537**	-.497**	-.582**
Total QWLQ-CS	-.205**	-.215**	-.178**

Note. *** $p < .001$, ** $p < .05$, * $p < .01$.

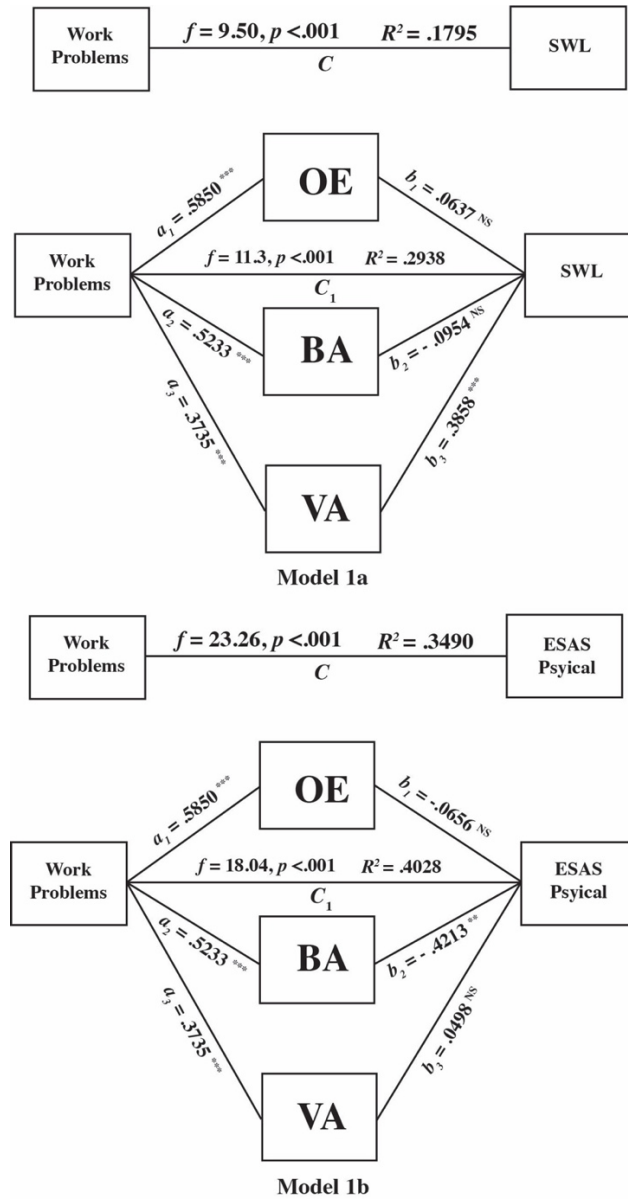
Psychological Flexibility as a Mediating Variable

Our third research question was, “Does PF mediate the relationships between the QWLQ-CS: Problems due to Health and Work and both physical symptoms and life satisfaction?” Given that De Jong et al. found that QWLQ-CS: Problems due to Health subscale discriminated between survivors and other individuals, this subscale was used as a predictor. We hypothesized that the CompACT subscales would mediate the relationship between QWLQ-CS: Problems due to Health and SWLS and ESAS-R. We entered the CompACT subscales as mediators in the relationship between QWLQ: Problems due to Health and SWLS (Model 1; see Figure 4.4) and ESAS: Physical Symptoms (Model 2; see Figure 4.4). In Model 1, the indirect effect of CompACT: Valued Action was statistically significant [$B = .144$, $CI: .071, .229$] and partially mediated the relationship between QWLQ: Problems due to Health and SWLS. In the second model, CompACT: Behavioural Awareness [$B = -.221$, $CI: -.391, -.016$] partially

mediated the relationship between QWLQ: Problems due to Health and ESAS: Physical Symptoms.

Figure 4.4.

Effect of Problems Due to Health and Work on Physical Health and Satisfaction with Life through Psychological Flexibility (Model 1a/b)



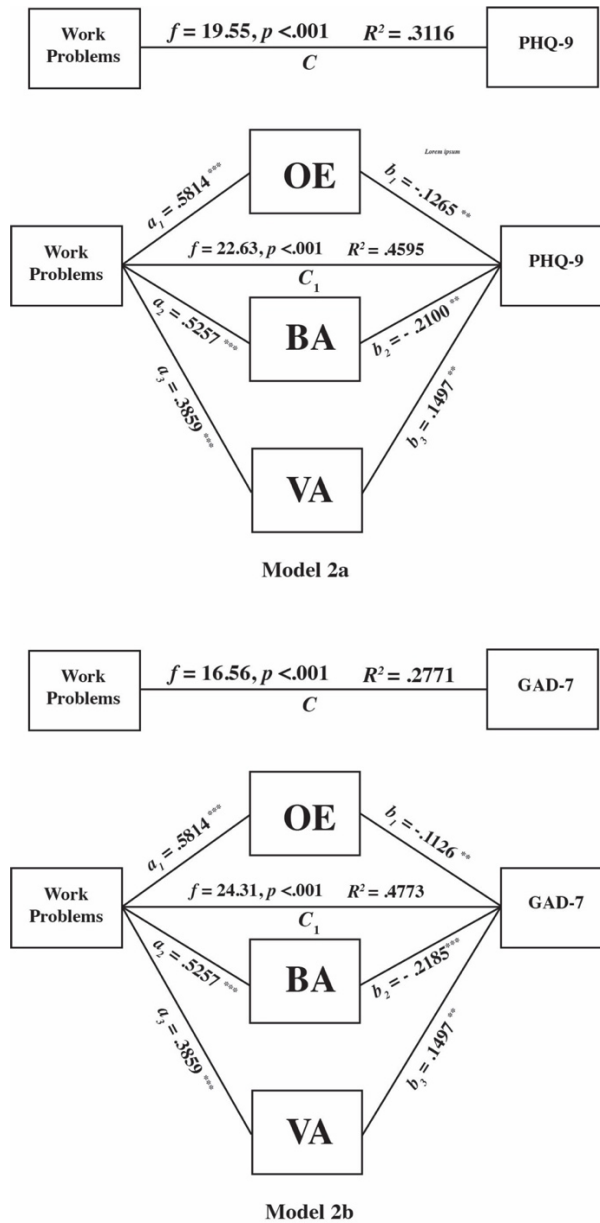
Note. OE = Openness to Experience, BA = Behavioural Awareness; VA = Valued Action; ESAS = Edmonton Symptom Assessment System; SWL = Satisfaction with Life

*** $p < .001$, ** $p < .05$, * $p < .01$.

Our fourth research question was, “Does PF mediate the relationships between Health Problems and Work and reported symptoms of depression and anxiety?” We hypothesized that the CompACT subscales would mediate the relationships between QWLQ-CS: Problems due to Health and both PHQ-9 and GAD-7. CompACT subscales were entered as mediators in the relationship between QWLQ-CS: Problems due to Health and PHQ-9 (Model 3; see Figure 4.4), and GAD-7 (Model 4; see Figure 4.5). Results indicated that the indirect effects of CompACT: OE [B=-.0735, CI: -.134, -.007], CompACT: BA [B=-.1104, CI: -.190, -.021], and CompACT: VA [B=-.0578, CI: -.123, -.012] partially mediated the relationship between QWLQ: Problems due to Health and PHQ-9. Further, that the indirect effects of CompACT: OE [B=-.0655, CI: -.113, -.05], CompACT: BA [B=-.1149, CI: -.180, -.041], and CompACT: VA [B=-.0468, CI: -.100, -.010] were statistically significant. Thus, having higher levels of PF partially mediated the relationship between Health Problems and Work and both depression and anxiety.

Figure 4.4

Effect of Problems Due to Health and Work on Depression and Anxiety Symptoms through Psychological Flexibility (Model 2a/b)



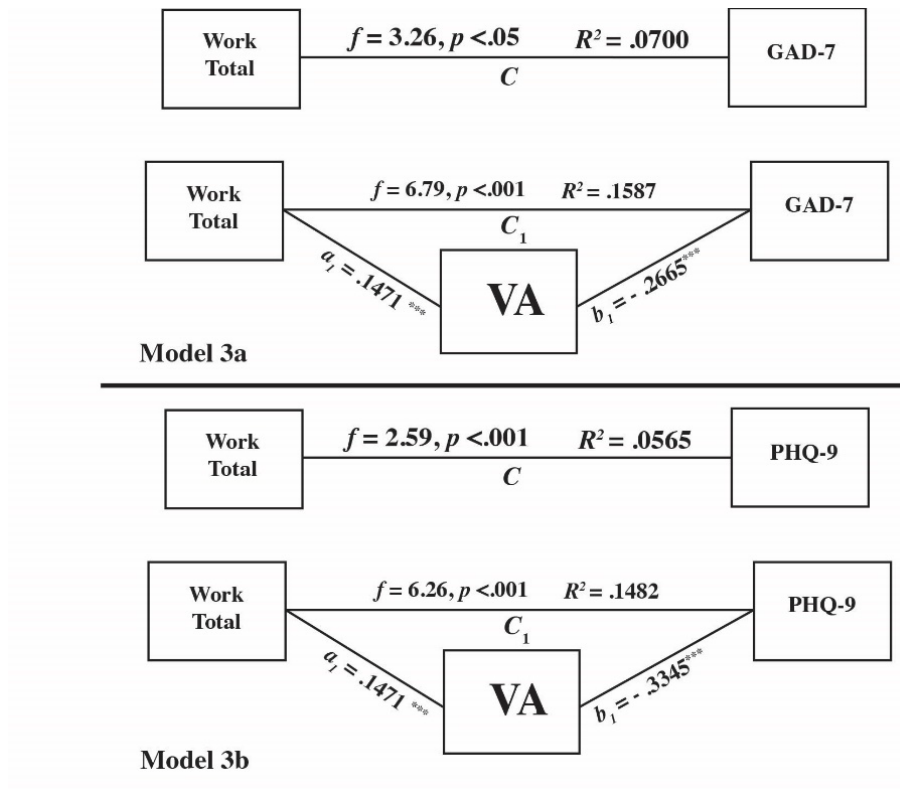
Note. OE = Openness to Experience, BA = Behavioural Awareness; VA = Valued Action; ESAS = Edmonton Symptom Assessment Scale; SWL = Satisfaction with Life

*** $p < .001$, ** $p < .05$, * $p < .01$.

Given that employment satisfaction is not limited to health problems, our final research question, “Do the subscales of the CompACT mediate the relationship between overall employment satisfaction and both depression and anxiety? We hypothesized that the CompACT subscales would partially mediate these relationships. Prior to conducting the mediation analysis, we tested the assumptions underlying the model. In this model, QWLQ: CS total score was a statistically significant predictor of CompACT: VA but did not predict CompACT: OE or CompACT: BA. Thus, the mediation analysis focused on the hypothesis that CompACT: VA would mediate the relationship between QWLQ-CS total score and PHQ-9 (Model 3a; see Figure 4.5), and GAD-7 (Model 3b; see Figure 4.5). When VA was added to the regression, the relationship between QWLQ-CS and both GAD-7 and PHQ-9 was no longer significant. Overall, CompACT: VA fully mediated the association between QWLQ-CS total score and PHQ-9 [B=-.0492, CI: -.073, -.022], and GAD-7 [B=-.0392, CI: -.059, -.018].

Figure 4.5

Effect of Total Quality of Working Life on Anxiety and Depression Symptoms through Psychological Flexibility (Model 3a/b)



Note. OE = Openness to Experience, BA = Behavioural Awareness; VA = Valued Action; GAD-7 = Generalized Anxiety Disorder – 7; PHQ-9 = Patient Health Questionnaire. *** $p < .001$, ** $p < .05$, * $p < .01$.

Discussion

Understanding factors beyond physical ailments that affect employment satisfaction can improve overall well-being in survivors and contribute to our understanding of factors that affect wellness after treatment. Greidanus et al. (2019) discussed how work is an essential aspect of life for cancer survivors and the current results highlight that the PF of the survivor, specifically the valued actions pillar, is linked to overall quality of working life. Results highlight that survivors who can prioritize activities that align with their values and defuse their self-identity as ‘cancer survivors’ or ‘patient’ may have more positive outcomes in relation to work. Unlike personality traits, which are relatively stable across the lifespan, PF is amenable to change and can be fostered through evidence-based treatment using ACT (Luoma et al., 2007). Thus, our results support the development of strategies to help survivors focus on activities that align with their values.

Working Life, Health, and Psychological Flexibility

Symptoms of anxiety and depression can have a widespread effect on an individual’s mental and physical well-being and SWL (Furukawa et al., 2018). Our results show the importance of overall levels of PF when addressing anxiety and depression symptoms and how these symptoms may impact the interference of health-related problems with work ability and performance. All three pillars of PF are strongly related to mental health outcomes (Gloster et al., 2011) and, as such, influence a survivor’s fulfillment at work. Focusing on increasing PF in survivors struggling to re-engage in work due to increased anxiety or depressive symptoms may benefit from interventions that target all pillars of PF.

Our results indicated that different aspects of PF mediated physical and psychological wellness. Specifically, VA partially mediated the relationship between health-related issues at work and life satisfaction and BA partially mediated the relationship between health-related issues at work and physical symptoms. Thus, although individuals who were more psychologically flexible reported fewer health-related impacts on their work and fewer symptoms, the different pillars of PF should be considered when targeting specific health concerns. Additionally, in this study, OE was inversely associated with the importance of work and the role that work plays in one's life goals (*Meaning of Work*). It is possible that, to some degree, individuals who reported being open to both positive and negative inner experiences in their daily life look less to work for motivation in life. The correlation suggests that it is not as if these individuals do not require the structure and identity that work provides but engage in work because it serves another, more tangible purpose.

Previous research indicates associations between PF and health (Kashdan & Rottenberg, 2010; Proctor et al., 2022; Gloster et al., 2011). Overall, our results are aligned with Kent et al. (2019), who found all components of PF related to burnout, stress, and compassion fatigue in a sample of nurses. In the current study, health-related work problems were significantly associated with all pillars of PF and inversely associated with physical and psychological distress (anxiety and depression). Those more psychologically flexible generally reported less anxiety, depression, and fewer health-related problems at work. Results of a mediation analysis indicated that PF mediated the relationship between ongoing reported health concerns after a cancer diagnosis and the health problems that impact their work.

Individuals with higher levels of PF are not only able to live life in line with their values, but they are also able to detach their inner experiences from those around them, accept both positive and negative inner experiences, and be present in the moment (Luoma et al., 2007). Higher PF is a resiliency factor in individuals with chronic pain; Gentil et al. (2019) reported individuals with chronic pain and low PF were more likely to be on sick leave than those with the same levels of pain but higher PF. Although the current sample included currently employed survivors, results suggest they are not working without distress. These results provide insight into obstacles faced by survivors who are well enough to work but may still experience barriers in their work life. Individuals perceiving their physical health problems as negatively impacting work reported lower SWL, and this relationship was also partially mediated by levels of PF, specifically VA. The more flexible the individual, the less they perceived their health problems as an obstacle to work performance.

Behavioural Awareness

We found associations between BA, which includes contact with the present moment and noticing bodily sensations and aspects of working life that tap into confidence and skill in work (*Understanding and Recognition at Work, Perceptions of Work*). There was a positive relationship between BA and being confident in performance and ability of one's work (*Perceptions of Work*), including doing your work well and being in control of your work. BA was most strongly related to the perception of how significantly one's health problems interfere with work performance (*Problems due to Health and Work*). Further, BA partially mediated the relationship between *Problems due to Health and Work* and physical symptoms. Thus, this present

moment mindfulness internal states creates a flexible and fluid acceptance of internal and external events (Luoma et al., 2007). The awareness aspect of PF is the central pillar of the ACT process.

Ongoing physical concerns are common in life after cancer and often translate into challenges at work. Understanding how the BA component of PF mediates the relationship between reported health concerns and the impact these concerns have on health is illuminating. Individuals who are higher in BA are better at being present in the moment, which involves letting go of worries about the future and not ruminating about the past. Those higher in BA can identify with a sense of self that is related to the current context and not an abstract idea of who they are (e.g., cancer survivor/patient). When individuals are inflexible or lower in BA, their conceptualizations of the past and future hijack their experience of what is currently happening, making it difficult to engage meaningfully. It makes sense that helping an individual develop the ability to be present and gain perspective on their contextual identity in the moment could lessen the impact of current physical concerns while at work.

