

The Importance of Social and Emotional Needs for the Psychological
Well-Being of Cancer Survivors: An Application of Socioemotional
Selectivity Theory

by

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AUTHOR'S DECLARATION

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

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Abstract

As the number of cancer survivors continues to rise, there is an increasing need for psychological research to better understand and help individuals cope with their cancer journey. According to Socioemotional Selectivity theory (SST), shortened time perspective and mortality awareness heighten the importance of social and emotional goals. In the present analysis, SST is applied to the unmet needs of cancer survivors. This is done to provide a better understanding of the association between unmet needs of cancer survivors and the impact of such needs on the survivors' psychological well-being, especially in the case of survivor's awareness of his/her mortality. In keeping with SST theory, we anticipated that for those with higher mortality awareness (e.g., recurrence of cancer, older age, greater mortality ratio), high unmet social and emotional needs, above else, will be associated with lower psychological well-being. Partial support was found for these hypotheses and results are discussed in terms of their contribution to a better understanding of the nature of psychological well-being of cancer survivors.

Keywords: Socioemotional Selectivity theory; cancer; socioemotional needs; survivors; unmet needs

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Table of Contents

List of Figures	viii
List of Tables	ix
1.0 Introduction.....	1
1.1 Study Rationale	2
1.2 Purpose	3
2.0 Literature Review.....	5
2.1 Cancer.....	5
2.2 Cancer Survivors	6
2.2.1 What is a Cancer Survivor?	6
2.2.2 Cancer Survivor Literature Overview	7
2.3 Unmet Needs	8
2.3.1 What is an Unmet Need?	8
2.3.2 Cancer Survivors and Unmet Needs.....	9
2.3.3 Measuring the Unmet Needs of Cancer Survivors	10
2.4 Cancer Survivors and Well-Being	11
2.4.1 Psychological Well-Being	11
2.4.2 Social Well-Being.....	13
2.5 Theories of Aging.....	13
2.5.1 Disengagement Theory.....	14
2.5.2 Activity Theory.....	14

2.5.3	Socioemotional Selectivity Theory of Aging	15
2.5.3.2	Socioemotional Selectivity Theory and Cancer	20
3.0	Hypotheses	23
4.0	Methods	25
4.1	Participants	25
4.2	Data Collection	26
4.3	Survey Variables & Scales	28
4.3.1	Independent Variables	28
4.3.2	Dependent Variables	30
4.3.3	Moderators	31
4.3.4	Control Variables	32
4.4	Data Analysis	33
4.4.1	Descriptive Statistics	34
4.4.2	Regression Models	34
5.0	Results	42
5.1	Descriptive Statistics	42
5.2	Anxiety	43
5.3	Stress	50
5.4	Depression	57
6.0	Discussion	64
6.1	Summary of Results	64

6.2 Results and Hypothesis of Study.....	67
6.3 Main Findings and Socioemotional Selectivity Theory.....	73
7.0 Strengths and Limitations	76
7.1 Strengths.....	76
7.2 Limitations	76
8.0 Future Research and Implications.....	79
9.0 Conclusion	81
References.....	82
Appendix A.....	95
Appendix B.....	97
Appendix C.....	110
Appendix D.....	117

List of Figures

Figure 1. <i>Survivor unmet social needs predicting survivor anxiety moderated by cancer recurrence.</i>	47
Figure 2. <i>Survivor unmet financial needs predicting survivor anxiety moderated by age.</i>	47
Figure 3. <i>Survivor unmet emotional needs predicting survivor anxiety moderated by age.</i>	48
Figure 4. <i>Survivor unmet informational needs predicting survivor stress moderated by recurrence of illness.</i>	52
Figure 5. <i>Survivor unmet social needs predicting survivor stress moderated by age.</i>	54
Figure 6. <i>Survivor unmet emotional needs predicting survivor stress moderated by age.</i>	54
Figure 7. <i>Survivor unmet financial needs predicting survivor stress moderated by mortality ratio(MR).</i>	56
Figure 8. <i>Survivor unmet financial needs predicting survivor depression moderated by age.</i>	61
Figure 9. <i>Survivor unmet emotional needs predicting survivor depression moderated by age.</i>	61
Figure 10. <i>Survivor unmet social needs predicting survivor depression moderated by mortality ratio (MR).</i>	63
Figure 11. <i>Survivor unmet emotional needs predicting survivor depression moderated by mortality ratio</i>	63

List of Tables

Table 1. Means and Frequencies for Socio-demographics, Mortality Awareness, and Psychological Well-being Variables.....	42
Table 2. <i>Unstandardized Coefficients for Regression Models Presenting the Effect of Sociodemographics Survivor’s Unmet Needs, Recurrence of Cancer Diagnosis and Survivor Unmet Needs by Recurrence of Cancer Diagnosis on Survivor Anxiety</i>	45
Table 3. <i>Unstandardized Coefficients for Regression Models Presenting the Effect of Sociodemographics Survivor’s Unmet Needs and Survivor Unmet Needs by Age on Survivor Anxiety</i>	46
Table 4. <i>Unstandardized Coefficients for Regression Models Presenting the Effect of Sociodemographics Survivor’s Unmet Needs, Probability of Mortality and Survivor Unmet Needs by Mortality Ratio on Survivor Anxiety</i>	49
Table 5. <i>Unstandardized Coefficients for Regression Models Presenting the Effect of Sociodemographics Survivor’s Unmet Needs, Recurrence of Cancer Diagnosis and Survivor Unmet Needs by Recurrence of Cancer Diagnosis on Survivor Stress</i>	51
Table 6. <i>Unstandardized Coefficients for Regression Models Presenting the Effect of Sociodemographics Survivor’s Unmet Needs and Survivor Unmet Needs by Age on Survivor Stress</i>	53
Table 7. <i>Unstandardized Coefficients for Regression Models Presenting the Effect of Sociodemographics Survivor’s Unmet Needs, Mortality Ratio and Survivor Unmet Needs by Mortality Ratio on Survivor Stress</i>	55
Table 8. <i>Unstandardized Coefficients for Regression Models Presenting the Effect of Sociodemographics Survivor’s Unmet Needs, Recurrence of Cancer Diagnosis and Survivor Unmet Needs by Recurrence of Cancer Diagnosis on Survivor Depression</i>	59
Table 9. <i>Unstandardized Coefficients for Regression Models Presenting the Effect of Sociodemographics Survivor’s Unmet Needs and Survivor Unmet Needs by Age on Survivor Depression</i>	60

Table 10. *Unstandardized Coefficients for Regression Models Presenting the Effect of Sociodemographics*
Survivor's Unmet Needs, Mortality Ratio and Survivor Unmet Needs by Mortality Ratio (MR) on Survivor
Depression62

1.0 Introduction

The news and subsequent shock of a cancer diagnosis leave many cancer survivors with a perception that they are in a race against time. Irrespective of their age, many patients become acutely aware of their mortality. Individuals are forced to deal not only with the needs associated with their cancer diagnosis and day-to-day survival, but also manage their psychological well-being; both of which impact their overall well-being. When this occurs, according to Carstensen's Socioemotional Selectivity Theory (SST), an individual reflects on the time-sensitive nature of his/her life, resulting in a re-prioritization of his/her life's goals (Carstensen, Fung & Charles, 2003; Carstensen, 1992; Carstensen, Isaacowitz, & Charles, 1999). These re-prioritized goals tend to focus on acquiring present-day, *emotional needs* and emotionally rewarding *social needs*. In comparison, pre-diagnosis goals tended to be relatively unconstrained futuristic goals that focus on optimizing one's life through expanding social networks and acquiring information (Lockenhoff & Carstensen, 2004; Pinquart & Silbereisen, 2006; Carstensen, 1992; Carstensen & Isaacowitz, 1999; Carstensen & Fung, 2003). While Carstensen focuses on aging as the motive behind these changes, she also argues that aging is a proxy that is used to describe the perceived time left in life (Carstensen et al., 1999). Thus, aging theories can be relied upon to describe the consequent psychological changes resulting from critical illness. In this study, we will examine the impact of mortality awareness (operationalized as recurrence of cancer diagnosis, age, and mortality ratio [i.e., cancer severity]) on the relationship between various unmet need domains (*Informational, Work and Financial, Health Care Access and Continuity, Coping*

and Sharing and Emotional [i.e. Social] Needs) and the psychological well-being of cancer survivors. In keeping with SST theory, it is anticipated that an increased sense of mortality awareness will heighten the impact of unmet social and emotional needs particularly on psychological well-being.

1.1 Study Rationale

Advances in the field of medicine have resulted in an increasing number of individuals being (a) diagnosed with cancer (as cancer risk increases with age) and/or (b) diagnosed multiple times (Okamaru, 2011; Campbell et al., 2009). It has been found that multiple cancer diagnoses, receiving palliative care and/or suffering with late-stage or a difficult cancer prompts an individual to change his/her view on life (Roh, 1994). A plethora of current-day research on the psychological well-being of cancer patients focuses on the biological implications of the stress brought about by cancer. However, significant gaps are evident in the assessment of the impact of unmet needs of cancer patients on their overall psychological well-being. Biological research alone fails to humanize cancer and factor in life beyond diagnosis for cancer survivors.

An estimated one in four Canadians will be diagnosed with cancer and 62% of individuals diagnosed are expected to live 5 years post-diagnosis (Canadian Cancer Society, 2011, p. 57; Canadian Cancer Society, 2011, p. 60). Between 1994 and 2004, the overall rate of survival for cancer climbed from 56% to 62% evidencing the rising survival rate of Canadians diagnosed with cancer (Canadian Cancer Society, 2011, p.62). In fact, the number of cancer survivors is expected to double in less than 20 years (Campbell, 2009). It is

important to consider however, that while a survivor's body may resume its normal function during remission, many times, their emotional well-being may not. This underscores the importance of recognizing the psychological trends experienced by cancer survivors on a daily basis and understand the needs resulting from these patterns. Recognizing the degree of influence of physical, functional, social, psychological and/or existential domains on survivors' well-being will help in the creation of optimized goals to meet their needs at every stage (Zimmerman et al., 2010).

This study will enable a better understanding of the nature of psychological well-being of cancer survivors. In addition, the examination of how mortality awareness heightens the impact of the relationship between certain unmet needs and psychological well-being will enable the creation of specific interventions aimed at resolving such issues in survivors. This will further restore and/or enhance the quality of life for this group of survivors. Moreover, this will enable cancer programs and policymakers to introduce preventive programs that may aid survivors with an increased sense of mortality in avoiding negative psychological effects on their well-being.

1.2 Purpose

In this study, we will examine the impact of mortality awareness (operationalized as recurrence of cancer diagnosis, age, and mortality ratio [i.e., cancer severity]) on the relationship between various unmet need domains (*Informational, Work and Financial, Health Care Access and Continuity, Coping and Sharing* [i.e. Social] and *Emotional Needs*) and the psychological well-being of cancer survivors. In keeping with SST theory, it is

anticipated that an increased sense of mortality awareness (operationalized as age, recurrence, mortality risk) will heighten the impact of unmet social and emotional needs, above all, on psychological well-being (anxiety, stress, depression).

2.0 Literature Review

A review of the relevant literature revealed that there was still much to learn about the psychological well-being of cancer survivors, especially within a Canadian context. This thereby reflects a genuine need for research in this area.

2.1 Cancer

Cancer is a disease that occurs at the cellular level and affects just under thirty-percent of the Canadian population, making it the leading cause of death in Canada, affecting men more than women (Canadian Cancer Society, 2011). Over 450 Canadians receive a cancer diagnosis every day, while more than 200 die as a result of the disease (Canadian Cancer Society, 2011). Furthermore, one in four Canadians are expected to die from cancer during their lifetime (Canadian Cancer Society, 2011).

Cells are the basic structure of life, and their groupings comprise the organs and tissues found in the human body (Canadian Cancer Society, 2011). These cells are found to multiply, divide and replace themselves on a regular basis. However, when these cells undergo an abnormal proliferation or conversely, an under-proliferation, cancerous tumors can develop. Cancerous cells may eventually spread to neighboring tissues and metastasize (Canadian Cancer Society, 2011).

The most common types of cancer found amongst Canadians vary depending on gender. Breast cancer is the leading cancer diagnosis found amongst women, while prostate cancer is the most common cancer found amongst Canadian men (Canadian Cancer Society,

2011). However, the leading cause of death due to cancer for both men and women is lung cancer followed by colorectal cancers (Canadian Cancer Society, 2011).

Upon diagnosis, an individual's survival rate will depend on the type of cancer discovered. Overall, there is a 62% likelihood that an individual diagnosed with cancer will survive at least five years post-diagnosis compared to their counterparts in the general population (Canadian Cancer Society, 2011).

2.2 Cancer Survivors

2.2.1 What is a Cancer Survivor?

Much variability exists in the cancer literature as to what exactly constitutes a “cancer survivor”. Few papers have made an attempt to precisely define a cancer survivor, and most cancer research relies on the definitions supplied by cancer organizations such as the National Coalition for Cancer Survivorship (NCCS) or the National Cancer Institute (NCI) to provide context to their studies (Twombly, 2004; NCI, 2012). Some of these definitions incorporate individuals such as caregivers that have been affected by the diagnosis (Twombly, 2004; NCI, 2012).

Both the NCI and NCCS consider all individuals that have been diagnosed with the disease to be survivors for the duration of their lives (NCI, 2012; About, 2012). This definition commences from diagnosis onwards. As such, the term “survivor” and “patient” is used interchangeably (Twombly, 2004; NCI, 2012; About, 2012).

Survivors are also commonly defined as individuals who have lived at least five years post-diagnosis (Feuerstein, 2007; Aziz, 2007). Dr. Mullan, a physician in the 1980's who was

diagnosed with cancer, proposed that the word “survival” be defined to encompass those who are “cured” as well as those still afflicted, due to the long-standing effects that cancer has on an individual (Feuerstein, 2007; Mullan, 1985). In an attempt to discern between the various stages and the common events that survivors face beginning at diagnosis, Mullan categorized the “stages of survival” (acute extended, and permanent) that a cancer survivor would belong to at any point post-diagnosis (Feuerstein, 2007; Mullan, 1985).

The NCI and NCCS definition of survivor, wherein one is considered a survivor from the point of diagnosis, will be assumed in this study (NCI, 2012; About, 2012).

2.2.2 Cancer Survivor Literature Overview

Cancer poses the most significant threat to the aging Canadian population. According to the Canadian Cancer Society, over 88% of new cancer cases are accounted for in Canadians over the age of 50, while over 95% of deaths due to cancer in Canada occur to those 50 years of age and older (2012). Overall, 40% of women and 45% of men in Canada will develop cancer, and one out of every four diagnosed Canadians will succumb to the disease (Canadian Cancer Society, 2011). These statistics evidence a large number of cancer survivors in the Canadian population.

The prevalence of cancer survivors has been associated with a shift in perceptions and attitudes towards the disease. Individuals began viewing cancer as a chronic illness (Avis & Deimling, 2008; Blank, 2009; Aziz, 2007). The change in definitions made it no longer sufficient to treat the disease until remission and forego any post-treatment care. Cancer survivors are unique as the effects of cancer and its treatment do not end at remission. Rather

during remission, the disease presents a host of mental, social and physical complexities that go beyond the realm of biological implications (Avis & Deimling, 2008; Aziz, 2007; Mullan, 1985; Sanson-Fisher, 2009). Thus, as Blank argues, the onus lies not only on the survivor, but on the researchers and clinicians to assist and facilitate the entire process of survival from diagnosis to post-treatment care (Blank, 2009). This would include careful consideration of the survivors' long and short term needs and would help in ensuring survivor overall well-being (Blank, 2009; Markman, 2006).

2.3 Unmet Needs

2.3.1 What is an Unmet Need?

The definition of an 'unmet need' can vary from one cancer survivor to another. Scales to assess the unmet needs of patients and/or survivors differ based on which phase of the cancer journey (undergoing treatment, survivor or advanced/terminally ill) an individual is on (Sanson-Fisher, 2009). For the purposes of this study, an unmet need is defined as "...a requirement for some desirable, necessary or useful action to be taken or some resource to be provided, in order to attain optimal well-being" and the Survivor Unmet Needs Survey is the scale by which these needs are assessed (Campbell, 2009). By adopting a broad definition on what cancer survivors perceive as an "unmet need", evidence-based decisions pertaining to resource allocation and public health measures can be more efficiently constructed to better address the primary concerns of cancer patients (Hodgkinson et al., 2007; Campbell, 2009). Although some research has focused on needs as they were established by a primary care physician, recent literature has revealed that a physician's definition of a need requiring

professional attention (better referred to as the ‘Top-down method’ of need identification), and what the patient defines as a problem may differ (Osse, Vernooij-Dassen, Vree & Grol, 2000; Pollock et al., 2007; Sanson-Fisher, 2009). The definition of an unmet need is succinctly summarized by Carr and Wolf as being “...differences between services judged necessary to deal appropriately with health problems and services actually received.” (1976; Hodgkinson et al., 2007).

