Weighing In: Psychological outcomes associated with weight changes among women treated for breast cancer

by

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A thesis submitted in conformity with the requirements for the degree of Doctor of Philosophy
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Abstract

This mixed-methods program of research consisted of three inter-related studies to examine how changes in weight contribute to women’s psychological health in the post-treatment phase of breast cancer. Study 1 employed a qualitative design and purposeful sample of weight-preoccupied women \((n = 11)\), to explore experiences of weight-related changes post-treatment, and examines perceptions of weight throughout the cancer trajectory. In a prospective longitudinal design spanning the first-year post-treatment for breast cancer \((n = 173)\), Study 2 examines how pre-cancer and post-treatment weight patterns impact indices of psychological health (i.e., weight-related guilt, shame, and depressive symptoms). Study 3 utilized a daily diary design of women with comorbid breast cancer and obesity \((n = 52)\) to assess the acute emotional outcomes associated with daily self-weighing in the context of weight management. Collectively, this body of work underscored the distressing nature of both weight changes and weight management efforts, in the context of reducing risk for breast cancer. Women reported experiencing more negative emotional consequences when their weight was higher than usual, both acutely after self-weighing and chronically over time in the first-year post-treatment. It was further suggested that a history of pre-cancer weight cycling served as an additional risk factor predicting worsened psychological experiences after treatment. These findings are important given that the well-documented impact of excess weight and psychological distress on worsened
cancer survival. In light of the fundamental challenges of weight management, targeting women’s weight-related psychological distress after breast cancer should be a clinical priority. Recent weight-neutral paradigms and compassion-focused approaches may be useful for improving the psychological health and well-being of women across the weight spectrum, and throughout the cancer trajectory.
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Preface

Study 1 (described in Chapter 3) was conducted at the University of Toronto. The manuscript is to be submitted for publication in a scholarly journal [Pila, E., Sabiston, C.M., Taylor, V.H., Arbour-Nicitopoulos, K. “The weight is even worse than the cancer”: Exploring weight preoccupation in women treated for breast cancer. To be submitted.] Catherine Sabiston (CMS), Valerie Taylor (VHT), and Kelly Arbour-Nicitopoulous (KAN) are co-authors on this manuscript. The primary author (Eva Pila) was responsible for all aspects of the research (i.e., conceptualizing research question, creating interview guide, application of ethical approval, collecting data, analyzing, and interpreting the data, and manuscript preparation. CMS oversaw all aspects of the research and facilitated participant recruitment. VHT and KAN consulted on the interview guide and reviewed the final manuscript. Ethical approval for this study was granted by the University of Toronto Research Ethics Board. This study was funded by a grant awarded to CS from the Canadian Institutes of Health Research (CIHR).

Study 2 (described in Chapter 4) was conducted at McGill University and the University of Toronto. The manuscript is currently under review in Health Psychology [Pila, E., Sabiston, C.M., Castonguay, A.L., Arbour-Nicitopoulos, K., & Taylor, V.H. Emotional consequences of weight cycling in the first-year post-treatment for breast cancer. Under review, Health Psychology.] CMS), Andree Castonguay (ALC), KAN, and VHT are co-authors on this manuscript. EP was responsible for all aspects of the research (i.e., conceptualizing research question, integrating measures during data collection, organizing secondary data analysis, analyzing and interpreting data, and manuscript preparation. CS oversaw all aspects of the research and facilitated participant recruitment. ALC lead the preliminary analyses and provided statistical consultation. VT and KAN reviewed the final manuscript. Ethical approval for this study was granted by the University of Toronto Research Ethics Board. This study was funded by a grant awarded to CS from the Canadian Institutes of Health Research (CIHR).

Study 3 (described in Chapter 5) was conducted at the University of Toronto, with participants recruited from the Wharton Medical Clinic. The manuscript is to be submitted for publication in a scholarly journal [Pila, E., Sabiston, C.M., Taylor, V.H., Arbour-Nicitopoulos, K., & Wharton, S. Emotional consequences of self-weighing: A daily diary study in women with comorbid breast cancer and obesity. To be submitted.] CMS), VHT, KAN, and Sean Wharton (SW) are co-
authors on this manuscript. EP was responsible for all aspects of the research (i.e., conceptualizing research question, collating measures and application for ethical approval, recruiting participants, collecting data, analysis, interpretation, and manuscript preparation. CS oversaw all aspects of the research. SW consulted on the research question and facilitated participant recruitment. VT and KAN provided insights on the protocol and reviewed the final manuscript. Ethical approval for this study was granted by the University of Toronto Research Ethics Board. This study was funded by a grant awarded to CS from the Canadian Institutes of Health Research (CIHR).
# Table of Contents

Acknowledgments ........................................................................................................ iv
Table of Contents ........................................................................................................ viii
List of Tables ................................................................................................................ xi
List of Figures ................................................................................................................. xii
List of Appendices ....................................................................................................... xiii

Chapter 1 ....................................................................................................................... 1
  1 Introduction ............................................................................................................. 1
    1.1 Breast Cancer and Weight Gain ................................................................. 1
    1.2 Weight and Psychological Distress ............................................................ 1
    1.3 Weight-related Self-Conscious Emotions .................................................. 2
    1.4 Dissertation Objectives ............................................................................. 4
    1.5 Significance and Implications of the Dissertation Research ................. 5
    1.6 Overview of Dissertation ....................................................................... 5

Chapter 2 ....................................................................................................................... 7
  2 Literature Review .................................................................................................... 7
    2.1 Breast Cancer ............................................................................................... 7
    2.2 Obesity and Breast Cancer ....................................................................... 8
    2.3 Changes in Weight and Health Outcomes ............................................ 11
    2.4 Weight Management .................................................................................. 12
    2.5 Impact of Breast Cancer and Weight on Psychological Health .......... 14
    2.6 Body- and Weight-Related Emotions ....................................................... 17
    2.7 Body Image and Depression .................................................................... 20
    2.8 Theoretical Summary .............................................................................. 22
    2.9 Overview of Dissertation Studies ............................................................. 25
    2.10 Conclusion of Literature Review ........................................................ ...... 26

Chapter 3 ....................................................................................................................... 27
  3 “The weight is even worse than the cancer”: Exploring women’s psychosocial experiences with weight after treatment for breast cancer ........................................... 27
    3.1 Abstract ....................................................................................................... 27
    3.2 Introduction ................................................................................................. 28
      3.2.1 The present study ............................................................................... 29
    3.3 Method ......................................................................................................... 30
      3.3.1 Participants ......................................................................................... 30
      3.3.2 Procedure .......................................................................................... 31
      3.3.3 Interview ............................................................................................ 31
      3.3.4 Analysis .............................................................................................. 32
    3.4 Results ......................................................................................................... 34
      3.4.1 “It’s about one of the few things that get me down”: Weight-related concerns notably contributed to psychological distress ........................................... 35
      3.4.2 “It’s been a concern all my life”: Prevalent history of weight cycling and ongoing quest to manage weight .................................................. 36
      3.4.3 “The weight is even worse than the cancer”: Shifting psychological impact of cancer vs weight .............................................................. 37
      3.4.4 “I don’t understand why I can’t get [my weight] under control”: Dominant perceptions of failure around goal-oriented weight management behaviours ...... 39

viii
6.2.2 Conceptualizations of guilt and shame ................................................................. 103
6.3 Methodological Implications .................................................................................. 104
6.4 Practical Implications ............................................................................................. 109
  6.4.1 Overview of practical implications .................................................................... 109
  6.4.2 Identifying high-risk subsets ............................................................................ 109
  6.4.3 Challenging weight-focused interventions .................................................... 109
  6.4.4 “Health At Every Size” interventions ............................................................ 111
  6.4.5 Compassion-focused interventions .................................................................. 112
  6.4.6 Conclusion of practical implications ............................................................... 113
6.5 Limitations ............................................................................................................... 114
6.6 Future Directions ................................................................................................... 115
6.7 Conclusion ............................................................................................................... 117
References ..................................................................................................................... 118
Appendices .................................................................................................................... 140
List of Tables

Table 2.1. Overview of Dissertation Studies
Table 3.1. Participant demographics.
Table 4.1. Means, standard deviations, and frequencies of main study variables (N = 173)
Table 4.2. Bivariate Pearson’s and Spearman’s correlations for main study variables.
Table 4.3. Results of Level-1 and Level-2 analyses for weight-related guilt, shame, and depressive symptoms.
Table 5.1. Means, standard deviations, and frequencies of main study variables (N = 52)
Table 5.2. Bivariate Pearson’s and Spearman’s correlations for main study variables.
Table 5.3. Results of Level-1 and Level-2 analyses for models predicting (i) acute weight-related guilt and (ii) shame.
Table 5.4. Results of Level-1 and Level-2 analyses for model predicting cumulative weight-related guilt and shame.
List of Figures

Figure 2.1. Self-objectification theory (Fredrickson & Roberts, 1997) framework as conceptualized by Moradi & Huang (2008).

Figure 2.2. Heuristic cognitive behavioural model for body image in oncology (White, 2000).

Figure 2.3. Process model of self-conscious emotions (Tracy & Robins, 2004).

Figure 2.4. Proposed associations of theoretical constructs linking weight characteristics to weight-related psychological distress.

Figure 4.1. The moderating influence of pre-cancer body weight cycling on the within-person associations between objective body weight and weight-related shame among women treated for breast cancer.

Figure 5.1. Cross-level interaction between daily body weight and guilt, by pre- and post-cancer weight cycling.

Figure 5.2. Cross-level interaction between daily body weight and shame, by pre- and post-cancer weight cycling.
List of Appendices

Appendix A. Study 1 Interview Guide
Appendix B. Study 2 Surveys
Appendix C. Study 3 Surveys
Appendix D. Ethical Approvals
Chapter 1

1 Introduction

1.1 Breast Cancer and Weight Gain

One in nine Canadian women will be diagnosed with breast cancer in their lifetime (Canadian Cancer Society, 2011). Advancements in breast cancer treatment have significantly improved survival rates, thereby increasing the number of women treated for breast cancer in the Canadian population (Courneya & Friedenreich, 2007). After breast cancer, women undergo lengthy and severe treatments, which are linked with many negative physical (e.g., loss of breast(s), pain, fatigue, osteoporosis; (Demark-Wahnefried, Aziz, Rowland, & Pinto, 2005) and psychological side effects (e.g., mood disturbance, stress, impaired sexuality, negative body image; (Harvie, 2010). Post-treatment fluctuations in weight have been identified as one of the most detrimental side effects of treatment (White & Hood, 2011). Prevalence of weight gain post-treatment has been estimated to occur in approximately 50% to 96% of women (Demark-Wahnefried et al., 1997; Demark-Wahnefried, Winer, & Rimer, 1993). The pervasiveness of post-treatment weight gain is highly problematic given that excess weight in women treated for breast cancer is linked with increased risk of physical co-morbidities (i.e., cardiovascular disease), mental health concerns (i.e., depression), and increased risk of breast cancer reoccurrence and mortality (Caan et al., 2008; Demark-Wahnefried et al., 2001). Due to the potential for psychological distress after weight gain (White & Hood, 2011), and weight-related associations with poorer breast cancer prognosis, overall health, and quality of life (Makari-Judson, Braun, Jerry, & Mertens, 2014), examining patterns of weight change and psychological sequelae is relevant for improving survivorship outcomes.

1.2 Weight and Psychological Distress

Cancer-related changes to weight have been associated with psychological distress and adverse effects on quality of life (Ganz, 2005; Rosenberg, Tamimi, & Gelber, 2013). Of the many distressing symptoms that occur in the years after cancer treatment, changes in weight and body composition have been reported as some of the most distressing and challenging to a woman’s
identity (White & Hood, 2011). Specifically, women who gain weight post-treatment consistently report higher body image disturbance compared to women whose weight remains stable (Falk Dahl et al., 2010; Raggio, Butryn, Arigo, & Mikorski, 2014; Rosenberg et al., 2013). In fact, within qualitative accounts, women describe post-treatment changes in weight as persistent reminders of the breast cancer diagnosis, and contributing to pressure to manage weight with radical changes to diet and physical activity (Halbert et al., 2008; Maley, Warren, & Devine, 2013). Although the extant literature has predominantly focused on treatment-related weight gain, an undesirable pattern of weight change in adulthood pre-diagnosis may also predispose women to exacerbated body image concerns post-treatment (Thomas, 1991). In fact, a recent study reported that large weight fluctuations pre-cancer predict various dimensions of body image after treatment, above any treatment-related changes to weight (Fazzino, Hunter, Sporn, Christifano, & Befort, 2017). Based on this evidence, considering women’s cumulative weight histories is important for understanding post-cancer psychological distress.

1.3 Weight-related Self-Conscious Emotions

One index of weight-related psychological distress is appearance self-consciousness (Fazzino et al., 2017), with specific reports of feelings of embarrassment, guilt, and shame around the body and weight after breast cancer (Brunet, Sabiston, & Burke, 2013; Fallbjörk, Rasmusson, Karlsson, & Salander, 2013). Experiences of weight-related guilt and shame have been generally overlooked in the literature, despite recognizing the value of these emotions in the context of breast cancer (Chapple, Ziebland, & McPherson, 2004; LoConte, Else-Quest, Eickhoff, Hyde, & Schiller, 2008). Body- or weight-related guilt and shame are likely prevalent emotional experiences in women treated for breast cancer because (i) cancer-related changes to weight are undesired and do not fit societal ideals (Helms, O’Hea, & Corso, 2008), and (ii) women are aware of the general and cancer-specific health risks associated with excess weight (Demark-Wahnefried et al., 2001). Indeed, qualitative data suggests that women are aware that excess weight contributes to one’s survival and risk of cancer recurrence – which is in itself very distressing, and provokes self-blame and shame (Pedersen, Groenkjaer, Falkmer, Mark, & Delmar, 2016). Experiences of weight-related guilt and shame are problematic in women treated for breast cancer, given that these emotions have been shown to adversely impact mental health and quality of life, beyond other body image constructs (Moreira & Canavarro, 2010). Thus,
focusing on specific emotions like guilt and shame is pertinent to advancing an understanding of the factors that contribute to distress after breast cancer.