Valued Action

Current results highlight the importance of the VA component of PF, which represents how an individual lives life in line with their values. Individuals who scored higher on the VA subscale were more inclined to pursue activities and experiences aligned with their core values even though they might face obstacles. In short, individuals with lower PF tend to be overwhelmed by attempting to avoid negative emotions, manage depressed moods, and protect their fragile self-esteem. Given the complexities of these concerns, it is clear why it becomes difficult to put energy into

living life in line with your values. In this study of survivors, VA, which represents living life in line with your values despite obstacles, was significantly and positively related to all components of the quality of working life in cancer survivors. In this study, individuals who reported living in line with their values despite obstacles reported a higher quality of working life. The VA subscale partially mediated the relationship between reported anxiety and depression symptoms, the perceived impact of health problems on work, and a sense of being recognized and appreciated at work. Those who reported living in line with their values reported less anxiety and were less likely to see their health problems as a barrier to positive work performance. It is also possible that individuals who scored higher on the VA subscale are already working a job in a company that aligns with their values and supports a lifestyle that allows them to live in accordance with this balance. VA was the strongest consistent predictor for this sample of individuals with a previous cancer diagnosis; it provides insight to employers when planning a return to work for these employees.

The VA component of PF fully mediated the negative relationship between the overall reported quality of working life and reported symptoms of anxiety and depression. Individuals who reported having more clearly delineated values and reported behaviours in line with those values also reported better quality of their work life and less symptoms of anxiety and depression. This flexibility may have impacted their perceptions of their ability to engage productively in work and their actual performance. Previous research has documented the correlations between depression and anxiety symptoms and levels of PF in cancer patients (Bai et al., 2020) and the general population (Kashdan & Rottenberg, 2010).

Strengths and Limitations

This study is the first to examine the relationships between the pillars of PF and the Quality of Working Life in those with a previous cancer diagnosis. Additionally, this study examines how PF mediates relationships between work and mental health symptoms. This study boasts a broad sample with various types of cancer and a range of years since the diagnosis occurred, making it a generalizable model. The results add to the growing evidence that PF is a valuable set of skills and traits to foster and grow to enhance life after cancer.

Online recruitment through Qualtrics provided a clean sample with no missing data; however, only those who have access to the internet and were seeking extra income through completing online surveys participate. A sample of individuals with a previous cancer diagnosis in the United States of America completed this survey; this may not be generalizable to other geographic populations with different sets of work values or healthcare access and quality. Despite these caveats, it is important to note that all participants passed the "checks and balances" placed within the questionnaires to ensure quality and thoughtful responses.

Directions for Future Research

Future research should consider the importance of measuring the pillars of PF when exploring the efficacy of ACT interventions for individuals who have received a cancer diagnosis. Studies that examine these relationships at different stages after diagnosis may help clinicians mould interventions that will fit the needs of their clients. Prevention is also an under-researched area of mental health. Receiving a cancer diagnosis can be a traumatic experience for individuals and their families. Exploring at

which period after diagnosis interventions or even psychoeducation could be impactful is a valuable avenue for research.

Conclusion

PF plays a vital role in reintegrating individuals who have received a cancer diagnosis into the workplace. Not only can employers improve working conditions for these individuals, but clinicians can work with their clients to improve their ability to live a life that is in line with their values, shift away from viewing themselves as only survivors of cancer, and accept the positive and negative experiences that will come from employment challenges that emerge after diagnosis.

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Statements and Declarations

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Competing Interests

The authors have no relevant financial or non-financial interests to disclose.

Author Contributions

Lisa Best and Anthony Reiman secured funding for this project. Lisa Best provided graduate supervision for Cecile Proctor. Anthony Reiman is a member of Cecile Proctor's dissertation supervisory committee. All authors contributed to the study conception, design, and data analytic plan for this study. Material preparation, data collection and analysis were performed by Cecile Proctor and Lisa Best. The manuscript was written by Cecile Proctor. All authors approved the final manuscript.

Data Availability

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Research Ethics

This study was performed in line with the principles of the Declaration of Helsinki and the Canadian *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans – TCPS 2 (2018)*. Approval was granted by the Ethics Committee of University New Brunswick (*REB File #049-2020; 1 January 2020*).

Chapter Five: Intimacy and Sexual Function

The ACT process involves identifying personal values before working towards living a life aligned with those values. One ACT exercise uses a graphic to indicate how closely the individual lives in line with four aspects of life: work/education, leisure, personal growth/health, and relationships. I broadly examined personal relationships, leisure, and physical health in Proctor et al. (2023; Study 1). In Proctor et al. (2023b; Study 2), I specifically examined employment satisfaction. The purpose of Study 3 was to examine how the pillars of PF affect satisfaction with romantic relationships, specifically examining sexual function and intimacy. This research builds upon the theoretical model depicted in Figure 1.5 and applies it to the relationships between sexual function and SWB.

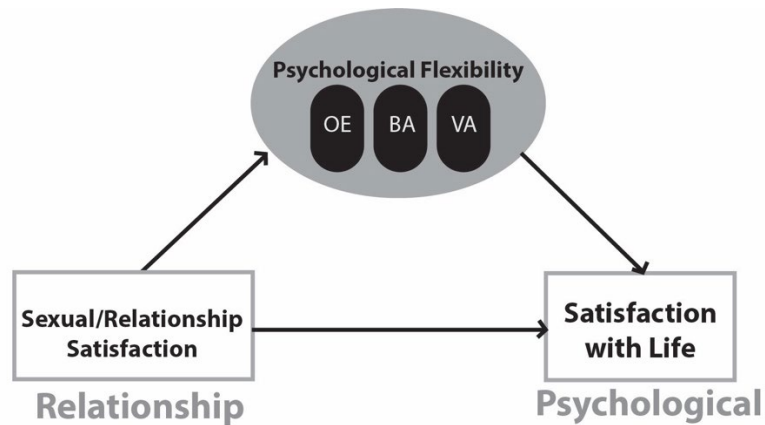
The impetus for this interest occurred because of previous research with individuals who suffered from a brain injury. My questionnaire included a question that asked participants to provide feedback on the survey and a common comment was that we did not ask about sex, intimacy, or spousal relationships. When we approached Dr. Reiman about this idea, he was intrigued, noting that he often follows up with patients about challenges related directly to sexual dysfunction but admitted there is no avenue to support survivors in fostering intimate relationships with their partners. From here, the plan for Study 3 was born.

Although we collected some information on sexual function and intimacy as a part of the data collection for Study 1, I wanted to narrow in on specific questions and focus on getting enough male and female participants to make meaningful comparisons. Although much more research is needed, this final study rounds out the four quadrants

of the values bullseye (see Figure 1.2). When we collected the data, sexual function did not have consistent significant relationships with SWL or mental health variables such as anxiety and depression; however, relationship and sexual satisfaction did relate significantly to these variables. We hypothesized that the influence of PF in the model would be similar to the previous two studies (Figure 5.1).

Figure 5.1

Model Depicting the Mediation by PF in the Relationship Between Sexual and Relationships Satisfaction and SWL



Note. PF = Psychological Flexibility; OE = Openness to Experience; BA = Behavioural Awareness; VA = Valued Action.

**Intimacy and sexual functioning after cancer: The intersection
with psychological flexibility**

Short Title: Intimacy after Cancer

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Abstract

Cancer significantly impacts overall satisfaction with life (SWL). Psychological flexibility (PF) involves adapting to situational demands, balancing life demands, and committing to value-aligned behaviours, which can help survivors manage cancer-related distress. Given the lack of research examining how PF affects relationship and sexual satisfaction, our purpose was to elucidate the relationship between variables associated with partner intimacy, pillars of PF, and variables related to psychological wellness. We explored relationships between SWL and the pillars of PF (Valued Action, Behavioural Awareness, Openness to Experience) as mediating factors in the association between relationship and sexual satisfaction and SWL. Participants (113 male, 106 female) completed questionnaires measuring sexual function, intimacy, relationship and sexual satisfaction, PF, SWL, anxiety, and depression. Results indicated an equal percentage (57.5%) of males and females reported sexual dysfunction; however, varied patterns of relationships emerged between the sexes. There were significant relationships between SWL and relationship and sexual satisfaction. The mediation analyses showed that valued action and openness to experience partially mediated the relationship between relationship satisfaction and SWL. Interestingly, Valued Action was the only pillar of PF that emerged as a partial mediator between sexual satisfaction and SWL. Thus, value-aligned behaviours may be a key focus for intervention in cancer survivors.

Intimacy and sexual functioning after cancer: The intersection with psychological flexibility

Cancer can significantly impact the quality of life (QOL) of survivors and their intimate partner (Hawkins et al., 2009). Survivors and their intimate partners behave in ways that can either strengthen or disrupt connections in marital relationships, and these interactions influence adjustment during treatment. Individual coping behaviours and mutual support can improve overall wellness during all cancer stages and can aid in adjustment and acceptance through periods of relapse (Gilbert et al., 2010). As perceived closeness increases, the overall positive psychosocial adaptation to cancer improves (Manne & Badr, 2008). Relationship factors, including sexual function and intimacy, significantly impact overall QOL; unfortunately, cancer, treatment, and side effects result in significant changes in sexual functioning, relationships, and even one's sense of self and identity (Ratner et al., 2010). Female survivors are six times more likely to report separation or divorce than male survivors (Glantz et al., 2009). Most couples adapt and persevere after cancer, but the cancer experience can strain relationships and lead to marital distress.

Sexual Dysfunction and Intimacy after Cancer

Feelings of isolation, anxiety, depression, or inadequacy may emerge due to changes in sexual functioning (Gilbert et al., 2010). Sexual function is impacted by multiple factors, including side effects of surgery, medication, or treatment (Sadovsky et al., 2010) and psychological factors, such as body image and emotional distress or low mood (Augustinsson et al., 2018). Hawkins found that 30% of men and 33% of women experienced physical barriers to traditional sexual intercourse (Hawkins et al., 2009);

75% of female breast cancer survivors met the criteria for sexual dysfunction, and 71% of these women felt unprepared for the treatment's impact on their sexual function (Di Mattei et al., 2021). Given that illnesses, pain, anxiety, rage, stressful situations, and medication affect sexual functioning (Kelemen et al., 2019; Naaman et al., 2009), sexual function assessment is vital for survivors to identify treatment side effects and improve QOL (Ananth et al., 2003). There is a growing recognition that providers are not addressing these factors in individual treatment plans (Naaman et al., 2009).

Intimacy is a multifaceted construct that increases emotional, social, sexual, intellectual, and recreational intimacy needs (Schaefer & Olson, 1981). Intimacy is a primary psychological need that extends beyond sexual functioning (Hawkins et al., 2009). Intimacy is not a destination but a process of growth that can change over time. Although more than half of survivors (62%) reported a desire for sexual intimacy, physical limitations impaired their sexual function (Bond et al., 2019). Survivors need to realize that it is possible to develop and maintain an intimate relationship without sexual function (Schaefer & Olson, 1981). According to Flynn et al., (2011), most survivors experienced diminished intimacy post-cancer; less than half were satisfied with the sexual aspects of their relationships. Although essential, emotional intimacy is not sufficient for sexual satisfaction but can be interpreted as a reward of sexual activity. Sexual satisfaction is highly related to sexual function but is distinct from overall relationship satisfaction (Byers, 1999; Flynn et al., 2011). The length of relationships impacts satisfaction and varies for males and females (Lawrance & Byers, 1995), supporting the need for research exploring the patterns of associations between sexual and relationship satisfaction in males and females.

Given the varied impact of sex-specific cancers on sexual functioning, examining sex differences in this population is vital. Reported disruptions include sex drive decreases, fear of initiating sex, difficulty recapturing "normality," and feeling unwanted or unattractive because of a lack of sex (Gilbert et al., 2010). Cancer impacts women's sexual functioning and intimate relationships, resulting in feelings of inadequacy (Bártolo et al., 2018; Canavarro et al., 2015), resentment, withdrawal from their partner, and overall relationship discord (Creasman, 2005). Feelings of obligation can push women into sexual activity despite their dissatisfaction (Moreira & Canavarro, 2013), which can lead male partners of survivors to feel that their spouse is engaging in sexual activity despite a lack of desire/interest (Moreira & Canavarro, 2013). Many sexual function issues resulting from cancer persist over time (Burbie & Polinsky, 1992).

For men, impacts go beyond erectile dysfunction and permeate into psychosocial domains; therefore, using partners in interventions relating to sexual problems is critical (Katz & Dizon, 2016). Long-term testicular cancer survivors reported changes in their intimate relationships, ranging from strengthened relationships for married men to strained relationships for single men with sexual partners (Schepisi et al., 2019). Men reported feeling a sense of "failure" when unable to engage in sexual activities that they were previously able to perform. Male response and perception of sexual dysfunction or loss of sexual function vary. For couples in the survivorship phase, resuming a sexual relationship is challenging; however, many long-term testicular cancer survivors and their partners believe their cancer experience brings them closer (Schepisi et al., 2019).

Psychological Flexibility

Psychological Flexibility (PF) is amenable to change. It is the measured outcome of Acceptance and Commitment Therapy (ACT), a third-wave behavioural therapy that targets internal and external behaviours. There are three pillars of PF: (1) being consciously present in the moment (behavioural awareness); (2) being open to positive and negative experiences (openness to experiences); and (3) valued action (engaging in or changing behaviours to align behaviours with personal values). Changes in PF can occur by increasing resilience and teaching individuals to prevent negative thoughts and feelings from driving their behaviour (Swash et al., 2017). Individuals with low PF have difficulty engaging with thoughts, emotions, and behaviours that align with personal values and may react judgmentally to internal and external experiences. Because the ACT process does not involve teaching individuals to dismiss negative thoughts, it can help individuals actively engage with their trauma and bolster self-awareness, preventing a cancer diagnosis from fully defining their sense of self (Boykin et al., 2020). Daily incorporation of psychological flexibility allows individuals to focus on the present moment and more effectively cope with trauma while engaging in meaningful lives (Droutman et al., 2018). It is important to understand PF as one factor of resilience that includes components beyond resiliency (Gentili et al., 2019).

The ACT process encourages acceptance of positive and negative experiences but is not passive. Acceptance is an active reaction that intentionally shifts the focus from avoiding unwanted thoughts and feelings to moving toward them with interest, curiosity, and, most importantly, non-judgemental observation. Much like distress intolerance and emotional suppression, experiential avoidance offers short-term relief

from discomfort with the cost of long-term adverse effects (Hayes et al., 2013). By incorporating acceptance, individuals may move beyond avoidance and accept negative experiences as a normal part of survivorship.

Moderate inverse correlations exist between psychological flexibility and depression, anxiety, anxiety sensitivity, behavioural inhibition, and the personality factors of neuroticism and extraversion (positive correlation;(Kashdan & Rottenberg, 2010)). Depression, psychosis, and burnout have all been treated successfully with ACT through the improvement of PF (Bai et al., 2020). Psychological flexibility significantly predicts functioning and impairment in clinical samples (Panic Disorder with Agoraphobia, Anxiety/Social Phobia), even when controlling for depressive symptoms, neuroticism, and anxiety sensitivity (Gloster et al., 2011). Generally, PF predicts levels of functioning and not specific symptomatology or diagnostic presentation.

After cancer, male and female survivors can experience a loss of sexual function; however, some people can renegotiate their intimacy to include sexual practices that were previously unexplored (Hawkins et al., 2009). A psychologically flexible individual chooses values-based behaviours even when internal (for example, cognitions) or external (for example, pain, discomfort) obstacles are present (Fani Sobhani et al., 2021). Higher levels of PF are not expected to alleviate physical symptoms but are related to increased well-being and reduced distress (Stenhoff et al., 2020). Furthermore, increases in PF through ACT have been linked to improved marital adjustment and satisfaction (Fani Sobhani et al., 2021). Through ACT, PF can be improved and changed over time (Francis et al., 2016; Swash et al., 2017).

When individuals fear or avoid intimacy, their ability to form and maintain relationships is hindered, and behaviours that conflict with emotional connection and intimacy may develop (Fani Sobhani et al., 2021). By avoiding intimacy, individuals are not fully accepting of their inner experiences, and they may avoid unpleasant inner experiences and even avoid behaviours that align with values associated with their relationship. This psychologically inflexible approach can lead to difficulty in solving relational disputes, holding grudges, or even a lack of forgiveness, which can strain relationships (Fani Sobhani et al., 2021). Exploring specific factors related to higher intimacy despite sexual dysfunction is an essential avenue of study.

Purpose of the Current Study

Our objectives were to answer four specific research questions: 1. What levels of sexual dysfunction do male and female cancer survivors report? 2. Are relationship and sexual factors (sexual dysfunction, intimacy, sexual satisfaction, relationship satisfaction) related to the pillars of psychological flexibility? 3. Are relationship and sexual factors (sexual dysfunction, intimacy, sexual satisfaction, relationship satisfaction) related to mental health variables, including symptoms of anxiety and depression, and overall satisfaction with life (SWL) for male and female cancer survivors? 4. For male and female cancer survivors, how are relationship and sexual satisfaction related to SWL and the three pillars of PF?