According to Sanson-Fisher, there is a shortage of psychometrically-strong scales used on cancer survivors that accurately and effectively measure unmet needs (2009; Pearce et al., 2008). Current scales have been under-examined with regards to their reliability (Sanson-Fisher, 2009). Although cross-sectionally proven, one aspect that remains to be verified is whether or not the newer unmet need scale scores can be translated to predict future outcomes such as depression (Sanson-Fisher, 2009). Moreover, the translation of improvements in unmet needs scores to clinical significance and improved well-being is unclear (Sanson-Fisher, 2009).

2.3.2 Cancer Survivors and Unmet Needs

A qualitative study done by Hodgkinson revealed that cancer survivors’ concerns are ongoing and changing (2007). These fluctuating concerns emotionally impact survivors as their existing problems do not decrease, but rather morph into new ones which can be more difficult to manage post-treatment due to the lack of consistency in professional care (Hodgkinson et al., 2007). The study’s results also indicate that relationships (including the

expectations that arise as a result thereof) changed following a cancer diagnosis and never reverted back to their ‘pre-cancer’ state (Hodgkinson et al., 2007).

One of the first large scale studies done to determine the unmet needs of cancer patients across various domains, found that psychological well-being was a primary concern (Sanson-Fisher et al., 2000). Psychological issues may become ongoing problems once a patient transitions to a survivor. A similar study found that nearly one-fifth of the participating disease-free cancer patients were found to experience fatigue, which is also correlated with anxiety and depression, although the causal direction of the relationship was not determined (Servaes, Verhagen, & Bleijenberg, 2002). Other studies have also concluded that the issues in the psychological domain (namely depression and anxiety) are pressing concerns when dealing with those patients still undergoing treatment, as well as those in the post-treatment phase (Gotay & Muraoka, 1998; Sanson-Fisher et al., 2000; Lobb et al., 2009; Abrahamsen, 1998; Servaes et al., 2002).

The level and intensity of an unmet need varies according to the type of cancer an individual experiences as well as the age of the survivor (Lobb et al., 2009; Hodgkinson et al., 2007). For example, younger patients suffering from hematological malignancies in one study seemed to exhibit higher levels of unmet needs with regards to relationships and emotions upon reaching the end of treatment (Lobb et al., 2009).

2.3.3 Measuring the Unmet Needs of Cancer Survivors

A study assessing the unmet needs of head and neck cancer patients found that their needs were highly dependent on each individual’s stage of disease, site of cancer and type of

treatment received (Rogers, Clifford & Lowe, 2010). Often, unmet needs and/or lack of patient support results in a higher likelihood of increased caregiver burden causing negative impacts to the rating of patient well-being (Sharpe, Butow, Smith, McConnell & Clarke, 2005; Rogers et al., 2010). Current surveys such as the Supportive Care Needs Survey, Unmet Needs Cancer Survivor Survey, Health-Related Quality of Life surveys (HRQL) or Supportive Care Needs Survey (SCNS) amongst many others, are aimed at identifying the unmet needs of cancer survivors through the use of surveys (Rogers et al., 2010; Pearce, Sanson-Fisher & Campbell, 2008). Other tools were also created to assess the needs of specific cancers such as the Patients Concerns Inventory (PCI) for patients diagnosed with head and neck cancers (Rogers et al., 2010). A review of the current scales used to measure the quality of cancer survivors found that a needs-based approach was only used in two of the 18 reviewed questionnaires (Pearce et al., 2008; Campbell et al., 2009). According to Campbell et al. (2009), a needs-based approach is an effective tool in measuring the unmet needs of survivors as it considers both patient and provider perspectives which may sometimes conflict. For example, while providers will overwhelmingly see cancer as a negative event, many patients are likely to positively view their journey in an effort to attribute meaning to their experience (Taylor, 1995).

2.4 Cancer Survivors and Well-Being

2.4.1 Psychological Well-Being

According to Hodgkinson and colleagues, survivors of gynecologic cancer were found to suffer from high levels of clinical anxiety (almost one-third of the sample) and post-traumatic

stress disorder (levels varied from one-fifth to one-third, depending on the stage of cancer they sought treatment for) (2007). In addition, time since diagnosis proved to be an unreliable method in gauging anxiety levels. The lack of reliability stems from the fact that survivors who had survived more than three years post-diagnosis had higher anxiety rates and lower mental and physical quality of life scores than those whom were more recently diagnosed (Hodgkinson et al., 2007).

Cancer survivors have reported feelings of general anxiety (Hodgkinson et al., 2007; Hodgkinson et al., 2007; Zabora et al., 2001; Lobb et al., 2009; Knobf et al., 2011) and fear related to disease recurrence (Hodgkinson et al., 2007, Hodgkinson et al., 2007; Hodgkinson et al., 2007; Thewes et al., 2003; Wenzel et al., 2002; Lobb et al., 2009; Knobf et al., 2011). Post-traumatic disorder (Hodgkinson, 2007; Lobb et al., 2009, Alter et al., 1996) and depression (Hodgkinson et al., 2007; Miovic & Block, 2007; Knobf et al., 2011) were also common amongst this population of individuals. Younger survivors place more emphasis on needs related to emotions and relationships in comparison to their older counterparts (Sanson-Fisher et al., 1999; Lobb et al., 2007). In addition, available literature also highlights troubles with dealing with the emotional toll of transitioning from a patient to a survivor (Hodgkinson et al., 2007; Gotay & Muraoka, 1998; Knobf et al., 2011). This sometimes leads to an ‘adjustment disorder’, defined as “...symptoms of situational anxiety or depression that are distressing enough to warrant treatment but that are not so strong and pervasive as to meet criteria for a full anxiety or depressive disorder” (Miovic & Block, 2007). A study

performed on breast cancer survivors highlighted a direct correlation between depression and higher unmet needs (Hodgkinson et al., 2006).

2.4.2 Social Well-Being

Cancer is a chronic disease that affects multiple aspects of life including physical health and social well-being. Cancer survivors have reported changes in relationships, including a change in expectations by those around them (Hodgkinson et al., 2006; Hodgkinson et al., 2006; Hodgkinson et al., 2007; Lobb et al., 2009). Relationships have been found to be a buffer for the ill effects of the cancer journey. A recent study found a high degree of correlation between those that were stated to be in a relationship during the course of their treatment and the number of met needs (Hodgkinson et al., 2006). In addition, marriage has been linked to protective health effects and decreased mortality in much of the literature (Waldron, Hughes & Brooks, 1996; Gove, 1973; Hu & Goldman, 1990).

2.5 Theories of Aging

While studying patients with a cancer diagnosis that are facing a shorter life span, researchers stand to learn a lot about their shift in psyche from aging theories (Carstensen & Frederickson, 1998). The Socioemotional Selectivity Theory (SST) was in part developed in response to two main aging theories: Disengagement and Activity theory (Carstensen et al., 1999). Therefore, in order to understand how SST evolved, it is pertinent to have a basic understanding of these two theories.

2.5.1 Disengagement Theory

Disengagement theory is one of the most common and widely accepted theories describing psychosocial changes during the aging process. This theory posits that given the existence of both financial and physical independence, older adults tend to withdraw or disengage from their social surroundings. This in turn relieves older individuals from the societal pressures that they would otherwise face if actively part of society (Vander Zyl, 1979). Thus “disengagement” refers to the phenomenon that is thought to occur between the individual and their society as they age, resulting in a psychological disengagement process (Vander Zyl, 1979; Cumming, 1959). This theory articulates that age is a strong indicator of individuals distancing themselves from society and social relationships as a means of preparing for death and the eventual separation from the physical world (Carstensen, 1992). Moreover, this disengagement process mutually occurs both by the aging individual as well as their surrounding society (Cumming, 1959).

2.5.2 Activity Theory

Another common theory that is used to explain the psychosocial aspect of the aging process is known as the Activity Theory of Aging. According to this theory, successful aging would involve an individual that remains active in old age. Maintaining an active lifestyle is a good predictor of an individual’s overall satisfaction with life. Thus social interaction and/or activity are the primary reasons used to explain contentment in old age (Knapp, 1977). These activities may be physical or intellectual, however, it is crucial that the inability to maintain one type of activity due to aging is superseded with another (Vander Zyl, 1979). Thus it can

be said that social and physical obstacles are the primary reasons for decreased social interactions amongst the elderly and the society at-large (Carstensen, 1992).

2.5.3 **Socioemotional Selectivity Theory of Aging**

There is a consensus amongst gerontologists that some form of withdrawal occurs where social contacts are limited with age. Social inactivity in old age has primarily been explained through two main theories: Disengagement theory and Activity theory. However, empirical evidence would suggest that these theories do not adequately capture the interaction between aging adults and their social environments (Carstensen, 1992). For instance, some studies that have controlled for health status found that social activity levels cannot predict physical or psychological well-being (Carstensen, 1992; Lee & Markides, 1990). Moreover, strong emotional connections in late life predict happiness (Carstensen, 1992; Lee & Markides, 1990), thus why would aging adults disengage from such relationships?

The Socioemotional Selectivity theory classifies social goals into two broad functional categories: (1) acquisition of knowledge and (2) emotion regulation (Carstensen et al., 1999). Goals that optimize the future involve: acquiring knowledge; personal development; and/or establishing social contacts that may prove beneficial in the future (Lockenhoff & Carstensen, 2004). On the other hand, goals that are emotionally-driven tend to involve: regulation of emotions (especially those involving positive experiences/states); the intensification of positive states of being; and/or fostering the ability to regulate emotions in response to various experiences (Lockenhoff & Carstensen, 2004; Carstensen & Frederickson, 1998). Those dealing with a terminal illness also re-orient their present goals to

ones that help in alleviating adverse symptoms. Consequently, the individual can then partake in emotionally meaningful activities with close social contacts (Lockenhoff & Carstensen 2004; Pinquart & Silbereisen, 2006; Carstensen & Frederickson, 1998). The acquisition of knowledge category deals with learning about society and one's self as an individual in it (social and physical world) while the emotion regulation category is more concerned with finding meaning, "gain[ing] emotional intimacy, [and] establish[ing] feelings of social embeddedness" (Carstensen & Isaacowitz, 1999).

There is constant competition between goals and depending on future outlook (expansive vs. limited), an individual is more to elicit behaviour that is likely to favour goals (1) or (2) depending on their situation (Lockenhoff & Carstensen 2004; Pinquart & Silbereisen, 2006; Carstensen & Frederickson, 1998). Therefore, emotions, cognition and motivation change depending on the perception of time and whether it is viewed as limited or expansive (Lockenhoff & Carstensen 2004; Pinquart & Silbereisen, 2006; Carstensen & Frederickson, 1998). One study tested the hypothesis that older adults remember facets of memories that were more likely to be emotionally-charged and found that as one gets older, the perception that time is limited "...softens the experiences of negative emotions and enhances the appreciation of positive aspects of life" (Carstensen and Turk-Charles, 1996; Carstensen et al., 1999).

Alternatively, when emotionally-oriented goals take precedence over knowledge-acquisition goals, individuals will tend to favour close social contacts as opposed to strangers (Carstensen, 2003; Frederickson & Carstensen, 1990). A study asking people to consider

who they would rather spend a spare 30 minutes with found a strong favouring of immediate family by older individuals (Carstensen, 2003; Frederickson & Carstensen, 1990).

Conversely, a study by Carstensen (2003) found that the alteration of perception of time left in life of older adults (i.e., a life extension of 20 years) increased the preference of novel social partners (Frederickson & Carstensen, 1990).

As previously mentioned, this phenomenon is not specific to aging adults. Rather, the same trend has been observed in individuals dealing with a terminal illness. A study done by Carstensen and Frederickson (1998) compared gay men with varying HIV statuses (HIV negative, HIV positive with no symptoms, HIV positive with symptoms) and examined their social contact preferences. They found that those with greater mortality awareness (HIV positive with symptoms) had similar views as older adults in that they favoured close social contacts as compared to men with other disease statuses (Carstensen & Frederickson, 1998). Another study illustrated the same phenomenon within a historical context. Fung and colleagues (1999) found that irrespective of age, when time is perceived as limited (in this case, it was when Hong Kong being returned to Republic of China from Britain), young and older adults preferred closer social contacts in the few months leading up to the handover (seen in many ways during that time as “the end of time”) versus the year prior. This evidence suggests that many variables can serve as proxies for ‘time left in life’, or ‘mortality awareness’ (Carstensen, Fung & Charles, 2003).

2.5.3.1 Mortality awareness

Mortality awareness, according to Carstensen, is an individual's realization of the time sensitive nature of their existence (1998). Since there is no single measure that can be used to determine mortality awareness in this study, *recurrence* of cancer, *age* of the survivor, and the calculated *mortality ratio* in the survivor will be used as proxies.

2.5.3.1.1 Recurrence

Socioemotional Selectivity Theory is primarily concerned with time perspective as the main indicator for mortality awareness (Carstensen, Isaacowitz & Charles, 1999; Carstensen & Frederickson, 1998). In a study focusing on HIV status and time perspective, age was held constant and HIV status (positive or negative) and symptom status (symptomatic or asymptomatic) served as the primary indicator for mortality awareness (Carstensen, Isaacowitz & Charles, 1999; Carstensen & Frederickson, 1998). The study found an increased likelihood of symptomatic individuals placing more importance on the emotional well-being and stability brought forth by social contacts (Carstensen & Frederickson, 1998). Therefore it is important to discern that chronological age, although an important measure, is not the only means by which time perspective in individuals can be measured (Man-Yin Kin & Fung, 2004; Lockenhoff & Carstensen, 2004). Time perspective may also be manipulated in an experimental setting such as was done with Fung et al. when study participants were asked to base answers to their questions on limited or extended time horizons (Man-Yin Kin & Fung, 2004; Fung et al., 1999, Lockenhoff & Carstensen, 2004).

One of the most prominent fears for cancer survivors is a recurrence of the disease (Hodgkinson et al., 2007, Hodgkinson et al., 2007; Hodgkinson et al., 2007; Thewes et al., 2003; Wenzel et al., 2002; Lobb et al., 2009; Hamama-Roz & Solomon, 2006; Knobf et al., 2011). Having a cancer recurrence has been found to be more traumatic than an initial diagnosis (Cella, Mahon & Donovan, 1990). This again leads to heightened sense of mortality awareness. Moreover, emotional distress and poor psychological adjustment have both been linked to fears concerning cancer recurrence (Stanton et al., 2002; Vickberg, 2003).

2.5.3.1.2 Age

Age plays a major factor when it comes to cancer diagnoses as most new diagnoses are accounted for by individuals that are 50 to 79 years old and 62% of cancer deaths also occur in individuals in this age range (Canadian Cancer Society, 2012). As a person ages, an increasing awareness of time is realized. However, one can also gain this awareness if their time horizon shifts, for example, through a diseased state, in which he/she no longer has as much time left as their healthy peers (Carstensen, Isaacowitz & Charles, 1999; Lockenhoff & Carstensen, 2004; Frederickson & Carstensen, 1998; Carstensen, Fung & Charles, 2003; Pinguart & Silbereisen, 2006). It is this perception of time that ultimately drives one's behaviour to execute their goals and desires (Carstensen, Isaacowitz & Charles, 1999; Lockenhoff & Carstensen, 2004; Frederickson & Carstensen, 1998). An individual's lifetime is typically a collection of emotions 'marked' by significant milestones such as the death of a loved one. Such situations occur more frequently with age. However, Carstensen et al. argue

that one is always monitoring their “time left” unconsciously (Carstensen, Isaacowitz & Charles, 1999). Since SST emphasizes time perspective, age was deemed as the simplest form of measuring time left in life, or in other words, the mortality awareness. Much of the aging literature present today focuses on how individuals look to age as a primary means of gauging how much time they have left in life.

2.5.3.1.3 Mortality ratio

No two cancers are alike, and proof of this is found in the relative survival ratio that is connected to each type of cancer. The Canadian Cancer Society has developed a population-based survival estimate, termed the ‘Relative Survival Ratio’ which provides the likelihood of surviving a specific type of cancer five years post-diagnosis, or “...the ratio of the observed survival for a group of persons diagnosed with cancer to the survival expected for people in the same general population.” (Canadian Cancer Society, 2011, p. 62). Each RSR value will vary depending on the type of cancer. For example, while thyroid cancer has the highest RSR at 97%, pancreatic cancer has the lowest at 6%. The Canadian Cancer Society’s complete list of RSR values by cancer types and gender is presented in Appendix A.

2.5.3.2 **Socioemotional Selectivity Theory and Cancer**

Socioemotional Selectivity theory itself can be summarized through its three basic tenants; 1) Individual survival largely relies on social interaction, 2) An individual’s behaviours is directed by his/her goals and 3) There is a constant competition between goals (seeking knowledge versus seeking emotional comfort), and at the heart of this matter is the

perception of time (expansive versus limited) (Carstensen, Isaacowitz & Charles, 1999).