Self-conscious emotions of guilt and shame are fundamental social processes that guide social goals, and are central in regulating cognitions and behaviours (Tangney & Fischer, 1995). Self-conscious emotions involve self-awareness, self-representations and self-evaluations and to be elicited require: awareness of a self-discrepancy, and a negative evaluation of the discrepancy that hinders a positive external representation of the self (Tracy & Robins, 2004, 2006). Not surprisingly, self-conscious emotions have been linked with appearance, body shape, size, and function (Castonguay, Pila, Wrosch, & Sabiston, 2015; Sabiston, Brunet, Kowalski, et al., 2012), although researchers are only beginning to explicitly assess these constructs after treatment for breast cancer. In the only currently published study examining weight-related guilt and shame (Castonguay, Wrosch, Pila, & Sabiston, 2017), it was reported that high levels of shame were associated with external motivations for physical activity (e.g., exercising to lose weight), and decreased levels of physical activity over time. As such, it is reasonable to assume that negative self-conscious emotions like shame and guilt are pertinent for women who experience cancer-related changes in weight. First, being overweight is considered socially undesirable and may precipitate negative self-evaluations (Castonguay, Brunet, Ferguson, & Sabiston, 2012; Higgins et al., 1987). Secondly, given that weight is highly stigmatized and discriminated against, it is a domain that commonly elicits feelings of guilt and shame (Puhl & Brownell, 2006). Third, societal perceptions that weight is controllable and weight loss is easily achievable (Tiggemann & Rothblum, 1997) further contribute to bias against individuals who do not fit the restricted societal ideal and contribute to feelings of self-blame, guilt and shame. And lastly, women internalize the detrimental societal belief that their greatest value in society is their physical appearance (Fredrickson & Roberts, 1997). These detrimental societal beliefs can be highly problematic for women who experience difficulties with weight post-treatment, and underscore the need to examine weight-related guilt and shame among women post-treatment for breast cancer.

Among women diagnosed with breast cancer, weight-related concerns generally, and conceptualizations of self-conscious emotions specifically, are predictive of psychological consequences such as depression (Paterson, Lengacher, Donovan, Kip, & Toftmann, 2015;
Rosenberg et al., 2013). Notably, given that body image and weight concerns tend to be highly pervasive and long-standing (Kornblith & Ligibel, 2003; Montazeri, Vahdaninia, & Harirchi, 2008), impacting women up to 5 years after diagnosis (Falk Dahl et al., 2010), body image concerns can significantly predict depressive symptoms throughout survivorship. This is problematic since presentation of depression can independently contribute to negative cancer outcomes and overall survival (Befort, Austin, & Klemp, 2011). Meanwhile, women who have more positive indices of body image tend to better cope and adjust to cancer, experience less psychological distress (Paterson et al., 2015) and have better cancer and survival outcomes (Befort et al., 2011). Given than body dissatisfaction and negative emotion are significant contributors to psychological distress, and specifically to depression, examining negative weight-related emotions in the context of breast cancer should be a research priority.

1.4 Dissertation Objectives

Integrating theoretical frameworks of objectification theory (Fredrickson & Roberts, 1997), the multidimensional model of body image in oncology (White, 2000a), and the process model of self-conscious emotions (J Tracy & Robins, 2004), the overarching aim of this program of research was to assess emotional indices of distress associated with weight changes in women treated for breast cancer. Utilizing a mixed-methods methodology in three inter-related studies, this program of research sought to:

i) Explore women’s experiences and interpretations of weight-related changes post-treatment, and examine perceptions of weight throughout the cancer trajectory.

ii) Examine how naturally occurring changes in weight in the first year post-treatment impact weight-related guilt, shame, and depressive symptoms.

iii) Examine the acute emotional outcomes associated with daily self-weighing among women with a history of breast cancer, who are engaging in weight management.

iv) Assess if the relationship between (a) naturally occurring changes in weight and emotional outcomes, and (b) daily assessments of weight and acute emotional outcomes vary as a function of a woman’s history of weight cycling.
1.5 Significance and Implications of the Dissertation Research

Excess weight has been identified as one of the most common and distressing side-effects of breast cancer treatment (Demark-Wahnefried et al., 2001). Gains in weight are reported several years post-treatment, and pose many adverse physical (i.e., diabetes, cardiovascular disease) and psychological health consequences (i.e., reduced quality of life, mood disorders; (Vance, Mourtzakis, McCargar, & Hanning, 2011)). Further, excess weight and problematic patterns of weight change (i.e., weight cycling) have been shown worsen cancer prognosis, increase risk of recurrence, and contribute towards cancer-related mortality (Chan et al., 2014). Notably, the cumulative impact of excess weight and weight-related psychological distress may further contribute towards worsened cancer-related outcomes. Despite this, the literature examining psychological consequences of weight gain is currently underdeveloped. As such, the current mixed-methods research program was developed to elucidate the specific emotional consequences associated with weight gain and weight cycling for weight-concerned women treated for breast cancer. The collective findings will have important utility in advancing research and intervention strategies to reduce negative weight-related consequences and improve the health and well-being of women in survivorship.

1.6 Overview of Dissertation

The present section, Chapter one, provides a brief background and empirical context of the research program, along with the overarching purpose and specific aims of each study. Chapter two provides a comprehensive overview of the literature pertaining to breast cancer, obesity, and weight-related psychological distress. Further, this chapter includes an overview of the theoretical frameworks and conceptual considerations that encapsulate the constructs of interest. Throughout this chapter, limitations and gaps of a theoretical, conceptual, and methodological nature will be discussed, to build a case for the current program of research. Chapters three through five will be presented in manuscript form, and represent the unique scholarly contributions that stemmed from this program of research. Specifically, Chapter three presents a qualitative examination of women’s experiences and interpretations with weight, from adulthood to currently in late survivorship (Pila, Sabiston, Taylor, Arbour-Nicitopoulos). Chapter four describes a prospective longitudinal study of women in the first year post-treatment for breast cancer, and examines within- and between-person effects of weight change on emotional...
consequences of weight-related guilt, shame, and depressive symptoms (Pila, Sabiston, Castonguay, Arbour-Nicitopoulos, & Taylor). Chapter five overviews an intensive longitudinal study utilizing daily diary methodology, and examining acute emotional responses to self-weighing, while examining between-person effects of weight-cycling (Pila, Sabiston, Taylor, Arbour-Nicitopoulos, & Wharton). Chapter six provides a collective and integrated discussion of the three studies and underscores the theoretical, conceptual, methodological, and practical implications that emanate from the present research program.
Chapter 2

2  Literature Review

2.1  Breast Cancer

Breast cancer is the leading diagnosis of invasive cancer in women worldwide, with 1 in 9 women in Canada diagnosed in their lifetime (Canadian Cancer Society, 2011). Women are at higher risk for breast cancer diagnosis based on early onset of menstruation and menopause, family history, occurrence of full-term pregnancy after 30 years of age, obesity, nulliparity, and living in an urban area. Of these risk factors, age is the biggest contributor, with over 77% of women diagnosed with breast cancer being at least 50 years old (Harvie, 2010). Significant improvements in breast cancer detection and treatment have led to increased survival and many women with early stage diagnosis having normal life expectancy (Jassem, Buchanan, Jänicke, & Baum, 2004). Improved breast cancer survival rates are leading to an increasing number of women in the phase of survivorship. Survivorship is defined as the disease-free period after primary treatment and can present considerable physical and psychological challenges (Courneya & Friedenreich, 2007). The survivorship period marks the end of consistent monitoring from health professionals and many women report feeling unprepared to cope after a major health crisis (Magee & Scalzo, 2006). However, survivorship is also often a time where individuals make efforts to improve health and avoid cancer recurrence (Sabiston & Brunet, 2012) and therefore research efforts are needed to assess women’s needs during the post-treatment survivorship phase.

For the majority of diagnosed breast cancers, 60% are localized to the breast (Stage I and II), while 30% have local lymph node involvement (Stage III) and 10% are metastatic (Stage IV). Treatment regimens include breast surgery (e.g., axial node dissection, lumpectomy, single or double mastectomy), radiation therapy, chemotherapy and hormone therapy, and most women receive a combination of the aforementioned treatments (Canadian Cancer Society, 2011). Although imperative to managing the disease, these breast cancer treatments are associated with a series of physical and psychological consequences. For example, women report physical side effects that include: loss and disfiguration of breast(s), weight gain, pain, nausea, lymphedema,
fatigue, tissue damage, cardiotoxicity, neuropathy, muscle weakness and loss, and osteoporosis (Demark-Wahnefried et al., 2001, 2005; Irwin et al., 2005; Wood, Shapiro, & Recht, 2001). Additionally, psychological side effects are commonly reported and include mood and anxiety disorders, increased stress, negative physical self-perceptions, intimacy and sexual difficulties, reduced quality of life and well-being (Burgess et al., 2005; Harvie, 2010). Given the (i) numerous side-effects of cancer treatment, and (ii) increasing number of women who successfully complete treatment, there is a great need for research to address health outcomes for women post-treatment to breast cancer.

2.2 Obesity and Breast Cancer

Postmenopausal breast cancer is one of the most common types of cancer that is linked to obesity among women, in addition to endometrial, gallbladder, esophageal, and renal cancers (Renehan, Tyson, Egger, Heller, & Zwahlen, 2008). Global data reveals that higher weight contributes to increased cancer risk in women, more commonly than among men, and postmenopausal breast cancer is among the cancers that contribute to 63.6% of cancers attributed to overweight and obesity (Arnold et al., 2015). In fact, concerns around obesity, weight status and weight gain are commonly reported among women with breast cancer and women in the survivorship period. The link between obesity and breast cancer is well documented; with several epidemiological accounts reporting women who are classified as overweight or obese women being at increased risk of developing breast cancer compared to age-matched women who are categorized as healthy weight (Reeves et al., 2007; Renehan et al., 2008). Notably, more than 65% of breast cancer survivors are classified as overweight or obese (Irwin et al., 2005), and even women who are classified as healthy weight tend to gain weight after breast cancer diagnosis (Vance et al., 2011). In addition, breast cancer diagnosis is highly predictive of weight gain. Demark-Wahnefreid and colleagues (1993; 1997) reveal that weight gain occurs in 50% to 96% of individuals diagnosed with breast cancer. For most women who gained weight, amount of weight averages between 2.5 to 6.2 kilograms (kg), although up to 20% of women gain over 10kg in the first year after diagnosis. More recent reviews (Vance et al., 2011) support the conclusion that women treated for breast cancer experience a high frequency of weight gain up to 3-years post-diagnosis (Campbell, Lane, Martin, Gelmon, & McKenzie, 2007; Cheney, Mahloch, & Freeny, 1997; Goodwin et al., 1999; Irwin et al., 2005; Lankester, Phillips, & Lawton, 2002; McInnes &
Knobf, 2001; Rio et al., 2002; Rock, Flatt, Newman, & Caan, 1999). Given the strong link between breast cancer and weight gain, efforts are needed to help women manage the psychological sequelae associated with these treatment-related changes.

The mechanisms explicating the weight and breast cancer relationship are complex and multifactorial. Proposed physiological pathways include increased estrogen derived from adipose tissue has been associated with cell growth, and the interaction of hormones related to metabolism (i.e., insulin, insulin-growth factor, leptin) with adipose tissue which may promote cell growth and further elevate estradiol. Proposed behavioural mechanisms may be associated with physical inactivity and dietary factors that may induce weight gain prior to diagnosis and post-treatment. Treatment-related weight gain is often linked to adjuvant chemotherapy and psychological factors associated with treatment (i.e., fatigue, distress) which may impede regular engagement with health behaviours (see Vance et al., 2011 for a summary of mechanisms).

Despite the empirical support for the mechanisms presented herein, there is still considerable variability in weight gain after treatment for breast cancer. Several important factors have been identified to explain some of this variability – including (i) menopause status, (ii) treatment type, (iii) period of cancer trajectory, and (iv) patterns of weight change. First, premenopausal women have been shown to gain more weight compared to postmenopausal women (Caan et al., 2006, 2008) which may be due partly to treatment-induced menopause whereby fat accumulation and body composition changes are common (Trémollieres, Pouilles, & Ribot, 1996). Second, treatment type and duration are commonly linked with changes in weight. Chemotherapy is the treatment type most closely predictive of weight gain, with an average weight gain of more than 5kg in about 33% of women (Goodwin et al., 1999; Rock et al., 1999; Vance et al., 2011). Duration of chemotherapy treatment is also an important factor, whereby newer treatments that are shorter in duration mitigate weight gain (Vance et al., 2011). Similarly, Tamoxifen therapy, which can be prescribed up to 5-years post-diagnosis, has long been considered an important contributor to weight gain (Demark-Wahnefried et al., 1993). However, there is also contradictory evidence that shows women receiving adjuvant therapy (e.g., Tamoxiifen) experience non-significant changes in weight (Makari-Judson, Judson, & Mertens, 2007), with follow-up of 6-years post-treatment (Saquib, Flatt, Natarajan, & Thomson, 2007). This inconsistent evidence may indicate that adjuvant chemotherapy and hormone therapies are not the sole causes of increased body weight and fat mass in women treated for breast cancer. For
example, weight gain after diagnosis has also been reported among women receiving surgical treatment only (Harvie, 2010).

Weight gain also varies throughout the cancer trajectory. There is evidence that weight remains relatively unchanged during treatment, but increases considerably in the post-treatment period. Specifically, researchers (Kutynec, McCargar, Barr, & Hislop, 1999) have reported that weight was stable during 3 months in both women receiving adjuvant chemotherapy or radiation, but increased to average of 4kg in the year following treatment. Evidence by Irwin and colleagues (2005) supports the assertion that weight increases progressively post-treatment and a longitudinal study of 185 women with early stage breast cancer survivors reported increasing mean weight changes of 1.5kg, 2.7kg and 2.8kg in the first respective three years post-treatment (Makari-Judson et al., 2007). Furthermore, for some women, changes in weight may be impacted by changes to body composition. For example, some evidence links body composition changes in breast cancer to mimic body composition changes common in sarcopenic obesity, specifically, gains in fat mass along with no change or declines in fat-free mass (Harvie, Campbell, Baildam, & Howell, 2004; Vance et al., 2011). In one study, researchers (Freedman et al., 2004) found that women experienced decreases in fat-free mass and increases in body fat, when compared before to after and 6-month follow-up from adjuvant chemotherapy. Therefore, changes in body composition can be potentially problematic, even when weight remains stable (Kutynec et al., 1999), and these factors may contribute to the variability of weight change among women diagnosed with breast cancer. In addition to treatment-related weight gain, there is emerging evidence that weight fluctuation during adulthood may independently predict increased incidence of breast cancer and adverse survival outcomes in diagnosed women (Ahn et al., 2007; Eliassen et al., 2006). Cycles of weight loss and gain have been linked to detrimental health effects through resting metabolic rate, body composition, and maladaptive behaviours for weight loss (Diaz, Mainous, & Everett, 2005), and may adversely impact survival outcomes through these or other undocumented mechanisms. Meanwhile, post-treatment cycling of weight (i.e., loss and regain) have been uniquely linked to increased risk of morbidity and mortality, beyond weight gain alone (Caan et al., 2006). The unique consequences of (i) weight status at diagnosis, (ii) adulthood weight history, and (iii) change in weight post-treatment, underscore the complexity of the obesity and breast cancer relationship, and suggest that several weight characteristics may impact cancer-related outcomes and survival (Protani, Coory, & Martin, 2010; Vance et al.,
2011). Drawing from this collection of evidence, it can be concluded that despite considerable variability, changes in weight are highly important factors to consider in women diagnosed with breast cancer. In fact, Demark-Wahnefried et al. (2001) noted three main outcomes of weight gain in women treated for breast cancer: (a) increase risk of weight-related disorders like diabetes and hypertension, (b) negative quality of life and psychological burden and (c) increase risk of breast cancer recurrence, all factors that collectively contribute to increased mortality.