Method

Participants

In this study, 219 cancer survivors were recruited through Prolific (<https://www.prolific.co/>), an online participant recruitment service. The sample

included 106 females ($M_{age} = 53.39$ years, $SD = 11.91$) and 113 males ($M_{age} = 54.94$ years, $SD = 15.40$). All individuals reported a previous cancer diagnosis, were over 19 years old, and were currently in what *they* defined as a romantic relationship. For this study, we asked people to indicate their relationship status. Only individuals who reported being in a romantic relationship (in a relationship, married, in a civil partnership/civil union) were eligible to participate. We did not collect information on the gender of their partner.

Materials

Acceptance and Commitment Therapy Processes

The Comprehensive Assessment of Acceptance and Commitment Therapy Processes (CompACT; [34]) uses 23 items to measure an individual's PF, with higher scores indicating higher PF. Using a 7-point scale from 1 (*strongly disagree*) to 7 (*strongly agree*), individuals are presented three subscales that contain both negative and positively valenced statements: Openness to Experience (OE; for example, “Thoughts are just thoughts - they don't control what I do”); Behavioural Awareness (BA; for example, “I rush through meaningful activities without being attentive to them”); and Valued Action (VA; for example, “I can identify the things that matter to me in life and pursue them”). Internal consistency was satisfactory in the current study, ranging from $\alpha = .83$ to $.86$.

The Patient Health Questionnaire

The Patient Health Questionnaire (PHQ-9; (Kroenke et al., 2001)) uses nine items to classify depression symptoms that align with the nine DSM-IV criteria for major depressive disorder (Kroenke et al., 2001). Questions such as "little interest or pleasure in doing things" are rated on a 4-point scale from nearly every day to not at all. This measure is valid and reliable and aids in the diagnosis of depression, and provides cut-off scores for symptom severity, with higher scores indicating more severe symptoms (Kroenke et al., 2001). The current Cronbach's alpha was .90.

Generalized Anxiety Disorder 7-item

The Generalized Anxiety Disorder 7-item (GAD-7; (Spitzer et al., 2006)) measures seven symptoms related to generalized anxiety disorder and its severity (for example, "not being able to stop or control worrying"). The scale uses a 4-point Likert scale ranging from not at all nearly every day, with scores greater than 10 indicating a clinically significant condition with a sensitivity of 89% and specificity of 82% (Spitzer et al., 2006). In this study, the reliability was high, Cronbach's Alpha = .93.

Changes in Sexual Functioning Questionnaire

Sexual dysfunction was measured using the 14-item sex-matched versions (male/female) of the Changes in Sexual Functioning Questionnaire (SFQ; (Keller et al., 2006)). Participants completed the sex-specific questionnaire based on their reported sex assigned at birth. Some questions presented to males and females are different based on specific sexual function concerns related to each (for example, females: "Do you have adequate vaginal lubrication?"; males: "Are you able to maintain an erection?"). General questions unrelated to sex-specific function are included for males and females (for example, "How much pleasure or enjoyment do you get from your orgasms?"). We

used the established cut-off threshold total scores for males (<41) and females (<48;(Keller et al., 2006)) to assess dysfunction. Cronbach's alphas for the individual subscales (sexual desire/frequency, sexual desire/interest, arousal/excitement, orgasm/completion) were acceptable, ranging from $\alpha = .72$ to $\alpha = .87$.

Personal Assessment of Intimacy in Relationships

The Personal Assessment of Intimacy in Relationships (PAIR; (Schaefer & Olson, 1981)) is a self-report measure that includes 36 items with five subscales (Emotional, Social, Intellectual, Sexual, and Recreational) capturing various domains of intimacy (Schaefer & Olson, 1981). Questions are answered in relation to a romantic partner. This scale has been validated in studies of heterosexual (Dandurand & Lafontaine, 2013; Lafontaine et al., 2018) and same-sex couples (Lafontaine et al., 2018). In the current study, Cronbach's alphas were between .70 and .77 for the subscales.

Satisfaction With Life Scale

Participants completed the Satisfaction with Life Scale (SWLS; (Diener et al., 1985)) to measure subjective well-being. This five-item measure uses a 7-point Likert scale (1 = strongly disagree). Higher scores indicate higher satisfaction with life. Cut-off scores indicate scores >25 represent high satisfaction across life domains, and scores between 20 and 24 show a general satisfaction with life. Scores under 20 indicate dissatisfaction with at least one area of their life. It is typical for individuals with chronic illness to have lower than average life satisfaction. The current reliability was also high, with Cronbach's alpha = .92.

Relationship and Sexual Satisfaction

The Global Measure of Relationship Satisfaction (GMREL; (Lawrance & Byers, 1995)) and the Global Measure of Sexual Satisfaction (GMSEX; (Byers, 1999)) issue five 7-point bipolar scales (*good-bad; pleasant-unpleasant; positive-negative; satisfying-unsatisfying; valuable-worthless*). These scales provide global evaluations of an individual's relationship's positive and negative dimensions. Higher scores indicate lower satisfaction; for interpretability, which we reversed when reporting results. In the current study, the Cronbach's alphas were high; GMSEX = .97 and GMREL = .96.

Procedure

The University of New Brunswick Research Ethics Board (REB File #2022-162) reviewed this project. Participants were recruited via Prolific, in which participants are matched for specific studies based on inclusion criteria. Data was collected between 14 July 2023 and 30 July 2023. In the current study, we invited male and female participants over 19 years old who reported English as their first language, had a previous cancer diagnosis, and were currently in an intimate relationship. All participants who met these inclusion criteria and completed all the measures were included in the analyses. Participants completed the questionnaire package after reading preliminary information and providing informed consent. They completed the demographic and disease-specific questions and were presented with the remaining questionnaires in randomized order. The survey completion time was approximately 12 minutes. After the survey was completed, all participants were paid £3 for their participation.

Data Analysis

Before data analysis, data was screened for missing values, and univariate and multivariate outliers were removed. Data conditioning ensured that assumptions for each statistical model were met. Confidence intervals were used in addition to *p* values to adjust for multiple comparisons when assessing the statistical significance of correlation coefficients. Significant *p* values are only noted in the tables if the confidence interval for the correlation did not include zero. The regression analyses included assumptions of normality, linearity, and homogeneity, assessed before data analysis.

Results

The reported number of years since first diagnosis was similar for males ($M_{years} = 11.44$ years, $SD = 8.98$) and females ($M_{years} = 11.32$ $SD = 9.38$). Participants reported living in the United States of America (42.0%), United Kingdom (50.7%), Australia (2.7%), and Canada (2.3%). Participants reported a variety of cancer types. The most frequent cancers were breast (24.7%), melanoma (11.4%), and prostate (8.2%). Over half the sample (Males: 58.5%; Females: 56.5%) reported their cancer at a stage between 0 - 2 and were expected to live more than five years at diagnosis (Males: 62.8%; Females: 64.1%). Almost all (98%) of the sample reported receiving some kind of treatment. Most participants (Males: 84.1%; Females: 79.2%) did not report a cancer relapse at the time of the survey.

Research Question 1: Sexual Dysfunction and Intimacy in Survivors

Our first goal was to determine levels of sexual dysfunction and intimacy in male and female survivors. We hypothesized that comparable to existing research, over half of the respondents would report sexual dysfunction as measured by scores below

the cut-off scores for males (48) and females (41) on the SFQ. In this sample, 57.5 % of males and females had scores that fell below their cut-off scores, indicating sexual dysfunction. Thus, even though there were differences in the average SFQ scores of males and females, the overall levels of dysfunction were identical. Thus, our prediction that sexual dysfunction would be equally reported by males and females was supported.

Levels of intimacy in relationships reported by males and females are reported in Table 1. There were no sex differences in emotional, intellectual, sexual, social, and recreational intimacy. Further, there were no sex differences in sexual ($p = .505$) or relationship satisfaction ($p = .611$), indicating that males and females had comparable levels of sexual and relationship satisfaction.

Table 5.1.

T-test comparisons between male (n = 113) and female (n= 106) participants.

Variable	Males (n=113) Mean (sd)	Females (n=106) Mean (sd)	t (p)
Sexual Function (SFQ-Total)*	44.76 (10.64)	39.42 (10.17)	-3.80 (<.001)
Intimacy (PAIR)			
Emotional	27.91(6.93)	27.17 (8.15)	-.727 (.468)
Social	23.00 (6.59)	21.47 (7.91)	-1.551 (.122)
Intellectual	28.30 (6.16)	27.81 (6.97)	-.562 (.575)
Sexual	22.23 (4.40)	22.30 (4.83)	.104 (.917)
Recreational	27.03 (5.96)	26.27 (6.60)	-.888 (.375)
Depression (PHQ-9)	14.45 (5.41)	16.11 (5.93)	2.167 (.031)
Anxiety (GAD-7)	5.30 (5.41)	6.85 (4.87)	2.233 (.027)
Satisfaction with Life (SWLS)	22.04 (6.70)	20.85 (7.75)	-1.192 (.234)
CompACT Subscales			
Openness	35.35 (9.86)	32.28 (10.83)	-2.196 (.029)
Valued Action	35.58 (6.42)	35.96 (5.68)	.461 (.645)
Behavioural Awareness	19.39 (6.40)	17.88 (6.79)	-1.707 (.089)
CompACT Total Score	90.33 (18.57)	86.12 (18.99)	-1.660 (.098)
Relationship Satisfaction (GMREL)	10.96 (6.05)	11.44 (7.68)	.510 (.611)
Sexual Satisfaction (GMSEX)	17.58 (8.46)	16.74 (9.85)	-.668 (.505)
Age	54.94 (15.40)	53.39 (11.91)	-.830 (.407)
Years Since Diagnosis	11.44 (8.98)	11.32 (9.39)	-.098 (.922)

Note. * Separate but equivalent scales were used for male and female participants.

We also examined associations between relationship (PAIR: intimacy; GMREL: relationship satisfaction), sexual satisfaction (GMSEX: sexual satisfaction) and factors

associated with sexual dysfunction (SFQ). For females, most PAIR subscales were positively related to SFQ subscales, GMSEX, and GMREL scores. For males, all PAIR subscales were positively associated with GMSEX and GMREL. SFQ: pleasure was positively related to all PAIR subscales but other associations between PAIR and SFQ subscales were inconsistent. For example, PAIR: sexual was positively correlated with most SFQ subscales but SFQ: desire/interest was not associated with any PAIR subscales. The magnitude of these correlations was low to moderate (see Table 2).

We used *r-to-z* transformations to assess gender differences in the strength of the correlations between sexual function and intimacy variables. Except for the correlation between PAIR: Emotional and GMREL, $z = 2.68, p < .001$, which was significantly stronger for males than for females, the magnitude of the correlations was generally stronger for female participants than for male participants (see shaded cells in Table 2).

Table 5.2.

Correlations for Males and Females Between the Sexual Function and Intimacy Variables.

	SFQ : Pleasure	SFQ: Desire/ Frequency	SFQ: Desire / Interest	SFQ: Arousal / Excitement	SFQ: Orgasm	SFQ : Total	GMREL	GMREL
Intimacy (PAIR)								
FEMALES								
Emotional	.499***	.274**	.159	.221*	.484***	.434***	.662***	.699***
Social	.340***	.204*	.147	.253**	.289***	.302***	.405***	.407***
Intellectual	.525***	.520***	.223*	.254**	.443***	.441***	.650***	.655***
Sexual	.608***	.335***	.332***	.325***	.528***	.581***	.688***	.410***
Recreational	.495***	.358***	.242*	.322***	.361***	.422***	.490***	.578***
GMREL	.460***	.258**	.031	.118	.373***	.304***	.621***	
GMREL	.759***	.528***	.296***	-.395***	.695***	.676***		
MALES								
Emotional	.365***	.078	-.043	.112	.105	.146	.282***	.844***
Social	.315***	-.038	-.007	.069	.030	.074	.204*	.432***
Intellectual	.333***	.102	-.012	.261**	.248**	.255**	.355*	.731***
Sexual	.504***	.223**	.094	.302***	.207*	.303***	.466***	.322***
Recreational	.365***	.147	.090	.204*	.126	.210*	.261**	.623***
GMREL	.370***	.018	.073	.109	.105	.122	.373***	
GMREL	.771***	.433***	.211*	.603***	.645***	.671***		

Note: *** $p < .001$, ** $p < .01$ * $p < .05$. Shaded cells indicate significant differences in the strength of the relationships for males and females.

Research Question 2: Sex Function, Intimacy, and Psychological Flexibility

Our second research question was: Are relationship (PAIR: intimacy; GMREL: relationship satisfaction) and sexual factors (SFQ: sexual function; GMSEX: sexual satisfaction) related to the pillars of psychological flexibility (CompACT: OE, BA, VA)? For females, SFQ: Pleasure and SFQ: Orgasm was related to all three pillars of PF and CompACT: total; GMSEX was significantly correlated with CompACT: BA, CompACT: VA, and CompACT: total. For males, the only significant relationship that emerged was between the SFQ: Pleasure and CompACT: VA. GMSEX was significantly correlated with CompACT: VA and CompACT: total (see Table 3).

For females, all subscales of the PAIR, except PAIR: social and GMREL, were significantly correlated with the CompACT subscale and total score (see Table 3). For males, PAIR: emotional, intellectual, and recreational were significantly associated with the CompACT subscales and total score. PAIR: sexual was correlated with CompACT: VA. Interestingly, PAIR: social and GMREL were not associated with CompACT subscales or total scores for males. We used r to z transformations and determined no significant differences in the magnitude of correlations between the pillars of PF and intimacy, sexual dysfunction, sexual satisfaction, or relationship satisfaction between males and females. Because there were no differences in the magnitude of relationships for men and women, our mediation analyses included all participants to address research question 4.

Table 5.3.

Pearson Product Moment Correlations Between Relationship and Sexual Variables and Subscales of the CompACT.

	Openness to Experience (CompACT: OE)		Behavioural Awareness CompACT: BA		Valued Action CompACT: VA		Psychological Flexibility CompACT: Total	
	Male	Female	Male	Female	Male	Female	Male	Female
Intimacy (PAIR)								
Emotional	.228* *	.236**	.288* **	.220*	.443* **	.299* **	.373* **	.304** *
Social	.088	.300** *	.135	.292* *	.160	.117	.148	.311** *
Intellectual	.309* **	.268**	.265* **	.266* *	.364* **	.277* *	.388* **	.332** *
Sexual	.101	.267**	.076	.212*	.252* *	.238* *	.167*	.300** *
Recreational	.203* *	.232**	.244* *	.196*	.396* **	.234* *	.328* **	.273** *
Sexual Functioning (SFQ)								
Pleasure	.027	.226*	-.006	.200*	.236* *	.269* *	.094	.281**
Desire: Frequency	-.014	.083	-.036	.015	.147	.048	.031	.067
Desire: Interest	-.050	.040	-.121	-.048	.048	.018	-.052	.011
Arousal: Excitement	-.058	.104	-.094	.058	.050	.027	-.046	.088
Orgasm	.003	.214*	-.037	.231*	.135	.306* **	.036	.296**
SFQ-Total	-.019	.190	-.073	.137	.137	.210*	.012	.220*
Sexual Satisfaction (GMSEX)	-.011	.234*	.017	.245* *	.204	.278* *	.071	.304** *
Relationship Satisfaction (GMREL)	.213*	.145	.216*	.265* *	- .458* **	- .238* *	.347* **	.249**

Note: *** $p < .001$, ** $p < .01$ * $p < .05$.

Research Question 3: Sex Function, Intimacy, and Psychological Wellness

Research question 3 was, Are relationship (PAIR: intimacy; GMREL: relationship satisfaction) and sexual factors (SFQ: sexual function; GMSEX: sexual satisfaction) related to symptoms of anxiety (GAD-7) and depression (PHQ-9) and satisfaction with life (SWLS) for male and female cancer survivors? For males, SFQ

total scores were not significantly correlated with GAD-7, PHQ-9, or SWLS. For females, SFQ total scores were significantly positively related to SWLS. Further, for females, GMSEX was significantly negatively associated with PHQ-9 and GAD-7, but positively with SWLS scores, but for males, GMSEX was only significantly positively related to SWLS (see Table 4).

For females, GAD-7 and PHQ-9 were significantly negatively correlated with PAIR: emotional, PAIR: intellectual, and PAIR: sexual. For males, PAIR: emotional and PAIR: intellectual were negatively related to GAD-7 and PHQ-9. Except for PAIR: social, all PAIR subscales were positively related to the SWLS scores for both males and females. GMREL was significantly negatively associated with GAD-7, PHQ-9, and SWLS for both males and females.

We used r to z transformations and determined no significant differences in the magnitude of these correlations. There were significant differences in the magnitude of the relationships between PHQ-9 and SFQ: orgasm, $z = 2.4, p = .016$, and GMSEX, $z = 2.9, .0037$. There were also significant differences between GAD-7 and PAIR: sexual, $z = 2.12, p = .034$, and GMSEX, $z = 2.2, p = .028$. Finally, the magnitude of the correlation between SWLS and Orgasm stronger for females than males, $z = 2.08, p = .038$ (See Table 4).