Therefore one's social behaviour at any point in time, depending on their perception of time they have left, will favour goals dealing with knowledge acquisition versus those that regulate one's emotions.

As previously discussed, SST is primarily concerned with an individual's perception of time and in many cases, a person's perception of time can be hypothesized by their age. In an attempt to discern whether "...age is associated with how people react and adjust to finding out they have cancer", Blank and Belizzi found a stark difference between 'physiologic', 'psychologic' and 'chronologic' aging and their respective effects on an individual diagnosed with cancer (2008). According to Blank and Belizzi, psychological aging, can be described through people's choices as they get older, namely that they tend to shift their goals to ones that can be achieved sooner, choose goals and activities that are more emotionally-regulated in nature and become more efficient at regulating their own emotions, (2008; Carstensen, Isaacowitz & Charles, 1999). On the other hand, physiologic aging is more concerned with the physiological breakdown that naturally occurs as one ages. In their opinion, much of the current literature lacks in outlining the effects of age outside of the chronological realm and its impact on a cancer survivor (Blank & Belizzi, 2008). A study done by Pinquart and Silbereisen sought to replicate the study done by Carstensen on HIV patients but with cancer patients (2006). They found that those individuals diagnosed with cancer were more likely to choose familiar social partners as compared to their healthy counterparts (Pinquart & Silbereisen, 2006). In addition, younger cancer patients exhibited

similar social preferences as older adults (Pinquart & Silbereisen, 2006). According to Pinquart and Silbereisen, this is likely attributable to the fact that those diagnosed with cancer hold a limited future time perspective (2006). In the case of survivors, they also noted that those who had undergone successful treatment were more open to unfamiliar social contacts, but the majority of them still preferred the familiar ones (Pinquart & Silbereisen, 2006). They attribute this particular finding to the fact that once an individual has been diagnosed with cancer or any life-threatening disease, it is difficult to regain their pre-disease perception of time. Thus the individual will always view their life as somewhat constrained by time (Pinquart & Silbereisen, 2006; Carstensen, Isaacowitz & Charles, 1999; Carstensen & Frederickson, 1998).

3.0 Hypotheses

The principle question under investigation for the purposes of this study is: Does mortality awareness (operationalized as recurrence of cancer diagnosis, age, and mortality ratio [i.e., cancer severity]) heighten the impact of unmet needs (defined as all the need domains from the SUNS survey, with particular emphasis on social and emotional needs) on the psychological well-being (i.e. anxiety, stress, depression) of cancer survivors? The anticipated research hypotheses are as follows:

1. Based on the literature, there will be a relationship between unmet needs and psychological well-being, where higher unmet needs result in worse psychological outcomes.
2. Given the nature of Socioemotional Selectivity Theory, the relationship between unmet needs and the outcomes will be moderated by mortality awareness (proxies: recurrence of diagnosis, age of survivor, mortality ratio of the cancer diagnosis) where each moderator will heighten the impact of unmet needs to produce higher anxiety, stress or depression levels. That is;
 - i. Unmet social and/or emotional needs of survivors with a cancer recurrence will result in poorer psychological well-being. In contrast, the unmet social and/or emotional needs of survivors without a recurrence would have less of an impact on their psychological outcome.
 - ii. Unmet social and/or emotional needs of older survivors will result in poorer psychological well-being. In contrast, the unmet social and/or emotional needs

of younger survivors would have less of an impact on their psychological outcome.

- iii. Unmet social and/or emotional needs of survivors with a high mortality ratio (i.e., cancer severity) will result in poorer psychological well-being. In contrast, the unmet social and/or emotional needs of survivors with a lower mortality ratio would have less of an impact on their psychological outcome.

4.0 Methods

For the purposes of this study, a quantitative statistical analysis will be employed to examine the association between unmet social and emotional needs on psychological well-being while using mortality awareness as a moderator. The research will draw on secondary data collected from Cancer Survivors Unmet Needs Survey (SUNS) (Campbell, 2011). Secondary data provides greater insight into an existing data set that can result in a more thorough analysis or an alternative conclusion to the initial inquiry (Dale et al., 1988, p.3). For the purposes of this study, in keeping with SST theory, the expectation is that the unmet social and/or emotional needs of survivors with a heightened sense of mortality (i.e. have a cancer recurrence, are older in age or have a cancer higher mortality ratio) will have a greater impact on their psychological well-being than those without a heightened sense of mortality.

4.1 Participants

Respondents who took part in the survey consisted of a random sample of 1600 listed cancer survivors in provincial cancer registries collected from two English-speaking provinces. Samples were stratified into four groups based on time since diagnosis; 12-24 months, 25 to 36 months, 37 to 48 months and 49 to 60 months. These survivors were living individuals, 19 years of age or older whom had been histologically diagnosed with cancer (neurological, in situ and non-melanoma cancers were excluded) in the 12-60 months prior to the commencement of the data collection. Of the 1600 contacted, 1128 survivors qualified to complete the *SUNS* however 789 survivors (n) fully completed the survey. The final sample

was 46% female. The ages of participants ranged from 50 to 78 years of age with a mean age of 64.58. Over 80% of the sample was married while over 41% were employed and close to 24% had a university degree.

4.2 Data Collection

Data from the Survivor's Unmet Needs Survey (SUNS) was used for the purposes of this survey. The SUNS is a, 89-item, comprehensive survey that "...has high acceptability, item test-retest reliability and internal consistency (Chronbach's alpha 0.990), face, content and construct validity" with a combined total of 64.4% variance across the 5 domains (Campbell et al., 2011). It measured five domains and 89 items: information needs (8 items), work and financial needs (11 items), access and continuity of care (22 items), relationship needs (15 items), and emotional needs (33 items). A five-point Likert scale was used as response options in the *SUNS* and the scale ranged from 0 (no unmet need) to 4 (very high unmet need). Respondents were asked to recall their unmet needs in the past month. In order to give respondents an option to identify areas which they needed to assistance with, "No unmet need" was also included as a response option in the survey.

For the purposes of determining survivors' mental and physical functioning as well as overall health-related-quality of life, the SF-12 was also incorporated into the SUNS. Additionally, stress, anxiety and depression were measured by incorporating the DASS-21 validated scale into the SUNS.

In addition to these questions, the survey posed demographic and contextual questions assessing the respondent's age, sex, highest education, employment status, co-

inhabitants, geographic location and distance from the cancer treatment centre. The survey also asked diagnosis/treatment-related questions such cancer type, diagnosis date, recurrence, current status and treatment within the last month.

This survey was prepared and reviewed in partnership between the Canadian Cancer Society and its support staff, as well as behavioural scientists and psychosocial health care provider. A pilot study and telephone interviews were conducted to assess acceptability, time to complete and response rates (Campbell, 2010). Readability was also reviewed by the Plain Language Service (Campbell, 2010).

Access to the data has been granted following an ethics review by the University of Waterloo, Office of Research Ethics and the provincial agency responsible for the cancer registry, as well as an ethics/confidentiality agreement between the researcher and the Propel Center for Population Health Impact at the University of Waterloo. Completed surveys were sent to Center for Behavioural Research and Program Evaluation at the University of Waterloo and were identifiable by participant number only. Otherwise, participant information was only available to the Cancer Registry staff who undertook any subsequent follow-up mailing. The data is secured in a locked filing cabinet and on password-protected server at all times. Under no condition are data (with the exception of the analyses output) allowed to leave the Propel premises at the University of Waterloo.

4.3 Survey Variables & Scales

4.3.1 Independent Variables

Each of the five domains (information needs, work and financial needs, access and continuity of care, relationship needs, and emotional needs) were independently tested against the dependent variable (psychological well-being) to assess the overall relationship between unmet needs and psychological well-being while using mortality awareness as a moderator (proxies: recurrence of cancer, age of survivor, mortality ratio of initial cancer diagnosis). The mean of the items used for each domain was calculated with higher values signifying greater unmet needs for that specific section. A full list of all items used for each domain is found in Appendix B.

4.3.1.1 Information Needs

The *Information Needs* of cancer survivors were assessed with the sum of questions from the entire domain which included eight questions on a five-point scale to evaluate the needs of a survivor where '0' signified 'no unmet need' and '4' signified a 'very high unmet need' (e.g., "Knowing which sources of information to trust;" "Dealing with worry about whether the treatment has worked") ($\alpha = 0.94$).

4.3.1.2 Financial Needs

The *Unmet Work and Financial Needs* of cancer survivors were assessed with 7 questions on a five-point scale to evaluate the needs of a survivor where '0' signified 'no unmet need' and '4' signified a 'very high unmet need' (e.g., "Paying household bills or other payments" and

“Doing yard work (cutting grass, snow shoveling, etc.) ($\alpha = 0.88$). Since this section also asks employment-related questions and there was no way in discerning whether respondents were retired, the employment-related items were dropped in the analysis and only data from finance-related questions were assessed. This was done to better reflect unmet financial needs of all respondents without concern about whether they were retired or unemployed.

4.3.1.3 Access & Continuity of Care Needs

The *Unmet Needs for Access and Continuity of Care* of cancer survivors were assessed using the entire domain which consisted of eight questions on a five-point scale to evaluate the needs of a survivor where ‘0’ signified ‘no unmet need’ and ‘4’ signified a ‘very high unmet need’ (e.g., “Finding out what is involved in follow-up care” and “Getting follow-up tests quickly enough”) ($\alpha = 0.97$).

4.3.1.4 Coping & Sharing Needs

The *Coping and Sharing Needs* of cancer survivors were assessed using the entire domain which consisted of fifteen questions on a five-point scale to evaluate the needs of a survivor where ‘0’ signified ‘no unmet need’ and ‘4’ signified a ‘very high unmet need’ (e.g., “Telling others how I was feeling physically” and “Dealing with how people are not able to cope with my illness”) ($\alpha = 0.97$). This section relates to social ties and thus essentially reflects the social aspect of cancer survivors.

4.3.1.5 Unmet Emotional Needs

The *Unmet Emotional Needs* section were assessed by using all items from the domain which included thirty-three questions on a five-point scale to evaluate the needs of a survivor where ‘0’ signified ‘no unmet need’ and ‘4’ signified a ‘very high unmet need’ (e.g., “Dealing with people not understanding how my physical abilities have changed” and “Dealing with feeling depressed”) ($\alpha = 0.98$).

4.3.2 Dependent Variables

The dependent variable being explored for the purpose of this study is psychological well-being, as determined by the Depression, Anxiety and Stress Scale (DASS-21) validated scale used in the *SUNS* (Appendix C). The DASS-21 is a validated scale consisting of 21 self-reported questions that are used to measure psychological well-being in three domains: anxiety (e.g. I felt I was close to panic) ($\alpha = 0.79$), stress (e.g. I found it difficult to relax) ($\alpha = 0.90$) and depression (e.g. I couldn’t seem to experience any positive feeling at all) ($\alpha = .92$) (Antony et al., 1998; Henry & Crawford, 2005). The 21 questions included in this scale are measured using a four-point continuous scale that ranges from 0 (did not apply to me at all) to 3 (applied to me very much, or most of the time) (see Appendix C). Scores are then summed and multiplied by 2 for each domain. The resulting summed score is then compared to a severity rating to determine the severity label (normal, mild, moderate, severe, and extremely severe) for each of the three domains (stress, anxiety and depression) (see Appendix D).

4.3.3 Moderators

The moderator that will be used in this study is mortality awareness. Variables that may reflect this moderator and will be used for the purposes of this study include *recurrence* of cancer and cancer diagnosis, *age* and five-year *mortality ratio* (see Appendix E).

4.3.3.1 Recurrence

The *recurrence* of cancer diagnosis variable will be assessed using the following questions from the survey: “Has the cancer spread to other parts of your body?” and “Have you had a new cancer?” where 1 indicated a relapse and/or new diagnosis and 2 indicated no relapse and/or no new cancer diagnosis. These two variables were then compressed into a new variable in which 0 indicated no recurrence of cancer and 1 meant disease recurrence (i.e. 0 = 0, 1 or 2 = 1).

4.3.3.2 Age

A new derived variable was also constructed for *Age of Survivor* (at diagnosis) based on data extracted from registry data. The original categorical ranges employed for age as found in the dataset were transformed into a continuous variable. This new variable was recoded by using the midpoint of the original range (i.e. the original 30-39 age range found in the original dataset was recoded to 35 for the new variable).

4.3.3.3 Mortality Awareness

Lastly, the five-year relative survival ratio will be used to determine the mortality ratio of a survivor’s initial cancer diagnosis. , the relative survival ratio (RSR) (Appendix A) from the

2011 Canadian Cancer Society Statistics was applied to data relating to each respondent's initial cancer type from his/her first diagnosis. However, since the Canadian Cancer Society gives the probability of surviving, the variable had to further be recoded to the probability of dying (i.e. 1-RSR) which more closely reflects the nature of mortality awareness. Thus for example, instead of a prostate cancer survivor having a 96% chance of living 5 years post-diagnosis, this new variable would indicate that they had a 4% chance of not surviving 5 years post-diagnosis.

The question related to this variable found in the survey is; "What type of cancer were you first diagnosed with?" A list of cancer types were listed as possible responses, respondents also had the option of answering an open-ended question under the field "other" if none of the listed responses were deemed appropriate. The open-ended responses that resulted from the "other" option were recoded into the main types of cancer as per the Canadian Cancer Society guidelines.

4.3.4 Control Variables

The demographic information for this study was extracted from *About You* found in the third section of the SUNS. For the purposes of this study, *age*, *gender*, *marital status*, *employment status* and *university education* were used as control variables in the analysis (see Appendix F). Studies have shown that gender may have an impact on the emotional and psychological well-being of cancer survivors (Piccinelli & Wilkinson, 2000). Level of education as well as employment status have also been proven to have an effect on overall well-being in which case, individuals with higher levels of education and/or employment status (and thus a better

sense of perceived control over one's affairs) are likely to report better overall well-being (Lachman & Weaver, 1998). Controlling for these variables will thus help in avoiding situations in which these variables confound the true association. In order to do so, questions from the survey specifically asking respondents "I am... [male/female]", "What education levels have you completed?" and "Do you do any paid work" will be analyzed.

As previously discussed, age was converted into a continuous variable for the purposes of this analysis while the gender variable was given either a '1' for female and '0' for male. The SUNS asked respondents 'What education levels have you completed' and 'University degree, certificate or diploma' served as the last option. Thus for *University Education*, only data pertaining to the 'University degree, certificate or diploma' option was coded as 1 and the rest of options (i.e. education levels below that of university) were given a value of 0. Concerning the *Employment* variable, data from respondents whom indicated that they were working for pay was assigned a value of '1' (i.e. yes) and those who indicated otherwise were given '0' (i.e. no) in response to the question "Do you do any paid work (including self-employed paid work)". Lastly, for the *Marital Status* variable, the question concerning the respondent's marital status found in the third section of the SUNS was used and a value of '1' was assigned for those that are married while a value of '0' assigned for the other options.

4.4 Data Analysis

Data analysis for this study was conducted using PASW (SPSS) statistical software to determine the impact of the various domains of unmet needs on the psychological well-being

of cancer survivors. The resulting sample size in this study (n) is 789. The data associated with a subset of questions from the survey and from each domain was used to analyse the independent, dependent, control and moderator variables.

4.4.1 Descriptive Statistics

The means of the control variables used in this study were computed prior to regression analyses in order to provide more information about the sample population. The socio-demographic variables (age (at diagnosis), gender [female], married, employment status [employed], level of education [university or higher]) means and frequencies were computed. In addition, the means and frequencies of the factors affecting mortality awareness (recurrence of diagnosis, age of survivor, mortality ratio [cancer severity]) as well as survivors' psychological well-being (depression, stress, anxiety) were also computed.

4.4.2 Regression Models

In this study which assesses the influence of mortality awareness on five types of unmet needs (information needs, work and financial needs, access and continuity of care, relationship needs, and emotional needs) on the psychological well-being (depression, anxiety and stress) of cancer survivors, regression models were created for 27 models in total, or nine sets of three models. Items from all domains were tested against the psychological well-being of survivors were in order to determine whether specific domains (such as Unmet Emotional Needs and Coping and Sharing Needs) had a more profound influence on well-being than other domains. The effects of unmet needs of cancer survivors

(independent variable) and mortality awareness (moderator) on anxiety, stress and depression (dependent variable) respectively, were analyzed through a three-step process.