2.3 Changes in Weight and Health Outcomes

Women with breast cancer who gain weight during and after treatment are at higher risk of developing further comorbidity (e.g., cardiovascular disease, hypertension and diabetes) and also face worse cancer prognosis and higher morality (Caan et al., 2008). Irwin and colleagues (2005) reported numerous mechanisms that may account for the negative impact of weight gain, including increased estradiol and inhibition of estrogen production, the interaction of insulin with adipose tissue which may promote cell growth, as well as increased adiposity reducing effectiveness of treatments like chemotherapy. Due to these complex and interrelated mechanisms, the link between cancer-related changes in weight and overall health outcomes must be carefully considered.

Weight-related co-morbidities are highly problematic given that they are a major cause of mortality in women with early stage breast cancer (Harvie, 2010). Additionally, weight gain post-diagnosis is independently associated with adverse cancer prognosis and worse cancer outcomes, including increased risk of reoccurrence and both cancer mortality and concurrent disease mortality (Camoriano et al., 1990; Chlebowski, Aiello, & Mctierman, 2002; Kumar, Cantor, Allen, & Cox, 2000; Newman & Miller, 1986). For example, Camoriano and colleagues (1990) reported that premenopausal women who gained 5.9kg had a 1.5 times higher chance of cancer reoccurrence and 1.6 higher chance of breast cancer related mortality when followed approximately 7 years post-diagnosis. In premenopausal (but not postmenopausal women), weight gain is associated with 50% increased risk of cancer reoccurrence and 60% cancer-related mortality (Camoriano et al., 1990). Others (Nichols et al., 2009) have reported that post-diagnosis weight gain was linearly linked with mortality, where each 5kg gain increased mortality by 12%. Additionally, in a review conducted by Chlebowski and colleagues (1986),
researchers reported that weight gain is an important risk factor for promoting cancer reoccurrence and reduced survival rates. More recent reviews (Vance et al., 2011) support past findings and thus continue to highlight that weight gain is a persistent concern for cancer outcomes and overall survival.

2.4 Weight Management

For women diagnosed with breast cancer, weight tends to increase post-diagnosis and seldom returns to pre-cancer levels (Camoriano et al., 1990; Chlebowski et al., 2002; Frumkin & Faber-Langendoen, 1996). Notably, while there is substantial evidence to highlight the detrimental effect of weight gain post-treatment, there is limited evidence that post-diagnosis weight loss can improve cancer outcomes (Irwin et al., 2005). In several reviews, limited evidence has been reported to support the assertion that weight loss reduces risk of mortality in individuals with a history of breast cancer diagnosis (Irwin et al., 2005). In analyses of national registries that control for cancer diagnosis (Taing, Ardern, & Kuk, 2012), it has been reported that weight cycling (which occurs from intentional weight loss efforts) is associated with worse mortality if weight cycling occurs in late-adulthood. In the largest study to date of approximately 13,000 women treated for breast cancer, Caan and colleagues (2012) reported a U-shaped association between weight change post-diagnosis and mortality, and thus suggest that stability of weight post-diagnosis seems to have the most favorable outcomes for survival. Further, the authors summarize the body of literature that also supports more adverse breast cancer outcomes with post-diagnosis weight loss (Chen et al., 2010; Nichols et al., 2009; Thivat et al., 2010), with one study in particular highlighting at least 5 times higher risk of all-cause mortality and 7 times the risk of cancer-related mortality for women who lose more than 5% of their pre-diagnosis weight, compared to women who remain stable in the post-diagnosis period (Bradshaw et al., 2012). This set of epidemiological research underscores the potential detriment of excessive weight change in any direction (i.e., gain or loss) post-treatment, but omits information on the intentional nature of weight change (i.e., if weight loss was intentional or naturally occurring).

Similar to general weight loss studies, behavioural weight loss interventions in women with breast cancer are mostly short-term, underpowered and show mixed findings (de Waard, Ramlau,
For example, researchers (Loprinzi, Athmann, Kardinal, & O’Fallon, 1996) used a dietician counselling intervention on 107 individuals receiving chemotherapy and did not find significant differences in weight after 6-months between the intervention and control group. Only studies that utilize cognitive behavioural intervention of both exercise and diet modification have shown significant loss of weight in women treated for breast cancer (Goodwin et al., 1998; Mefferd, Nichols, & Pakiz, 2007). Specifically, Mefferd and colleagues (2007) reported that a 16-week cognitive behavioural intervention targeting diet and exercise had significant improvements in weight, body mass index, waist circumference and fat mass compared to the waitlist control group – however, the authors did not offer any follow-up data post-intervention. Without this follow-up data, the weight management intervention is limited by the same pitfalls as most weight loss trails, whereby weight is regained quickly post-intervention, and poses risk factors associated with weight cycling (Bacon & Aphramor, 2011).

Guidelines by the National Institute of Health (1992) summarize that up to 70% of weight loss is regained following the year after weight loss, and almost all weight is regained within 5 years. Additionally, strict focus on weight loss and weight management can be detrimental to psychological well-being by contributing to weight-related anxiety (Sabiston et al., 2010) disordered eating (Bacon & Aphramor, 2011), weight bias, stigma and discrimination (Brownell et al., 2010). Therefore, it could be speculated that weight loss and weight management efforts are futile to improving breast cancer outcomes and breast cancer mortality. Challenging the traditional weight-focused paradigm in non-cancer specific populations, Bacon and Aphramor (2011) summarize how behavioural interventions that improve physical activity and diet can improve health outcomes, regardless of weight loss. Therefore, perhaps it is more effective to limit recommendations for explicit weight loss, and instead focus on improving physical activity and intuitive eating, which in turn will help to manage metabolic health outcomes and consequently may improve cancer outcomes (Chlebowski et al., 2002), regardless of losses in weight.

Many women with breast cancer report having limited access to health promotion resources and report that healthcare professionals do not adequately address lifestyle concerns, including weight concerns (Harvie, 2010). In an unpublished needs assessment survey, researchers (Straw,
Hopwood, Mitchell, & Harvie, 2006) assessed the lifestyle and weight-related needs of 100 women with breast cancer. Over 70% of the participants reported a desire to receive lifestyle advice and weight-related advice preferably after undergoing primary treatment, and preferred written advice or one-on-one consultation. Participants also noted that delivery of lifestyle and weight-related advice too early may have negative psychological outcomes and be too distressing for patients undergoing diagnosis (Harvie, 2010; Straw et al., 2006). Additionally, the researchers assessed the frequency with which health care practitioners targeted and discussed lifestyle and weight-related concerns with breast cancer patients within the United Kingdom. Less than a third of breast cancer practitioners had discussed lifestyle and weight-related concerns with patients, and discussions were typically initiated by the patient, even though over two thirds of the practitioners believed lifestyle counseling should be an integral part of breast cancer management. The authors summarized barriers to targeting these issues clinically, which included concern over inducing guilt and shame, and inadequate training for targeting sensitive issues like weight and body image concerns. It is imperative for researchers to understand the complexities of women’s emotional experiences around weight, to then inform the development of intervention strategies that will effectively target weight-related concerns post-treatment.

2.5 Impact of Breast Cancer and Weight on Psychological Health

Many researchers (Hegel et al., 2006; Kornblith & Ligibel, 2003; Mertz, Bistrup, Johansen, & Dalton, 2012) have reported psychological distress as a common concern resulting from cancer – with over 50% of women with breast cancer reporting emotional distress and 25% experiencing emotional concerns at a clinical level, such as depression (Glanz & Lerman, 1992). Some (Zabora, BrintzenhofeSzoc, & Curbow, 2001) have even suggested that of cancers that affect women, breast cancer is the most closely linked with mental health concerns. Women treated for breast cancer commonly experience fear of cancer recurrence, fluctuations in mood, feelings of vulnerability and uncertainty, and reductions in quality of life (Knobf, 2007).

Body image concerns, anxiety, depression and sexual functioning are commonly rated as the top psychological concerns for women treated for breast cancer (Figueiredo, Cullen, Hwang, Rowland, & Mandelblatt, 2004; Harvie, 2010). Concerns around weight are specific body image
issues often reported after treatment for breast cancer (Brunet & Sabiston, 2011; Guthrie, Dennerstein, Taffe, Lehert, & Burger, 2004; McInnes & Knobf, 2001). White and Hood (2011) suggest that changes in weight may be the largest contributors to body image concerns among women with breast cancer, and can contribute to psychological distress and even clinically relevant psychopathology. In combination with the negative impact of breast cancer diagnosis and treatment on quality of life (Chlebowski et al., 2002; Gelber, Bonetti, Cole, Gelber, & Goldhirsch, 1998; Michael, Kawachi, Berkman, & Holmes, 2000), weight-related concerns and co-morbid conditions (Fine et al., 1999) have enormous implications for the overall health and well-being of women treated for breast cancer. Equipped with knowledge regarding the importance of weight concerns after breast cancer, it is imperative to examine the associated emotional and mental health correlates that contribute to the psychological burden of weight concerns.

Breast cancer treatment has been linked with considerable appearance and functional changes to the body that can adversely impact how women perceive, feel and think about their bodies. Poor body image is commonly reported among breast cancer survivors, with concerns spanning many years following initial treatment-related alterations to appearance (Moreira & Canavarro, 2010). Some body-related changes include weight gain, altered body composition, loss of hair, breast disfigurement or loss, and functional changes include chronic pain, infertility, fatigue and sexual dysfunction (Collins et al., 2011; Irwin et al., 2005). To contextualize the various body-related changes in cancer and align with multidimensional frameworks of body image in breast cancer (Baxter et al., 2006), White (2000) developed a heuristic cognitive behavioural model for body image in oncology (Figure 2.1). Consistent with conceptualizations that body image is a multidimensional construct (Cash & Smolak, 2011), this model theorizes that perceived or actual cancer-related changes in appearance directly impact body image schemas that rely on individual’s body image investment and directly influence cognitions, evaluations, emotions and behaviours. Many breast cancer and body image studies are grounded in this theory and provide empirical support for how cancer-related changes impact body perceptions and satisfaction (Moreira & Canavarro, 2010), body-image affect (Brunet et al., 2013) and compensatory body-related behaviours (White, 2000b).
In this theory, White (2000) also highlights how investment in appearance is highly predictive of the extent that women will experience distress adjusting to breast cancer related changes in appearance and treatment (Lichtenthal, Cruess, Clark, & Ming, 2005). Body image investment has also been linked with breast cancer treatment choice, with women who are high in investment choosing breast-conserving surgeries. For example, researchers (Margolis, Goodman, Rubin, & Pajac, 1989) have reported that the most important factor affecting a woman’s decision for lumpectomy or mastectomy is the anticipated negative impact on body image and self-perceptions. In the same study, only 55% of mastectomy patients would chose the same procedure again, given post-treatment knowledge of psychological distress associated with breast disfigurement. Additionally, Helms and colleagues (2008) suggested that most women rate treatment-related appearance side effects as more severe than physical side effects like fatigue or nausea (Helms et al., 2008; White & Hood, 2011). And even after treatment-related side effects subside with time, the consequences on physical self-perceptions and self-worth do not always return to baseline levels pre-treatment, despite physical restoration (White & Hood, 2011). This evidence offers support for the enormous longstanding impact of body-related changes on psychological well-being (Harvie, 2010; Helms et al., 2008). As such, clinicians need to be aware of the role of body image in influencing treatment decisions and each individual's thoughts, beliefs and emotions around their physical self need to be considered in the treatment regimen.

These findings are unsurprising given a large body of evidence that shows (a) women are socialized to believe their value in society is based on appearance (Brown & Jasper, 1993), (b) commonplace social perceptions that overweight is unattractive and undesirable (Degher & Hughes, 1999), and (c) unrealistic societal beliefs that weight is controllable and weight loss is achievable (Tiggemann & Rothblum, 1997). These detrimental societal beliefs can be highly problematic for women who gain weight during treatment, and who have difficulties maintaining weight post-treatment. Notably, Brunet and colleagues (2013) also reported that women treated for breast cancer are highly aware that being overweight adversely impacts survival rates and cancer-related mortality (Demark-Wahnefried et al., 2001), further contributing to self-criticism, feelings of failure, self-blame, shame and guilt. Considering the prevalence of weight-related concerns among breast cancer survivors, it is highly important to assess the role of weight concerns on overall psychological health (Collins et al., 2011; White, 2000b).
2.6 Body- and Weight-Related Emotions

For the purposes of this dissertation, *body-related* emotions refer to any emotions related to any aspects of physical appearance (i.e., overall appearance, body size, shape, weight, physical function), while *weight-related* emotions refer specifically to body shape, weight, and weight-related behaviors (i.e., diet, exercise). According to White’s (2000) model of body image in oncology, cancer-related changes to appearance that threaten the ideal self (e.g., weight gain) will negatively impact cognitions, emotions and behaviours. In the psychosocial oncology literature, most research focuses on cognitive domains such as body dissatisfaction, while emotions relating to body image are rarely assessed. Drawing from Tangney and Tracy’s (2012) proposition to focus on self-conscious emotions with contextual underpinnings, body-related self-conscious emotions have been investigated in healthy female populations with a predominant focus on body-related shame and guilt (Mosewich & Kowalski, 2011; Sabiston et al., 2010). In a qualitative study of women treated for breast cancer, Brunet and colleagues (2013) found that women reported phenomenological accounts of anxiety, guilt and shame around their physical appearance and weight. Despite conceptual frameworks of body image in oncology (White, 2000b), in which importance of examining body-related emotions is highlighted, research on emotions such as guilt and shame have been overlooked among women with breast cancer.

Based on general definitions of emotions, body-related shame is defined as negative feelings about physical appearance, specifically elicited from a perceived or feared loss of social status and failure to meet internalized and idealized societal standards of physical appearance, body shape and weight (Lewis, 1993; Noll & Fredrickson, 1998; Sabiston et al., 2010). Shame is caused from global attributions made about the self (e.g., “I am an overweight person”), and is therefore intensely experienced and difficult to alleviate (Tangney, Wagner, & Gramzow, 1992). Chronic experiences of both generalized and body-related shame have been linked with a host of maladaptive psychological, behavioural, and physical outcomes such as depression (Ashby, Rice, & Martin, 2006; Tiggemann & Kuring, 2004), eating disorders (Gupta, Zachary Rosenthal, Mancini, Cheavens, & Lynch, 2008; Noll & Fredrickson, 1998; Swan & Andrews, 2003), decreased self-esteem (Bessenoff & Snow, 2006b) and increased physiological stress (Dickerson & Kemeny, 2004).
Guilt is a similar but distinct negative emotion, and body-related guilt is elicited from remorse and regret regarding a specific body-related behaviour that is perceived as undesirable (e.g., “I have gained weight”). Since body-related guilt is linked to transient behaviours, rather than stable aspects of the self, experiences of guilt are typically less detrimental and intense than shame, and can serve an adaptive role by motivating individuals to engage in reparative actions to mend their perceived transgression(s) (Lewis, 1993). For example, body-related guilt may motivate individuals to engage in alter behaviours that relate to the body such as eating and physical activity (Crocker et al., 2014; Sabiston et al., 2010). Due to its reparative nature, body-related guilt may also motivate maladaptive behaviours, such as restrictive eating (Burney & Irwin, 2000).