Table 5.4.*Correlations between Relationship and Sexual Variables and Mental Health Outcomes.*

	Depression (PHQ-9)		Anxiety (GAD-9)		Satisfaction with Life (SWLS)	
	Males	Females	Males	Females	Males	Females
Intimacy (PAIR)						
Emotional	-	-	-.291**	-.249**	.424**	.454***
	.278*	.307***			*	
Social	-.047	-.124	-.113	-.168	.263**	.181*
Intellectual	-	-.264**	.263**	-.215*	.324**	.446***
	.266*				*	
Sexual	.009	-.243**	.043	-.224*	.312**	.329***
					*	
Recreational	-.115	-.158	-.154	-.110	.357**	.423***
Sexual Functioning (SFQ)						
Pleasure	.014	.258**	-.064	-.183	.372**	.412***
					*	
Desire: Frequency	.032	-.005	-.135	.000	.147	.250**
Desire: Interest	.128	.088	.212*	-.030	.048	.110
Arousal: Excitement	.088	.028	-.094	.041	.050	.073
Orgasm	.022	-.299**	.098	-.160	.135	.399***
Total	.056	-.164	.138	-.101	.154	.340***
Sexual Satisfaction (GMSEX)	-.002	.378***	.048	.250**	.301**	.456***
					*	
Relationship Satisfaction (GMREL)	-	-	-.266**	-.264**	.445**	.431***
	.257*	.317***			*	

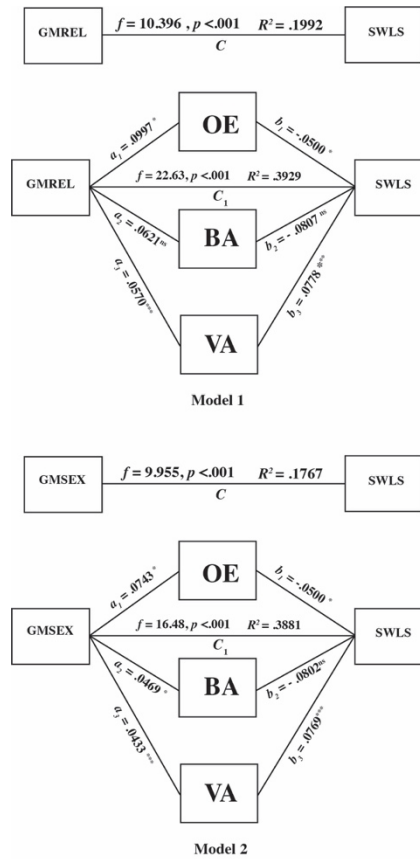
Note: *** $p < .001$, ** $p < .01$, * $p < .05$ Shaded cells indicate significant differences in the strength of the relationships for males and females.

Research Question 4: Sexual, Relationship, and Life Satisfaction

To further investigate the different relationships between SWLS, GMREL, and GMSEX for the whole sample ($N = 215$), we conducted two mediation analyses using Hayes PROCESS (Hayes, 2022) controlling for sex, age, relapse, and years since diagnosis. We entered the three pillars of psychological flexibility, CompACT: VA; CompACT: BA; CompACT: OE, as mediators in the relationship between GMREL and SWLS for Model 1 (see Fig 1) and between GMSEX and SWLS for Model 2 (see Fig 1). In Model 1, the indirect effects of Compact: VA [$B = -.0778.$, $CI: -.2105, -.0657$]

and Compact: OE [B = -.0500., CI: -.0576, -.0001] were statistically significant, accounting for 39.29 % of the total relationship and partially mediated the relationship between GMREL and SWLS. In Model 2, the indirect effect of Compact: VA [B = -.0768., CI: -.1387, -.0412] was statistically significant accounting for 38.81 % of the total relationship, partially mediating the relationship between GMREL and SWLS.

Fig 5.2. Model 1 and Model 2



Discussion

Sexuality and intimacy are important components of QOL for cancer survivors and can be significantly affected by both disease and treatment [13, 14, 21]. Research shows that survivors often experience adverse changes in their sexuality related to the impact of cancer diagnosis and treatment (Flynn et al., 2011). These changes in sexual functioning affect not only QOL but also the quality of intimate relationships. This impact can range from changes in sexual desire and satisfaction to physical limitations and body image concerns. Furthermore, the incidence of sexual dysfunction among female cancer survivors has been reported to range from 30% to 90% across multiple datasets (Cherven et al., 2021).

In the current study, levels of sexual dysfunction were high among both male and female survivors, with 57.5% of respondents reporting scores above the cut-off for sexual dysfunction. As hypothesized, there were no significant differences in the number of males and females reporting sexual dysfunction. This finding is consistent with previous research showing a high prevalence of sexual dysfunction in both genders after cancer (Ghosh et al., 2022). These rates of sexual dysfunction are alarming and highlight the significant impact that it can have on individuals' lives. We also examined levels of intimacy in male and female survivors and found that although females reported lower levels of social intimacy than males, there were no gender differences in emotional, intellectual, sexual, and recreational intimacy.

Sexual problems are difficult to predict after a cancer diagnosis. They can occur in those without other psychosocial risk factors and in any area of sexuality at any time, from pre-treatment to post-treatment (Burbie & Polinsky, 1992; Kroenke et al., 2001;

Sadovsky et al., 2010). Because there is not enough information about the effects of cancer on sexual relationships, it is challenging to advise therapists on how to help clients best. A better understanding of which survivors are most at risk of having a negative impact on sexuality could benefit therapists and other health professionals (Ghosh et al., 2022).

Psychological Flexibility and its Connection to Relationship and Sexual Factors

Our second research question focused on the associations between relationship and sexual factors (i.e., dysfunction, intimacy, sexual and relationship satisfaction) and the pillars of PF. The results of the current study indicated noteworthy gender differences in the associations between sexual and relationship factors and PF. For females, relationship satisfaction was significantly correlated with all three pillars of PF. On the other hand, for males, the only significant relationship that emerged was between sexual pleasure and PF: valued action. Also, sexual satisfaction was significantly correlated with PF: valued action and overall psychological flexibility for males in this sample. Considering these results, female patients may benefit from all aspects of ACT while male clients may benefit from introducing value identification and goals related to those values early on in treatment.

For females, sexual pleasure and orgasm were related to all three pillars of PF, supporting Bahrami et al. (Bahrami et al., 2023), who reported that women's sexual arousal and satisfaction are closely tied to the quality of their relationship. This is important to note for clinicians working with female cancer patients; fostering PF may help to increase sexual pleasure and, in turn, improve relationship quality and satisfaction with life. The discrepancies between male and female reports highlight the

importance of considering sex differences when examining the relationship between sexual and relationship factors and PF.

Relationship and Sexual Factors and Psychological Well-Being

We also examined whether relationship and sexual factors, such as sexual dysfunction, intimacy, sexual and relationship satisfaction, were related to symptoms of anxiety and depression and satisfaction with life for male and female survivors. Current results indicated that for female survivors, there was a significant relationship between sexual function (measured by the SFQ total scores) and life satisfaction (as measured by the SWLS); however, for male survivors, correlations between sexual factors and symptoms of anxiety and depression and overall life satisfaction were not statistically significant. These relationships do not infer causality; therefore, it is possible that, for females, when life presents challenges leading to lower life satisfaction and increased anxiety and depression, sexual function is impacted but it is also possible that females with higher levels of psychological distress may experience sexual dysfunction. From a clinical perspective, for females, these lower levels of sexual functioning may be an indication that their mental health is suffering. Thus, it is possible that targeting one may improve the other.

For males, only relationship satisfaction and intimacy were related to overall satisfaction with life. In Flynn et al.'s (Flynn et al., 2011) qualitative study, some male respondents described a tendency to push away from their partners with an increased desire to be alone, citing shame and failure as feelings associated with the changes in sexual function. It may be that this "pushing away" mentioned by Flynn and their colleagues contributes to overall distance in relationships. Previous research has shown

that many long-term testicular cancer survivors and their wives believe their cancer experience brings them closer (Schepisi et al., 2019), indicating that emotional factors beyond sex may enhance relationship factors even when sexual satisfaction is low.

Thus, for males, there appears to be a distinction between relationship/emotional factors and sexual satisfaction, whereas, for females, both components were linked to satisfaction with life. Further investigation may reveal whether it is the sexual components of relationships that impact SWL and mental health (i.e., anxiety, depression) for females or if these other factors, such as mental health, intimacy, and SWL, affect their sexual desire, engagement, and pleasure. Further studies should use qualitative approaches to examine these complex relationships.

In line with previous research, our results revealed that for female survivors, symptoms of anxiety and depression (including GAD-7 and PHQ-9 scores) were significantly correlated with emotional, intellectual, and sexual aspects of intimacy (as measured by the PAIR subscales), suggesting that sexual and relationship factors play a significant role in their overall well-being and satisfaction with life. Cancer significantly impacts women's sexuality, sexual functioning, intimate relationships, and sense of self (Bártolo et al., 2018; Canavarro et al., 2015). These feelings can lead to resentment, withdrawal from their partner, and discord (Creasman, 2005). Overall, factors such as sexual dysfunction, lower intimacy, and sexual and relationship dissatisfaction are associated with symptoms of anxiety and depression, as well as lower overall satisfaction with life, for female cancer survivors. The current results highlight the importance of addressing sexual factors to enhance female cancer survivors' overall satisfaction and QOL. Further, if practitioners see sexual difficulties in female

survivors, they should address the possibility that these difficulties may be linked to mental health difficulties or rooted in relationship distress. This aligns with previous research suggesting that relationship distress significantly relates to sexual functioning in breast cancer survivors (Bahrami et al., 2023).

Sexual Satisfaction, Satisfaction with Life and Psychological Flexibility.

Our final mediation analyses showed that the indirect effects of *valued action* and *openness to experience* were statistically significant, partially mediating the relationship between *relationship satisfaction* and SWL. Thus, engaging in values-based behaviours and being open to positive and negative experiences helped explain the link between *relationship satisfaction* and overall SWL. This aligns with previous research by Swash et al. (Swash et al., 2017), who reported that increased psychological flexibility is associated with lower levels of psychological distress and higher QOL. For *sexual satisfaction*, the indirect effect of *valued action* was the only statistically significant mediator, partially mediating the relationship between sexual satisfaction and satisfaction with life. This value-based behaviour helps explain the link between *sexual satisfaction* and SWL. Regarding sexual satisfaction and SWL, a dedication to engage in sexual behaviours because that connection is something valued in a relationship may be a vital component. These findings provide evidence for the role of psychological flexibility, specifically *valued action* and *openness to experiences*, in the relationship between general mental health related to relationship quality and subjective well-being with life satisfaction.

Valued action emerged as the strongest mediator of both sexual and relationship satisfaction. When encouraging value-aligned behaviours, values are defined as not

something to obtain, but instead, values are personal and focus on the direction of one's life and personal motivations to move forward (Lundgren et al., 2008). For example, a survivor may hold "connection" as a core value in their relationship and, thus, must work towards participating in behaviours and actions that align with those values (for example, engaging in intimate acts despite physical obstacles to traditional sexual activity). The openness component of the ACT process, which also emerged as a mediator, is not focused on eliminating or changing negative thoughts; instead, an individual may have persistent negative thoughts and yet be able to interact flexibly with both positive and negative inner experiences to live a life that is in line with their core values (Kashdan & Rottenberg, 2010). Behavioural awareness involves being present in the moment and enhances one's ability to engage in moment-to-moment behaviours that align with personal values (Luoma et al., 2007). This did not emerge as a mediator, indicating that the acceptance of positive and negative experiences and value-aligned behaviour are the most effective combination in relationships. The most important part of ACT is getting to those behaviours. For this sample openness to positive and negative experiences and the behaviours and values themselves contributed to overall satisfaction with life.

Strengths and Limitations of the Current Study

The participants reported a variety of cancer types, a wide range of time since diagnosis, and included those who had experienced relapse and those who did not. This created a well-represented pool of participants to answer our research questions but did not allow us to examine differences associated with different types of cancer. Because our research questions were novel, the relationships we examined were broad. A

limitation to this approach is that we did not collect in-depth information on specific aspects of intimate relationships, such as length of relationships, living arrangements, or gender of partner. The benefit of this approach is that we were able to narrow our research questions to target the process-level relationships but, at the same time, we may have missed important factors, such as and length of relationship, ages of partners, and relationship history.

Online recruitment has become increasingly popular in health research due to its ability to reach a broad and diverse population rapidly and cost-effectively (Moseson et al., 2020; Nath et al., 2016). This approach is advantageous and can help researchers address common enrollment challenges, such as reaching individuals, including cancer survivors, who are typically difficult to recruit (Benedict et al., 2019). At the same time, online recruitment does limit the range of participants who can participate as data collection is limited by internet access. The majority of participants were from the United States and the United Kingdom, which may limit the generalizability to other geographic locations.

Implications

Healthcare professionals may overlook discussions about sexual health and functioning during cancer treatment and in the years post-treatment. This lack of communication can leave survivors feeling unsupported and uninformed about the potential changes they may experience in their sexual and intimate relationships. As a result, healthcare providers need to initiate conversations about sexual dysfunction relationship satisfaction and provide appropriate support and resources for cancer

survivors. Focusing on values-based approaches and accepting positive and negative experiences will enhance the likelihood of relationships and life satisfaction.

Conclusion

Sexual health is an essential aspect of quality of life for individuals after a cancer diagnosis, and the treatments for these cancers can adversely affect sexual health. In conclusion, the findings of this study highlight the mediating role of personal functioning in the relationship between relationship satisfaction and life satisfaction. Specifically, the pillars of valued action and openness to experience played a significant role in this mediation process.

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Supplementary Information (docx)

Quality of Life in Adult Cancer Survivors Scale
Personal Assessment of Intimacy in Relationships (PAIR)
Comprehensive Assessment of Acceptance and Commitment Therapy (CompACT)
Patient Health Questionnaire Mood Scale (PHQ-9)
Generalized Anxiety Disorder (GAD-7)
Satisfaction with Life Scale
Changes in Sexual Functioning Questionnaire Short-Form
Interpersonal Exchange Model of Sexual Satisfaction

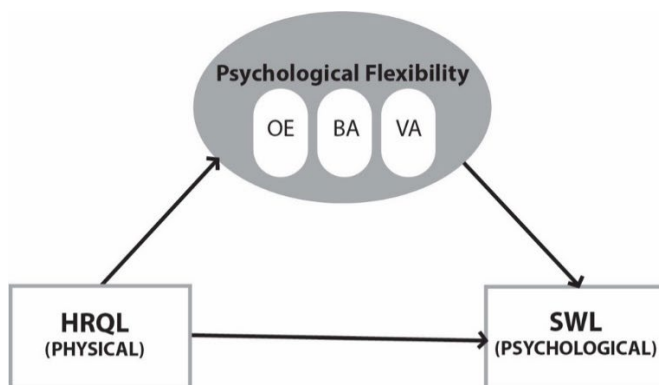
Chapter Six: Integrated Discussion

When faced with exceptional life circumstances, individuals' approach and process the experience the same way that they approached other major life events in the past. Each individual falls somewhere on the spectrum between psychological inflexibility and psychological flexibility (PF). Higher PF is related to positive health outcomes, decreased distress, improved chronic pain management, and reduced anxiety and depression (Kashdan & Rottenberg, 2010).

This dissertation includes three separate but related studies examining the relationship between PF and overall *satisfaction with life* (SWL; Study 1), vocation (Study 2), and romantic and sexual relationships (Study 3). I was interested in the influence of the pillars of PF in the relationships between physical health variables and SWL (See Figure 6.1).

Figure 6.1

Model Depicting the Mediating Effect of PF on the Relationship Between HRQL and SWL



Note. PF = psychological flexibility; OE = openness to experience; BA = Behavioural Awareness; VA = Valued Action; SWL = Satisfaction with Life.

PF is a core psychological concept encompassing an individual's ability to adapt and respond effectively to ever-changing demands and challenges (Ruizq & Odriozola-González, 2016). It involves skills that allow individuals to navigate challenging situations with resilience and mindfulness (Luoma et al., 2007). Research has shown that PF is crucial in promoting overall psychological health (Kashdan & Rottenberg, 2010). Through three studies, I examined the relationship between the pillars of PF and outcomes related to overall well-being, mental health, employment, and sexual function and intimacy in individuals who have previously received a cancer diagnosis.

In total, 762 cancer survivors were recruited online from online support groups, Qualtrics panels, and Prolific (see Table 6.1). Across the three studies, there were no statistically significant differences in age or time (years) since first diagnosis. The most common types of cancer of the participants in Study 1 were head/neck (21.45%), breast (16.2%), and colon/rectal (14.6%). The most common types of cancer of the participants in Study 2 were breast (24.3%), non-melanoma (16.5%), melanoma (12.6%) and prostate (11.3%). For Study 3, the most common types were breast (24%), melanoma (11.5%), and prostate (8.5%). Some participants reported more than one cancer as their “primary” cancer. Across the studies, the number of participants reporting a cancer relapse was similar (Study 1: 24.3%; Study 2: 23.7%; Study 3: 18.4%).