4.4.2.1 Anxiety

4.4.2.1.1 Recurrence of Diagnosis

This regression model initially included control variables (*age, gender, marital status, employment status, and university education*) and anxiety as the predictor/outcome variable. The five unmet need domains or the independent variables (*Informational Needs, Financial Needs, Access to Care Needs, Social Needs and Emotional Needs*) unmet needs and recurrence of diagnosis in survivor were added in the second step to the aforementioned control variables. Lastly, the final step of this analysis involved the testing of interactions through adding the five independent variables each by recurrence of cancer diagnosis. As previously mentioned, once a significant interaction was identified, it was further analyzed using a computational tool in SPSS (PROCESS) which computes the simple slope at high and low levels of the moderator (the mean of the moderator ± 1 SD) (Hayes, 2012). A significant interaction would illustrate that the effect of the various unmet needs of survivors on their anxiety levels varies depending on whether or not there was a recurrence of cancer.

4.4.2.1.2 Age

The first step in this regression analysis consisted of the inclusion of the control variables (*age, gender, marital status, employment status, and university education*) as well as the dependent variable, *anxiety*. The inclusion of the five unmet need domains or the

independent variables (*Informational Needs, Financial Needs, Access to Care Needs, Social Needs and Emotional Needs*) into the model was done in step two. Lastly, the third and final step of this analysis involved the testing of interactions through adding the five independent variables (*Informational Needs, Financial Needs, Access to Care Needs, Social Needs and Emotional Needs*) each by *age*. The addition of the control variables in the second stage make it possible to see whether any of the predictor variables (i.e. the various unmet need domains) have an influence on anxiety levels of survivors (i.e. the outcome variable) while controlling for age, gender, marital status, employment status, and university education. Thus far in the analysis, a significant interaction would illustrate that the effect of the various unmet needs of survivors on their anxiety levels varies according to the survivor's age (low versus high). Once a significant interaction was identified, it was further analyzed using a computational tool in SPSS (PROCESS) which computes the simple slope at high and low levels of the moderator (+/- 1 SD) resulting from the relationship between the independent variables (i.e. unmet need domains) and the dependent variable (i.e. anxiety) (Hayes, 2012).

4.4.2.1.3 Mortality Ratio

This final regression model included control variables (*age, gender, marital status, employment status, and university education*) and anxiety as the predictor/outcome variable in the first step. In addition to these control variables and outcome variable, the five unmet need domains or the independent variables (*Informational Needs, Financial Needs, Access to Care Needs, Social Needs and Emotional Needs*) as well as *mortality ratio* (i.e. severity of illness) were added in the second step. Lastly, the third and final step of this analysis

involved the testing of interactions through adding the five independent variables each by *mortality ratio*. Again, once a significant interaction was identified, it was further analyzed using a computational tool in SPSS (PROCESS) which computes the simple slope at high and low levels of the moderator (+/- 1 SD) (Hayes, 2012). A significant interaction in this third step would illustrate that the effect of the various unmet needs of survivors on their anxiety levels varies depending on the severity of their cancer diagnosis (mortality ratio being high or low).

4.4.2.2 Stress

4.4.2.2.1 Recurrence of Diagnosis

This regression model initially included control variables (*age, gender, marital status, employment status, and university education*) and *stress* as the predictor/outcome variable. The five unmet need domains or the independent variables (*Informational Needs, Financial Needs, Access to Care Needs, Social Needs and Emotional Needs*) unmet needs and *recurrence* of diagnosis in survivor were added in the second step to the aforementioned control variables. Lastly, the final step of this analysis involved the testing of interactions through adding the five independent variables each by *recurrence* of cancer diagnosis. As previously mentioned, once a significant interaction was identified, it was further analyzed using a computational tool in SPSS (PROCESS) which computes the simple slope at high and low levels of the moderator (+/- 1 SD) (Hayes, 2012). A significant interaction would illustrate that the effect of the various unmet needs of survivors on their stress levels varies depending on whether or not there was a recurrence of cancer.

4.4.2.2.2 Age

The first step in this regression analysis consisted of the inclusion of the control variables (*age, gender, marital status, employment status, and university education*) as well as the dependent variable, stress. The inclusion of the five unmet need domains or the independent variables (*Informational Needs, Financial Needs, Access to Care Needs, Social Needs and Emotional Needs*) into the model was done in step two. Lastly, the third and final step of this analysis involved the testing of interactions through adding the five independent variables each by *age*. The addition of the control variables in the second stage make it possible to see whether any of the predictor variables (i.e. the various unmet need domains) have an influence on stress (i.e. the outcome variable) while controlling for age, gender, marital status, employment status, and university education. Thus far in the analysis, a significant interaction would illustrate that the effect of the various unmet needs of survivors on their stress fluctuates according to the survivor's age (low versus high). Once a significant interaction was identified, it was further analyzed using a computational tool in SPSS (PROCESS) which computes the simple slope at high and low levels of the moderator (+/- 1 SD) (Hayes, 2012).

4.4.2.2.3 Mortality Ratio

This final regression model included control variables (*age, gender, marital status, employment status, and university education*) and stress as the predictor/outcome variable in the first step. In addition to these control variables and outcome variable, the five unmet need domains or the independent variables (*Informational Needs, Financial Needs, Access to Care*

Needs, Social Needs and Emotional Needs) as well as *mortality ratio* (i.e. severity of illness) were added in the second step. Lastly, the third and final step of this analysis involved the testing of interactions through adding the five independent variables each by *mortality ratio*. Again, once a significant interaction was identified, it was further analyzed using a computational tool in SPSS (PROCESS) which computes the simple slope at high and low levels of the moderator (+/- 1 SD) (Hayes, 2012). A significant interaction in this third step would illustrate that the effect of the various unmet needs of survivors on their stress levels varies depending on the severity of their cancer diagnosis (risk of mortality being high or low).

4.4.2.3 Depression

4.4.2.3.1 Recurrence of Diagnosis

This regression model initially included control variables (*age, gender, marital status, employment status, and university education*) and depression as the predictor/outcome variable. The five unmet need domains or the independent variables (*Informational Needs, Financial Needs, Access to Care Needs, Social Needs and Emotional Needs*) unmet needs and *recurrence* of diagnosis in survivor were added in the second step to the aforementioned control variables. Lastly, the final step of this analysis involved the testing of interactions through adding the five independent variables each by *recurrence* of cancer diagnosis. As previously mentioned, once a significant interaction was identified, it was further analyzed using a computational tool in SPSS (PROCESS) which computes the simple slope at high and low levels of the moderator (+/- 1 SD) (Hayes, 2012). A significant interaction would

illustrate that the effect of the various unmet needs of survivors on their depression varies depending on whether or not there was a recurrence of cancer.

4.4.2.3.2 Age

The first step in this regression analysis consisted of the inclusion of the control variables (*age, gender, marital status, employment status, and university education*) as well as the dependent variable, depression. The inclusion of the five unmet need domains or the independent variables (*Informational Needs, Financial Needs, Access to Care Needs, Social Needs and Emotional Needs*) into the model was done in step two. Lastly, the third and final step of this analysis involved the testing of interactions through adding the five independent variables each by *age*. The addition of the control variables in the second stage make it possible to see whether any of the predictor variables (i.e. the various unmet need domains) have an influence on depression (i.e. outcome variable) while controlling for age, gender, marital status, employment status, and university education. Thus far in the analysis, a significant interaction would illustrate that the effect of the various unmet needs of survivors on their depression varies according to the survivor's age (low versus high). Once a significant interaction was identified, it was further analyzed using a computational tool in SPSS (PROCESS) which computes the simple slope at high and low levels of the moderator (+/- 1 SD) resulting from the relationship between the independent variables (i.e. unmet need domains) and the dependent variable (i.e. depression) (Hayes, 2012). If for example unmet emotional needs by age was a significant interaction, the use of this tool would allow for the

illustration of how the influence of a survivor's age on low in comparison to high unmet emotional needs influences the survivor's level of depression.

4.4.2.3.3 Mortality Ratio

This final regression model included control variables (*age, gender, marital status, employment status, and university education*) and depression as the predictor/outcome variable in the first step. In addition to these control variables and outcome variable, the five unmet need domains or the independent variables (*Informational Needs, Financial Needs, Access to Care Needs, Social Needs and Emotional Needs*) and *mortality ratio* (i.e. severity of illness) were added in the second step. Lastly, the third and final step of this analysis involved the testing of interactions through adding the five independent each by *mortality ratio*. Again, once a significant interaction was identified, it was further analyzed using a computational tool in SPSS (PROCESS) which computes the simple slope at high and low levels of the moderator (+/- 1 SD) (Hayes, 2012). A significant interaction in this third step would illustrate that the effect of the various unmet needs of survivors on their depression varies depending on the severity of their cancer diagnosis (risk of mortality being high or low).

5.0 Results

5.1 Descriptive Statistics

Table 1 below summarizes the basic descriptive statistics related to the variables used in this study. Presented below are the socio-demographic variables (*age*, *gender* [female], *married*, *employment status* [employed], *level of education* [university or higher]) and their means and frequencies. In addition, the means and frequencies of the factors affecting mortality awareness (*recurrence of diagnosis*, *age of survivor*, *mortality ratio* [cancer severity]) as well as survivors' psychological well-being (depression, stress, anxiety) are also listed.

Table 1. Means and Frequencies for Socio-demographics, Mortality Awareness, and Psychological Well-being Variables.

Variables	Cancer Survivors	
	<i>M/Percent</i>	<i>SD</i>
Socio-demographics		
Age	64.58	11.43
Female	46.11	--
Married	80.35	
Employed	41.01	--
University Education	23.85	--
Mortality Awareness		
Recurrence of Diagnosis	19.79	--
Age of Survivor	64.58	11.43
Mortality Ratio (MR)	20.95	20.33
Psychological Well-being		
Depression	4.83	7.71
Stress	5.97	7.98
Anxiety	3.91	5.96

Cancer Survivors $n = 789$

5.2 Anxiety

As is the case with all analyses and across all 9 regression tables below, married individuals also had better psychological well-being scores than their unmarried counterparts. As well, older individuals were commonly found to have better psychological well-being scores than younger participants in model 1 across all regression analyses. The remaining demographic controls were inconsistently related with mental health across all analyses.

Model 2 exhibited that married survivors were found to suffer from less anxiety than the unmarried survivors (Table 2, Table 3, Table 4). Also, higher unmet emotional needs were found to be associated with higher anxiety levels (Table 2, Table 3, Table 4).

Married survivors were also found to suffer less anxiety than unmarried survivors in Model 3 (Table 2, Table 3). As well in this model, the higher a survivor's unmet emotional needs were, the higher their anxiety levels (Table 2, Table 4). Model 3 also revealed that the higher the unmet informational needs of a survivor, the higher their anxiety levels (Table 2). In addition, the greater a survivor's unmet financial needs were, the higher their anxiety levels (Table 3).

Three significant interactions were exhibited in the analysis. In the first significant interaction, survivors with a cancer recurrence had higher levels of anxiety in response to increasing unmet social needs ($b = 2.48$, $se = 1.11$; $p < .05$) (Figure 1). For the second interaction, younger survivors, the greater their unmet financial needs the higher levels of anxiety ($b = 1.47$, $se = 0.51$; $p < .01$) (Figure 2). In contrast, for older survivors, higher unmet financial needs were associated with lower anxiety ($b = -1.19$, $se = 0.54$; $p < .05$.)

(Figure 2). In final interaction, when survivors were young in age, higher unmet emotional needs translated into higher survivor anxiety ($b = 2.58, se = 0.60; p <.001$) (Figure 3). When survivors were older in age, higher unmet emotional needs also translated into higher survivor anxiety and this effect was more profound than it was for the younger survivors ($b = 5.48, se = 0.68; p <.001$).

Table 2. *Unstandardized Coefficients for Regression Models Presenting the Effect of Sociodemographics Survivor's Unmet Needs, Recurrence of Cancer Diagnosis and Survivor Unmet Needs by Recurrence of Cancer Diagnosis on Survivor Anxiety*

Variables	Model 1		Model 2		Model 3	
	B	SE	B	SE	B	SE
Constant	10.43 ***	1.71	1.92	1.42	1.68	1.42
Age	-0.06 **	0.02	0.01	0.02	0.01	0.02
Gender (Female)	0.47	0.44	0.09	0.35	0.11	0.35
Married	-2.89 ***	0.55	-1.43 ***	0.44	-1.34 ***	0.44
Employed	-0.94	0.50	-0.61	0.39	-0.58	0.39
Education	-0.50	0.50	-0.29	0.39	-0.25	0.39
Informational Needs	--		0.40	0.29	0.70 *	0.33
Financial Needs	--		0.12	0.34	0.18	0.39
Access to Care Needs	--		-0.21	0.42	-0.14	0.46
Social Needs	--		0.32	0.47	-0.11	0.52
Emotional Needs	--		3.91 ***	0.43	3.95 ***	0.49
Recurrence	--		0.21	0.43	0.58	0.59
Information X Recurrence	--		--		-1.18	0.75
Financial X Recurrence	--		--		-0.01	0.86
Care X Recurrence	--		--		-0.94	1.23
Social X Recurrence	--		--		2.59 *	1.22
Emotional X Recurrence	--		--		-0.61	1.04
Adjusted R ²	.05		.42		.42	

n = 715; * *p* < .05; ** *p* < .01, *** *p* < .001

Table 3. *Unstandardized Coefficients for Regression Models Presenting the Effect of Sociodemographics Survivor's Unmet Needs and Survivor Unmet Needs by Age on Survivor Anxiety*

Variables	Model 1		Model 2		Model 3	
	B	SE	B	SE	B	SE
Constant	10.17 ***	1.70	1.85	1.41	2.25	1.62
Age	-0.06 **	0.02	0.01	0.02	0.00	0.02
Gender (Female)	0.58	0.44	0.20	0.35	0.14	0.35
Married	-2.92 ***	0.55	-1.40 ***	0.44	-1.33 ***	0.44
Employed	-0.95	0.49	-0.66	0.39	-0.60	0.39
Education	-0.40	0.50	-0.26	0.39	-0.28	0.39
Informational Needs	--		0.37	0.29	0.38	1.59
Financial Needs	--		0.20	0.34	6.24 ***	1.84
Access to Care Needs	--		-0.24	0.42	-1.06	2.33
Social Needs	--		0.26	0.47	2.40	2.21
Emotional Needs	--		3.96 ***	0.43	-2.59	2.16
Information X Age	--		--		0.00	0.02
Financial X Age	--		--		-0.10 ***	0.03
Care X Age	--		--		0.01	0.04
Social X Age	--		--		-0.03	0.04
Emotional X Age	--		--		0.10 ***	0.03
Adjusted R ²	.05		.41		.43	

n = 721; * *p* < .05; ** *p* < .01, *** *p* < .001



Figure 1. *Survivor unmet social needs predicting survivor anxiety moderated by cancer recurrence.*

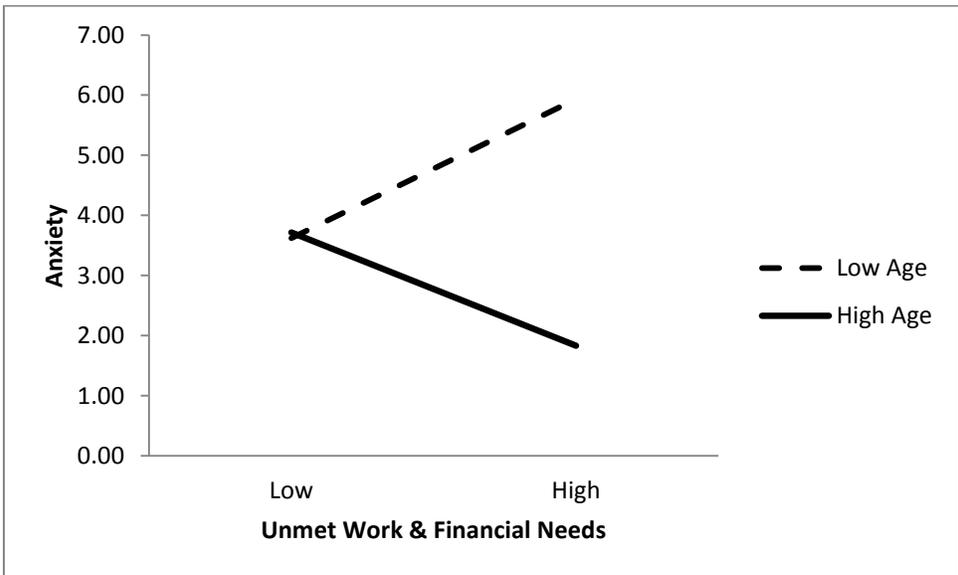


Figure 2. *Survivor unmet financial needs predicting survivor anxiety moderated by age.*