It is relevant to study body-related guilt and shame experiences specific to weight for two main reasons: (i) weight bias and stigma and (ii) attributions of self-blame. In anecdotal accounts of cancer survivors, women with breast cancer note that weight bias and stigma play an important role in their physical self-perceptions (Magee & Scalzo, 2006). For example, women report feeling pressure from family members and health care practitioners to maintain weight, and unsuccessful weight loss contributes to perceptions of failure. In a qualitative study exploring experiences of stigma and blame in lung cancer (Chapple et al., 2004), it was reported that individuals commonly reported feelings of guilt and shame in regard to the perceived causes of their cancer. Participants also felt consistently stigmatized in the social and healthcare context, and sensed that others attributed the cause to their cancer solely on smoking status, despite some participants never smoking. Although speculative, women treated for breast cancer may have similar experiences of negative emotions like shame and guilt, which they may self-attribute or perceive others attributing to their weight.

It has also been reported that women diagnosed with breast cancer commonly make attributions for the cause of their cancer, and often these attributions place blame on the self. For example, researchers (Janoff-Bulman & Ronnie, 1979) have identified two aspects of self-blame including behavioural self-blame (e.g., blame directed at specific behaviours of the self) and characterological self-blame (e.g., blame directed at global aspects of the self). Based on their conceptual definitions, behavioural and characterological self-blame are synonymous with experiences of guilt and shame, respectively. In fact, this evidence is supported by theoretical
underpinnings in the process model of self-conscious emotions (Tracy & Robins, 2004; 2006). In this model (Figure 2.3), negative appraisals of a self-relevant event that is incongruent with one’s ideal self will lead to negative self-conscious emotions of guilt and shame. Specifically, when an individual attributes the causes of an event to be due to stable, controllable, and global causes, shame will be elicited. For example, if women believe the cause of their cancer is related to weight, and they view weight as a stable and enduring trait that is out of their volitional control to manage, and representative of their failure as a human, they will experience shame, or characterological self-blame. Alternatively, if women attribute weight to be associated with specific state-like behaviours that are controllable, they will experience guilt, or behavioural self-blame. Due to the applicability of weight within a context of self-conscious emotions, researchers have begun examining weight-related guilt and shame among women treated for breast cancer (Castonguay et al., 2017).

In further support of the applicability of the process model in breast cancer (Tracy & Robins, 2004; 2007), past investigations have reported incidences of behavioural and characterological facets of self-blame after receiving a diagnosis of breast cancer (Bennett, Compas, Beckjord, & Glinder, 2005). In research with various types of cancers (Costanzo, Lutgendorf, Bradley, Rose, & Anderson, 2005; LoConte et al., 2008; Stewart et al., 2001), it is common for participants to attribute causes and maintenance factors of their cancer to different lifestyle factors (e.g., dietary habits, and stress). In a recent qualitative study, researchers (Wright, Harvie, & Howell, 2015) investigated women’s perceptions of weight on breast cancer risk and maintenance after participating in a weight loss intervention. Women consistently reported experiential descriptions of guilt and shame regarding their weight, and one participant recalled a conversation with a friend, where she said “have I done this to myself because I’m fat and […] am I depriving my children of a mother because I like my food and I’m overweight?” (Wright et al., 2015; pg 5). Given the socially ingrained belief that weight is controllable (Tiggemann & Rothblum, 1997), and tenets of the process model of self-conscious emotions (J Tracy & Robins, 2004, 2007) weight-related attributions in cancer may elicit perceptions of failure, and consequently guilt and shame.

A main reason to target experiences of guilt and shame during cancer is due to the impact that these emotions can have on mental health (Bennett et al., 2005; Else-Quest, LoConte, Schiller, &
Hyde, 2009; Friedman et al., 2007). In the only study to link self-consciousness regarding appearance to depression in breast cancer survivors, Moreira and Canaverro (2010) reported that women with higher body shame and overall self-consciousness during primary treatment were more likely to experience depression after secondary treatment. Further, Bennett and colleagues (2005) found that characterological self-blame (e.g., shame) was predictive of symptoms of depression at 4-months post-diagnosis, whereas behavioural self-blame (e.g., guilt) was not – findings are in line with the link between shame and depression, but not guilt and depression (Kim, Thibodeau, & Jorgensen, 2011). Drawing on White’s (2000) model of body image in oncology, it can be concluded that the emotional dimension of body image uniquely contributes to mental health, beyond other indices of body image. Interestingly, the authors also conclude that body image is likely not a primary source of concern in women during the diagnosis and initial treatment phase (where women are more likely to focus on completing treatment and survival), but becomes a significant source of distress post-treatment (Moreira & Canavarro, 2010). This finding underlies the need for additional research to both explore the role of body-related self-conscious emotions and focus on determining women’s body image concerns across the cancer trajectory. This information will consequently inform the best time to intervene and improve the psychological and physical health of women with breast cancer.

2.7 Body Image and Depression

Persistent post-treatment concerns around body image have been linked with the subsequent development of depression (Defrank, Christinabahnmehta, & Stein, 2007; Hartl et al., 2003; Petronis, Carver, & Antoni, 2003; Soothill et al., 2001). And throughout the cancer trajectory, women with body image concerns report higher depressive symptoms, compared to those who are not distressed about the body (Begovic-Juhant, Chmielewski, Iwuagwu, & Chapman, 2012; Fang, Chang, & Shu, 2014). Generally, the incidence of depressive symptoms is common after a diagnosis of breast cancer (Hartl et al., 2009; Hodgkinson et al., 2007). Specifically, at least 50% of women report depressive symptoms in the year following diagnosis, and 25% of women continue to report these concerns up to 2 years following diagnosis (Burgess et al., 2005), and as many as 26% of women may experience severe and debilitating depressive symptoms (Chen et al., 2009). Thereby, depression linked to breast cancer can considerably impact quality of life (Esch, Roukema, & Ernst, 2012) and further impact physical burden and cancer outcomes.
Body image concerns have been identified as one of the potential mechanisms to explain the incidence of depressive symptoms after breast cancer diagnosis (Moreira & Canavarro, 2010; Moreira, Crespo, & Paredes, 2011; Reich, Lesur, & Perdrizet-Chevallier, 2008). However, limited work has examined depression as a potential outcome of body image concern (Den Oudsten, Van Heck, Van der Steeg, Roukema, & De Vries, 2009; Himelein & Thatcher, 2006; Moreira & Canavarro, 2010; Moreira et al., 2011). In one study, Begovic-Juhant and colleagues (2012) reported that body image independently predicted 31% of the variance in depression when controlling for demographic and descriptive cancer variables. Providing support for a temporal link, Moreira and Canavarro (2010) conducted a longitudinal study and reported that body image during primary surgical treatment significantly predicted depression 6-months after completion of adjuvant treatment. In addition to the longitudinal design, this study was highly noteworthy in that it assessed previously untapped dimensions of body image, including affective dimensions of (a) self-consciousness and (b) self-evaluation salience and paved the way for further investigation of these affective constructs. It is imperative to further elucidate the temporal links between body image, weight and depression among breast cancer survivors, and promote emotional and psychological well-being that contributes to overall health.

Self-objectification theory (Fredrickson & Roberts, 1997) is a useful framework for understanding how body image concerns, negative self-conscious emotions and depression are linked (Figure 2.2). The theory posits that cultures and societies that sexualize women (e.g., portrayal of women in the media) can cause women to internalize these perspectives and lead to valuing the self solely on physical appearance and sexual value. Using self-objectification theory in a sample of women treated for breast cancer, researchers (Boquiren, Esplen, Wong, Toner, & Warner, 2013) theorized that women compare their physical appearance and altered social roles to their internalizations of women’s physical appearance and social role ideas, they are likely to experience body image disturbance (e.g., body-related shame) and consequent psychological distress (e.g., depression) that could significantly impact daily functioning. The authors found that women who internalized their gender roles reported feeling more vulnerable to their cancer and may feel high pressure to meet pre-cancer standards for appearance. Among women with breast cancer, self-monitoring may involve comparisons with both the ideal self and the pre-cancer self, thus adding a cumulative factor to consequent experiences of shame (Sinclair, 2005). Further, the authors speculated that when women feel loss of control, including the inability to
return to pre-cancer weight, experiences of shame will be rampant. Self-objectification theory is particularly relevant when contextualized to breast cancer, due to the nature of the treatment-related outcomes (e.g., loss of breast, changes in body shape and size) that are highly tied with femininity culturally. Perceived failure to meet these internalized feminine ideals can be detrimental to psychological well-being.

### 2.8 Theoretical Summary

This proposed study draws from frameworks of self-objectification (Fredrickson & Roberts, 1997; Figure 2.1), the heuristic cognitive behavioural model of body image in oncology (White, 2000; Figure 2.2) and the process model of self-conscious emotions (Tracy & Robins, 2004; Figure 2.3) to assess emotional consequences of weight changes in women treated for breast cancer. According to White’s model (2000), perceived or actual changes in appearance (e.g., weight gain) will function to predict changes in body-related emotions and cognitions. The negative and self-relevant attributions outlined in the process model of self-conscious emotions (Tracy & Robins, 2004; 2007) can be utilized to understand the mechanisms whereby weight changes may elicit shame and guilt responses. As per self-objectification theory, breast cancer changes are strongly linked with gendered internalizations of appearance, which will then negatively impact psychological health outcomes (e.g., depression) directly and indirectly through body-related emotions (e.g., guilt and shame). Potential factors that may affect the extent to which breast cancer treatment causes actual or perceived changes in appearance include a woman’s age, cancer stage at diagnosis, menopause status, time since diagnosis and types of treatment undergone. An integrated framework of the three theoretical frameworks (i.e., objectification theory; process model of self-conscious emotions; body image model in oncology) that represents the conceptual framework of this dissertation is depicted in Figure 2.4.
Figure 2.1. Self-objectification theory (Fredrickson & Roberts, 1997) framework as conceptualized by Moradi & Huang (2008). Figure has been adapted for use in this investigation, with shaded boxes representing constructs of focus in this program of research.

Figure 2.2. Heuristic cognitive behavioural model for body image in oncology (White, 2000). Figure has been adapted for use in this investigation, with shaded boxes representing constructs of focus in this program of research.
Figure 2.3. Adapted representation of the Process model of self-conscious emotions (Tracy & Robins, 2004), to include of constructs relevant to the current investigation, with shaded boxes representing constructs of interest.

Figure 2.4. Proposed associations of theoretical constructs linking weight characteristics to weight-related psychological distress.
2.9 Overview of Dissertation Studies

A comprehensive overview of the objectives and corresponding methodology for each study of this dissertation has been presented in Table 2.1. The first study is a qualitative interview study exploring women’s experiences and interpretations with weight, from adulthood to currently in late survivorship (Pila, Sabiston, Taylor, Arbour-Nicitopoulos). This investigation aimed to comprehensively consider women’s cancer-related experiences with weight, and served as the first exploration to inform the remaining research. Informed by findings from the first study which reveal the first year post-treatment is a unique time when women navigate cancer-related changes to their weight, the second study focuses on the first-year post-treatment using a prospective longitudinal design. The purpose of this study is examine the within- and between-person effects of weight change on emotional consequences of weight-related guilt, shame, and depressive symptoms (Pila, Sabiston, Castonguay, Arbour-Nicitopoulos, & Taylor). The third and final study was informed by findings from the first two investigations, and utilizes an intensive longitudinal daily diary design to examine acute emotional responses to self-weighing, while examining between-person effects of weight-cycling (Pila, Sabiston, Taylor, Arbour-Nicitopoulos, & Wharton). Taken together, this mixed-methods interrelated set of studies explores how women psychologically manage a range of weight changes related to breast cancer.

<table>
<thead>
<tr>
<th>Study</th>
<th>Title</th>
<th>Objectives</th>
<th>Design</th>
<th>Sample</th>
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<tr>
<td>Study 1</td>
<td>“The weight is even worse than the cancer”: Exploring weight preoccupation in women treated for breast cancer</td>
<td>Explore women’s experiences with weight across the cancer trajectory</td>
<td>Qualitative – Interviews</td>
<td>N = 11 women treated for breast cancer who express concern about their weight</td>
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<tr>
<td>Study 2</td>
<td>Body-related emotional consequences of weight cycling in the first-year post-treatment for breast cancer</td>
<td>Examine associations between weight changes and weight cycling on psychological health (i.e., weight-related guilt, shame and depressive symptoms).</td>
<td>Quantitative – Prospective longitudinal</td>
<td>N = 173 women treated for breast cancer</td>
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<tr>
<td>Study 3</td>
<td>Emotional consequences of self-weighing: A daily diary study in women with comorbid history of breast cancer and obesity</td>
<td>Examine acute and cumulative effects of daily self-weighing on body-related emotions</td>
<td>Quantitative – Intensive longitudinal daily diary</td>
<td>N = 52 women with a history of breast cancer, currently seeking treatment for weight management</td>
</tr>
</tbody>
</table>
2.10 Conclusion of Literature Review

This review of literature presents a comprehensive and detailed overview of the multifaceted and complex relationship between weight and breast cancer, and the psychological adversities that may impact women in survivorship. As breast cancer survival rates continue to improve, increasing attention ought to be paid to optimize women’s psychological health and well-being throughout the course of survivorship. The present investigation integrates theories of body image and emotion, and a range of methodologies, to explore and describe how weight changes in the context of breast cancer impact psychological health and well-being. Utilizing a concurrent mixed methods approach facilitated a variety of research questions aimed at understanding the between- and within-person associations between weight and psychological consequences, and provides an opportunity to triangulate the findings across various methodological perspectives. Collectively, the insights gained from this research program may be used to inform intervention strategies and clinical practice for the management of psychological concerns among women after breast cancer.
Chapter 3

3 “The weight is even worse than the cancer”: Exploring women’s psychosocial experiences with weight after treatment for breast cancer

3.1 Abstract

There is a complex association between obesity and breast cancer, whereby excess weight is linked with higher risk of breast cancer development, advanced diagnosis, and increased risk of cancer reoccurrence and mortality, and cancer-related changes in weight also contribute to worsened mental health. However, the psychosocial experiences of weight-concerned women treated for cancer are not well understood. As such, the purpose of this qualitative study was to explore women’s experiences with weight across the cancer trajectory. A purposeful sample of women selected based on criteria for high weight and body image concern (N=11; $M_{\text{age}} = 65.31 \pm 10.96$ years) participated in a semi-structured interview. Utilizing a phenomenological framework and thematic analysis methodology, five themes were identified: (i) weight-related concerns notably contributed to psychological distress, (ii) prevalent history of weight cycling and ongoing quest to manage weight; (iii) cancer experienced as a fleeting stressful event marginalized by ongoing social challenges; (iv) dominant perceptions of failure around goal-oriented weight management behaviours; and (v) internalized and explicit social pressures for weight loss in the context of risk reduction. Based on these findings, the pervasiveness of women’s weight concerns spans far beyond cancer diagnosis and treatment. In fact, women’s ubiquitous lifetime perceptions of being ‘high risk’ and concerted efforts to lose weight appeared to contribute to psychological distress. Combined with the fundamental challenges of weight management, improving weight-related psychological distress should be a clinical priority to improve the wellbeing of women in survivorship.
3.2 Introduction

Changes to appearance are well-documented side effects of treatment for breast cancer, and include deformation or loss of breast(s), lymphedema, alopecia, muscle loss, and weight gain (Collins et al., 2011; Irwin et al., 2005; Wood et al., 2001). Weight gain and changes to body composition have been reported as one of the most psychologically distressing side effects of breast cancer treatment (Figueiredo et al., 2004), with over 80% of women dissatisfied with their weight post-treatment (Hurd Clarke, 2000). Weight gain occurs in 50% to 96% of individuals diagnosed with breast cancer (Demark-Wahnefried et al., 1997) and is linked with higher risk of physical co-morbidities, mental health concerns, and breast cancer reoccurrence and cancer-related mortality (Demark-Wahnefried, Campbell, & Hayes, 2012). In fact, the relationship between weight and breast cancer is quite bi-directional and multifaceted, in that higher weight and adulthood weight fluctuation (Chan et al., 2014), increase both the risk of developing and upholding remission for breast cancer. In fact, given that around 70% of women diagnosed with breast cancer are classified as having overweight or obesity (Cui et al., 2002; Porter, Inglis, Wood, & Veugelers, 2006), it is important to understand the weight-related experiences of women across and beyond the cancer trajectory.