Table 6.1*Comparisons of Mean Age and Years Since Diagnosis by Sex and Recruitment Type*

	Online Support Study 1		Qualtrics Panel Study 2		Prolific Study 3	
	Males N = 83	Females N = 235	Males N = 92	Females N = 137	Males N = 106	Females N = 113
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Age	56.02 (12.47)	52.49 (13.26)	55.14 (15.45)	56.26 (18.34)	54.94 (15.04)	53.39 (11.91)
Years Since Diagnosis	7.08 (7.92)	6.47 (8.17)	7.09 (7.73)	10.30 (9.03)	11.44 (8.98)	11.32 (9.39)

Psychological Well-Being in Cancer Survivors

In Study 1, the *SWL* of individuals with a cancer diagnosis was significantly lower than published norms (see Diener, 2006; Diener et al., 2013). Although participants who reported a relapse had lower *SWL* than those with a single diagnosis, the difference was not statistically significant. These results suggest a negative impact of a cancer diagnosis on an individual's subjective well-being after diagnosis. This difference in subjective assessment could be related to situational circumstances surrounding a cancer diagnosis, including employment and relationship changes. Still, it could also be related to perspective changes that emerged after facing this life-threatening diagnosis.

Psychological Wellness Across Three Studies

The overall *SWLS* from the three studies are presented in Table 6.2. Participants in Study 1 reported the lowest *SWL* scores, with the participants in Study 2 and Study 3 reporting life satisfaction scores that ranged between 20 and 24, indicating general *SWL* with some domains that they perceive needing improvement.

Study 1 indicated that cancer survivors tend to have lower levels of psychological wellness than general population samples regardless of the time since their original diagnosis. Reported physical symptoms ranged from mild to moderate but did not vary based on the time since the initial diagnosis. Further, disease relapse was not associated with increased symptom severity. There was a moderate correlation between physical symptoms and psychological health. Although survivors reported only mild to moderate medical symptoms, they reported lower subjective well-being in terms of both life satisfaction and psychological thriving. These results align with prior large-scale studies (Adam et al., 2018; Annunziata et al., 2015; Avis et al., 2006; Ellis et al., 2022), suggesting direct and indirect connections between physical and psychological health, mediated by lifestyle factors such as increased physical activity and social connections.

Table 6.2 presents the different levels of psychological wellness and illustrates that participants in the three studies included in this dissertation reported different levels of psychological wellness. I compared the mean total scores for SWLS, PHQ-9, and GAD-7, which were measures common to the three studies. One-way ANOVAs were used to evaluate the group differences descriptively, and there were differences between the participants across the three studies. In addition to higher physical symptom scores, Study 1 participants also reported significantly higher symptoms of *anxiety* and *depression* and lower *valued action* component of PF than the participants in Studies 2 and 3. Study 1 participants reported significantly higher symptoms of *depression* compared to the other two studies, but PF scores also significantly differed across all three pillars (See Table 6.1). Although this highlights the differences in overall scores in

the three studies, the pattern of relationships between PF and physical health, mental health, and subjective well-being remained consistent. A visual representation of the pattern of responses is shown in Figure 6.2.

The differences between the groups were not unexpected, given that the inclusion criteria varied between the samples; participants were screened for being currently employed (Study 2) and in a romantic relationship (Study 3). These are two critical areas of life included in the areas of life that psychologically flexible individuals ensure are value-aligned. Although participants reported varied levels of employment and relationship satisfaction, they are at least engaging in these two quadrants of life to some degree.

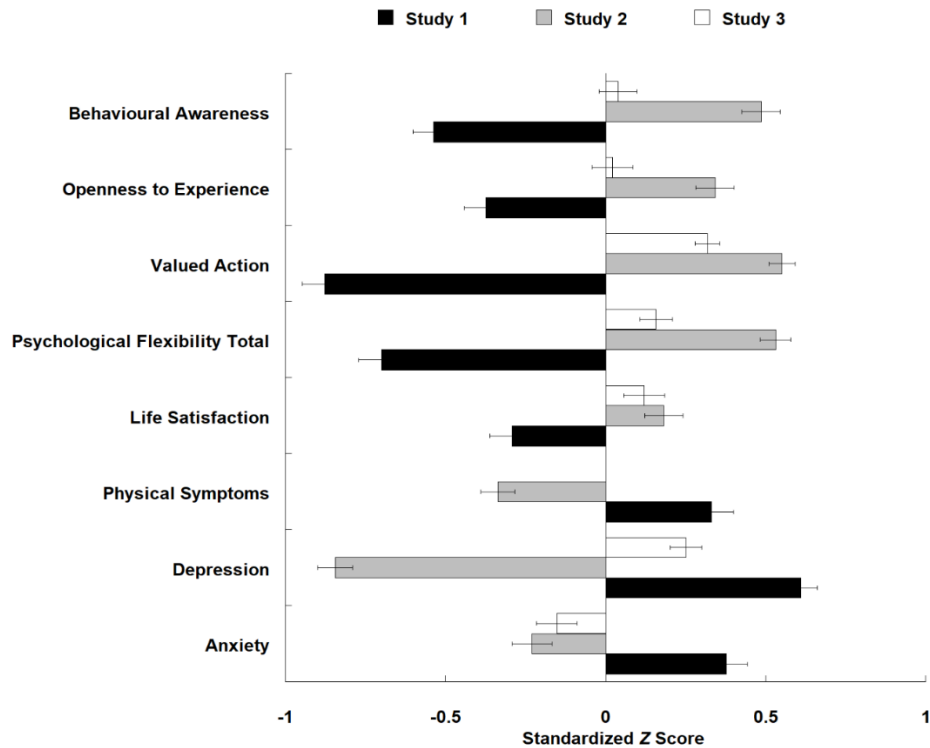
Table 6.2*ANOVA Comparing Group Differences Among Common Variables Between Studies.**Study 1 (N = 316); Study 2 (N = 230); Study 3 (N = 216)*

	Study	Mean (SD)	F (df1,df2)	η^2
Satisfaction with Life (SWLS)	1	18.23 (8.42) _a	16.03 (2,680)***	.045
	2	21.94 (7.13) _b		
	3	21.46 (7.36) _b		
Anxiety (GAD-7)	1	9.03 (5.57) _a	26.63 (2,673)***	.073
	2	5.62 (6.29) _b		
	3	6.05 (5.20) _b		
Depression (PHQ-9)	1	18.04 (6.01) _a	13.44 (2,672)***	.038
	2	15.75 (6.49) _b		
	3	15.26 (5.72) _b		
Physical Symptoms (ESAS Total)	1	30.60 (17.28) _a	57.76 (1,462)***	.166
	2	28.32 (19.72) _b		
	3	NA		
Psychological Flexibility (CompACT Total)	1	66.71 (26.71) _a	122.55 (2,670)***	.319
	2	97.70 (18.12) _b		
	3	88.30 (18.85) _c		
Openness to Experience (CompACT: OE)	1	29.53 (11.03) _a	31.87 (2,670)***	.128
	2	37.74 (9.92) _b		
	3	33.87 (10.43) _c		
Behavioural Awareness (CompACT: BA)	1	14.30(7.12) _a	72.24 (2,670)***	.227
	2	22.04 (6.87) _b		
	3	18.66 (6.62) _c		
Valued Action (CompACT: VA)	1	22.88 (11.39) _a	217.36 (2,670)***	.442
	2	38.28 (6.74) _b		
	3	35.77 (6.06) _b		

Note. Subscripts denote statistically significant post hoc differences at $p < .001$.

Figure 6.2

Mean Reported Levels of Overlapping Variables Between Recruitment Methods.



Note. For comparison purposes, the scale scores were converted to standardized z scores. The error bars represent the standard error of the mean.

In addition to these subjective changes in life satisfaction, in Study 1, there was a negative association between reported physical symptoms and overall thriving scales; however, as the participant's levels of PF increased, there was a decrease in reported negative physical and psychological impacts on health. Results from Study 1 indicated moderate correlations between PF and physical and psychological symptoms, replicating the meta-analysis conducted by Hayes (2016).

The change process that occurs through ACT by increasing PF is related to positive physical and psychological outcomes (Bach et al., 2012; Bai et al., 2020;

González-Fernández & Fernández-Rodríguez, 2019; Soo et al., 2017; Wicksell et al., 2008). In addition to higher psychological distress, cancer survivors report a variety of concerns, including fear of recurrence (Deckx et al., 2014), worries about the health of family members (Avis et al., 2006), and side effects of treatment (Fangel et al., 2013). The way individuals approach their lives and engage with their environments dramatically impacts their overall well-being despite the effects of inevitable variables, such as the passing of time, cancer relapse, or the severity of physical ailments related to health.

Relationship between PF and Thriving

According to Study 1 results, the ability to identify one's core values and live in alignment with them, even in the face of obstacles, accounted for approximately 24% of the variability in psychological thriving among individuals with cancer. This highlights the significance of *valued action*, a component of PF that measures an individual's ability to live according to their values (Kashdan & Rottenberg, 2010). *Openness to experience* also emerged as a significant predictor of psychological thriving. Throughout the cancer journey, individuals may experience periods of *anxiety* that are at least partially driven by the potential that they will receive bad news at their medical appointments (Avis et al., 2006).

During these challenging times, individuals who can accept and experience negative thoughts and emotions without judgment or suppression are more likely to have better psychological outcomes. This suggests that openness to all internal experiences, including negative thoughts and emotions, without judgment is a more influential predictor of psychological thriving than solely focusing on being positive or

suppressing negative emotions. PF allows individuals to navigate the complex emotional landscape of a cancer diagnosis (Hulbert-Williams et al., 2015; Köhle et al., 2017). By embracing all internal experiences, individuals can cultivate resilience and adaptability in adversity (Kashdan & Rottenberg, 2010).

In Study 1, *behavioural awareness* was not a statistically significant predictor of overall thriving. This component of PF embodies present-moment mindfulness (Kashdan & Rottenberg, 2010). Understanding the potential effects of behavioral awareness in individuals with a cancer diagnosis could shed light on the overall therapeutic process and its impact on outcomes. It would be essential to examine whether including behavioral awareness has positive, neutral, or potentially detrimental effects on the therapeutic process for individuals with specific disease or personality characteristics. Because I am looking at these pillars individually, it is possible that *behavioural awareness* without matching levels of *openness to experiences* can lead to increased, or at least not a decrease, in distress related to negative life events or impacts of cancer.

PF and Work

The results from Study 2 indicated that certain aspects of PF at least partially mediated relationships between quality of work life and symptoms of *depression* and *anxiety*. Specifically, *valued action* fully mediated the relationship between the overall *quality of working life* and symptoms of *anxiety* and *depression*. These results indicate that individuals with higher levels of PF are more likely to experience greater satisfaction and fulfillment in their work. My results highlight that survivors who prioritize activities that align with their values and allow them to overcome their self-

identity as "cancer survivors" or "patients" are more likely to have a higher quality of working life and less symptoms of anxiety and depression. This struggle is often seen in survivors, who may be overwhelmed by attempting to avoid negative emotions, manage depressed moods, and protect their fragile self-esteem. Given the complexity of these concerns, it becomes difficult for survivors to put energy into living life in line with their values. This finding emphasizes the importance highlighted in previous research addressing PF and values alignment in interventions and support programs for cancer survivors (Arch & Mitchell, 2016; González-Fernández & Fernández-Rodríguez, 2019b; Köhle et al., 2017).

In Study 2, *behavioral awareness* partially mediated the relationship between health-related issues at work and physical symptoms. Individuals with higher PF , specifically in the *behavioral awareness* component of present-moment mindfulness, can better accept their internal and external experiences, including their health concerns and potential symptoms (Luoma et al., 2007). Thus, a mindful internal state creates a flexible and fluid acceptance of internal and external events (Luoma et al., 2007), which is a central pillar of the ACT process.

This flexibility may allow a survivor to let go of worries about the future and not ruminate about the past, enabling them to be fully present in the moment. Moreover, individuals with higher *behavioural awareness* can identify with a sense of self related to their current context rather than being defined by their health concerns, such as being labeled solely as a "cancer survivor." This ability to be present in the moment and maintain a contextual identity can help lessen the impact of current physical concerns

on work. Further, increased behavioural awareness may impact their perceptions of their ability to engage productively in work and performance.

Openness to experience emerged alongside the other pillars, partially mediating the relationships between health problems at work and symptoms of *anxiety* and *depression*. Being open to positive and negative experiences without judgement is linked to a reduction in anxiety and depression (Hayes et al., 2006; Kashdan & Rottenberg, 2010; Ruizq & Odriozola-González, 2016; Soo et al., 2017). For survivors at work who are still experiencing physical limitations to their work, this *openness to experiences* may help reduce the distress associated with the work disruptions. *Openness to experience* is a valuable part of ACT for those with chronic pain and health conditions (Gentili et al., 2019). This helps shift the perspective to living *with* the obstacles instead of trying to move them.

In survivors, the ability to live life in line with personal values despite obstacles significantly and positively impacts the quality of their working lives. Individuals who prioritize their values and strive to align their behaviors with them experience a higher quality of working life. Focusing on therapeutic interventions that target factors beyond physical ailments, such as PF, that can affect employment satisfaction is paramount. The current results indicate that an individual's physical and psychological distress does not directly relate to the *quality of working life* after cancer. Such understanding can improve the overall well-being of survivors and enhance our knowledge regarding factors that influence wellness after treatment.

Understanding the relationship between health concerns and their impact on work is crucial. It is essential to recognize that ongoing physical concerns, such as those

experienced after cancer, can often pose challenges in the workplace. These concerns can affect an individual's ability to perform their work effectively and lead to further physical and psychological symptoms (Bártolo et al., 2018a); however, this research has shown that one's ability to be present in the moment, known as present moment mindfulness, and their level of PF play a crucial role in mediating this relationship.

PF and Intimate Relationships

The results of Study 3 indicated a statistically significant association between relationship satisfaction and sexual satisfaction with life satisfaction. These results support previous research findings that suggest a positive connection between healthy relationships and overall life satisfaction (Bühler et al., 2021). Furthermore, these results highlight the role of PF, specifically *valued action* and *openness to experience*, which mediated this relationship. Thus, individuals who can align their actions with their values and remain open to new experiences may be more likely to experience higher life satisfaction than those who are less psychologically flexible.

Additionally, sex differences affected the relationship between sexual factors and PF. Specifically, sexual arousal and satisfaction in females were more closely tied to their intimacy with their partner and the quality of their relationship. On the other hand, for males, only one significant relationship emerged; there was a positive association between sexual pleasure and one aspect of PF, *valued action*. Interestingly, when examining the relationships between PF and sexual and relationship satisfaction, I found that for males, the pillars of PF were not related to relationship satisfaction, but *valued action* was significantly correlated with sexual satisfaction. For females, all three pillars of PF were significantly related to relationship satisfaction, and *behavioural*

awareness and *valued action* were significantly associated with sexual satisfaction.

Overall, these findings emphasize the importance of considering sex differences when examining the relationship between sexual and relationship factors and PF.

These findings have important implications for both cancer survivors and healthcare professionals. Cancer survivors often experience relationship disruptions, including decreased sexual drive and fear of initiating sex with their partner (Gilbert et al., 2010). These disruptions can significantly impact their overall *SWL* and well-being. Therefore, healthcare professionals must address and prioritize sexual and relationship factors when caring for cancer survivors.

By addressing and supporting sexual health concerns, healthcare professionals can help enhance female cancer survivors' overall life, relationship, and sexual satisfaction. Specifically, for female survivors, addressing factors such as sexual pleasure and orgasm may improve psychological well-being and overall *SWL*. Additionally, healthcare professionals should consider the role of PF in supporting cancer survivors' relationships and overall well-being.

Acceptance and Commitment Therapy (ACT) can be valuable in helping couples maintain intimacy after cancer. This therapeutic approach focuses on promoting PF, which is crucial for individuals and couples dealing with the challenges of cancer survivorship (Fani Sobhani et al., 2021; Novak, 2015). Enhancing PF through ACT can assist couples in accepting the changes that may have occurred in their physical and sexual functioning due to cancer (Ananth et al., 2003). Additionally, ACT can help couples identify and let go of unhelpful thoughts or beliefs hindering their ability to connect with each other. Furthermore, this therapy can assist couples in clarifying their

values and priorities (Novak, 2015), which can be especially important after a cancer diagnosis of one partner (Manne & Badr, 2008). By aligning their actions and decisions with their values, couples can prioritize intimacy and connection, even with physical challenges or changes in sexual function.