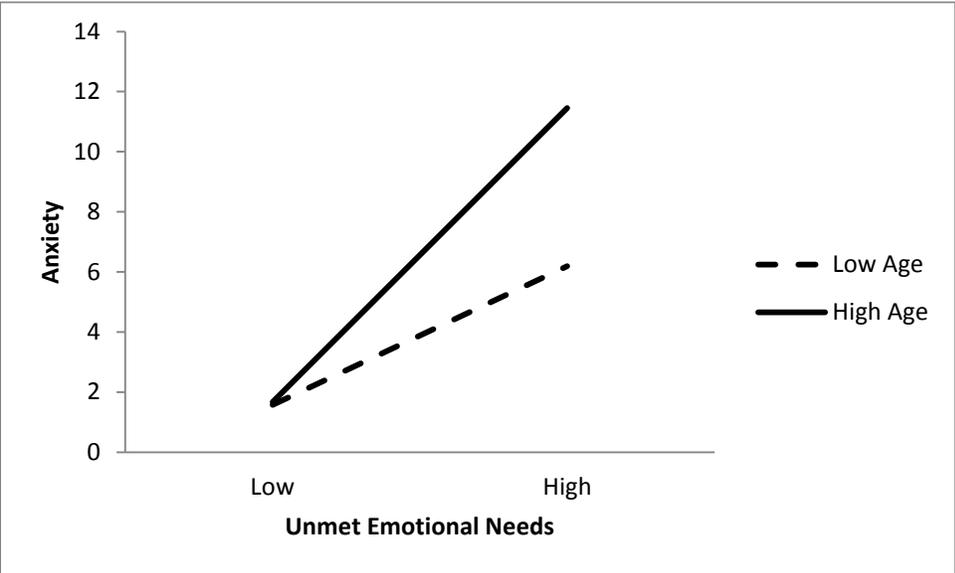


Figure 3. *Survivor unmet emotional needs predicting survivor anxiety moderated by age.*

Table 4. *Unstandardized Coefficients for Regression Models Presenting the Effect of Sociodemographics Survivor's Unmet Needs, Probability of Mortality and Survivor Unmet Needs by Mortality Ratio on Survivor Anxiety*

Variables	Model 1		Model 2		Model 3	
	B	SE	B	SE	B	SE
Constant	8.17***	1.66	1.20	1.44	1.14	1.45
Age	-0.04	0.02	0.02	0.02	0.02	0.02
Gender (Female)	0.63	0.43	0.21	0.35	0.17	0.35
Married	-2.53***	0.53	-1.26***	0.43	-1.28***	0.43
Employed	-0.51	0.48	-0.42	0.39	-0.45	0.39
Education	-0.16	0.48	-0.16	0.39	-0.08	0.39
Informational Needs	--		0.54	0.29	0.22	0.41
Financial Needs	--		0.28	0.34	1.00	0.53
Access to Care Needs	--		-0.40	0.42	-0.15	0.61
Social Needs	--		0.04	0.47	-0.29	0.72
Emotional Needs	--		3.70***	0.43	3.89***	0.65
Mortality Ratio (MR)	--		-0.34	0.79	0.24	1.02
Information X MR	--		--		1.37	1.31
Financial X MR	--		--		-2.84	1.74
Care X MR	--		--		-1.28	2.14
Social X MR	--		--		1.13	2.34
Emotional X MR	--		--		-0.43	2.01
Adjusted R ²	.04		.38		.38	

Note. MR = Mortality Ratio

$n = 669$; * $p < .05$; ** $p < .01$, *** $p < .001$

5.3 Stress

Model 2 exhibited that survivors with high unmet access to care needs had lower survivor stress levels. (Table 5, Table 6, Table 7). Survivors with high unmet access to care needs had lower survivor stress levels. Alternatively, survivors with higher unmet emotional needs also had higher levels of stress.

Model 3 revealed a significant association between unmet emotional needs and survivor stress. This finding illustrated that survivors with greater unmet emotional needs also suffered from higher survivor stress levels (Table 5, Table 6). Likewise, survivors with higher unmet informational needs were also found to have higher stress levels (Table 5). In addition, survivors with higher unmet access to care needs were found to suffer less anxiety than those with lower unmet access to care needs. Younger survivors were also more likely to exhibit stress symptoms than older survivors (Table 6). In addition, the higher the unmet social needs of a survivor, the higher their stress levels (Table 6).

One of the significant interactions illustrated that with no cancer recurrence, unmet informational needs were associated with higher levels of stress ($b = 0.97$, $se = 0.42$; $p < .05$). In contrast, with cancer recurrence the association between unmet informational needs and stress was not significant ($b = -1.05$, $se = 0.86$; $p = n.s.$) (Figure 4).

The second significant interactions illustrated that young survivors experienced higher stress levels as a result of increasing unmet social needs ($b = 2.03$, $se = 0.77$; $p < .01$) (Figure 5). Conversely, older survivors had lower stress levels in response to increased unmet social needs ($b = -1.44$, $se = 1.03$; $p = n.s.$) (Figure 5).

The third interaction illustrated that higher unmet emotional needs of survivors translated into higher levels of stress for younger survivors ($b = 4.86, se = 0.77; p < .001$). For older survivors, high levels of unmet emotional needs also produced high levels of stress and effect was more pronounced amongst older survivors than younger ones ($b = 8.61, se = 0.87; p < .001$) (Figure 6).

Lastly, the final interaction illustrated that for those with a high mortality ratio, there was a decrease in stress levels in response to high unmet work and financial needs ($b = -1.00, se = 0.67; p = n.s.$). Those with a low mortality ratio had increasing stress levels in response to high unmet work and financial needs ($b = 0.92, se = 0.64; p = n.s.$). Both of these findings proved to be insignificant thereby suggesting that each respective slope is not significantly different from 0, however in comparison to each other they are.

Table 5. *Unstandardized Coefficients for Regression Models Presenting the Effect of Sociodemographics Survivor’s Unmet Needs, Recurrence of Cancer Diagnosis and Survivor Unmet Needs by Recurrence of Cancer Diagnosis on Survivor Stress*

Variables	Model 1		Model 2		Model 3	
	B	SE	B	SE	B	SE
Constant	17.67 ***	2.36	4.64 *	1.82	4.42 *	1.82
Age	-0.15 ***	0.03	-0.04	0.02	-0.04	0.02
Gender (Female)	0.26	0.61	-0.40	0.45	-0.42	0.45
Married	-2.22 ***	0.76	0.03	0.56	0.05	0.56
Employed	-0.49	0.68	-0.02	0.50	-0.03	0.50
Education	-0.25	0.69	0.03	0.50	0.01	0.51
Informational Needs	--		0.58	0.38	0.97 *	0.42
Financial Needs	--		0.04	0.44	-0.12	0.49
Access to Care Needs	--		-1.23 *	0.54	-1.24 *	0.58
Social Needs	--		0.57	0.60	0.61	0.66
Emotional Needs	--		6.52 ***	0.55	6.47 ***	0.63

Recurrence	--	-0.10	0.55	0.82	0.76
Information X	--	--	--	-2.02*	0.96
Financial X Recurrence	--	--	--	1.37	1.11
Care X Recurrence	--	--	--	0.28	1.57
Social X Recurrence	--	--	--	-0.39	1.57
Emotional X Recurrence	--	--	--	0.24	1.33
Adjusted R ²	.05	.50		.50	

$n = 715$; * $p < .05$; ** $p < .01$, *** $p < .001$

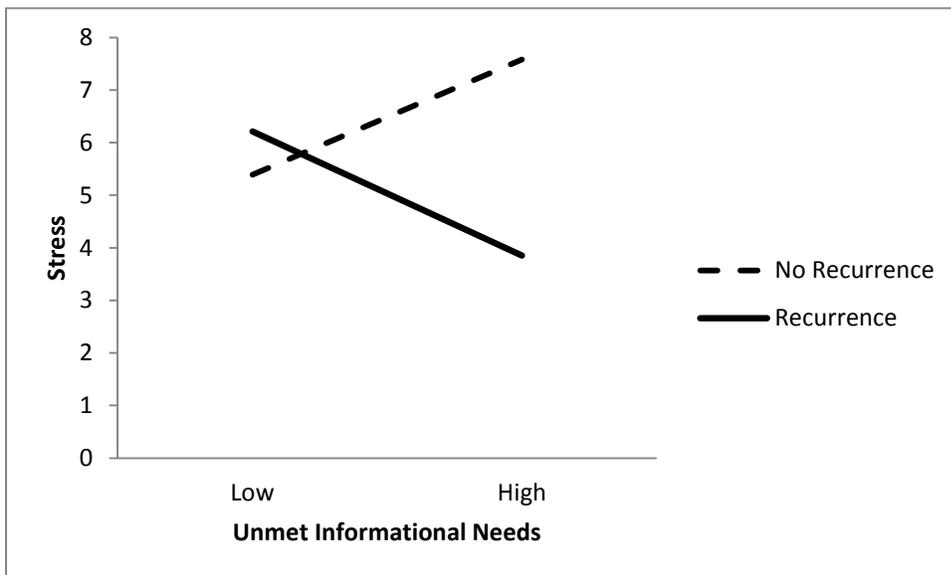


Figure 4. Survivor unmet informational needs predicting survivor stress moderated by recurrence of illness.

Table 6. *Unstandardized Coefficients for Regression Models Presenting the Effect of Sociodemographics Survivor's Unmet Needs and Survivor Unmet Needs by Age on Survivor Stress*

Variables	Model 1		Model 2		Model 3	
	B	SE	B	SE	B	SE
Constant	17.31 ***	2.33	4.61 *	1.80	6.37 **	2.07
Age	-0.15 ***	0.03	-0.04	0.02	-0.07 *	0.03
Gender (Female)	0.32	0.61	-0.37	0.45	-0.38	0.44
Married	-2.22 **	0.76	0.10	0.56	0.09	0.56
Employed	-0.48	0.68	-0.08	0.50	-0.06	0.50
Education	-0.18	0.68	-0.02	0.50	-0.14	0.50
Informational Needs	--		0.61	0.37	1.39	2.04
Financial Needs	--		-0.04	0.43	-0.52	2.36
Access to Care Needs	--		-1.19 *	0.54	-4.28	2.99
Social Needs	--		0.56	0.60	8.25 **	2.83
Emotional Needs	--		6.49 ***	0.55	-1.86	2.77
Information X Age	--		--		-0.01	0.03
Financial X Age	--		--		0.01	0.04
Care X Age	--		--		0.05	0.05
Social X Age	--		--		-0.12 **	0.05
Emotional X Age	--		--		0.13 **	0.04
Adjusted R ²	.05		.49		.50	

n = 721; * *p* < .05; ** *p* < .01, *** *p* < .001

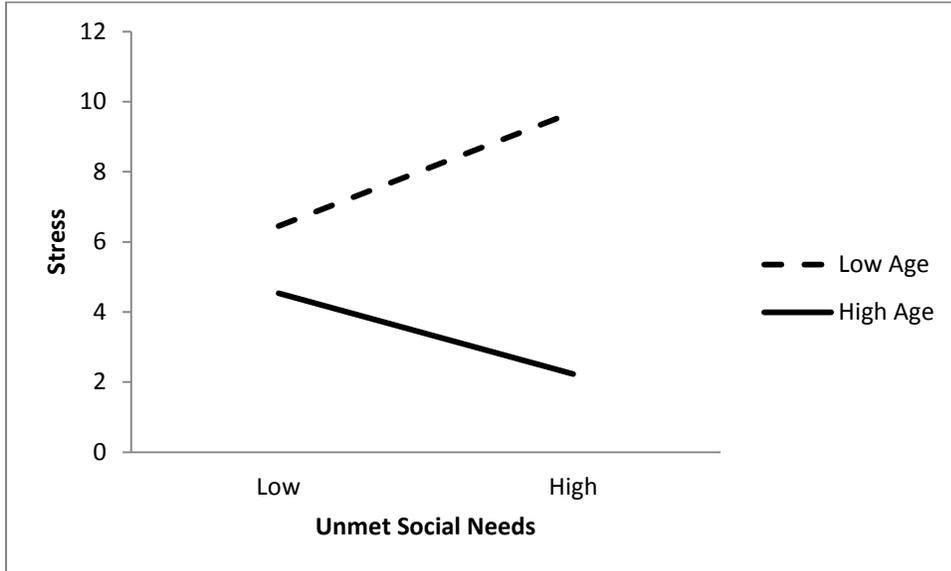


Figure 5. Survivor unmet social needs predicting survivor stress moderated by age.

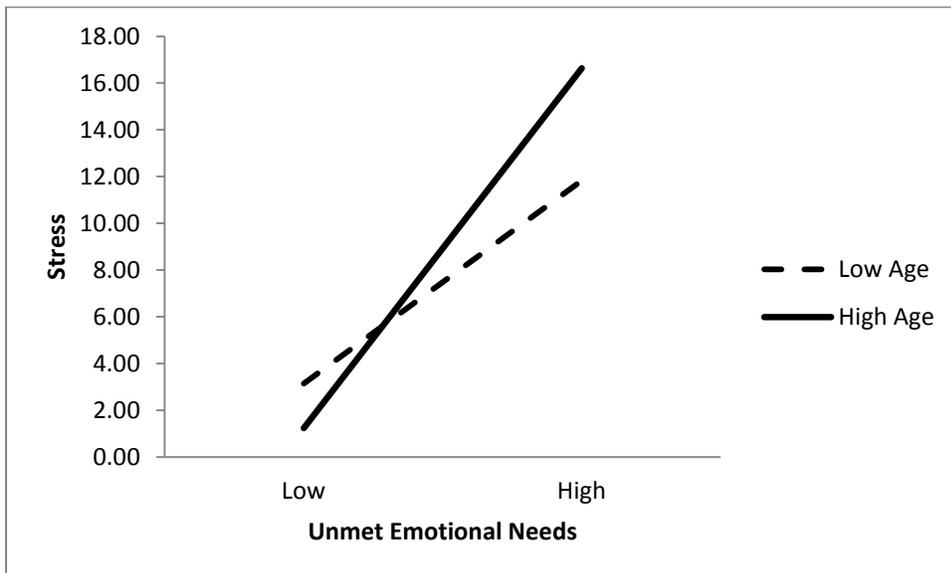


Figure 6. Survivor unmet emotional needs predicting survivor stress moderated by age.

Table 7. *Unstandardized Coefficients for Regression Models Presenting the Effect of Sociodemographics Survivor's Unmet Needs, Mortality Ratio and Survivor Unmet Needs by Mortality Ratio on Survivor Stress*

Variables	Model 1		Model 2		Model 3	
	B	SE	B	SE	B	SE
Constant	16.29 ***	2.37	5.07 **	1.92	4.74 **	1.93
Age	-0.14 ***	0.03	-0.05	0.02	-0.05	0.02
Gender (Female)	0.41	0.61	-0.37	0.46	-0.37	0.47
Married	-2.08 **	0.76	-0.02	0.58	-0.01	0.58
Employed	-0.05	0.68	0.07	0.52	0.14	0.52
Education	0.14	0.69	0.10	0.52	0.21	0.52
Informational Needs	--		0.62	0.39	1.13	0.55
Financial Needs	--		-0.03	0.45	1.11	0.71
Access to Care Needs	--		-1.11 *	0.56	-1.60 *	0.81
Social Needs	--		0.30	0.63	-0.32	0.96
Emotional Needs	--		6.40 ***	0.58	6.16 ***	0.86
Mortality Ratio (MR)	--		-0.42	1.06	0.64	1.36
Information X MR	--		--		-2.35	1.75
Financial X MR	--		--		-4.68 *	2.33
Care X MR	--		--		2.31	2.86
Social X MR	--		--		2.15	3.12
Emotional X MR	--		--		1.43	2.68
Adjusted R ²	.05		.47		.47	

Note. MR = Mortality Ratio

$n = 669$; * $p < .05$; ** $p < .01$, *** $p < .001$

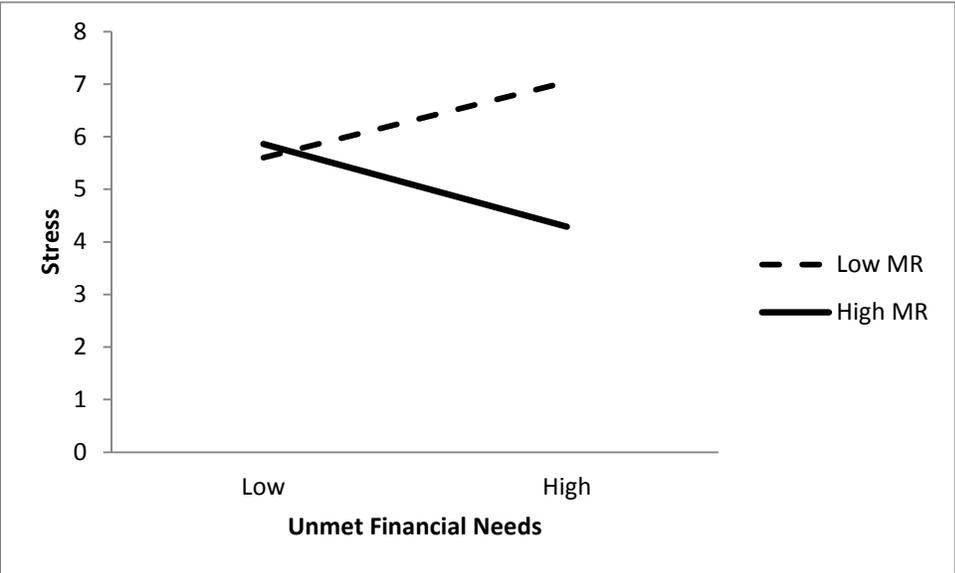


Figure 7. *Survivor unmet financial needs predicting survivor stress moderated by mortality ratio(MR).*

5.4 Depression

The more unmet financial needs a survivor had, the higher their depression levels were (Table 8, Table 9). Survivors with a recurrence of a cancer diagnosis also had higher depression scores in Model 2 (Table 8).