In the limited body of quantitative literature exploring the psychological experiences of women treated for breast cancer, researchers suggest that appearance and weight-specific concerns span many years following initial treatment-related alterations to appearance (Moreira & Canavarro, 2010), and are often heavily influenced by a pre-cancer weight history (Fazzino et al., 2017). In fact, in a recent qualitative study of healthy middle-aged women, Pila and colleagues (2017) highlight the stability of women’s weight-related disturbances across the lifespan, and the importance of considering a narrative account to understanding the cumulative effect of a history of adulthood weight concern. To date, the few qualitative accounts (Brunet et al., 2013; Halbert et al., 2008; Maley et al., 2013; Pedersen et al., 2016) of women’s body and weight-related experiences have focused exclusively on women’s experiences with treatment-related body and weight changes – precluding a comprehensive understanding of women’s global perceptions and cumulative weight histories, beyond breast cancer.
For example, Brunet and colleagues (2013) interviewed women on their body-related changes after treatment. It was revealed that a subset of women expressed marked concern over treatment-related changes in weight, citing concerns around the health consequences associated with excess weight gain. Another qualitative study focusing on the psychological experiences of weight changes in women treated for breast cancer was conducted using focus groups of African American women (Halbert et al., 2008). Regardless of the direction of weight change, women reported feeling psychological distress and concerns regarding their health. Similarly to Brunet et al (2013), some women expressed unique and severe degree of distress after gaining post-treatment weight (i.e., stating, “I’d rather die than look like this”). Most recently, Pederson and colleagues (2016) aimed to advance the literature by examining the body-related perceptions among a purposeful sample of women treated for breast cancer who reported a change in weight (gain or loss) post-treatment. The authors conclude that “bodily changes objectively measured in kilograms and centimeters provide incomplete knowledge of what may be at stake for women”, given that minor changes in weight, and perceptual changes carry important and significant meaning to a woman’s psychological well-being after treatment. Cumulatively, this work highlights that (i) a unique subset of women may be particularly vulnerable to experiencing the negative physical and psychological consequences associated with cancer-related weight changes, and (ii) weight-preoccupation and concern need to be considered, beyond objective changes in body weight.

3.2.1 The present study

The current study aimed to advance the current literature in several important ways. First, this study focuses on a purposeful sample of women who have expressed distress and preoccupation regarding their weight post-treatment, and report sustained levels of high distress regarding the body over the first-year post-treatment. Second, the study focuses on a sample of women approximately 5-years post-treatment, thus offering a highly unique perspective by reflecting on their weight-related experiences since finishing prior treatment, and reflect across the period of secondary treatment (i.e., preventative hormonal treatment). Third, the present study aims to explore women’s holistic and comprehensive experiences around weight, beyond and across the cancer trajectory. As such, the objective of the present study was to explore the interpretations
and experiences of weight-related changes among women who express concerns regarding their weight post-treatment, concerns across and beyond the breast cancer trajectory.

To best understand the depth and complexity of women’s experiences and interpretations of weight concerns, a constructivist epistemology was adopted. This approach allows for an understanding of women’s realities through their embodied experiences – whereby the body is viewed as both a physical and cultural entity that is actively tied to the mind and social environment that it occupies (Lende & Lachiondo, 2009). This framework lends to exploration to capture how women perceive, reflect and interpret their weight-related concerns within the context of their breast cancer experience.

3.3 Method

3.3.1 Participants

Participants were recruited from a prospective longitudinal cohort study of women treated for breast cancer (Life after Breast Cancer: Moving On). The original study targeted women over 18 years of age who had recently completed primary treatment for their first diagnosis of breast cancer, were able to communicate in French or English, and reported no contraindications to engaging in physical activity. Participants in the original study (N = 201) self-identified predominantly as White (85%), were aged 28 to 79 (M = 55, SD = 11) years, had received a diagnosis of early stage (1 or 2) breast cancer (75%), and completed primary treatment 3.98 months (SD = 3.07) prior to the initial wave of data collection. In the original study, participants were sampled at 5 time-points in the first-year post-treatment (i.e., every 3-months).

For the present study, women were purposefully recruited (Patton, 2002) if they (i) identified weight as a concern/stressor post-treatment from a list of other common cancer-related stressors, (ii) were classified into a high body-related anxiety trajectory group, that consists of data across five data-collection timepoints (average 3 to 15 months post-treatment; (Brunet, Amireault, Chaiton, & Sabiston, 2014)), (iii) were comfortable communicating in English, and (iv) consented to be contacted for future studies. Of the total sample in the cohort, 84 met inclusion criteria. Participants were recruited from the eligible list, and recruitment ceased once an adequate purposeful sample and informational redundancy was achieved in the interviews (n =
The final sample size was appropriate for a study utilizing a purposefully selected sample (Morse, 2000; Starks & Brown Trinidad, 2007). The final sample of participants ranged in age from 51 to 82 ($M = 66.3; SD = 10.2$) years old, self-identified predominantly as White, currently single, post-menopausal, and initially diagnosed with Stage I breast cancer. Full demographic information is presented in Table 1, and pseudonyms have been assigned to all participants for confidentiality.

### 3.3.2 Procedure

After university behavioural ethics board approval, eligible participants from the *Moving On* study were identified and contacted by the study research coordinator. Participants who expressed interest in the study were then contacted by the first author (EP) to discuss the study in detail, confirm eligibility, and schedule an interview time. All one-on-one interviews were conducted via telephone. EP was a doctoral candidate, who identified as a White woman in her mid-20s, and had formal experience in qualitative research and exploration of women’s weight-related concerns in the context of breast cancer. Each interview began with the establishment of verbal consent, and a brief demographic questionnaire. Interviews lasted between 90 to 120 minutes, and were audio recorded. After completion of the interview, participants were emailed or mailed a short follow-up narrative survey on weight-related emotions that was used to triangulate the interview data. Upon completion, participants were asked to return the narrative responses and then were provided with financial compensation.

### 3.3.3 Interview

A semi-structured interview script with open-ended exploratory questions was used as a flexible guide to direct the interview process. The list of questions and topics from the interview guide provided guidance to the interview structure, but the responses of the participants shaped the direction of the interviews. In accordance with phenomenological frameworks (Giorgi & Amedeo, 2009; Starks & Brown Trinidad, 2007), the interview was meant to elicit the participant’s story, and probing questions were asked to encourage elaboration of details, while staying firmly within the participant’s lived experience. Generally, women were asked to reflect on their perceptions and experiences with their weight from before diagnosis to currently during
survivorship, leading with general prompts (i.e., “How do you describe your experience with weight concerns throughout cancer?”), and probing for detail to obtain clarity and depth. The highly flexible nature of the interviews precluded researcher preconceptions and bias from influencing how women constructed the meaning of their weight-related experiences (Allen-Collinson, 2009). The interview guide and style was pilot tested with one participant (70 year old, White, first-time diagnosis of breast cancer) for clarity, length, depth, and overall comprehension. At the beginning of the interview, the primary goal was to establish rapport. This was carried out by asking non-threatening questions, positioning the researcher as an inquisitive observer to women’s descriptions and interpretations of their lived experiences. At the end of the interview, the participants were asked to discuss their feelings regarding the interview process. The main study interviews were audio-taped and transcribed verbatim by EP.

3.3.4 Analysis

Thematic methodology (Braun & Clarke, 2006) was used to analyze the data, while simultaneously drawing from the idiographic approach utilized in phenomenology. Thematic analysis was applied due to its theoretical flexibility, whereby phenomenology can be utilized as a guiding framework to highlight the heterogeneity in women’s experiences, while also highlighting similarities and differences across the sample. Interviews and narratives were analyzed using the prescribed approach by Braun and Clarke (2006), while also integrating idiographic profiles commonly used in phenomenological analyses (Smith, 2004). After transcription of all the data, the first step consisted of reading and re-reading the first transcript, and corroborating the transcript through the audio recording for a full immersion of the interview data, rhetorical context, and atmosphere. The first author (EP) made notes and reflections about the observations of the audio and transcribed interview, focusing on language, context, and preliminary interpretations closely tied to the participant narrative. At this stage, EP started to also consider personal reflexivity – specifically how her personal characteristics, social identities, and past experiences (i.e., young adult female without a breast cancer diagnosis) may have affected her rapport with the participant and interpretation of the findings.
Table 3.1. Participant demographics.

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Ethnicity</th>
<th>Highest Education</th>
<th>Menopausal Status</th>
<th>Stage at diagnosis</th>
<th>Adult weight status</th>
<th>Post-treatment weight fluctuations</th>
<th>Breast cancer treatment</th>
<th>Depressive symptoms</th>
<th>Weight Guilt/Shame</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linda</td>
<td>71</td>
<td>Black</td>
<td>High school</td>
<td>Post-menopausal</td>
<td>Stage I</td>
<td>Very unstable</td>
<td>Up to 9kg</td>
<td>Radiotherapy</td>
<td>13.8</td>
<td>Mod-high</td>
</tr>
<tr>
<td>Susan</td>
<td>71</td>
<td>White</td>
<td>University</td>
<td>Post-menopausal</td>
<td>Stage I</td>
<td>Very unstable</td>
<td>Up to 4kg</td>
<td>Lumpectomy, radiotherapy, hormone therapy</td>
<td>8.2</td>
<td>High</td>
</tr>
<tr>
<td>Emily</td>
<td>53</td>
<td>White</td>
<td>University</td>
<td>Pre-menopausal</td>
<td>Stage I</td>
<td>Fairly stable</td>
<td>Up to 3kg</td>
<td>Lumpectomy, radiotherapy, hormone therapy</td>
<td>11.8</td>
<td>Moderate</td>
</tr>
<tr>
<td>Elizabeth</td>
<td>71</td>
<td>White</td>
<td>High school</td>
<td>Post-menopausal</td>
<td>Stage I</td>
<td>Very unstable</td>
<td>Up to 5kg</td>
<td>Radiotherapy, hormone therapy</td>
<td>8.8</td>
<td>Moderate</td>
</tr>
<tr>
<td>Margaret</td>
<td>82</td>
<td>Asian</td>
<td>Graduate</td>
<td>Post-menopausal</td>
<td>Stage I</td>
<td>Very stable</td>
<td>Up to 2kg</td>
<td>Radiotherapy, lumpectomy</td>
<td>3.2</td>
<td>Mod-high</td>
</tr>
<tr>
<td>Heather</td>
<td>73</td>
<td>White</td>
<td>High school</td>
<td>Post-menopausal</td>
<td>Stage I</td>
<td>Fairly unstable</td>
<td>Up to 9kg</td>
<td>Lymphadenectomy, hormone therapy, radiotherapy</td>
<td>12.4</td>
<td>Moderate</td>
</tr>
<tr>
<td>Sara</td>
<td>77</td>
<td>White</td>
<td>High school</td>
<td>Post-menopausal</td>
<td>Stage II</td>
<td>Fairly stable</td>
<td>Up to 3kg</td>
<td>Lymphadenectomy, radiotherapy, hormone therapy</td>
<td>2.5</td>
<td>Low</td>
</tr>
<tr>
<td>Sophie</td>
<td>60</td>
<td>White</td>
<td>High school</td>
<td>Post-menopausal</td>
<td>Stage II</td>
<td>Fairly unstable</td>
<td>Up to 2kg</td>
<td>Lymphadenectomy, lumpectomy, single mastectomy, chemotherapy</td>
<td>10.6</td>
<td>Moderate</td>
</tr>
<tr>
<td>Vanessa</td>
<td>56</td>
<td>White</td>
<td>College</td>
<td>Menopausal</td>
<td>Stage I</td>
<td>Fairly unstable</td>
<td>Up to 2kg</td>
<td>Lymphadenectomy, radiotherapy, hormone therapy</td>
<td>9.2</td>
<td>Mod-high</td>
</tr>
<tr>
<td>Nicole</td>
<td>64</td>
<td>White</td>
<td>High school</td>
<td>Post-menopausal</td>
<td>Stage II</td>
<td>Fairly stable</td>
<td>Up to 6kg</td>
<td>Lymphadenectomy, double mastectomy, chemotherapy, radiotherapy, hormone therapy</td>
<td>5.8</td>
<td>Moderate</td>
</tr>
<tr>
<td>Lynn</td>
<td>51</td>
<td>Asian</td>
<td>College</td>
<td>Pre-menopausal</td>
<td>Stage I</td>
<td>Fairly stable</td>
<td>Up to 2kg</td>
<td>Lymphadenectomy, lumpectomy, radiotherapy, hormone therapy</td>
<td>8.8</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

Note. Adult weight status refers to self-reported perception of adult weight before breast cancer diagnosis (i.e., very stable (little to no weight change per year), fairly stable (weight changed by less than 2kg per year), fairly unstable (weight changed by 2-5kg per year), very unstable (weight changed by more than 5kg per year). Post-treatment weight fluctuation refers to change in clinician-measured weight observed in the first 15-months post-treatment, assessed by 3-month intervals. Depressive symptom cut-off scores ≥10 represent marked symptoms of depression. Weight guilt/shame refers to self-reported averages of weight-related guilt and shame measures over the first year post-treatment (range of scores 1-5; mean scores of 1-2 = low, 2-3 = moderate, 3-4 = moderate-high, 4-5 = high.)
In a second step, EP worked with the original transcripts and notes created in the first step to formulate a concise set of codes or phrases that reflected psychological conceptualization but was still grounded in the participant’s account. In the third step, a comprehensive list of themes was compiled for the first transcript, to subsume the codes and phrases that were identified in the previous step. At this stage, an idiographic account was created to display collated codes relevant to each theme, and excerpts from the transcript were added to substantiate and contextualize each preliminary theme with the participant’s account. The fourth step involved review and refinement of the preliminary list of themes within the idiographic account. Specifically, codes within themes were reviewed for homogeneity, while themes were reviewed across the profile to assess for heterogeneity (Patton, 1990), utilizing excerpts to guide decision-making and ensure themes represent the participants’ narrative. This series of steps was then repeated for each remaining woman’s account. As each additional transcript was read, the table of themes was used to code similar meaning into the same categories and expand themes to incorporate new ideas as they were identified. Overall, the process was cyclical and iterative, as new themes are tested against earlier data and modified as necessary to ensure each woman’s comprehensive and unique account is highlighted. Upon completed analysis of each transcript, the final step consisted of EP re-reading each interview to ensure that data were appropriately coded, categorized, and represented within the final set of themes, and refined the theme names to best capture the essence of the data across the sample. In an assessment of rigor, all co-authors acted as “critical friends”, to closely inspect the process of data analysis and challenge current direction and interpretations with alternative viewpoints (Smith & McGannon, 2017).