As a therapeutic approach, ACT emphasizes open and honest communication, active listening, and empathy and can provide couples with practical skills and strategies to improve their communication and enhance emotional intimacy (Köhle et al., 2017). By learning effective communication techniques, couples can express their needs, desires, and concerns regarding intimacy in a safe and supportive environment (Novak, 2015). They can also develop skills to understand better and validate their partner's experience, fostering emotional intimacy and deepening their connection.

In addition to improving communication, ACT can also assist couples in managing the psychological distress that may arise after cancer (Fani Sobhani et al., 2021). ACT can provide couples with tools to cope with *anxiety*, *depression*, or other emotional challenges that can impact their relationship (Kashdan & Rottenberg, 2010). Overall, ACT can help couples maintain intimacy after cancer by promoting PF, assisting in the acceptance of physical changes, enhancing communication skills, fostering emotional intimacy, and providing tools for managing psychological distress.

Impact of PF on Life After Cancer

To thrive psychologically after a cancer diagnosis and during periods of remission, individuals need to cultivate a mindset of acceptance and non-judgment towards their internal experiences, including negative thoughts and emotions related to their health concerns. By embracing all internal experiences and not rushing through

meaningful activities, individuals can improve their psychological outcomes following a cancer diagnosis. Specifically, individuals who have received a cancer diagnosis may benefit from programs designed to increase PF, which can help them increase their openness to all internal experiences and not judge or suppress them (Luoma et al., 2007). Individuals who can experience negative thoughts and emotions related to their cancer diagnosis without judgment and without trying to suppress them may report better psychological outcomes both immediately after a cancer diagnosis and during their remission. Overall, my research highlights the importance of targeting PF aspects such as acceptance and non-judgment when working with individuals diagnosed with cancer.

Behavioural Awareness

Behavioural awareness is the ability to be present in the moment. Those higher in *behavioural awareness* can identify with a sense of self related to the current context and not an abstract idea of who they are (e.g., cancer survivor/patient), and they are better at being present at the moment, which involves letting go of worries about the future and not ruminating about the past (Gloster et al., 2011). In Study 3, *behavioural awareness* was not a predictor or mediator of overall life satisfaction or variables related to intimacy, but this pillar did affect satisfaction with employment. Ongoing physical concerns are common in life after cancer and often translate into challenges at work (Dumas et al., 2020). Understanding how the *behavioural awareness* component of PF mediates the relationship between reported health concerns and the impact these concerns have on work is illuminating.

When individuals are inflexible or lower in *behavioural awareness*, their conceptualizations of the past and future hijack their experience of what is currently happening, making it difficult to engage meaningfully in the present. It makes sense that helping an individual develop the ability to be present and gain perspective on their current contextual identity could lessen the impact of current physical concerns at work.

Openness to Experience

Openness to experience is defined by one's ability to accept all positive and negative thoughts without attaching a valence label. ACT therapy programs focus on this ability and teach individuals to discriminate between constructive and non-constructive thoughts. Skills such as these encourage individuals to change their focus from using maladaptive problem-solving coping strategies to descriptive-engaged coping styles, including cognitive defusion (Soo et al., 2017), which is defined by the ability to be aware of thoughts while not trying to change them (Hayes et al., 2006). Cognitive defusion involves accepting both positive and negative emotions, and in this state, individuals do not focus on modifying or labeling any thought process. The development of cognitive defusion skills has the potential to help survivors manage fears of relapse, sickness, and death.

This non-judgemental process could help break the typical cycle of rumination. When thoughts are allowed to occur without conscious effort to change the "bad" thought, the negative impact on well-being is diminished. The results of Study 1 indicated that, when demographic and physical symptom variables were controlled, *openness to experience* predicted approximately four percent of the overall variability in psychological thriving, providing the potential clinical utility of this concept. After a

cancer diagnosis, there are many periods where anxiety and the potential for bad news are inevitable (Adam et al., 2018; Annunziata et al., 2015); individuals who can experience these negative thoughts and emotions without judgement and do not work to suppress them may experience less distress associated with these negative internal experiences.

In Study 2, *openness to experience* mediated the relationship between problems at work and overall *SWL*. Still, it was not a significant predictor in regression models focused on examining predictors of physical symptoms, problems at work, or general satisfaction with work and life. This pillar of PF is important for overall wellness but may not be the most important component of PF for employment satisfaction.

In Study 3, *openness to experience* was correlated with *SWL* and emerged as a significant mediator in the relationship between relationship and overall *SWL* for both males and females. It did not emerge as a significant mediator in the relationship between sexual satisfaction and overall *SWL*. Being open to the positive and negative experiences is important for overall relationship satisfaction.

Valued Action

Valued action is related to the degree to which an individual can identify their core values and live life in line with those values, even when obstacles are present (Hayes et al., 2006). ACT helps individuals identify their values and objectively evaluate how their actions align with those values in all quadrants of their lives. In Study 1, *valued action* significantly predicted overall thriving beyond demographic, cancer, and physical symptom variables. Moving forward with life activities that bring meaning and value to one's life is highly related to thriving. *Valued action* accounted

for almost 24% of the variability in psychological thriving. This component of PF is also an important part of resiliency. Bonanno (2004) describes a resilient individual as one who may not show a reduction in symptoms or negative life experiences but is showing signs of thriving or “doing well.” Thus, survivors who were able to identify the activities that they valued and prioritize those activities may be more resilient, and thus, report greater life satisfaction.

In Study 2, I examined the subjective impact of reported physical symptoms on components of quality of working life. The results show the importance of overall *valued action* when addressing *anxiety* and *depression* symptoms and how these symptoms may impact the interference of health-related problems with work ability and performance. Individuals who reported living in line with their values despite obstacles reported a higher quality of working life. Those who reported living in line with their values reported less *anxiety* and were less likely to see their health problems as a barrier to positive work performance. It is also possible that individuals who scored higher on the *valued action* subscale are already working a job in a company that aligns with their values and supports a lifestyle that allows them to live in accordance with this balance.

In Study 2, *valued action* partially mediated the relationship between health-related issues at work and life satisfaction. Individuals who scored higher on the *valued action* subscale were more inclined to pursue activities and experiences aligned with their core values despite facing obstacles. In short, individuals with lower PF tend to be overwhelmed by attempting to avoid negative emotions, manage depressed moods, and protect their fragile self-esteem (Hayes et al., 2006). Given the complexities of these concerns, it is clear why it becomes difficult to put energy into living life in line with

your values. Focusing on increasing PF may help survivors who are struggling to re-engage in work due to increased *anxiety* or *depression* symptoms and could result in interventions that target all pillars of PF; however, current results suggest that a focus on *valued action* may be the most impactful.

In Study 3, *valued action* was the only pillar of PF that partially mediated the relationships between relationships and sexual satisfaction to *SWL* for both males and females. Engaging in behaviours that align with your values within a relationship despite obstacles that can emerge because of a cancer diagnosis can help improve overall *SWL* (Manne & Badr, 2008), even when the conditions of the relationship are not ideal. This leads to higher *relationship satisfaction* and *sexual satisfaction*. In some cases, individuals may need help identifying their values related to intimate relationships. The process of ACT involves identifying those values and then learning to engage in behaviours that align with them (Luoma et al., 2007).

Clinical Implications

ACT can be helpful for cancer survivors in several ways. This therapy encourages individuals to acknowledge and embrace their emotions, thoughts, and physical sensations without judgment or resistance (Hayes et al., 2006). By practicing mindfulness and acceptance, survivors can learn to let go of negative thoughts and emotions that may contribute to their suffering. Furthermore, ACT can help survivors reconnect with their values and engage in meaningful activities. By identifying and clarifying their values, survivors can set goals and take steps towards living a fulfilling life despite their illness. This approach can also help survivors develop PF , which

allows them to adapt and cope with the challenges they may face in the aftermath of their illness and treatment (Feros et al., 2013; Novak, 2015).

In addition, ACT can help cancer survivors manage the physical symptoms that may arise from their illness and treatment (Gentili et al., 2019; Köhle et al., 2017). Through the cultivation of mindfulness and acceptance, cancer survivors can learn to regulate their emotions and reduce distress. By adopting a non-judgmental attitude towards their physical and psychological pain and discomfort, cancer survivors can develop strategies to cope with these symptoms rather than trying to eliminate them entirely. ACT can be a useful intervention for cancer survivors by helping them to navigate the emotional challenges and physical symptoms associated with their diagnosis and treatment (Gentili et al., 2019; Köhle et al., 2017). In other words, it can support cancer survivors in accepting their diagnosis, managing their emotions and physical symptoms, clarifying their values and goals, and ultimately living a meaningful and fulfilling life despite the challenges they may face because of their cancer journey.

ACT is an established intervention for helping individuals cope with distress, including anxiety, depression, and chronic illness. ACT has the potential to reduce symptom-related suffering in cancer patients by encouraging mindfulness/ acceptance processes and commitment/behavior change processes. There is evidence of this in individuals with chronic pain and chronic illnesses (Gentili et al., 2019; Wicksell et al., 2008), as well as those with cancer (Arch & Mitchell, 2016; Feros et al., 2013). It is not “just” a coping technique or something that helps individuals through one difficult time. These skills and approaches to life have widespread and long-term impacts on mental health.

Strengths and Limitations

The three studies in this dissertation explored the relationships between the pillars of PF and variables associated with the cancer experience that had not yet been explored in the literature. The participants reported a variety of cancer types, a wide range of time since diagnosis, and included those who had experienced relapse and those who did not. This created a well-represented pool of participants to answer our research questions.

In Study 1 and 2, I had a disproportionate number of males and females, which is not uncommon for online recruitment of participants but does result in an unbalanced sample. To accommodate for this, I controlled for sex in our analyses. In Study 3, I recruited an almost equal number of males and females and, thus, were able to make balanced gender comparisons.

For Study 2 and 3, our research questions were focused on two experiences that relate to the theoretical bases of ACT. I was very interested in the impact of a cancer diagnosis on quality of working life, relationships, and sexual factors. Because our research questions were novel, the relationships I examined were broad. A limitation to this approach is that I did not collect in-depth information on specific aspects of work or intimate relationships, such as length of relationships, living arrangements, salary, benefits, or education.

The benefit of this approach is that I was able to narrow our research questions to target the process-level relationships but, at the same time, I may have missed important factors, such as salary, working hours, benefits related to employment satisfaction in Study 2, and length of relationship, ages of partners, and relationship

history in Study 3. Future researchers could consider the impact of these variables, and the current results can inform the development of research to extend current findings. Important research questions remain; for example, is *valued action* more critical for longer relationships or jobs with lower salaries? It would also be interesting to examine the interactions between these variables; specifically, how do these relationships change in relationships where both partners are working compared to situations where only one partner is working?

Online Recruitment for Research

Online recruitment has become increasingly popular in health research due to its ability to reach a broad and diverse population rapidly and cost-effectively (Moseson et al., 2020; Nath et al., 2016). This approach is advantageous and can help researchers address common enrollment challenges, such as reaching individuals, including cancer survivors, who are typically difficult to recruit (Benedict et al., 2019). One advantage of online recruitment in health support groups is that it allows researchers to tap into existing social networks and communities. These captive populations, characterized by their shared experiences of health and illness, provide a fertile ground for recruiting participants in health studies (Topolovec-Vranic & Natarajan, 2016). Research has also shown that individuals participating in online health support groups are more likely to utilize online health resources if they feel a sense of control (Nath et al., 2016). This sense of control allows participants to seek out information actively and independently relevant to their health concerns. In study 1, participants were recruited through social media, and many were in online support groups. This sample had lower PF, which aligns with what we know about being psychologically flexible. It may be that those

who reach out to and participate in online support groups are more likely to connect with a sense of self-related to content (e.g., “I am a survivor of cancer”) that is consistent with psychological inflexibility rather than a self as context (e.g., “I am a person currently experiencing cancer”). Compared to other online recruitment sources (e.g., MTurk, Qualtrics, SONA), Prolific participants provided more high quality responses and were less likely to fail attention checks (Douglas et al., 2023).

Empirical and Statistical Considerations

The three studies in this dissertation were designed to test specific hypotheses that address gaps in the existing literature on relationships between PF, well-being, and components of life after cancer. I had specific *a priori* hypotheses driven by previous research, which were used to devise the methods of each study. In addition, I used *g* power to determine the sample size needed to conduct the proposed analyses before data collection. This is an important point because the first line of defence against Type I errors is to plan your analyses based on research and theory (Saville, 1990). Secondly, it is crucial to ensure that statistical tests are well-powered. Inflated Type I errors are a concern when inferential tests, such as t-tests, are performed on all variables collected in the absence of theory-driven hypotheses (Tabachnick & Fidell, 2007).

For all three studies, I had initial hypotheses that included a directional, one-tailed correlational hypotheses that confirmed either what had previously been observed in the literature or what supported the theory-driven hypotheses. Although some statisticians advise that using a correction for multiple comparisons is not necessary (Rothman, 1990), especially for *a priori* hypotheses testing, I recognize that when examining many variables it is important to balance the risks of Type I and Type II error

(Chen et al., 2017; Sullivan & Feinn, 2021). For this reason, I cautiously interpreted significance at $p < .01$ instead of .05 and examined the confidence intervals for correlation coefficients to ensure the reported relationships are valid. In the three studies, I presented correlation coefficients between the study variables. Correcting for multiple comparisons when examining the correlations between the variables would result in a *p-value* that was too stringent to detect the actual effects, increasing the Type II error. When evaluating correlations, the *p-value* is helpful for the reader; however, the strength of the correlations is where we find our best descriptive evidence for the relationships. Regardless of the *p-value*, a small correlation remains less impactful than a moderate or strong correlation. For our purposes, it was more important to include variables contributing to the model than excluding variables that should not be in the model.

In addition to the above measures, I used the “Benjamini Hochberg False Discovery Rate” (Benjamini & Hochberg, 1995) to double check our descriptive statistics tables. In studies one and two, all correlations were below critical values and in study three less than 1% were above critical values when males and females were tested separately creating a very stringent assessment of significance.

Using Mediation Models and Maintaining Statistical Power

In the early stages of research in any area, there is a focus on identifying the direct relationships between variables (e.g., is X correlated with Y? or does X predict Y?). Study 1 focused on these questions of association and prediction. Understanding the mechanisms by which an effect operates and identifying its boundary conditions or contingencies are the next crucial steps in advancing scientific research in any field

(Hayes, 2022) and were the focus of Study 2 and Study 3. These studies were designed to allow a deeper understanding of the underlying processes and variables that contribute to the observed relationships between X and Y. By identifying the mechanisms, it becomes possible to explain how and why certain variables interact and influence each other, providing a more comprehensive understanding of the relationship. This deeper understanding helps us identify the specific circumstances or variables under which the effect is more or less likely to occur (Hayes, 2022).

The PROCESS mediation model analyzes conditional process models efficiently (Hayes, 2022); however, like many mediation models, the PROCESS mediation model faces an inherent limitation in establishing causal relationships. Because the mediator and criterion variables are measured rather than manipulated, it is challenging to establish causal relationships. I lean on theory and previous research to infer the direction of the relationships. When possible, I discuss relationships rather than impacts, even when using an independent and a dependent variable in a mediation model. The inferred direction of the effect is hypothesized based on the theoretical model.

An important consideration when using the PROCESS mediation model is the issue of multiple comparisons. Multiple comparisons occur when researchers test multiple hypotheses simultaneously, increasing the likelihood of obtaining false positive results (Chen et al., 2017; Sullivan & Feinn, 2021). To address the issue of multiple comparisons, the PROCESS mediation model includes the option to use methods, such as bootstrapping, to control for Type I errors. Bootstrapping is a statistical technique that resamples the data multiple times to create bootstrapped samples (Hayes, 2022). These bootstrapped samples are then used to estimate the sampling distribution of

mediation effects, allowing for the calculation of bias-corrected confidence intervals. These confidence intervals, rather than p values used in other methods, are how the significance of the models is determined. Compared to traditional methods that require certain assumptions, Hayes' (2022) PROCESS model provides an accurate estimation of mediated effects and does not rely on as many assumptions as other tests, enhancing the accuracy of results.

Simulation studies have shown that the standard error estimator used in computer-intensive methods exhibits low bias for sample sizes of at least 50 in single-mediator models. The standard error is accurate for minimum sample sizes of 100-200 in models with multiple mediators. Therefore, using computer-intensive methods for mediation analysis is essential to ensure accurate estimation of mediated effects and construct reliable confidence intervals, especially when analytical formulas are unavailable and traditional methods may be less accurate due to assumptions (Fritz & MacKinnon, 2007).