Model 3 illustrated that higher unmet social needs of survivors meant lower levels of depression and a higher unmet emotional needs of survivors is associated with higher depression levels (Table 10). Higher unmet financial needs of cancer survivors predicted lower survivor depression levels (Table 8).

Four significant interactions were exhibited in this analysis. Firstly, it was exhibited that older survivors had lower levels of depression with increasing unmet work and financial needs ($b = -2.21$, $se = 0.65$; $p < .001$) whereas the same trend was observed for younger survivors, but not as profoundly ($b = 0.09$, $se = 0.61$; $p = \text{n.s.}$) (Figure 8).

In the second significant interaction, it was illustrated that older survivors had higher levels of depression as a result of increasing unmet emotional needs ($b = 8.70$, $se = 0.78$; $p < .001$). The same, although less profound trend was observed for younger survivors ($b = 6.09$, $se = 0.73$; $p < .001$) (Figure 9).

In the third significant interaction, survivors with a cancer diagnosis that carried a lower probability of mortality within 5 years had on average, lower levels of depression with decreasing unmet emotional needs than those with a higher probability of mortality associated with their diagnosis ($b = -2.29$, $se = 0.80$; $p < .01$). Those with higher probability

of mortality had higher levels of depression in response to increased unmet social needs ($b = 0.85$, $se = 0.85$; $p = \text{n.s.}$) (Figure 10).

The final significant association revealed that survivors with a high mortality ratio and high levels of unmet emotional needs also had high levels of depression ($b = 5.29$, $se = 0.75$; $p < .001$). Survivors with a low mortality ratio that suffered from high levels of unmet emotional needs also had higher depression levels and this effect was more pronounced than at high levels of mortality ratio ($b = 9.38$, $se = 0.72$; $p < .001$.) (Figure 11).

Table 8. *Unstandardized Coefficients for Regression Models Presenting the Effect of Sociodemographics Survivor's Unmet Needs, Recurrence of Cancer Diagnosis and Survivor Unmet Needs by Recurrence of Cancer Diagnosis on Survivor Depression*

Variables	Model 1		Model 2		Model 3	
	B	SE	B	SE	B	SE
Constant	13.51 ***	2.23	2.37	1.71	2.16	1.71
Age	-0.09 ***	0.03	0.01	0.02	0.01	0.02
Gender (Female)	0.05	0.58	-0.70	0.42	-0.73	0.42
Married	-3.65 ***	0.72	-1.62 ***	0.53	-1.56 ***	0.53
Employed	-0.92	0.65	-0.42	0.47	-0.35	0.47
Education	0.03	0.65	0.18	0.47	0.26	0.48
Informational Needs	--		-0.19	0.35	0.19	0.40
Financial Needs	--		-1.26 ***	0.41	-1.07 *	0.46
Access to Care Needs	--		0.11	0.51	-0.11	0.55
Social Needs	--		-0.29	0.56	-0.64	0.62
Emotional Needs	--		7.33 ***	0.51	7.08 ***	0.58
Recurrence	--		1.18 *	0.52	1.04	0.72
Information X	--		--		-1.58	0.90
Financial X Recurrence	--		--		-0.71	1.04
Care X Recurrence	--		--		0.67	1.48
Social X Recurrence	--		--		2.11	1.47
Emotional X Recurrence	--		--		0.49	1.25
Adjusted R ²	.04		.50		.50	

n = 715; * *p* < .05; ** *p* < .01, *** *p* < .001

Table 9. *Unstandardized Coefficients for Regression Models Presenting the Effect of Sociodemographics Survivor's Unmet Needs and Survivor Unmet Needs by Age on Survivor Depression*

Variables	Model 1		Model 2		Model 3	
	B	SE	B	SE	B	SE
Constant	12.90 ***	2.22	4.392	1.70	4.39 *	1.96
Age	-0.08 **	0.03	-.024	0.02	-0.02	0.03
Gender	0.14	0.58	-.613	0.42	-0.61	0.42
Married	-3.72 ***	0.72	-1.613 ***	0.53	-1.61 ***	0.53
Employed	-0.87	0.65	-.473	0.47	-0.47	0.47
Education	0.17	0.65	.212	0.47	0.21	0.47
Informational Needs	--		-1.213	0.35	-1.21	1.92
Financial Needs	--		3.699 **	0.41	3.70	2.22
Access to Care Needs	--		-1.100	0.51	-1.10	2.81
Social Needs	--		.594	0.57	0.59	2.63
Emotional Needs	--		1.423 ***	0.51	1.42	2.55
Information X Age	--		--		0.02	0.03
Financial X Age	--		--		-0.08 *	0.04
Care X Age	--		--		0.02	0.04
Social X Age	--		--		-0.01	0.04
Emotional X Age	--		--		0.09 *	0.04
Adjusted R ²	.04		.50		.50	

n = 721; * *p* < .05; ** *p* < .01, *** *p* < .001

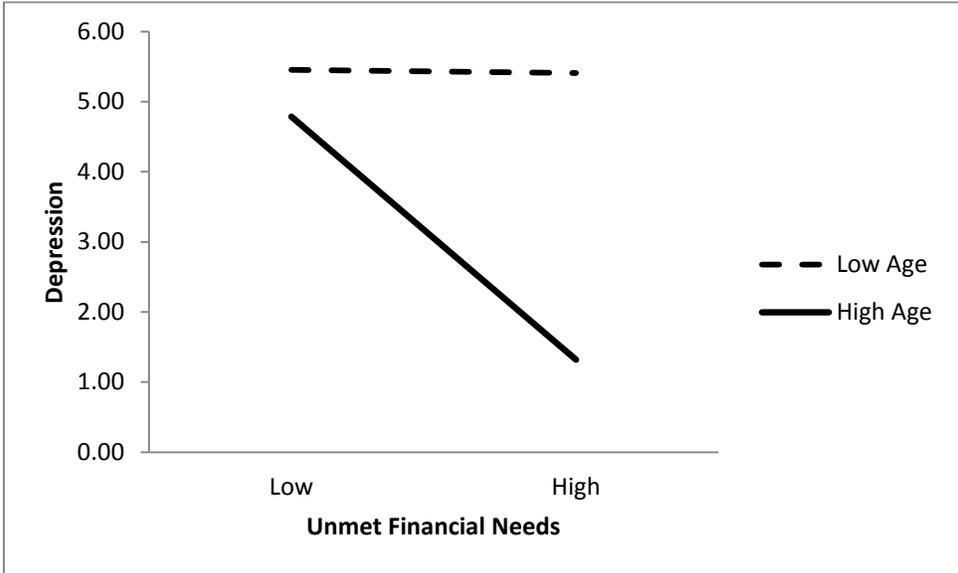


Figure 8. *Survivor unmet financial needs predicting survivor depression moderated by age.*

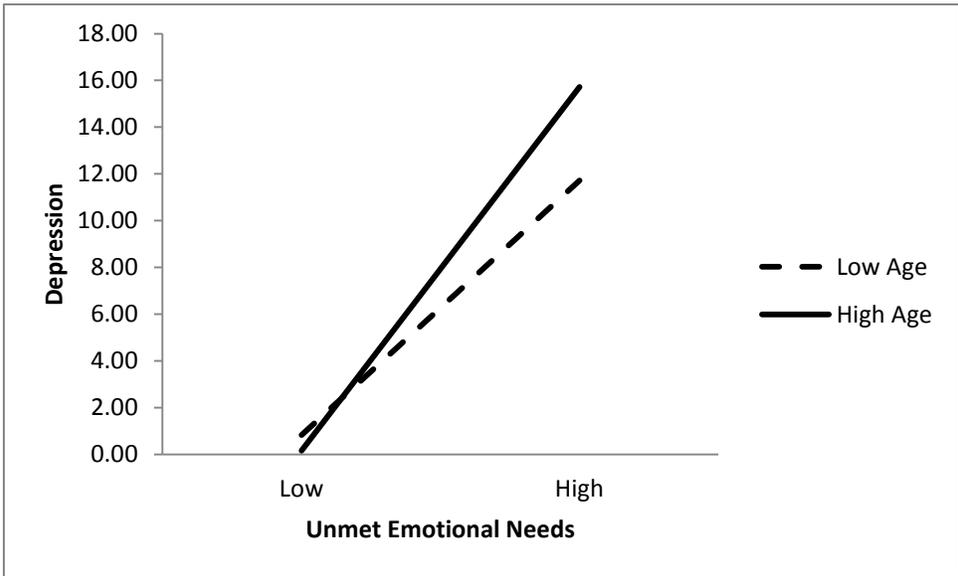


Figure 9. *Survivor unmet emotional needs predicting survivor depression moderated by age.*

Table 10. *Unstandardized Coefficients for Regression Models Presenting the Effect of Sociodemographics Survivor's Unmet Needs, Mortality Ratio and Survivor Unmet Needs by Mortality Ratio (MR) on Survivor Depression*

Variables	Model 1		Model 2		Model 3	
	B	SE	B	SE	B	SE
Constant	11.29 ***	2.22	2.57	1.79	2.76	1.77
Age	-0.06 *	0.03	0.01	0.02	0.00	0.02
Gender (Female)	0.22	0.57	-0.48	0.43	-0.66	0.43
Married	-3.55 ***	0.71	-1.77 ***	0.54	-1.77 ***	0.53
Employed	-0.31	0.64	-0.25	0.48	-0.32	0.48
Education	0.42	0.64	0.25	0.48	0.35	0.48
Informational Needs	--		-0.20	0.36	-0.11	0.50
Financial Needs	--		-1.21 ***	0.42	-1.19	0.65
Access to Care Needs	--		0.16	0.52	0.54	0.74
Social Needs	--		-0.58	0.58	-2.60 ***	0.89
Emotional Needs	--		7.20 ***	0.53	9.78 ***	0.79
Mortality Ratio (MR)	--		-1.80	0.98	1.03	1.25
Information X MR	--				-0.44	1.61
Financial X MR	--		--		0.61	2.14
Care X MR	--		--		-1.76	2.63
Social X MR	--		--		7.65 *	2.87
Emotional X MR	--		--		-9.98 ***	2.47
Adjusted R ²	.04		.46		.48	

Note. MR = Mortality Ratio

$n = 669$; * $p < .05$; ** $p < .01$, *** $p < .001$

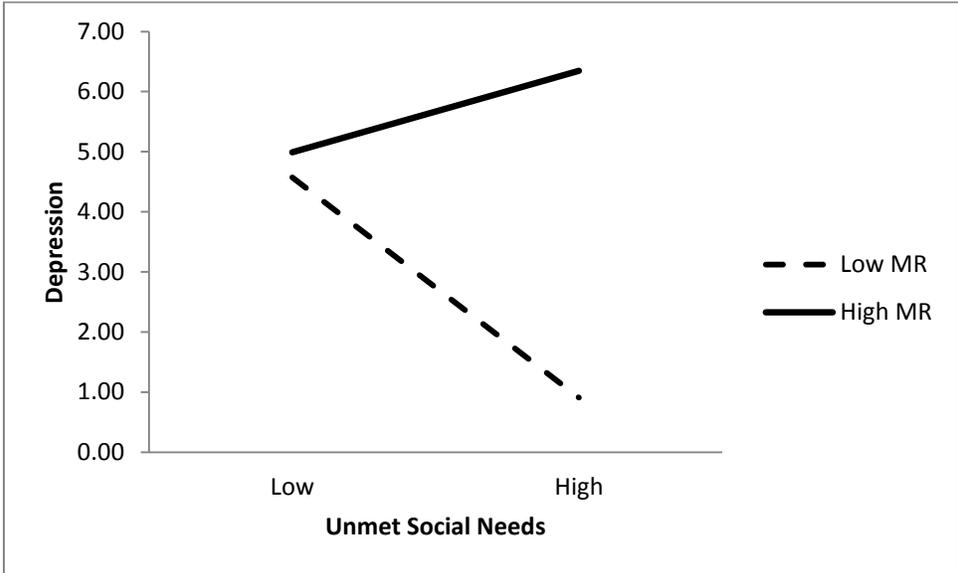


Figure 10. *Survivor unmet social needs predicting survivor depression moderated by mortality ratio (MR).*

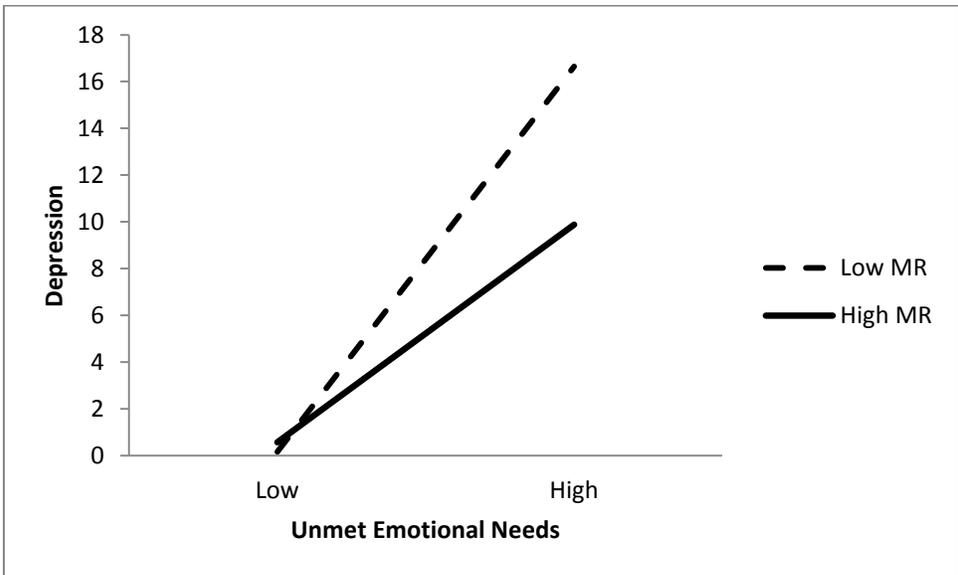


Figure 11. *Survivor unmet emotional needs predicting survivor depression moderated by mortality ratio*

6.0 Discussion

6.1 Summary of Results

As was predicted with Socioemotional Selectivity Theory, unmet emotional needs of survivors proved to be a strong indicator of poor psychological well-being in this sample (Figure 3, Figure 6, Figure 9, Figure 11). Specifically, high unmet emotional needs of survivors are found to be associated with higher levels of depression, stress and anxiety. These results are consistent with a breast cancer survivor study indicating those with higher depression and anxiety reported a higher number of unmet needs (Hodgkinson et al., 2006).

Older cancer survivors whom likely have a greater sense of mortality than their younger counterparts, were on average, more likely to suffer from higher anxiety, stress and depression resulting from higher unmet emotional needs (Figure 3, Figure 6, Figure 9, Figure 11). This is consistent with SST as the theory argues that the smaller the future time perspective is for an individual, the more likely they are to place emphasis on goals that satisfy their emotional well-being (Carstensen, Fung & Charles, 2003; Carstensen, 1992; Carstensen, Isaacowitz, & Charles, 1999). As such, if these priority needs are not met, the survivor is susceptible to feeling unfulfilled and will suffer from poor psychological well-being.

Interestingly, survivors with a cancer diagnosis that carried a lower probability of mortality within 5 years had, on average, higher levels of depression with increasing unmet emotional needs than those with a higher probability of mortality associated with their diagnosis (Figure 5). This could be due to the fact that the five-year relative mortality does

not account for potential cancer recurrence, which plagues the minds of many cancer survivors (Hodgkinson et al., 2006, Hodgkinson et al., 2007; Hodgkinson et al., 2007; Thewes et al., 2003; Wenzel et al., 2002; Lobb et al., 2009; Hamama-Roz & Solomon, 2006; Knobf et al., 2011).

Relative to social needs, survivors with cancer recurrence had higher levels of anxiety in response to increasing unmet social needs (Figure 1). This is also in line with SST since it is expected that social needs play a critical role in stabilizing one's emotions in times when one is aware of their mortality, such as the case with a cancer recurrence (Hodgkinson et al., 2006; Lockenhoff & Carstensen 2004; Pinquart & Silbereisen, 2006; Carstensen & Frederickson, 1998). Moreover, stress levels of younger survivors seemed to increase with increasing unmet social needs (Figure 5). This trend is predicted in SST given the increase in mortality awareness caused by a cancer diagnosis that younger survivors have experienced. Lastly, as is expected with SST, survivors with a higher mortality ratio (and therefore assumed to be closer to death) had higher levels of depression with increasing unmet social needs (Figure 10).