3.4 Results

Women described a range of weight-related perceptions and concerns across the breast cancer trajectory. Five themes were identified that illustrate women’s concerns around weight in the context of a past breast cancer diagnosis: (i) weight-related concerns notably contributed to psychological distress, (ii) prevalent history of weight cycling and ongoing quest to manage weight, (iii) shifting psychological impact of cancer versus weight, (iv) dominant perceptions of failure around goal-oriented weight management behaviours, (v) internalized and explicit social pressures for weight loss in the context of risk reduction. These themes are presented in detail with accompanying quotations to reflect the patterns of similarity, and unique distinctions across
3.4.1 “It’s about one of the few things that get me down”: Weight-related concerns notably contributed to psychological distress

Most women described marked weight-related distress that is consistent and pervasive, contextualized to breast cancer and experienced more broadly. The normative nature of distress around weight is highlighted by Susan, who described a lifetime of very unstable and fluctuating weight: “weight is just always in the back of my head, it’s always there and I’m just used to that level of concern over weight all the time”. Similarly, Linda, a 71-year old with unstable adult weight described the change in body shape and redistribution of her weight after breast cancer treatment as particularly distressing. Linda also scored marked symptoms of post-treatment depression, with which she describes her stress surrounding weight being a contributor within the context of other life stressors: “[my weight] is really bothersome. I am angry, and it doesn't help. I hate to put anything that would show my stomach, my belly protruding. It’s something that bothers me very much […] The overweight is a straight reminder every day when I look at myself, that I know I need to do something”.

In addition to the chronic and normative nature of weight-related distress reported by the women, descriptions of acute effects of weight, and the contingent nature of the weight-mood relationship was consistently described. Vanessa, a 56-year old menopausal woman reports: It does impact my mood especially when getting dressed in the morning or when I’m shopping […] it’s about one of the few things that get me down […] the weight is the biggest issue negatively impacting my mood.” Oftentimes, acute experiences of weight-related distress occur when women reported being exposed to their weight or when there is a chance that others may evaluate their weight. For example, Susan described, “I look at [the scale], I’m totally devastated and then my self-esteem goes down and when I lose the weight I’m high as a kite and feel really good”. In another instance, Susan recalled her experience with gaining weight while on vacation, “once I finally got my nerve up to get on the scale, I realized that I had gained nearly 10 pounds. I was devastated and felt worthless”. Descriptions of weight-related guilt, shame, and embarrassment were prominent in regards to the body’s appearance, and with regards to perceptions of control around changing the body, or managing weight. For example, Vanessa described how her weight-related distress was exacerbated by her perceived failure to control her weight: “I think of
myself as an empowered and intelligent woman and I don’t understand why I can’t get that under control and I am embarrassed and ashamed of the fact that I can’t get a better handle on that”.

Most women also recalled meticulous and deeply-entrenched accounts of acute experiences when their weight was distressing and shameful. Margaret, an 82-year old post-menopausal woman who reported very stable adult weight, described a time when her friend invited her for a boat ride “I had a hard time to get onto it because of my fat body and clumsy gait. I felt extremely ashamed at that episode. They had to pull me and some others had to push me. It was such an ugly sight. Being fat certainly damaged my self-esteem. I was actually depressed.”

3.4.2 “It’s been a concern all my life”: Prevalent history of weight cycling and ongoing quest to manage weight

Overall, women described their pursuit of weight loss as a lifelong struggle that predated the diagnosis of breast cancer. For example, Elizabeth, a 71-year old woman described, “I’ve always had a weight problem, my family’s always had a weight problem. I always walked a lot and I always did a lot of exercise but I still have a weight problem”. Similarly echoed by Linda, a 71-year old woman who experienced very unstable adult and post-treatment weight recalled: “I cannot remember any specific time when my problem of losing weight [began]… it has always been a problem for me […]. I keep putting on weight yet I don’t do anything to stop it.”

In contrast, other women (e.g., Margaret and Susan), identified a very specific time, often predating treatment for breast cancer, when weight gain initially begun. Margaret described, “because I had my asthma I took Prednisone for quite a few years and that’s how I gained that weight and also because I’m not mobile that much and I like to eat”. Meanwhile, Susan described the start of her weight concerns beginning “55 years ago” after her second pregnancy, and a mix of highly stressful life events that continued to perpetuate cycles in weight. Specifically, she described stress-induced eating as contributing to her weight cycling: “there are so many other things interfering in terms of what is going on in your social life, or your family life and whatever else, there are lots of other stressors interfering in the whole mix”. Other women described similar instances of externally-induced weight gain (i.e., pharmacologically-induced, or pregnancy-induced) that marked the beginning of their weight gain and stressful life occurrence that then led to a perpetual cycle of weight loss and re-gains.
Women described the ensuing cycling of weight that originated from an intentional attempt to lose weight. For example, Susan recalled a lifetime of very unstable and fluctuating weight, and the inextricable tie between weight and emotions in each cycle of weight loss-regain:

I was obese pretty well all the time, and I still am considered obese […], so it’s been a concern all my life. When I lost the weight I was just exalted, I was just on cloud nine. Then I felt so defeated when I would start to eat again, and it would usually be slow coming back on […] and sometimes higher than you were before so you were just absolutely devastated”.

And yet despite navigating a lifetime of cycling weight, Elizabeth held hope that she will eventually achieve her weight goal: “I think that one day I’ll be able to get down…lose the weight that I want to lose.” Collectively, women reported enduring and pervasive concerns around weight that were established far prior to their diagnosis and treatment of breast cancer. These findings underscore the nature of breast cancer as an acutely stressful life event that may contribute to a pre-established cycle of weight cycling, and may further motivate one’s unwavering commitment to the quest for weight loss.

3.4.3 “The weight is even worse than the cancer”: Shifting psychological impact of cancer vs weight

In describing their cancer experiences, women often noted their focus shifting between primary concerns about the diagnosis, to concern regarding weight. The majority of women described their diagnosis of breast cancer as an acutely stressful, but fleeting event that was marginalized by ongoing social challenges, such as poverty, loneliness, other health complications, family stress, and caregiver burden.

Three women (i.e., Emily, Sophie, Susan) recall cancer as a very challenging emotional experience, and weight as a secondary stressor to breast cancer. For example, Sophie, aged 60, described the difficulties of dealing with reoccurrence of cancer in her breast and thyroid. She recalled feelings of anger and frustration at being diagnosed three times, and illustrated cancer as a “spider and it just spreads its legs”. As a result of these traumatic experiences with cancer, her weight-related concern and distress were no longer a predominant concern: “I guess you get a point in your life, when you go through a lot, to me that was the least thing on my mind. I am
who I am, what can I do about it? I am not going to go have surgery because I am big”.

Similarly, Susan explained that her lifetime struggle with weight was secondary to diagnosis:

You don’t have time to think about [weight] when you are worrying about living; you are worrying about the cancer killing you anyways. Initially I was not even thinking about the weight as much, I just had to cope with getting through surgery, radiation and trying to be on these pills. It’s probably been more of a concern 2 to 3 years down the road.

Meanwhile, the remaining women described their concerns regarding weight as surpassing their acutely stressful experience with breast cancer. For example, Linda explained that her weight was steadily increasing prior to her cancer and noted: “The breast cancer, I don't think it affected my weight. Actually, the breast cancer I went through it very positive. I haven't linked my weight around the waist and belly with the cancer”. She went on to say that breast cancer is more manageable than excess weight: “If the cancer comes back, in my mind I always say ’we’ll deal with that’. There’s a cure now a days. […] But it’s the weight and the change in the body… that does bother me”. Similarly, Lynn described that cancer acted as a catalyst to fuel her weight concerns which were manageable prior to diagnosis, but now are at the forefront due to fear of accumulating health problems:

Now, I am more conscious of [my weight], very more conscious of it, it’s not something in the background now it’s something I have to deal with every day… Like if I gain a bit of weight it’s something I have to work on right away, I can’t go and do something else because this is what I have to take care of.

Meanwhile, Vanessa presented an eloquent and poignant account of her difficulties navigating her weight after breast cancer:

I blame a lot of the outcome of my weight to my diagnosis of cancer. It has contributed to the negativity surrounding the diagnosis, because now that I am not battling cancer on a daily basis, I am battling some of the consequences […], it is almost like a constant reminder because of what I am seeing every morning when I get dressed. […] It’s almost like the by-product of the original diagnosis, I was able to kick the cancer but now I am having this weight issue. I am a very resilient
person and it takes a lot to really bum me out and I have to say the weight is even worse than the cancer sometimes.

Vanessa described struggling to accept her weight-related stress in the context of overcoming cancer, in that distress around weight felt like an issue of vanity when she was battling through waves of treatment. Considering both appearance- and health-related reasons, Vanessa described her weight as the primary reason for ceasing hormonal treatment:

I was just taken off of [Femara] last week because […] I had significant weight gain in 2.5 years that I was on that, so [my physician] felt the benefits were outweighing the risks, he said ‘I won’t lose you from cancer I will lose you from cardiovascular disease’, so it was a joint decision so I was taken off that therapy last week.

Overall, women described complex and widely ranging experiences of their breast cancer and weight concerns. Women’s accounts ranged from finding cancer to be a highly traumatic experience that surpassed any other concerns, to experiencing cancer as a fleeting event marginalized by other life stressors, to even experiencing weight as a protective factor against future reoccurrence. Across all accounts, there was an inextricable and multifaceted link between weight and breast cancer, which shifted in importance depending on the context of women’s lives.

3.4.4 “I don’t understand why I can’t get [my weight] under control”: Dominant perceptions of failure around goal-oriented weight management behaviours

In women’s narratives describing weight-related concerns, there was consistent discussion around goal-oriented behaviours (i.e., diet, exercise) as main methods of managing weight. Most women ascribed to the notion that weight can only be managed by dualistic rituals of ‘eat less, move more’, consisting of dietary restriction and efforts at intense and vigorous regimented exercise. Yet, despite describing these behaviours as within their control, most women expressed frustration that their weight was often fluctuating and/or remaining consistent despite diligent efforts to manage their diet and sometimes, exercise. For example, Sophie recalled: “It’s when I
saw when I was going to 198 lbs, then 204 lbs. I was like “what? how can it be? I didn't do anything different!” […] So why the weight gain was there, I never knew. I never had a clue why it was there.” Lynn, similarly described a high degree of diligence, and even preoccupation with her diet and weight management, “I am very observant about what I eat, even alcohol, like my birthday someone brought me a drink and I didn’t touch it […]. But I feel uncomfortable you have to spend so much energy [dieting]. If I gain [weight], I gain 1-2lbs. But even that is not good.” Lynn described that this preoccupation is in itself distressing, and particularly because of this diligence, the weight gain does not make sense.

Related but distinct to this perception of failure around weight, other women (i.e., Linda, Susan, Vanessa, Margaret) described a perceived lack of control and feelings of failure with regards to initiating and sustaining health behaviour change or weight management (i.e., “I don't do anything and I expect a miracle”, Linda). Women described these experiences as self-relevant failures that reflected an inadequate self, exemplified by Vanessa: “I think of myself as an empowered and intelligent woman and I don’t understand why I can’t get that under control […], that is what is frustrating and shameful. […] I have overcome almost everything well and yet I can’t handle [my weight]”. Notions of weight-related shame, blame, and embarrassment were commonly described, as exemplified by Susan: “it was this constant conflict in my brain saying you know better, you know that you should be exercising more and eating the proper foods. […] The guilt over the knowing better, and just depression I guess, like how can I not see this? The writing is on the wall”. Susan goes on to illustrate how the weight-related negative emotions and distress had a cyclical pattern:

I have a hard time understanding why I can’t get it into my head to do something more significant about [my weight] in order to alleviate that worry. So that is what I struggle with. […] It has been extremely stressful dealing with my weight while knowing that the stress it causes also contributes to its reoccurrence….a vicious circle.

Overall, this theme is exemplified by women’s assignment of personal responsibility around weight gain, and the perception that weight management is dependent on self-regulation. Despite recognizing that weight gain was often due to cancer- and ageing-related reasons, notions of personal responsibility for weight management were abundant, and attributed to lack of willpower, and precipitating negative emotions, self-criticism, and perceptions of failure.
3.4.5 “You should be okay as long as you don’t get fat”: Internalized and explicit social pressures for weight loss in context of risk reduction

All women described internalization of societal ideals for attaining thinness for appearance and health-related reasons, and the overwhelming undesirability of higher weight. For example, Elizabeth described: “nobody puts pressure on me. I’ve always wanted to [lose weight]” and further illustrated how these internal pressures around weight loss can be overwhelming. Overall, women’s internalized desires for weight loss were interpreted as internal and self-relevant pressures, and were both rooted in appearance and health-related reasons, particularly in the context of reducing risk for breast cancer reoccurrence and obesity-related health comorbidities. For example, Lynn recalled:

I read a lot so I knew they always said be careful of your weight because fat contributes to estrogen and causes breast cancer. So then I was more careful […]. I wanted to make sure that at least on my part I have done what I had to do, what if it comes back you know, but I can’t say ok I should have done this I should have done that.

Further, women explained dual and conflicted instances of weight stigma and bias from healthcare practitioners, in addition to desires for more support from medical practitioners to recommend weight loss. For example, Sophie described how her general practitioner and cardiologist warned her against exercise due to a heart condition, yet the physician she encountered for lymphedema provided generalized advice to lose weight to improve the effects on her arm. Sophie described her frustration in this experience: “in a way it’s kind of rude. [the doctor] knows that I try to keep my mind healthy, try to do things, that’s the best I can do. And I go to work, and I live in a townhouse, so I do up and down, up and down. What more sometimes do they want from a patient?”. She further described her experience around weight with the medical system as “It’s like you're going into a fat animal hostel and then you're out the exit door”. Lynn echoed similarly frustrating experiences with her radiologist during a cancer care visit, “I asked her last November, ‘is there risk of me relapsing as I grow older?’ and she said you should be ok as long as you don’t get fat, that’s what she told me”.