Contributions to the Literature

Although research and clinical interest in PF is increasing, there is a lot more to learn about how the components of PF relate to specific areas of life. Broadly, there is research that focus on the overall clinical utility of ACT (Bach et al., 2012; Bai et al., 2020; Rahal & Gon, 2020) and its benefit for specific populations (Treharne et al., 2007; Wicksell et al., 2008), including in cancer survivors (Feros et al., 2013; Li et al., 2021; Salari et al., 2021) and their caregivers (Köhle et al., 2017). This dissertation focused more closely on PF and how the specific pillars related to important outcomes across different areas of life. The current research confirms that individuals

with higher levels of PF have better mental health (see also Gloster et al., 2011; Kashdan & Rottenberg, 2010; Ruizq & Odriozola-González, 2016) This dissertation fills a gap in the literature, as I focused on how specific aspects of PF impacts different areas of life, specifically overall well-being, employment, and intimate relationships.

To my knowledge, Study 1 is the first published paper that examined components of PF individually to elucidate how they relate to subjective well-being in individuals with a previous cancer diagnosis. Previous studies that examined the impact of ACT by measuring outcomes and PF focused on the overall levels of PF without further analyses to determine the role of the three pillars. This is, in part, due to the outcome measures used; many researchers utilised the Acceptance and Action Questionnaire, which only provides a PF total score and does not provide information on the three pillars (González-Fernández & Fernández-Rodríguez, 2019). The studies focused on cancer patients and ACT are clinical in nature and examine the outcomes of ACT and not the existing relationships between variables before intervention (Arch & Mitchell, 2016; Feros et al., 2013; González-Fernández & Fernández-Rodríguez, 2019). Although this information is valuable, it is also important to know which components PF have the strongest relationships to favourable outcomes.

Study 2 was the first published paper to focus on employment outcomes and PF in cancer survivors. Previous research on PF and work either targeted healthcare and human service professionals (Holmberg et al., 2020; Ramaci et al., 2019), or productivity and work quality (Kuo et al., 2018). Research focused on the experiences of cancer survivors in the workplace exists (Amir et al., 2010; Barnard et al., 2016; Bártolo et al., 2018), but none of the studies examined PF or its pillars in the context of

quality of working life. Thus Study 2 lays the groundwork for further investigation on how a cancer survivor's PF affects how they manage their return to work or continuation of employment.

Similar to Study 2, Study 3 was the first to examine the pillars of PF and their relationships to sexual functioning and intimacy variables in cancer survivors. There is research to support the use of ACT for couples therapy (Fani Sobhani et al., 2021; Novak, 2015), but research examining the pillars of PF and how they relate to relationship variables, such as sexual functioning and intimacy, is lacking. The descriptive literature on relationship challenges after cancer is extensive (Di Mattei et al., 2021; Geue et al., 2015; Hawkins et al., 2009; Manne & Badr, 2008; O'Brien et al., 2012) indicating this is an important area of research. Expanding on this body of knowledge by elucidating how the pillars of PF are related to intimacy, sexual function, and psychological variables after a cancer diagnosis helps to broaden the conversation. This opens the door to future research that examines the importance of fostering PF after cancer to improve subjective well-being through positive intimate relationships.

Directions for Future Research

The common question that I faced when starting my doctoral research was why I did not focus on differences as a function of cancer type. First, many individuals are not aware of their primary cancer, especially if, at diagnosis, there is cancer in multiple areas of the body. Although research examining differences between different types of cancer is important, in the current dissertation, my focus was to explore how a cancer diagnosis affected wellness, and, therefore, I did not recruit participants with specific types of cancer. Getting the sample sizes necessary to ensure the required statistical

power to examine cancer-specific differences would be challenging. Although research shows that individuals with significant or chronic illnesses can report their medical history accurately (Kehoe et al., 1994; Kelstrup et al., 2014; Wada et al., 2009), many people do not understand complex aspects of their diagnosis. Second, in the current studies, I targeted the impact of a previous cancer diagnosis on the measured variables across different areas of life. Thus, the studies focused on how wellness and life satisfaction shift after a cancer diagnosis and whether there are improvements as time passes.

Future researchers should also explore the long-term effects of ACT interventions for individuals with a previous cancer diagnosis by using study designs that include measurement of outcomes before and after intervention. The results of these three studies inform future research designed to examine the components of PF in individuals with a previous cancer diagnosis. Optimistically, future research can expand on the findings of this research with Randomized Control Trials (RCTs) that include pre- and post-treatment outcomes. In addition to RCTs, the longitudinal studies will help identify therapy's long-term impacts and document progress maintenance.

Further, it would be beneficial to focus on a more controlled sample to increase the validity of the findings. For example, recruiting survivors from a single clinic or region would help to reduce extraneous variables, such as location, inclusion in a support group, treatment type, quality of medical care, and geographic location. Additionally, using a longitudinal design would provide a more comprehensive understanding of the experiences and outcomes of cancer survivors over time. Future researchers should consider exploring the impact of cultural factors on the efficacy of

ACT interventions for individuals with a cancer diagnosis. It would be interesting to examine if cultural background is related to levels of PF or impacts the relationships the pillars have with measured outcomes.

Conclusion

The ACT process focuses on acquiring skills that enhance survivors' lives long after therapy sessions end (Feros et al., 2013; Hayes et al., 2006; Köhle et al., 2017). Optimistically, future researchers will expand upon the findings of this research with randomized control trials that include pre- and post-treatment outcomes. In addition to randomized control trials, longitudinal studies will help identify therapy's long-term impacts and document progress maintenance.

This study uniquely contributes to the body of research on subjective well-being after a cancer diagnosis. PF is instrumental to thriving in all domains of life, including working life and intimate relationships. Incorporating values identity and encouraging daily behaviours that are in line with those values will contribute to the identification of purpose in the lives of cancer survivors. These results highlight the important aspects of PF that can help enhance therapeutic effectiveness for clients after a cancer diagnosis.

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Appendix A: Edmonton Symptom Assessment System (ESAS-r)

Please select the number (0-10) that best describes how you feel NOW:

Pain

No pain (0) → Worst pain possible (10)

Tiredness (Tiredness = lack of energy)

No tiredness (0) → Worst possible tiredness (10)

Drowsiness (Drowsiness = feeling sleepy)

No drowsiness (0) → Worst possible drowsiness (10)

Nausea

No nausea (0) → Worst possible nausea (10)

Lack of appetite

No lack of appetite (0) → Worst possible lack of appetite (10)

Shortness of breath

No shortness of breath (0) → Worst possible shortness of breath (11)

Depression (Depression = feeling sad)

No depression (0) → Worst possible depression (10)

Anxiety (Anxiety = feeling nervous)

No anxiety (0) → Worst possible anxiety (10)

Well-being (Well-being = how you feel overall)

No well-being (0) → Worst possible well-being (10)

Reference:

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Appendix B: Changes in Sexual Functioning Questionnaire (SFQ)

For 12 of the 14 items, higher sexual functioning corresponds to greater frequency or enjoyment/pleasure (e.g., 1 = never to 5 = every day). For two items (item 10, assessing loss of interest after arousal for women and priapism for men, and item 14, assessing painful orgasm), higher sexual functioning corresponds to lower frequency (e.g., 1 = every day to 5 = never). Items 10 and 14 are included in the total score but not in any scale score.

FEMALE VERSION

1. Compared with the most enjoyable it has ever been, how enjoyable or pleasurable is your sex life right now?
2. How frequently do you engage in sexual activity (sexual inter-course, masturbation, etc.) now?
3. How often do you desire to engage in sexual activity?
4. How frequently do you engage in sexual thoughts (thinking about sex, sexual fantasies) now?
5. Do you enjoy books, movies, music or artwork with sexual content?
6. How much pleasure or enjoyment do you get from thinking about and fantasizing about sex?
7. How often do you become sexually aroused?
8. Are you easily aroused?
9. Do you have adequate vaginal lubrication during sexual activity (get wet)?
10. How often do you become aroused and then lose interest?
11. How often do you experience an orgasm?
12. Are you able to have an orgasm when you want to?
13. How much pleasure or enjoyment do you get from your orgasms?
14. How often do you have painful orgasm?

MALE VERSION

1. Compared with the most enjoyable it has ever been, how enjoyable or pleasurable is your sex life right now?
2. How frequently do you engage in sexual activity (sexual inter-course, masturbation, etc.) now?
3. How often do you desire to engage in sexual activity?
4. How frequently do you engage in sexual thoughts (thinking about sex, sexual fantasies) now?
5. Do you enjoy books, movies, music or artwork with sexual content?
6. How much pleasure or enjoyment do you get from thinking about and fantasizing about sex?
7. How often do you have an erection related or unrelated to sexual activity?

8. Do you get an erection easily?
9. Are you able to maintain an erection?
10. How often do you experience painful, prolonged erections?
11. How often do you have an ejaculation?
12. Are you able to ejaculate when you want to?
13. How much pleasure or enjoyment do you get from your orgasms?
14. How often do you have painful orgasm?

Reference:

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Appendix C: Comprehensive Inventory of Thriving (CIT)

Please indicate your agreement or disagreement with each of the following statements using the scale below.

- 1 Strongly Disagree
- 2 Disagree
- 3 Neither Agree nor Disagree
- 4 Agree
- 5 Strongly Agree

I. Relationship

Support

1. There are people I can depend on to help me
2. There are people who give me support and encouragement
3. There are people who appreciate me as a person

Community

1. I pitch in to help when my local community needs something done
2. I invite my neighbors to my home
3. I look for ways to help my neighbors when they are in need

Trust

1. I can trust people in my society
2. People in my neighborhood can be trusted
3. Most people I meet are honest

Respect

1. People respect me
2. People are polite to me
3. I am treated with the same amount of respect as others

Loneliness

1. I feel lonely
2. I often feel left out
3. There is no one I feel close to

Belonging

1. I feel a sense of belonging in my community
2. I feel a sense of belonging in my state or province
3. I feel a sense of belonging in my country

II. Engagement

Engagement

1. I get fully absorbed in activities I do

2. In most activities I do, I feel energized
3. I get excited when I work on something

III. Mastery

Skills

1. I use my skills a lot in my everyday life
2. I frequently use my talents
3. I get to do what I am good at everyday

Learning

1. I learned something new yesterday
2. Learning new things is important to me
3. I always learn something everyday

Accomplishment

1. I am achieving most of my goals
2. I am fulfilling my ambitions
3. I am on track to reach my dreams

Self-Efficacy

1. I can succeed if I put my mind to it
2. I am confident that I can deal with unexpected events
3. I believe that I am capable in most things

Self-Worth

1. What I do in life is valuable and worthwhile
2. The things I do contribute to society
3. The work I do is important for other people

IV. Autonomy

Control

1. Other people decide most of my life decisions (R)
2. The life choices I make are not really mine (R)
3. Other people decide what I can and cannot do (R)

V. Meaning

Meaning and Purpose

1. My life has a clear sense of purpose
2. I have found a satisfactory meaning in life
3. I know what gives meaning to my life

VI. Optimism

Optimism

1. I am optimistic about my future
2. I have a positive outlook on life

3. I expect more good things in my life than bad

VII. Subjective Well-Being

Life satisfaction

1. In most ways my life is close to my ideal
2. I am satisfied with my life
3. My life is going well

Positive feelings

1. I feel positive most of the time
2. I feel happy most of the time
3. I feel good most of the time

Negative feelings

1. I feel negative most of the time (R)
2. I experience unhappy feelings most of the time (R)
3. I feel bad most of the time (R)

Note. Reversely scored items are noted with an (R). The CIT subscales may be used alone or in combination with each other. Dimension names and subscale titles are presented for clarification purpose and were removed during data collection in the current stud

Reference:

Su, R., Tay, L., & Diener, E. (in press). The development and validation of Comprehensive Inventory of Thriving (CIT) and Brief Inventory of Thriving (BIT). *Applied Psychology: Health and Well-being*.

Appendix D: Satisfaction with Life (SWLS)

Below are five statements that you may agree or disagree with.

Using the 1 (strongly disagree) to 7 (strongly agree) scale below, indicate your agreement with them by selecting the appropriate number. Please be open and honest in your responding.

1. In most ways my life is close to my ideal.
2. The conditions of my life are excellent.
3. I am satisfied with my life.
4. So far I have gotten the important things I want in life.
5. If I could live forever I would change almost nothing

Reference:

Diener, E. D., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction with Life Scale. *Journal of Personality Assessment*, 49(1), 71-75.
https://doi.org/10.1207/s15327752jpa4901_13.

Appendix E: Personal Assessment of Intimacy in Relationships (PAIR)

Instructions: In the first phase please respond to each question as your relationship is now. In the second phase please respond to each question as you would like your relationship to be. Please use the scale below:

Rate on a 6-point scale ranging from Does not describe me/my relationship at all (1) to Describes me/my relationship very well (6)

1. My partner listens to me when I need someone to talk to.
2. We enjoy spending time with other couples.
3. I am satisfied with our sex life.
4. My partner helps me clarify my thoughts.
5. We enjoy the same recreational activities.
6. My partner has all the qualities I've ever wanted in a mate.
7. I can state my feelings without him/her getting defensive.
8. We usually "keep to ourselves."
9. I feel our sexual activity is just routine.
10. When it comes to having a serious discussion it seems that we have little in common.
11. I share very few of my partner's interests.
12. There are times when I do not feel a great deal of love and affection for my partner.
13. I often feel distant from my partner.
14. We have very few friends in common.
15. I am able to tell my partner when I want sexual intercourse.
16. I feel "put-down" in a serious conversation with my partner.
17. We like playing together.
18. Every new thing that I have learned about my partner has pleased me.
19. My partner can really understand my hurts and joys.
20. Having time together with friends is an important part of our shared activities.
21. I "hold back" my sexual interest because my partner makes me feel uncomfortable.
22. I feel it is useless to discuss some things with my partner.
23. We enjoy the out-of-doors together.
24. My partner and I understand each other completely.
25. I feel neglected at times by my partner.
26. Many of my partner's closest friends are also my closest friends.
27. Sexual expression is an essential part of our relationship.
28. My partner frequently tries to change my ideas.
29. We seldom find time to do fun things together.
30. I don't think anyone could possibly be happier than my partner and I when we are with one another.

Reference:

Schaefer, M. T., & Olson, D. H. (1981). Assessing intimacy: The PAIR Inventory. *Journal of Marital and Family Therapy*, 7, 47–60. <https://doi.org/10.1111/j.1752-0606.1981.tb01351.x>

Appendix F: Quality of Working Life Scale- Cancer Survey (QWLS-CS)

INSTRUCTIONS for employees / self-employed persons **This questionnaire is about your experience and perception of your work during the past four weeks.** In order to answer the questionnaire, it is important, therefore, that you worked at some time during the past four weeks. The questions in the questionnaire can be answered with ‘agree’ or ‘disagree’. There are no right or wrong answers.

If you are unsure how to answer a question, give the best answer you can. Do not skip any questions. All your answers to the questions will be treated in confidence, and the results will be processed anonymously. The questions are about your current work situation. You should therefore try to give answers about the past four weeks.

If you have more than one job, give answers for the job in which you work the most hours. It may be that a question does not apply to you, for example, because you do not have an immediate superior. In that case, you can use the answer category ‘not applicable’ (N/A).

The following questions are about the meaning of work.

	Disagree completely	Disagree	Disagree slightly	Agree slightly	Agree	Agree completely
Working gives me structure in my life	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think it is good to work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I consider that my work gives me a goal in life	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I consider my work important	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The following questions are about **your perception of your work situation.**

	Disagree completely	Disagree	Disagree slightly	Agree slightly	Agree	Agree completely
I do my work well	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am self-confident in my work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am suited to my work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have control over the work I do	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel powerless in my work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The following questions are about **the atmosphere in your working environment.**

If the statement has not applied in your work situation as a self-employed person, give the answer 'N/A' (not applicable).

	Disagree completely	Disagree	Disagree slightly	Agree slightly	Agree	Agree completely	Not applicable (N/A)
I feel there is a positive atmosphere in my working environment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I have
the
feeling I
am taken
seriously
by people
in my
working
environm
ent

I am
content
with my
work

I have
good
relations
with my
colleague

I feel
valuable
to my
colleague
s

The following questions are **about problems due to your health situation.**

	Disagree completely (1)	Disagree (4)	Disagree slightly (5)	Agree slightly (6)	Agree (7)	Agree completely (8)
Because of my health situation I have problems in my work with fatigue and/or lack of energy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am limited in my work by my health situation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Because of my health situation I have little trust in my own body	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Because of my health situation I feel uncertain about the future	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Reference:

de Jong, M., Tamminga, S. J., de Boer, A. G. E. M., & Frings-Dresen, M. H. W. (2016). Quality of working life of cancer survivors: Development of a cancer-specific questionnaire. *Journal of Cancer Survivorship, 10*(2), 394–405. <https://doi.org/10.1007/s11764-015-0485-4>

Appendix G: Generalized Anxiety Disorder (GAD-7)

Over the last 2 weeks, how often have you been bothered by the following problems?