As was consistent with other findings, younger survivors in this study also seemed to exhibit poorer psychological well-being scores (depression, stress and anxiety) than older survivors (Sanson-Fisher et al., 1999; Lobb et al., 2007). In addition, married survivors are less likely to suffer from depression, stress and/or anxiety symptoms than unmarried survivors. The results of married survivors is consistent with literature and likely attributable to the fact that married individuals diagnosed with cancer were found to have a higher

likelihood of survival as it provides a type of protection against disease (Goodwin et al., 1987 as cited in Kim et al., 2008; Burman & Margolin, 1992 as cited in Cannon & Cavanaugh, 1998). Also, marriage has been linked to protective health effects and decreased mortality in much of the literature and this effect is evident in this study sample as well (Waldron, Hughes & Brooks, 1996; Gove, 1973; Hu & Goldman, 1990).

A significant interaction resulting from the analysis of survivor stress levels revealed that survivors without a cancer recurrence experienced higher levels of stress with increasing unmet informational needs (Figure 4). This may be due to the fact that survivors with a recurrence are still being followed by healthcare professionals so they likely have more opportunities for their questions to be answered. In contrast, those without a recurrence may not be followed as closely and thus are more likely to be psychologically affected by their unanswered questions.

Increased unmet financial needs were also associated with higher anxiety levels for younger survivors, and decreased anxiety levels for older survivors (Figure 2). Similarly, higher unmet financial needs were also associated with decreased depression levels for older survivors (Figure 8). This finding is also a reflection of SST given that the theory asserts that social and emotional needs are more likely to affect the well-being of individuals that are aware of their mortality (i.e. older). Thus since work and financial needs do not fall under the socio-emotional needs category, it is befitting that older individuals would not show a marked increase in their depression levels in response to higher unmet work and financial needs. These mixed results thus illustrate how mortality awareness fails to heighten the

impact of non-socioemotional unmet needs on psychological well-being of survivors in a predictable fashion.

6.2 Results and Hypothesis of Study

The principle question in this study was: Does mortality awareness (operationalized as recurrence of cancer diagnosis, age, and mortality ratio [i.e., cancer severity]) heighten the impact of unmet needs (defined as all the need domains from the SUNS survey, with particular emphasis on social and emotional needs) on the psychological well-being (i.e., anxiety, stress, depression) of cancer survivors? The first anticipated hypothesis stemming from this question was that there will be a relationship between unmet needs and psychological well-being, where higher unmet needs result in worse psychological outcomes. In contrast, low unmet needs would translate into better psychological outcomes for survivors in this study.

Findings from this study did partially support this prediction as it was found that higher unmet needs in need domains such as Emotional, Informational, Financial and Social had higher anxiety, stress and/or depression scores (Tables 2 through 10). This could be indicative of such needs having a higher impact on certain psychological outcomes than others. In addition, it is also important to note that unmet emotional needs was the domain that was most frequently associated with poor psychological outcomes as it proved to be associated with anxiety, depression and stress. On the other hand, unmet informational needs were only associated with poor anxiety outcomes, social unmet needs with higher stress levels and unmet financial needs with depression and anxiety symptoms. This is somewhat

consistent with SST as it would predict that social and emotional needs would have the largest influence on psychological well-being. Results from these analyses similarly seem to illustrate that emotional needs have the largest and broadest impact on psychological outcomes. This impact is evidenced by unmet emotional needs commonly found to affect all three outcomes (anxiety, stress and depression) whereas the effects of other unmet needs (informational, financial and social) were not as far-reaching, affecting only one or two of the three outcomes.

The second anticipated hypothesis is that the relationship between unmet needs and the outcomes will be moderated by mortality awareness (proxies: recurrence of diagnosis, age of survivor, mortality ratio of the cancer diagnosis) where each moderator will heighten the impact of unmet needs to produce higher anxiety, stress or depression levels. Stemming from this hypothesis was the prediction that unmet social and/or emotional needs of survivors with a cancer recurrence will result in poorer psychological well-being. In contrast, the unmet social and/or emotional needs of survivors without a recurrence would have less of an impact on their psychological outcome. In this case, cancer recurrence is acting as a proxy for mortality awareness. Thus if there was a new cancer diagnosis or cancer recurrence, the assumption would be that an individual would feel that their time horizon became limited and would therefore favour emotionally-satisfying goals. Accordingly, unmet social or emotional needs would prove to be the most devastating to a survivor, the effects illustrated through poor psychological well-being.

Findings from this study did support this prediction as it was found that survivors with a cancer recurrence had higher levels of anxiety in response to increasing unmet social needs (Figure 1). This is in line with SST since those with a recurrence are thought to be more aware of their mortality and thus as is predicted with SST, they somewhat rely on their met social needs to provide them with psychological stability. There was also one significant interaction found however for unmet informational needs by cancer recurrence where survivors with no cancer recurrence were more likely to have greater stress levels with higher unmet informational needs (Figure 4). This could be due to the fact that those with a recurrence are likely being followed by a healthcare provider and thus their questions are being answered regularly, whereas those with no recurrence may not have such opportunities to get their questions answered. Thus this may result in increased stress for those without a recurrence given that they may not know how to meet their informational needs. Moreover, as previously mentioned, SST is only concerned with the moderating effects of mortality awareness on unmet social or emotional needs and psychological well-being. Thus this second interaction is illustrating that the effects of this moderator on non-socioemotional unmet needs and psychological well-being are not as consistent or predictable.

The second prediction stemming from the second hypothesis in this study predicted that unmet social and/or emotional needs of older survivors will result in poorer psychological well-being. In contrast, the unmet social and/or emotional needs of younger survivors would have less of an impact on their psychological outcome. The underlying assumption is that older individuals, having lived longer, have an increased realization of

their pending mortality. According to SST, as this realization occurs, these individuals consequently re-focus their goals from knowledge-acquisition to ones that provide immediate emotional stability and fulfillment. The findings in this study supported this prediction when it came to the unmet emotional needs of survivors. Results showed that older survivors were in fact more likely to suffer from higher anxiety, stress and depression levels as a result of higher unmet emotional needs than younger cancer survivors (Figure 3, Figure 6, Figure 9). A significant interaction was also found for unmet financial needs by age where younger cancer survivors were more likely to suffer from higher anxiety levels as a result of higher unmet financial needs while older cancer survivors experienced less stress on average as a result of increased unmet financial needs (Figure 2). In addition, older cancer survivors were found to have less depression symptoms in response to increased unmet financial needs (Figure 8). However, the results dealing with financial unmet needs did not fit the theory as mortality awareness (i.e. older age) did not interact with financial needs in a way that would be predicted by SST in a condition in which awareness of mortality is evident.

Conversely, SST would predict that in a condition where an individual is aware of their mortality (i.e. older), unmet emotional and/or social needs, in comparison to the other domains more significantly influence psychological well-being. This is accurately illustrated in the interactions between unmet emotional needs impacting anxiety, stress and depression levels (Figure 3, Figure 6, Figure 9). It is also illustrated in the interaction wherein younger cancer survivors were found to suffer higher levels of stress in response to increased unmet social needs (Figure 5).

The third and final prediction stemming from the second hypothesis in this study deals with how unmet social and/or emotional needs of survivors with a high mortality ratio (i.e., cancer severity) will result in poorer psychological well-being. In contrast, the unmet social and/or emotional needs of survivors with a lower mortality ratio would have less of an impact on their psychological outcome. The premise of this prediction is similar to the aforementioned one with the exception of mortality ratio acting as a proxy for mortality awareness. Thus if the mortality ratio was high, it would be expected that an individual would feel that their time horizon became limited and therefore favour emotionally-satisfying goals over knowledge-acquisition goals. Accordingly, unmet social or emotional needs would prove to be most devastating to a survivor with a high mortality ratio and the effects would be illustrated through poor psychological well-being.

Results from this study partially supported this prediction. The first significant interaction that appeared from the analyses using mortality ratio as a moderator was for unmet emotional needs by mortality. Interestingly, this result illustrated that survivors with a cancer diagnosis that carried a lower mortality ratio had on average, higher levels of depression with increasing unmet emotional needs than those with a higher mortality ratio (Figure 11). This could be due to survivors with a higher mortality ratio having come to terms with their disease and their mortality. It could also be due to the fact that survivors who contemplate a life post-cancer might worry about long-term physical changes associated with their treatment (e.g. colostomy, mastectomy, etc.).

The second significant finding illustrated that survivors with a cancer that had a low mortality ratio had lower depression levels in response to higher unmet social needs (Figure 10). Conversely, survivors with a higher mortality ratio associated with their cancer had higher depression levels in response to increased unmet social needs. This result is considered in line with the theory given that the depression levels of survivors with higher mortality ratio associated with their cancer (i.e. higher mortality awareness) were more likely to be affected by unmet social needs. On the other hand, SST cannot be used to accurately explain trends in situations where mortality awareness is not evident, such as when the mortality ratio is low.

The hypotheses of this study were supported. Some important trends were illustrated, mainly that in a mortality awareness condition where age is used as a proxy, the impact of unmet emotional needs on anxiety and stress and depression levels of survivors is heightened for older versus younger survivors (Figure 3, Figure 6, Figure 9). It is interesting to note that even younger survivors' psychological well-being, despite not being influenced as prominently as the older individuals, was still heavily influenced by unmet emotional needs. This is consistent with findings wherein younger cancer patients changed social preference due to what SST describes to be the shift in priority goals from knowledge-acquisition to emotional well-being, thereby indicating a shift in their time perspective (Pinquart & Sibereisen, 2006).

Unmet social needs of survivors with a cancer recurrence were also found to influence anxiety. Perhaps the lack of significance for the social needs domain is attributable

to the fact that the SUNS was administered to survivors that had been diagnosed with cancer in the 12-60 months prior to data collection. Current SST literature focuses on patients rather than survivors, while this study was dealing strictly with cancer survivors. According to SST, social contacts change depending on the current situation of an individual (Carstensen, Fung & Charles, 2003; Carstensen, 1992; Carstensen, Isaacowitz, & Charles, 1999) and individuals may have different social preferences as survivors than they had as patients. This would make it difficult to assess whether social needs are as impactful on their psychological well-being during the course of data collection as they would have been during treatment or immediately after diagnosis.

6.3 Main Findings and Socioemotional Selectivity Theory

The Socioemotional Selectivity Theory is a framework that regards the concept of mortality awareness as the principal driver of certain individual goals at certain times (Carstensen, Fung & Charles, 2003; Carstensen, 1992; Carstensen, Isaacowitz, & Charles, 1999).

Individuals that see their future time perspective as vast will tend to favour networking and/or knowledge-acquisition goals that are more future-oriented. Conversely, those with a more limited time perception will focus on goals that bring them immediate emotional gratification and well-being (Carstensen, Fung & Charles, 2003; Carstensen, 1992; Carstensen, Isaacowitz, & Charles, 1999). The idea of age not being the only means of indirectly measuring mortality awareness was critical to building the hypotheses explored for the purposes of this study. Mortality awareness is concerned with how an individual perceives their time left to live. Studies have shown that this sense of awareness can be

brought on by other factors aside from age, such as being diagnosed with an illness, being in a certain disease state (active versus latent) or simply having the knowledge of an impending civil unrest in one's vicinity (Fung et al., 1999). Thus the underlying assumption was that if an individual would perceive time left to live as limited, whether it is that they have a cancer recurrence, are older, or were initially diagnosed with a high mortality, then they would also tend to favour goals that satisfied their emotional wellness. Presumably, if their emotional needs were not being met, then the expectation would be that they would be more likely to suffer from depression and/or stress and/or anxiety.

The resulting main effects between some unmet needs and survivor psychological well-being (depression, stress and anxiety) of the analyses undertaken for the purposes of this study are found in Tables 2 to 4 for anxiety levels of survivor, Tables 5 to 7 for stress levels of survivor and Tables 8 to 10 for depression levels of survivor. The significant interactions that were revealed are presented on Figures 1 through 5.

The results of this study partially supported the hypotheses under question. There was compelling evidence supporting the notion of mortality awareness heightening the impact of unmet emotional needs on psychological well-being of cancer survivors. The underlying assumption of this study was that greater levels of mortality awareness would result in there being more emphasis on social and/or emotional needs, which if unmet, would lead to higher depression, stress and anxiety levels. The results of the analyses did demonstrate that age amplified the impact of unmet emotional needs on anxiety, stress and depression, as would be predicted by SST (Figure 2, Figure 4). Fittingly, age was not interacting with financial

needs in a way that is consistent with SST in a mortality awareness condition (Figure 1). Moreover, for survivors with a recurrence, unmet social needs resulted in higher anxiety levels as SST would suggest.

7.0 Strengths and Limitations

7.1 Strengths

This study served as the first attempt to look at SST within the cancer survivor context. No other studies to date have looked at this theory from this unique perspective. As the number of cancer survivors in Canada continues to increase, there is an impetus to understand just what this growing population is experiencing beyond the physical realm and this study aimed to shed light on this experience. Moreover, the use of the SUNS data also largely contributed to the strength of this study given that it provided a large sample size and is the only survey of its nature in Canada. The SUNS used a highly psychometrically robust scale to measure the unmet needs of cancer survivors. The SUNS has acceptability, face and construct validity as well as being acceptable in item test-retest reliability and having high internal consistency (Chronbach's alpha = .990) (Campbell et al., 2011).

7.2 Limitations

Despite the many strengths involved in this study, there were also some limitations. Since this survey employed a Likert scale to measure the unmet needs of cancer survivors in various domains, there are a set number of options from which a respondent may choose, and these options being one-dimensional in nature, may not capture the essence of the complex nature of cancer survival.

Such methods are also prone to common issues that are associated with self-reported surveys. The respondent, while answering the survey, may end up portraying their feelings

that specific day, despite it not being the normal feelings they had throughout their cancer journey. This may result in participants falling victim to reporting extreme cases of their feelings (i.e., reporting a slightly unmet need as highly unmet) to vent their frustration. Conversely, inherent in Likert scales is the increased likelihood of central tendency bias, wherein a respondent may avoid extreme responses (i.e., no unmet need or very high unmet need). Recall bias is also an important problem to consider with such methods as participants' recollection of the past may prove to be inaccurate.

With regards to the variables, the database that housed the SUNS data only provided age cohorts of respondents instead of their exact age. This necessitated the construction of a variable for age wherein the median of each category was used (e.g. 20-29 was recoded to 25). This is important to note when considering the interactions that dealt with age since the results may be slightly inaccurate due to the exact age not being used in the analysis.

The mortality ratio as determined in this study also had its limitations. Given that a number of respondents filled in the open-ended question relating to the type of cancer they had, much of that data had to be recoded manually. Although best efforts were undertaken to match responses to appropriate types of cancer as per the Canadian Cancer Society guidelines, the process was not without its flaws. The CCS guidelines only provide selected general cancer types that may not accurately reflect the true relative survival ratio of a more specific cancer type that a respondent has provided. The reverse situation may also be true in which a respondent may provide a general cancer type whose relative survival ratio may not accurately depict the particular cancer that they may have in reality. Moreover, the CCS

guidelines are based on cancer data collected from Canada and given the nature of how cancer types may vary across countries, these generalizations are most accurately applicable within a Canadian context.

With regards to SST aspect of this study, the participants in this survey were survivors who had been diagnosed with cancer in the 12-60 months preceding data collection. Thus at the time of survey completion, many had already seen the worst of the disease and were beginning to recover both physically and psychologically. Socioemotional Selectivity Theory maintains that one's social contacts would change either immediately following diagnosis, or while an individual was in an active disease state. Since this survey is cross-sectional in nature, it makes it difficult to assess whether the survivor had any shift in contact preferences since diagnosis making it problematic to directly measure the social component of SST.

Secondly, mortality awareness was not measured directly as can be done with the Future Time Perspective Scale developed by Carstensen and Lang (2002), rather the use of proxies (age, cancer recurrence and cancer severity) was employed.

8.0 Future Research and Implications

These results shed an interesting light on the journey of cancer survivors. Doctors are commonly expected to treat the physical abnormality of an individual. However, these results illustrate that the emotional unmet needs of individuals who are diagnosed with cancer play a significant role in determining their psychological status post-diagnosis, and in some cases, well after remission. This is especially important when it comes to older survivors who are particularly vulnerable to elevated anxiety, stress and depression levels in response to unmet emotional needs. Thus the onus lies on the practitioners to not only treat the physical pain that comes with a cancer diagnosis, but the emotional anguish as well.