Overall, most women described the experience at the doctor’s office as being stressful around the issue of weight. For example, Vanessa described:

To go see [my GP] is bothering me because I am afraid to get on that scale, and is she going to give me heck for putting on weight?! […] I would think ‘oh I have to go soon
and I have gained 10lbs since I last saw her and she is not going to be happy’. I don’t want it to get to the point that it’s another diagnosis that is going to make me do something and I don’t want it go get to that point before I start to manage it, so I am hoping something will wake up”

Similarly, Lynn described: “My family doctor knows my situation with breast cancer so he weighed me and when I am on the weight scale with him I am a bit nervous because I know the risk. I would get disappointed in myself if I didn’t lose weight, like I want him to know that I am doing my best and I am trying”. She also went on to say that: “if I have gained a bit of weight, I thought let me lose a bit before I go see him before I feel comfortable to see him”. In fact, other women also described self-presentational desires relating to weight, in that visits to the doctor’s office were often considered temporal targets to achieve weight loss goals. For example, Susan noted: “I am always scared and embarrassed to get on the scale at the doctor’s office... I even take a laxative a couple of days before my appointment to decrease my weight. I also weigh the clothes I am wearing to the doctors and choose the lightest ones. I also wear a body shaper to hide my rolls”.

Overall, women described a strong and pervasive internalized pressure to maintain their weight, in both the context of reducing risk for cancer reoccurrence and dually linked to issues of appearance and fitting societal ideals of how the body and weight should be. Notably, while women did not describe external pressures from family and friends, there was a reoccurring pattern of health care practitioners as key perpetrators of weight stigma and bias, as evidenced by women’s motivations to stave off medical check-ups until they felt their weight was more acceptable to be seen by a health care provider.

3.5 Discussion

The present investigation focused on exploring the weight-related experiences of a subset of women with post-treatment weight-preoccupations. This novel study considered women’s weight-related experiences across and beyond the cancer trajectory, given evidence that weight-related concerns are chronic and longstanding among older women (Pila, Solomon-Krakus, Egelton, & Sabiston, 2017). Described herein were unique yet collective experiences of pervasive and prevalent history of weight-preoccupation, on-going quests and perceived failures to manage weight, the acute nature of breast cancer relative to chronic weight-related distress,
and the overall distressing nature of longstanding weight-preoccupations. These findings extend the current literature by purposefully sampling a subset of women treated for breast cancer who express weight preoccupation post-treatment, and report sustained levels of weight-related distress in the first year post-treatment. The focus on this high-risk sample of women functions to understand weight-related perceptions as they are currently being experienced and interpreted, and to understand the impact of past weight-related perceptions and experiences at this later stage of the cancer survivorship trajectory.

In support of previous research, women expressed marked concerns around their weight, and changing body composition subsequent to cancer treatment (Brunet et al., 2013; Halbert et al., 2008; Maley et al., 2013). Further, women expressed these concerns over 5 years past primary treatment, thereby resounding both quantitative (Przezdziecki et al., 2013), and qualitative findings (Brunet et al., 2013) that identified that body-related concerns are maintained well past the immediate post-treatment period, and even several decades post-treatment. Notably, women described and interpreted varied experiences with weight in the context of breast cancer. For most women, cancer was experienced as an acute and fleeting event that was marginalized by other social and health challenges, whereas weight concerns were chronic and stable in nature. In a sense, cancer was an ailment that could be medically treated, whereas the psychological preoccupation with weight was more difficult to manage. This finding highlights the nature of (excess) weight as a chronic condition that needs to be managed in light of other co-occurring illnesses.

Further, the present study extended current conceptualizations of weight concerns exclusively as treatment-induced, and highlights the considerable impact of pre-cancer weight concerns, and the stable nature of weight preoccupations that persist over the course of the cancer trajectory. Specifically, women identified how a previous history of weight cycling was intricately linked with present weight concerns, and how the history and current state of weight concern was exacerbated by breast cancer. Other researchers (Maley et al., 2013) have briefly discussed a similar finding, whereby women’s meanings of weight differed not only by their cancer treatment, but also by their life course prior to diagnosis. Extending the current limited body of qualitative evidence that explores women’s perceptions of weight, exclusively for women that report treatment-related changes in weight (Pedersen et al., 2016) or beliefs about weight after a weight loss intervention (Wright et al., 2015), the present study aims to underscore the
experiences of women who report weight preoccupation, regardless of any actual or perceived changes in weight. Focusing on this potentially vulnerable subset of women is valuable given the risk of mental health sequela associated with weight preoccupation.

A key finding in this study highlighted the cyclical nature that women describe throughout their lives, and particularly exacerbated by cancer – the cycle consists of weight gain or failure of weight loss leading to subsequent distress, and further thwarting efforts for weight management. The chronic and repeated nature of failures in weight management are further perpetuated by the women’s perceptions of the “high risk” nature of weight, and negative social experiences around weight. Collectively, these experiences around weight are inherently distressing and difficult to manage. Similar to past research (Brunet et al., 2013; Maley et al., 2013; Pedersen et al., 2016), women describe lack of control around weight gain, despite maintaining or even increasing health behaviours, such as physical activity. It is likely that women’s perceptions of lack of control are impacted by the common societal belief that weight is entirely controllable by diet and exercise, and a matter of personal responsibility (Pearl & Lebowitz, 2014). As such, the investment in the effectiveness of these health rituals, women reported feeling distress when these societally endorsed prescriptions for weight maintenance were not successful. Similar findings have been reported in past research, where women describe their bodies as “disobedient” (Pederson et al., 2016, pg. 23). Overall, this finding was underscored by women’s assignment of personal responsibility around weight gain, and the perception that weight gain is predominantly an issue of self-regulation. Women were often suffering from the undue burden of weight management, despite the multitude of factors that contribute to weight gain (i.e., complex biological, psychological, social, and environmental factors; Brownell et al., 2010; Swinburn & Egger, 2004). These findings are firmly founded in sociocultural models of “healthy weight” discourse (Rodgers, 2016), which state that the internalization of anti-fat attitudes and beliefs about the controllability of weight, lead to weight preoccupation and disordered eating and exercise behaviours. The model also proposes a role of current and past history of weight, whereby weight cycling as a result of adopting these rigid cognitions contributes to psychological distress.

Another key and common narrative was identified around social pressures for weight management, which were both internalized and experienced explicitly. The internalization of weight bias refers to the internalization of negative attitudes and beliefs towards obesity, and is
associated with psychological distress, maladaptive eating patterns, and poorer outcomes in weight management (Carels et al., 2010; Puhl, Moss-Racusin, & Schwartz, 2007). In fact, recent models have suggested that weight bias and stigma form a positive feedback loop wherein weight stigma precipitates weight gain and difficulty in weight loss via several biological and psychological mechanisms (e.g., dysregulated eating, emotions, and increased cortisol; (Tomiyama, 2014)). Notably, in the present study, experienced of weight stigma were especially exemplified in women’s accounts of appearance management during exposure to health care practitioners, whereby some women preferred to delay medical appointments until their weight was more acceptable. This finding illustrates how the chronic and repeated weight bias and stigmatization experienced in health care is associated with health care avoidance (Drury, Aramburu, & Louis, 2002). Providing that these negative experiences can impact women’s access to cancer care, it is important to examine how both explicit and internalized weight bias and stigma may impact preventative and regular screening care for women throughout cancer survivorship.

Converging findings from women’s narratives also highlight how chronic and acute changes in weight impact overall mood, and affective states. This finding is corroborated by quantitative evidence whereby changes in weight may precipitate negative mood and depressive symptoms, a trend that is particularly heightened among women with breast cancer (Fann et al., 2008). In fact, the weight-related changes in mood that are reported by this set of women may contribute to the observed incidence of depressive symptoms in the post-treatment period for breast cancer (Burgess et al., 2005). The affective experiences related to weight are likely tied to women’s negotiations between weight gain as an issue of vanity versus weight gain as a risk factor for survival, as similarly reported by Pederson and colleagues (2016). Overall, special attention needs to be paid to women with chronic weight preoccupation, and the role of breast cancer which may exacerbate risks for mental health challenges.

3.5.1 Limitations

In light of the present findings, several important limitations need to be considered. For example, the sample was purposefully selected from a longitudinal cohort of women treated for breast cancer. While this sampling strategy allows for a highly selective sample of women with chronic weight preoccupation, it represents a subset of self-selected women who have a long history of
commitment to participation in a cohort study, and may not be representative of community samples of women treated for breast cancer. Further, the analysis utilized in the study involved categorization of women’s experiences into discrete themes, and may not represent the full richness and complexity of women’s lived experiences. In addition, the findings are limited to the interpretations of the primary author’s personal experiences as a younger woman without breast cancer, or obesity, and thus may preclude interpretations made by other interviewers. And finally, given the aim to select a purposeful and homogenous sample (Giorgi & Giorgi, 2008), the current study focused on women during the same discrete time in survivorship (i.e., treated for breast cancer between 5 to 6 years prior to the interview). While this strategy is effective in capturing women’s reflections and interpretations of their histories with weight preoccupation in the context of breast cancer, it may not capture perspectives of women earlier or later in survivorship.

3.5.2 Conclusion

Overall, the present study builds upon the limited body of knowledge on women’s experiences with weight after treatment for breast cancer, and advances the literature by presenting the unique accounts of women with a history of post-treatment weight-preoccupation. Understanding the experiences of this subset of women is important identifying and targeting patients during cancer care, which may be particularly at-risk of psychological consequences associated with weight-preoccupation. Further, the present findings lend support to emerging weight stigma and cycling frameworks (Tomiyama, 2014), and suggest applicability of these models to obesity-related cancers. As the first study to identify the existence and importance of weight stigma in oncology samples, the present investigation highlights the need for rigorous longitudinal research to examine the psychological effects of weight stigma and weight preoccupation in the context of breast cancer. In fact, considering the fundamental challenges of weight management (Bacon & Aphramor, 2011), improving weight-related psychological effects should be a clinical priority to improve the wellbeing of women in survivorship.
Chapter 4: Bridging Text

The main findings from Chapter 3 can be summarized as:

1. The experiences of women who are weight concerned after treatment for breast cancer are complex, heterogeneous, and unique to their social context.
2. Weight-related concerns are pervasive throughout the lifespan and are exacerbated after a diagnosis of breast cancer due to perceptions of being at ‘higher risk’ of health complications. Although changes in weight during and after breast cancer treatment may be particularly distressing due to the disease-related connotations of excess weight, post-cancer weight concerns need to be contextualized to a woman’s comprehensive lifetime experiences with weight.
3. Efforts and pressures to manage weight are psychologically distressing due to the repeated failures of weight management. As such, these findings may contribute to the growing movement that is challenging current weight-focused paradigm (Tylka et al., 2014), and encouraging enhancing health behaviours, without a focus on weight loss.
4. Acute and chronic gains in weight contribute to mood disturbances, and negative emotions about the body and the self. Future research is needed to examine the extent to which objective and perceived changes in weight contribute to emotional states, and the impact of this weight-related psychological distress on overall health and well-being.

Drawing on these findings, and the well-documented challenges of weight management (Mann et al., 2007), it is important to quantify how women’s weight impacts their psychological health and well-being. Based on evidence that a woman’s history of pre-cancer weight cycling was highly salient in shaping weight concerns after treatment for cancer, it is necessary to consider how a history of weight change may impact women’s psychological experiences after treatment for breast cancer. In particular, given women’s descriptions of self-relevant failure around weight management, it will be valuable to assess psychological consequences associated with perceived failures and devaluations of social status (i.e., weight-related guilt, shame, and depressive symptoms). In Chapter 5, a longitudinal assessment of changes in weight and weight-related guilt, shame, and depressive symptoms, is tested in a sample of women in the first year after treatment for breast cancer.
Chapter 4

4  Emotional consequences of weight cycling in the first year post-treatment for breast cancer

4.1  Abstract

Weight cycling is linked with advanced breast cancer diagnosis, increased risk of cancer reoccurrence, and cancer-related mortality. While women treated for breast cancer report challenges with navigating their post-treatment body shape and weight, the effects of weight cycling on body image and mental health have not been elucidated. This study examined associations between weight changes and weight cycling on psychological health (i.e., weight-related guilt, shame and depressive symptoms) among women in the first year post-treatment. Self-reported assessments of pre-cancer weight cycling, post-treatment weight-related guilt, shame, and depressive symptoms, and objective assessments of weight were assessed in a longitudinal sample of 173 women treated for breast cancer ($M_{age}=55.01\pm10.96$ years). Based on findings from multilevel models, women experienced the most weight-related shame when their weight was heavier than their personal average. Additionally, heavier weight was associated with worse psychological health, particularly for women with a history of stable (vs cycling) weight pre-cancer. Weight cycling pre-cancer and post-treatment weight change have important implications for psychological well-being. Due to the psychological consequences associated with a history of weight cycling, targeted strategies are needed to improve overall health outcomes for women’s survivorship after breast cancer.
4.2 Introduction

Excess weight has been identified as a robust risk factor for the development of breast cancer in adulthood (Reeves et al., 2007). Breast cancer treatment is also concurrently associated with additional weight gain due to several physiological (i.e., reduced lean body mass and resting energy expenditure) and behavioural (i.e., impact on diet and physical activity) mechanisms (Vance et al., 2011). And for most women, weight tends to increase post-diagnosis and seldom returns to pre-cancer levels (Chlebowski et al., 2002). These links between obesity and breast cancer are highly problematic, given that gains in weight pose a risk for cancer reoccurrence and cancer-related mortality (Chan et al., 2014). Further, a history of weight cycling may independently contribute to the development and maintenance of breast cancer – beyond the threat posed by high weight status alone (Eng et al., 2005; Komaroff & Marina, 2016).

Currently, there are no universally recognized standards to define weight cycling, but researchers agree that the phenomenon refers to long-term instability of weight or repeated cycles of weight loss and regain in adulthood (Mehta, Smith, Muhammad, & Casazza, 2014). And while there is mixed evidence for the effects of this pattern of weight change on general (Mehta et al., 2014; Stevens et al., 2012) and breast cancer specific morbidity and mortality (Welti et al., 2017), a history of weight cycling has been shown to contribute to negative psychological consequences (Foster, Sarwer, & Wadden, 1997), especially after breast cancer diagnosis (Fazzino et al., 2017). To our knowledge, Fazzino and colleagues are the only researchers to examine the psychological consequences of a related phenomenon (i.e., weight fluctuation; highest adulthood weight minus lowest adulthood weight) in women treated for breast cancer (Fazzino et al., 2017). Based on their findings that magnitude of weight fluctuation in adulthood was associated with worse psychosocial symptoms, and well-documented evidence that psychological comorbidities contribute to worsened cancer outcomes (Guthrie et al., 2004), it is important to examine psychological effects related to a history of repeated weight cycling post-treatment for breast cancer.