1. Feeling nervous, anxious or on edge 0 1 2 3
2. Not being able to stop or control worrying 0 1 2 3
3. Worrying too much about different things 0 1 2 3
4. Trouble relaxing 0 1 2 3
5. Being so restless that it is hard to sit still 0 1 2 3
6. Becoming easily annoyed or irritable 0 1 2 3

If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?

- Not difficult at all
- Somewhat difficult
- Very difficult
- Extremely difficult

Reference:

Spitzer, R. L., Kroenke, K., Williams, J. B. W., & Löwe, B. (2011). *Generalized Anxiety Disorder 7* [Data set]. American Psychological Association.
<https://doi.org/10.1037/t02591-000>

Appendix H: Depression (Patient Health Questionnaire; PHQ-9)

Over the last 2 weeks, how often have you been bothered by any of the following problems?

Items are rated on a 4-point scale ranging from not at all (1) to nearly half of the days (7)

1. Little interest or pleasure in doing things
2. Feeling down, depressed, or hopeless
3. Trouble falling or staying asleep, or sleeping too much
4. Feeling tired or having little energy
5. Poor appetite or overeating
6. Feeling bad about yourself – or that you are a failure or have let yourself or your family down
7. Trouble concentrating on things, such as reading the newspaper or watching television
8. Moving or speaking so slowly that other people could have noticed? Or the opposite – being so fidgety or restless that you have been moving around a lot more than usual
9. Thoughts that you would be better off dead or of hurting yourself in some way

Reference:

Kroenke, K., Spitzer, R. L., & Williams, J. B. W. (2001). The PHQ-9. *Journal of General Internal Medicine*, *16*(9), 606–613. <https://doi.org/10.1046/j.1525-1497.2001.016009606.x>

Appendix I: Comprehensive Assessment of Acceptance and Commitment Therapy Process (CompACT)

Questions are rated on a 7 point scale ranging from
strongly disagree (1) to strongly agree (7)

1. I can identify the things that really matter to me in life and pursue them
2. One of my big goals is to be free from painful emotions
3. I rush through meaningful activities without being really attentive to them
4. I try to stay busy to keep thoughts or feelings from coming
5. I act in ways that are consistent with how I wish to live my life
6. I get so caught up in my thoughts that I am unable to do the things that I most want to do
7. I make choices based on what is important to me, even if it is stressful
8. I tell myself that I shouldn't have certain thoughts
9. I find it difficult to stay focused on what's happening in the present
10. I behave in line with my personal values
11. I go out of my way to avoid situations that might bring difficult thoughts, feelings, or sensations
12. Even when doing the things that matter to me, I find myself doing them without paying attention
13. I am willing to fully experience whatever thoughts, feelings and sensations come up for me, without trying to change or defend against them
14. I undertake things that are meaningful to me, even when I find it hard to do so
15. I work hard to keep out upsetting feelings
16. I do jobs or tasks automatically, without being aware of what I'm doing
17. I am able to follow my long terms plans including times when progress is slow
18. Even when something is important to me, I'll rarely do it if there is a chance it will upset me
19. It seems I am "running on automatic" without much awareness of what I'm doing
20. Thoughts are just thoughts – they don't control what I do
21. My values are really reflected in my behaviour
22. I can take thoughts and feelings as they come, without attempting to control or avoid them
23. I can keep going with something when it's important to me

Reference:

Francis, A. W., Dawson, D. L., & Golijani-Moghaddam, N. (2016). Title: The development and validation of the comprehensive assessment of acceptance and commitment therapy processes (CompACT). Published. In *The Journal of Contextual Behavioral Science*. <https://doi.org/10.1016/j.jcbs.2016.05.003>

**Appendix J: General Measure of Sexual and Relationship Satisfaction (GMSEX;
GMREL)**

Rate your sexual (relationship) satisfaction on the following scale
Good (1) -----Bad (7)

Rate your sexual (relationship) satisfaction on the following scale
Pleasant (1) -----Unpleasant (7)

Rate your sexual (relationship) satisfaction on the following scale
Positive (1) -----Negative (7)

Rate your sexual (relationship) satisfaction on the following scale
Satisfying (1) -----Unsatisfying (7)

Rate your sexual (relationship) satisfaction on the following scale
Valuable (1) -----Worthless (7)

Reference:

Byers, S. The Interpersonal Exchange Model of Sexual Satisfaction: Implications for Sex Therapy with Couples. *Canadian Journal of Counselling and Psychotherapy* [Internet]. 1999 [cited 2023 Aug 22];33(2). Available from: <https://cjc-rcc.ucalgary.ca/article/view/58618>

Appendix K: Demographics (Study 3)

Are you over the age of 19?

- Yes
- No

*If no, end survey.

Have you ever been diagnosed with cancer?

- Yes
- No

What type of cancer were you diagnosed with? (click all that apply)

- Colon and Rectal Cancer
- Breast cancer
- Endometrial Cancer
- Kidney Cancer
- Leukemia
- Liver Cancer
- Lung Cancer
- Skin Cancer Melanoma
- Skin Cancer Non-melanoma
- Non-Hodgkin Lymphoma
- Pancreatic Cancer
- Prostate Cancer
- Thyroid Cancer
- Ovarian Cancer
- Bone Cancer
- Cervical Cancer
- Other _____
- I don't know

At diagnosis, what was the stage of your primary cancer?

- Stage 0
- Stage 1
- Stage 2
- Stage 3
- Stage 4

- I don't know

At the time of your initial diagnosis, what were your chances of being cured?

- Very low (e.g. < 20%)
- Low (e.g. 20-40%)
- Moderate (e.g. 40-60%)
- Moderately high (e.g. 60-80%)
- High (>80%)
- My cancer is not curable
- I don't know

At the time of your initial diagnosis, how long were you expected to live?

- Less than 2 years
- 1-2 years
- 2-5 years
- More than 5 years
- I don't know

Have you had treatment?

- Yes
- No

Why did you not have treatment?

- I did not want the treatment that was recommended.
- The cancer was not advanced enough to require treatment at this time.
- The risks of treatment outweighed the benefits.
- I have other health concerns that prevent me from receiving the required treatment (i.e., heart problem)
- I do not believe in treatment for religious reasons.

Has your cancer relapsed?

- Yes (enter year) _____
- No

What sex were you assigned at birth?

- Male
- Female
- Intersex

What is your gender?

- Female
- Male
- Other (if other, please specify)

How old are you currently?

• _____

What Country do you live in?

- o Canada
- o United States of America
- o Australia (3)
- o United Kingdom (4)
- o Other (5) _____

What is your marital status?

- o Married (1)
- o Common-Law (2)
- o I have a Long-term partner who I do not live with (3)
- o Separated (4)
- o Divorced (5)
- o Dating Casually (6)
- o Single (7)
- o Other (8) _____

Curriculum Vitae

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Universities attended (with dates and degrees obtained):

M.A. Psychology, University of New Brunswick, 2018

B.A (Hons.) Psychology University of New Brunswick, 2015

Publications:

Proctor, C. J., Reiman, A., & Best, L. A. (2023). Working after cancer: psychological flexibility and the quality of working life. *Journal of cancer survivorship : research and practice*, 10.1007/s11764-023-01364-7. Advance online publication. <https://doi.org/10.1007/s11764-023-01364-7>

Proctor, C. J., Reiman, A. J., & Best, L. A. (2023). Cancer, now what? A cross sectional study examining physical symptoms, subjective well-being, and psychological flexibility. *Health psychology and behavioral medicine*, 11(1), 2266220. <https://doi.org/10.1080/21642850.2023.2266220>

Beaulieu, D. A., Proctor, C. J., Gaudet, D. J., Canales, D., & Best, L. A. (2022). What is the mindful personality? Comparative study between dispositional mindfulness and personality domains and facets. *Acta Psychologica*, 224, 103514. <https://doi.org/10.1016/j.actpsy.2022.103514>

Proctor, C. J., & Best, L. A. (2022). Psychological well-being, individual experiences, and knowledge: The effects of single and multiple concussions. *International Journal of Sport Psychology*, 52(6), 543-554. doi:10.7352/IJSP.2021.52.543

Ciszewski, S., Flood, K. E., Proctor, C. J., & Best, L. A. (2020). Exploring the relationship between disordered eating and executive function in a non-clinical sample. *Perceptual and Motor Skills*, 127(6), 1033-1050.

Proctor, C. & Best, L. (2019). Social and psychological influences on satisfaction with life after brain injury. *Disability and Health Journal*.

<https://doi.org/10.1016/j.dhjo.2019.01.001>

Conference Proceedings :

Proctor, C. J., Beaulieu, D. A., Reiman, A., J., & Best, L. A. (2021). Living well after cancer: The impact of social support and productive leisure. In: C. Pracana and M. Wang (Eds). *Psychological Applications and Trends in Science Press*. ISBN: 978-989-54815-5-2

Best, L., Proctor, C., Freeze, T., Gaudet, D., Russel, R., McPhee., (2019, In Press) Relation between subjective and physical well-being and mindfulness. In Pracana, C. & Wang, M. *International Psychological Applications Conference and Trends, Book of Proceedings*. Zagreb, Croatia. Lisbon Portugal: World Institute for Advanced research and Science.

Proctor, C. & Best, L., (2017) The effects of concussion: Perceptions and awareness of sufferers. In Pracana, C. & Wang, M. *International Psychological Applications Conference and Trends, Book of Proceedings*. Lisbon, Portugal. Lisbon Portugal: World Institute for Advanced research and Science.

Davis, L., Proctor, C., Lilly, S., Best, L., (2016) Body dissatisfaction: Effects of gender, exercise, personality and disordered eating. In Pracana, C. &

Wang, M. *International Psychological Applications Conference and Trends, Book of Proceedings*. Lisbon, Portugal. Lisbon Portugal: World Institute for Advanced research and Science.

Proctor, C., and Best, L., (2015) Loneliness and isolation after brain injury: factors impacting survivor and caregiver's quality of life after injury. In Pracana, C. & Wang, M. *International Psychological Applications Conference and Trends, Book of Proceedings*. Ljubljana, Slovenia. Lisbon Portugal: World Institute for Advanced research and Science.

Conference Presentations:

Proctor, C. J., Reiman, A. J., & Best, L. A. (2023, November 12). *Finding intimacy without sex: Exploring the impact of lost intimacy and sexual function after cancer [Conference presentation]*. Canadian Cancer Research Conference. Halifax, NS.

Proctor, C. J., Reiman, A. J., & Best, L. A. (2023, March). *Intimacy after cancer: The intersection of psychological flexibility [Poster Session]*. International Convention of Psychological Science. Brussels, BE.

Proctor, C. J., Beaulieu, D. A., Reiman, A. J., & Best, L. A. (2023, March). *What about sex? The role of sexual function, intimacy, and romantic loneliness in female cancer survivors [Poster Session]*. International Convention of Psychological Science. Brussels, BE

Beaulieu, D. A., Hickey, P. M., Proctor, C. J., & Best, L. A. (2022, June). *Staying healthy throughout COVID 19: Health-related quality of life across a*

timeline[Poster session]. Paper presented at the Canadian Psychological Association's 2022 National Annual Convention, Calgary Alberta.

Proctor, C. J., Beaulieu, D. A., Reiman, A., J., & Best, L. A. (2021, April). *Living well after cancer: The impact of social support and productive leisure* [Oral presentation]. 2021 International Psychological Applications Conference and Trends (InPACT)

Proctor, C. J., Beaulieu, D. A., & Best, L. A. (2022, November). *What about sex? Predictors of romantic loneliness in female cancer survivors* [Poster presentation]. New Brunswick Health Research Foundation Health Research Week

Beaulieu, D. A., Hickey, P. M., Proctor, C. J., & Best, L. A. (2021, June). *Staying healthy throughout COVID-19: Health-related quality of life across a timeline* [Poster Session]. Canadian Psychological Association's 2022 National Annual Convention

Beaulieu, D., Proctor, C., Wilbiks, J., Roach, S., Law, M. & Best, L. (2021, June). *Physical and psychological impact of COVID-19 restrictions on university students?* [Virtual poster session]. Canadian Psychological Association Annual Convention.

Harper, C., Proctor, C., Beaulieu, D., Law, Wilbiks, J., M., Roach, S., & Best, L. (2021, June). *A prolonged pandemic: Personality, psychological distress, public policy perceptions and adherence* [Virtual conference session]. Canadian Psychological Association Annual Convention.

- Proctor, C., Beaulieu, D., J., Reiman, A. J., & Best, L. A. (2021, July) *Get on with it!: Psychological flexibility improves life after cancer [Poster presentation]*. International Convention of Psychological Science (ICPS). Prague, Czech Republic
- Beaulieu, D. A., Proctor, C. J., Reiman, A., & Best, L. A. (2020, November). *A cancer diagnosis has long-term detrimental effects on health [Virtual conference session]*. New Brunswick Health Research Foundation
- Proctor, C., Carpenter, A., Beaulieu, D., Reiman, A., & Best, L. (2020, May). *Physical and mental health after a cancer diagnosis: can cognitive flexibility improve outcomes? [Poster Session]*. Canadian Psychological Association Annual Convention. Montreal, Canada. Cancelled due to COVID 19
- Beaulieu, D. A., Proctor, C. J., Reiman, A., & Best, L. A. (2020, November 20). *A cancer diagnosis has long-term detrimental effects on health [Virtual conference session]*. New Brunswick Health Research Foundation.
- Proctor, C., Beaulieu, D., Wilbiks, J., Roach, S, Law, M. & Best, L. (2020, November 20). *The effects of COVID-19 on physical and psychological wellness [Virtual conference session]*. New Brunswick Health Research Foundation
- Proctor, C., Carpenter, A., Beaulieu, D., Reiman, A., & Best, L. (2020, May). *Physical and mental health after a cancer diagnosis: can cognitive flexibility improve outcomes? [Poster Session]*. Canadian Psychological Association Annual Convention. Montreal, Canada. Cancelled due to COVID 19

- Freeze, T., Best, L., Proctor, C., DiTomasso, E., (2020, April). *Does attachment to God predict mindfulness? [Poster Session]*. International Psychological Application Conference and Trends. Madiera, Portugal.
- Proctor, C. & Best, L. (2019, March). *The utility of Acceptance and Commitment Therapy (ACT) after brain injury: Psychological flexibility and well-being. [Poster presentation]*. International Convention of Psychological Science (ICPS). Paris, France.
- Best, L., Proctor, C., Freeze, T., Gaudet, D., Russel, R., McPhee., R (2019, April). *Relation between subjective and physical well-being and mindfulness. [Oral presentation]*. InPact 2017 International Psychological Applications Conference and Trends. Zagreb, Croatia.
- Proctor, C. & Best, L. (2019, June). *Role of psychological flexibility and loneliness in predicting satisfaction with life. [Poster Session]*. Canadian Psychological Association Annual Convention. Halifax, Canada.
- Proctor, C. & Best, L. (2019, April). *Impacts of psychological flexibility on physical and psychological outcomes after brain injury [Poster Session]*. Interprofessional Health Research Day, Saint John, Canada.
- Proctor, C & Best, L. (2019, April). *The effects of cancer on psychological health: The effects of psychological flexibility [Poster Session]*. Interprofessional Health Research Day, Saint John, Canada
- Proctor, C., Nwaonumah, L., Flood K., & Best, L., (2018, April). *The effects of cancer on psychological health: Impact of personality, attachment, and*

psychological flexibility on thriving [Poster Session]. Interprofessional Health Research Day, Saint John, Canada

Proctor, C. & Best, L. (2018, August) *Acceptance after injury: the role of psychological flexibility in recovery. [Keynote address]* Domestic Violence and Brain Injury Symposium. Saint Andrews, Canada.

Nwaonumah, L., Proctor, C., Flood, K. & Best, L. (2018, July). *Role of psychological flexibility and loneliness in predicting satisfaction with life [Poster Session]*. Canadian Psychological Association Annual Convention. Montreal, Canada.

Proctor, C & Best, L. (2016, September) “*Life after brain injury: Factors impacting satisfaction with life in caregivers of brain injury survivors*”. [Oral presentation]. Toronto ABI Network Conference Toronto, Ontario.

Proctor, C & Best, L. (2015, April): “*Loneliness and Isolation after Brain Injury*”. [Oral Presentation] InPact 2015 International Psychological Applications Conference and Trends Ljubljana, Slovenia

Proctor, C & Best, L. (2014, October) “*Return to Productive Leisure: Art as Therapy*” [Oral presentation]. Brain Injury Canada 13th Annual Conference, Toronto, Ontario

Proctor, C & Best, L. (2015, April) *Loneliness and isolation after brain injury [Oral Presentation]*. Brain Injury Canada Semi-Annual Conference, Halifax, Nova Scotia

Proctor, C & Best, L. (2014, September) *Alternative Roads to Recovery: Exploring
online social networks and art as therapy* [Oral Presentation]. Brain
Injury Canada National Conference, Gatineau, Quebec