In addition, this paper also illustrates how the impact of certain needs may take precedence and vary in their impact according to whether or not survivors have had a recurrence, their age, and/or the mortality ratio associated with the cancer diagnosis. For example, while the depression levels of survivors with a low mortality ratio associated with their diagnosis heightened in response to unmet emotional needs, depression levels of those with a high mortality ratio cancer heightened in response to unmet social needs. Similarly, the psychological outcomes of younger survivors may not necessarily be impacted by the same unmet needs as older survivors. This current study has given a small glimpse of some groups of individuals (i.e., those with a recurrence, older vs. younger survivors, those with high vs. low risk of dying) and how their psychological outcomes are impacted by certain domains of unmet needs. Future research should seek to identify the impact of various groups

of unmet needs on more at-risk subgroups of survivors so that proper early interventions may be established before their psychological well-being is affected.

This study did illustrate some noteworthy findings with regards to SST and unmet needs. Namely, it was proven that certain proxies for mortality awareness more consistently heightened the impact of unmet emotional needs on psychological well-being outcomes worked better than others (i.e., age). In addition, social needs were not as commonly associated with worse psychological outcomes when survivors were more aware of their mortality as SST would have predicted. Since there was no direct way to measure mortality awareness, age, cancer recurrence and mortality ratio were used as proxies to measure this variable. It is not clear whether this is a matter of age being the best measure for mortality awareness, or whether it simply was the most accurate out of the three proxy measures used in this study. Future research should aim to more directly measure mortality awareness through the use of the Future Time Perspective Scale developed by Carstensen and Lang (2002).

A direct measure of social contact preference would also be useful in determining the impact on the social aspect of cancer survival. It would also be interesting to observe whether there were any shifts in the influence of certain unmet needs (i.e., emotional or social) from the time of diagnosis to treatment to remission in a temporal fashion.

9.0 Conclusion

This study was the first of its' kind to apply Socioemotional Selectivity Theory in the context of cancer survivors while using data from the SUNS to examine survivor unmet needs.

Despite the results being mixed, findings still supported the hypotheses of this study and are in accordance with some of the expectations brought forth by SST. Primarily, how older age, acting as a proxy for mortality awareness, heightens the impact of unmet emotional needs on the psychological well-being (i.e., anxiety, stress and depression) of cancer survivors. In addition, how unmet social needs increased anxiety levels in survivors with a recurrence (i.e., higher sense of mortality).

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Appendix A

Estimated Five-Year Relative Survivor Ratios and 95% Confidence Intervals (CI) for
Selected Cancers by Sex, Canada (Excluding Quebec), 2004-2006

	Relative Survival Ratio (%) (95% CI)			Mortality Ratio (MR) (%) ([100-RSR])		
	Both Sexes	Males	Females	Both Sexes	Males	Females
All Cancers	62 (62-62)	62 (61-62)	63 (63-63)	38	38	37
Thyroid	98 (97-98)	94 (93-96)	99 (98-99)	2	6	1
Prostate	--	96 (96-97)	--	--	4	--
Testis	--	95 (94-96)	--	--	5	--
Melanoma	90 (89-90)	86 (85-88)	93 (92-94)	10	14	7
Breast	88 (87-88)	79 (73-85)	88 (87-88)	12	21	12
Hodgkin Lymphoma	85 (83-87)	83 (81-86)	87 (84-89)	15	17	13
Body of Uterus	--	--	85 (85-86)	--	--	15
Bladder	75 (74-77)	76 (74-78)	73 (71-76)	25	24	27
Cervix	--	--	75 (73-76)	--	--	25
Kidney	67 (66-68)	67 (65-68)	67 (66-69)	33	33	33
Larynx	64 (62-66)	65 (62-67)	61 (56-66)	36	35	39
Oral	63 (61-64)	61 (59-62)	66 (64-68)	37	39	34
Colorectal	63 (63-64)	63 (62-63)	64 (63-65)	37	37	36
Non-Hodgkin Lymphoma	63 (62-64)	61 (60-62)	65 (63-66)	37	39	35
Leukemia	55 (54-56)	55 (54-57)	54 (53-	45	45	46

			56)			
Ovary	--	--	42 (41-44)	--	--	58
Multiple Myeloma	37 (35-38)	37 (35-39)	36 (34-38)	63	63	64
Stomach	24 (23-25)	24 (22-25)	25 (23-27)	76	76	75
Brain	23 (21-24)	21 (20-23)	25 (23-27)	77	79	75
Liver	18 (16-19)	18 (16-20)	17 (14-20)	82	82	83
Lung	16 (15-16)	13 (13-14)	19 (18-19)	84	87	81
Esophagus	13 (12-15)	13 (11-14)	15 (13-18)	87	87	85
Pancreas	6 (6-7)	6 (5-7)	7 (6-8)	94	94	93
<hr/>						
-- Not applicable.						

Note. Adapted from Canadian Cancer Society: Canadian Cancer Statistics 2011 (p.65)

Appendix B

Variable List for Items from Independent Variables

Variable	Variable Label	Question as found in the survey (Indicators)	Response Options
Independent Variable			
Unmet Informational Needs	NQS1001	Finding information about the signs of cancer and when I should be concerned	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
	NQS1002	Knowing which sources of information to trust	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
	NQS1003	Finding information about all my treatment choices, including no treatment at all	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
	NQS1004	Finding information about complementary or alternative therapies	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
	NQS1005	Dealing with fears about cancer spreading	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
	NQS1006	Dealing with worry	0 = No unmet need

		about whether the treatment has worked	1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
	NQS1007	Dealing with feelings of worry (anxiety) between follow-ups	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
	NQS1008	Dealing with not feeling sure that the cancer has gone	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
Unmet Work and Financial Needs	NQS1011	Paying household bills or other payments	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
	NQS1013	Paying non-medical costs related to my cancer (travel, accommodation, special foods, etc.)	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
	NQS1014	Finding what type of financial assistance is available and how to obtain it	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
	NQS1015	Finding car parking that I can afford at the hospital or clinic	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need

			3 = High unmet need 4 = Very high unmet need
	NQS1016	Understanding what is covered by my medical insurance or benefits	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
	NQS1018	Doing work around the house (cooking, cleaning, home repairs, etc.)	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
	NQS1019	Doing yard work (cutting grass, snow shovelling, etc.)	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
Unmet Needs for Access and Continuity of Care	NQS1020	Finding information about who I should contact if I have a problem or concern	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
	NQS1021	Finding information about cancer and its effects in a way I can understand	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
	NQS1022	Finding out what is involved in follow-up care	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
	NQS1023	Making sure my family	0 = No unmet need

	doctor could get information from specialists	1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1024	Making sure I was treated in a hospital or clinic that was as physically pleasant as possible	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1025	Having access to cancer services at night and on weekends	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1027	Getting appointments with my family doctor quickly enough	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1028	Getting appointments with specialists quickly enough (oncologist, surgeon, etc.)	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1029	Getting follow-up tests quickly enough	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1030	Getting test results quickly enough	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need

		3 = High unmet need 4 = Very high unmet need
NQS1031	Having access to care from other health specialists (dietitians, physiotherapists, occupational therapists)	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1032	Making sure I had choices about which hospital or clinic I could go to	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1033	Making sure health care workers had access to my medical information when planning services for me	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1034	Feeling comfortable in the waiting room	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1035	Making sure I had enough time to ask my doctor or nurse questions	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1036	Making sure all my health care workers had all the medical files related to my cancer care	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1037	Getting the health care	0 = No unmet need

		team to attend promptly to my physical needs	1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
	NQS1038	Finding health care professionals who were friendly and could have a laugh with me	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
	NQS1039	Making sure the health care team understood and was aware of my feelings and emotional needs	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
	NQS1040	Making sure I was treated like a person, not just another case	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
	NQS1041	Understanding the information I was given	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
Coping and Sharing Needs	NQS1042	Dealing with the way other people react to my new priorities and my different outlook on life	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
	NQS1043	Dealing with my losses and changes in my relationships	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need

		3 = High unmet need 4 = Very high unmet need
NQS1044	Telling others how I was feeling emotionally	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1045	Telling others how I was feeling emotionally	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1046	Talking to my family and friends about how they were feeling	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1047	Finding someone to talk to who understands and has been through a similar experience	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1048	Dealing with people who expect me to be "back to normal"	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1049	Dealing with people not knowing what to say or how to behave	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1050	Dealing with people who expect me to feel	0 = No unmet need 1 = Low unmet need

	happy or relieved when treatment has ended	2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1051	Dealing with people not understanding what I'm going through	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1052	Dealing with how people are not able to cope with my illness	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1053	Dealing with people accepting that having cancer has changed me as a person	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1054	Dealing with reduced support from others when treatment has ended	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1055	Dealing with strains in relationships	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1056	Finding someone to listen to me even if there is nothing they can do	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need

Unmet Emotional Needs	NQS1057	Dealing with people not understanding how my physical abilities have changed	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
	NQS1058	Dealing with feeling like I am a burden to my family and friends	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
	NQS1059	Dealing with feeling depressed	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
	NQS1060	Dealing with feeling tired	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
	NQS1061	Dealing with feeling stressed	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
	NQS1062	Dealing with feeling worried (anxious)	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
	NQS1063	Dealing with feeling lonely	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need

		3 = High unmet need 4 = Very high unmet need
NQS1064	Dealing with feeling vulnerable	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1065	Dealing with worry about the emotional well-being of my family	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1066	Dealing with grief and loss	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1067	Dealing with feelings about death and dying	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1068	Dealing with not feeling able to set future goals or make long-term plans	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1069	Dealing with losing confidence in my own abilities	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1070	Dealing with feeling a loss of control	0 = No unmet need 1 = Low unmet need

		2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1071	Coping with feelings of despair	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1072	Coping with feeling like a different person	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1073	Dealing with not feeling happy or relieved when treatment has ended	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1074	Dealing with not being able to feel 'normal'	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1075	Trying to stay positive	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1076	Trying to keep a sense of hope	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need

NQS1077	Dealing with feeling guilty about what I have put others through	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1078	Being told I had cancer	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1079	Wanting to reflect on what I have achieved	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1080	Dealing with not wanting to do the things I used to	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1081	Knowing how to relax	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1082	Dealing with feelings of isolation	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1083	Coping with having a bad memory or lack of focus	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need

		3 = High unmet need 4 = Very high unmet need
NQS1084	Dealing with changes in how my body appears	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1085	Dealing with changes in my physical ability	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1086	Coping with going back into the 'real' world	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1087	Coping with things not going back to how they were before I had cancer	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1088	Dealing with missing important events like holidays	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need
NQS1089	Support for finding meaning or a new purpose in life	0 = No unmet need 1 = Low unmet need 2 = Moderate unmet need 3 = High unmet need 4 = Very high unmet need

Appendix C

Variable List for Dependent Variable- Psychological Well-Being

Variable	Variable Label	Question as found in the survey (Indicators)	Response Options
Dependent Variable			
Psychological Well-Being - ANXIETY	A_HWBDRY02	I was aware of dryness of my mouth	0 = Did not apply to me at all 1 = Applied to me to some degree, or some of the time 2 = Applied to me to a considerable degree, or a good part of the time 3 = Applied to me very much, or most of the time
	A_HWBBRT04	I experienced breathing difficulty (e.g., excessively rapid breathing, breathlessness in the absence of physical exertion)	0 = Did not apply to me at all 1 = Applied to me to some degree, or some of the time 2 = Applied to me to a considerable degree, or a good part of the time 3 = Applied to me very much, or most of the time
	A_HWBTRM07	I experienced trembling (e.g., in the hands)	0 = Did not apply to me at all 1 = Applied to me to some degree, or some of the time 2 = Applied to me to a considerable degree, or a good part of the time

		3 = Applied to me very much, or most of the time
A_HWBFOO09	I was worried about situations in which I might panic and make a fool of myself	0 = Did not apply to me at all 1 = Applied to me to some degree, or some of the time 2 = Applied to me to a considerable degree, or a good part of the time 3 = Applied to me very much, or most of the time
A_HWBPAN15	I felt I was close to panic	0 = Did not apply to me at all 1 = Applied to me to some degree, or some of the time 2 = Applied to me to a considerable degree, or a good part of the time 3 = Applied to me very much, or most of the time
A_HWBHRT19	I was aware of the action of my heart in the absence of physical exertion (e.g., sense of heart rate increase, heart missing a beat)	0 = Did not apply to me at all 1 = Applied to me to some degree, or some of the time 2 = Applied to me to a considerable degree, or a good part of the time 3 = Applied to me very much, or most of the time
A_HWBSCD20	I felt scared without good reason	0 = Did not apply to me at all 1 = Applied to me to some degree, or some of

			the time 2 = Applied to me to a considerable degree, or a good part of the time 3 = Applied to me very much, or most of the time
Psychological Well-Being - STRESS	S_HWBWDN01	I found it hard to wind down	0 = Did not apply to me at all 1 = Applied to me to some degree, or some of the time 2 = Applied to me to a considerable degree, or a good part of the time 3 = Applied to me very much, or most of the time
	S_HWBOVR06	I tended to over-react to situations	0 = Did not apply to me at all 1 = Applied to me to some degree, or some of the time 2 = Applied to me to a considerable degree, or a good part of the time 3 = Applied to me very much, or most of the time
	S_HWBNER08	I felt that I was using a lot of nervous energy	0 = Did not apply to me at all 1 = Applied to me to some degree, or some of the time 2 = Applied to me to a considerable degree, or a good part of the time 3 = Applied to me very much, or most of the time

S_HWBAGI11	I found myself getting agitated	<p>0 = Did not apply to me at all</p> <p>1 = Applied to me to some degree, or some of the time</p> <p>2 = Applied to me to a considerable degree, or a good part of the time</p> <p>3 = Applied to me very much, or most of the time</p>
S_HWBREL12	I found it difficult to relax	<p>0 = Did not apply to me at all</p> <p>1 = Applied to me to some degree, or some of the time</p> <p>2 = Applied to me to a considerable degree, or a good part of the time</p> <p>3 = Applied to me very much, or most of the time</p>
S_HWBINT14	I was intolerant of anything that kept me from getting on with what I was doing	<p>0 = Did not apply to me at all</p> <p>1 = Applied to me to some degree, or some of the time</p> <p>2 = Applied to me to a considerable degree, or a good part of the time</p> <p>3 = Applied to me very much, or most of the time</p>
S_HWBTOU18	I felt that I was rather touchy	<p>0 = Did not apply to me at all</p> <p>1 = Applied to me to some degree, or some of the time</p> <p>2 = Applied to me to a considerable degree, or a</p>

			good part of the time 3 = Applied to me very much, or most of the time
Psychological Well-Being - DEPRESSION	D_HWBPOS03	I couldn't seem to experience any positive feeling at all	0 = Did not apply to me at all 1 = Applied to me to some degree, or some of the time 2 = Applied to me to a considerable degree, or a good part of the time 3 = Applied to me very much, or most of the time
	D_HWBINI05	I found it difficult to work up the initiative to do things	0 = Did not apply to me at all 1 = Applied to me to some degree, or some of the time 2 = Applied to me to a considerable degree, or a good part of the time 3 = Applied to me very much, or most of the time
	D_HWBFWD10	I felt that I had nothing to look forward to	0 = Did not apply to me at all 1 = Applied to me to some degree, or some of the time 2 = Applied to me to a considerable degree, or a good part of the time 3 = Applied to me very much, or most of the time
	D_HWBBLU13	I felt down-hearted and blue	0 = Did not apply to me at all 1 = Applied to me to

			some degree, or some of the time 2 = Applied to me to a considerable degree, or a good part of the time 3 = Applied to me very much, or most of the time
	D_HWBENT16	I was unable to become enthusiastic about anything.	0 = Did not apply to me at all 1 = Applied to me to some degree, or some of the time 2 = Applied to me to a considerable degree, or a good part of the time 3 = Applied to me very much, or most of the time
	D_HWBWOR17	I felt I wasn't worth much as a person	0 = Did not apply to me at all 1 = Applied to me to some degree, or some of the time 2 = Applied to me to a considerable degree, or a good part of the time 3 = Applied to me very much, or most of the time
Moderator	Age	Registry Data	
	Survival Ratio of Type of Cancer	What type of cancer was found most recently (p.46-47)? What type of cancer were you first diagnosed with (p.45)? CCS – p.62	
	Recurrence of	Has the cancer	

	Cancer diagnosis	spread to other parts of your body (p.45)? Have you had a new cancer (p.45)?
Control Variable	Gender	I am... (male or female) (p.37)
	Level of Education	What education levels have you completed? (p.39)
	Employment Status	Do you do any paid work? (p.40)

Appendix D

DASS-21 Severity Indices

	Depression	Anxiety	Stress
Normal	0-9	0-7	0-14
Mild	10-13	8-9	15-18
Moderate	14-20	10-14	19-25
Severe	21-27	15-19	26-33
Extremely Severe	28+	20+	34