Of the primary psychological distresses experienced post-treatment, women report considerable challenges with body shape and weight (Falk Dahl et al., 2010; Moreira & Canavarro, 2010). Theorists (White, 2000a) have advocated for examination of the multidimensional facets of body- and weight-related changes during cancer, yet the vast majority of current research has
examined generalized perceptions around the body and weight, as broad indicators of quality of life (Parker et al., 2007). As such, the current literature limits a comprehensive understanding of the multiple dimensions that inform changes in body image and weight. For example, emerging evidence (Brunet et al., 2013) suggests that negative body- and weight-related emotions are important and overlooked indicators of psychological health. Specifically, shame and guilt have been identified as important body-related emotions in individuals struggling with weight (Conradt et al., 2007), and may be particularly relevant in the experience of breast cancer.

Weight-related shame is elicited from a perceived or actual global self-failure to meet internalized societal standards around weight (Conradt et al., 2007) and is intensely experienced and difficult to alleviate (Tangney, Miller, Flicker, & Barlow, 1996). Weight-related guilt is a similar but distinct emotion that is elicited from remorse and regret regarding a specific weight-related behaviour that is perceived as undesirable (Conradt et al., 2007). Experiences of guilt are typically less detrimental and intense than shame, and can serve an adaptive role by motivating individuals to engage in reparative actions to mend their perceived transgression (Lewis, 1993). Weight-related shame and guilt are important to study among women treated for breast cancer because of: (i) the intense perceptions of failure when societal weight ideals and weight maintenance behaviours are not attained (Tylka et al., 2014), (ii) biases around weight perpetuated by family members and health care practitioners (Bennett et al., 2005), and (iii) women’s tendencies to attribute the causes and maintenance factors of their cancer to different modifiable lifestyle factors (e.g., dietary habits, and stress (Burgess et al., 2005; Harvie, 2010), and (iv) internalizations of weight-related stigma commonly perpetuated in society (Puhl & Heuer, 2009). Collectively, these detrimental societal beliefs can be highly problematic for women treated for breast cancer who are at higher risk for gaining weight during treatment, and who may have difficulties maintaining weight post-treatment. Further, chronic experiences of shame and guilt have been linked with a host of psychopathologies (Bessenoff & Snow, 2006a; Swan & Andrews, 2003; Tiggemann & Kuring, 2004), particularly depression, see Kim and colleagues for meta-analysis (Kim et al., 2011) – thus positioning these emotions as highly pertinent indices of psychological health.

In addition to affective body image concerns, changes in weight have also been linked with negative mood and depressive symptoms, a trend that is particularly heightened among women with breast cancer (Hartl et al., 2009). In fact, over 50% of women report depressive symptoms
in the year following diagnosis, and 25% of women continue to report these concerns up to 2 years following diagnosis (Burgess et al., 2005). It is possible that individual fluctuations in weight during and after treatment for breast cancer may contribute to negative mood and symptoms associated with depression (Harvie, 2010). As such, it is highly valuable to understand two of the most predominantly reported concerns – depressive symptoms and negative weight-related emotions – in the post-treatment period after breast cancer.

4.2.1 The Present Study

The primary objective of this prospective longitudinal study was to examine within-person associations between changes in weight and weight-related guilt, shame, and depressive symptoms in the first year after treatment for breast cancer. A secondary aim was to test pre-cancer weight cycling as a moderator of these associations. Within-person analyses were used to examine the effects of weight status on weight-related emotions and depressive symptoms, given substantial variations in weight that may occur for each patient post-treatment for breast cancer (Irwin et al., 2005). Meanwhile, perceptions of pre-cancer weight cycling was considered a between-person variable, given evidence that fluctuations in adult weight status may independently predict health outcomes (Eliassen et al., 2006). Based on relevant evidence, age (Paterson et al., 2015), stage of cancer at diagnosis (Bennett et al., 2005), menopause status (Caan et al., 2008), and treatment type (Vance et al., 2011), were included as covariates. It was hypothesized that women would report higher levels of weight-related shame, guilt, and depressive symptoms during data collection times when they also experienced higher (as compared to lower) levels of body weight. Additionally, it was anticipated that the effect of body weight on levels of weight-related shame, guilt and depressive symptoms would be exacerbated among breast cancer survivors who have a history of pre-cancer weight cycling (compared to those who have a stable pre-cancer weight) because gains in weight post-treatment would be exponentially upsetting and further induce shame.

4.3 Method

4.3.1 Participants and Procedures

Data were drawn from the *Life After Breast Cancer: Moving On* study, an on-going longitudinal
cohort investigation of breast cancer survivors. Following University and Hospital Research Board Ethics approval, participants were recruited via posters, physician endorsement, and word of mouth. Interested participants contacted the research team and were screened for the following eligibility criteria: (i) female, (ii) minimum 18 years of age, (iii) first breast cancer diagnosis, (iv) diagnosed with stage I to III breast cancer and (v) completed primary treatment (e.g., surgical treatment, radiotherapy and/or chemotherapy) within 5 months of study conception. Participants who met the eligibility criteria and were able to provide written consent were enrolled in the study \((n = 201)\). At Time 1 \((M = 3.46 \text{ months post-primary treatment})\), participants completed self-administered questionnaires and had their weight and height measured by a trained research associate. Follow-up data were collected 6-months (Time 2), 9-months (Time 3) and 12-months (Time 4) post-treatment, and consisted of objectively measured body weight, height, and self-reported weight-related guilt and shame, and depressive symptoms.

4.3.2 Measures

4.3.2.1 Demographics

At baseline, information was collected on participants’ age, ethnicity, highest level of education (from \(0 = \text{did not complete high school} \) to \(5 = \text{postgraduate degree}\)), and marital status (\(0 = \text{single, widowed, or divorced}, 1 = \text{married or living with a life partner}\)). Participants were also asked to report on menopausal status (\(0 = \text{pre-menopausal}, 1 = \text{menopausal}, 2 = \text{post-menopausal}\)), months since diagnosis, stage of cancer at diagnosis, and treatment type (i.e., lumpectomy, lymph node dissection, single/double mastectomy, chemotherapy, radiotherapy, hormone therapy, and/or reconstructive surgery).

4.3.2.2 Weight Characteristics

Body weight was measured in kilograms using a standard research-grade scale (Seca 700, Germany) by a researcher in a lab setting at baseline, Time 2, Time 3, and Time 4. Pre-cancer weight cycling was assessed with a one-item measure at baseline whereby participants rated the perceived stability of their body weight throughout adulthood: 1 (very stable; little to no weight changes per year), 2 (fairly stable; weight changed by less than 2 lbs per year), 3 (fairly unstable; weight changed by 2 to 5 lbs per year) and 4 (very unstable; weight changed by more
than 5 lbs per year). Retrospective recall of weight fluctuation has been used previously with similar samples of women treated for breast cancer, and is shown to be a reliable and valid assessment of weight fluctuation (Fazzino et al., 2017). Criteria for meaningful weight change was defined based on past recommendations for women with breast cancer (Ingram, Carolyn; Brown, 2004) such that participants who self-rated as 1 (very stable) or 2 (fairly stable) were coded as ‘non-cyclers’ and participants who rated 3 (fairly unstable) or 4 (very unstable) were classified as ‘weight-cyclers’.

4.3.2.3 Weight-related Guilt and Shame

The Weight-related Shame and Guilt Scale (WEB-SG; 15) is a 12-item scale that was used to assess weight-related guilt (six-items; e.g., “When I can’t manage to work out physically, I feel guilty”) and shame (six-items; e.g., “I am ashamed of myself when others get to know how much I really weight”) at Time 2, Time 3, and Time 4. Each item was scored on a five-point Likert scale ranging from 1 = Never to 5 = Always. Mean scores were calculated for each shame and guilt subscale. The WEB-SG has shown acceptable convergent and discriminant validity in previous research (Conradt et al., 2007). In the current study, Cronbach alpha coefficients for shame ranged from .85 to .88, and coefficients for guilt ranged from .88 to .90.

4.3.2.4 Depressive Symptoms

The 10-item Centre for Epidemiological Studies Depression Scale (CES-D) (Andresen, Malmgren, Carter, & Patrick, 1993) was utilized to assess depressive symptoms at Time 2, Time 3, and Time 4. The CES-D is a self-report scale that asks participants to rate the frequency they have experienced depressive symptoms within the past seven-days. Responses are rated on a four-point scale ranging from 0 = Rarely or none of the time to 3 = Five to seven days. A total score was calculated and higher scores represent more frequent depressive symptoms. Reliability and validity evidence for the CES-D scores have been shown in past research with breast cancer survivors (Sabiston, Brunet, & Burke, 2012). Cronbach alpha coefficients ranged from .78 to .86 in the current study.
4.3.3 Data Analysis

Descriptive statistics, bivariate correlations, and inter-class correlations were calculated for the main study variables using SPSS v20. Using hierarchical linear modeling (HLM 7.0), three separate sets of models were conducted to predict within-person variability in (i) weight-related guilt, (ii) weight-related shame, and (iii) depressive symptoms. Superior to alternative multivariate analyses, multilevel modeling can manage within-person data (e.g., weight-related emotions, depressive symptoms) that are nested hierarchically within time (e.g., months post-treatment). Missing values for between-person variables (i.e., weight cycling) were replaced using sample means, and cases were only included for participants who had at least two valid scores in the outcome variables (i.e., guilt, shame, depressive symptoms; n = 173). All other missing within-person data were accounted for using maximum likelihood estimation methods in multilevel modeling.

In the first step of the analyses, Level-1 models estimated within-person variability in weight-related guilt, weight-related shame, and depressive symptoms, across time, as a function of participants’ body weight, and a residual term. In these models, the intercept represents women’s average levels of guilt/shame/depressive symptoms, and the slope represents the within-person associations between body weight and guilt/shame/depressive symptoms. In the second step, Level-2 models were estimated to examine whether the between-person effects of perceived pre-cancer weight cycling would produce significant cross-level interactions and moderate the effects of within-person changes in objective body weight on levels of participants’ weight-related guilt and shame, and depressive symptoms. The Level-2 intercept represents the average levels of guilt/shame/depressive symptoms and slope values represent the within-person associations between body weight and the specified outcome variable. The Level-2 models included the following covariates: age, menopausal status, stage of breast cancer at diagnosis, and breast cancer treatment type. For Level-2 predictors, standard z-scores were calculated prior to analyses. Finally, effect size calculations were conducted by contrasting the variance component of each outcome slope (i.e., guilt, shame, and depressive symptom) estimated in a null model without predictors, and the final model.

In the third step, simple slopes were estimated when significant cross-level interactions between Level-1 and weight-cycling were present. Average upper and lower quartiles of body weight and
actual values for the dichotomous weight cycling variable were used as reference points. All models used restricted maximum likelihood estimation and robust standard errors were reported.

4.4 Results

4.4.1 Preliminary Results

The sample of participants who had sufficient data for the current study ($n = 173$) ranged in age from 28 to 79 years old with a mean age of 55 years. Most women self-identified as Caucasian (85.5%) and had completed college or university-level education (71.1%), and were married or common-law (62.7%). The majority of women self-reported as post-menopausal (62.4%), followed by pre-menopausal (18.1%) and menopausal (17.6%). Most women received a stage I (42.4%) or stage II (39.5%) breast cancer diagnosis, and the remaining women received a stage III diagnosis (18.1%). Mean time since diagnosis was 10.59 months ($SD = 3.41$) and mean time since completion of primary treatment (e.g., surgery) was 3.40 months ($SD = 2.36$). Participants completed at least one treatment type including: lumpectomy (59.8%), lymph node dissection (58.3%), single mastectomy (27.1%), double mastectomy (15.8%), chemotherapy (63.3%), radiotherapy (90.4%), hormonal therapy (52.5%), and reconstructive surgery (7.0%). Body weight (ICC = .84), guilt (ICC = .84), shame (ICC = .84), and depressive symptoms (ICC = .62) were fairly stable across the first year post-treatment. Further descriptive statistics are presented in Table 4.1 and bivariate correlations are presented in Table 4.2.
Table 4.1. Means, standard deviations, and frequencies of main study variables (N = 173)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Score Range</th>
<th>Mean (SD) or Percentage</th>
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</thead>
<tbody>
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<tr>
<td>≥ 35.00 kg/m²</td>
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<td>Weight (kg)</td>
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<tr>
<td>Adulthood&lt;sup&gt;a&lt;/sup&gt;</td>
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<td>67.93 (14.27)</td>
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<tr>
<td>9-months</td>
<td>42.27-117.93</td>
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<tr>
<td>12-months</td>
<td>39.09-118.70</td>
<td>68.46 (14.29)</td>
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<tr>
<td>15-months</td>
<td>39.50-118.70</td>
<td>68.05 (13.93)</td>
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<td>2.61 (0.92)</td>
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<td>12-months</td>
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<td>Weight-related shame</td>
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<tr>
<td>9-months</td>
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<td>2.22 (0.89)</td>
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<td>12-months</td>
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<td>15-months</td>
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<td>2.19 (0.93)</td>
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<td>12-months</td>
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<td>15-months</td>
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<td>Perceived weight cycling in adulthood</td>
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<tr>
<td>Very unstable</td>
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<td>12.7%</td>
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<sup>a</sup> Calculated from average adulthood pre-diagnosis self-reported weight and height.
Table 4.2. Bivariate Pearson's and Spearman's correlations for main study variables. Note. *p < .05, **p < .001. aSpearman's rho.

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<td>3. Weight (Mean T1 – T3)</td>
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<td>5. Weight-related guilt (Mean)</td>
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<td>.37**</td>
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<td>-.17’</td>
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<td>-.05</td>
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<td>.12</td>
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<td>.13</td>
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<td>-.05</td>
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<td>-.01</td>
<td>-.02</td>
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<td>.45**</td>
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<td>.08</td>
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<td>-.08</td>
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<td>.04</td>
<td>.04</td>
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4.4.2 Main Results

4.4.2.1 Weight-related Guilt

Results from Level-1 and Level-2 models are reported in Table 4.3. The Level-1 intercept (i.e., average levels of guilt across study time) was significant, suggesting that average levels of guilt were significantly different from zero. The slope (i.e., within-person association between body weight and guilt) was not significant, whereby within-person variability in body weight did not significantly predict deviations in average levels of weight-related guilt. Further, the Level-1 analysis confirmed significant variability around the average intercept, (variance component = 0.74, $\chi^2 = 3058.27$, $p < .001$), but not the average within-person body weight slope (variance component = 0.001, $\chi^2 = 176.26$, $p = .32$).

The Level-2 model aimed to explain the variability in overall levels of weight-related guilt and the within-person associations between body weight and weight-related guilt by predicting the Level-1 coefficient by the between-person effects of pre-cancer weight cycling and the covariates (i.e., age, menopausal status, stage of breast cancer at diagnosis, and breast cancer treatment type). There was a significant effect on the intercept for weight cycling, whereby participants with a history of weight cycling in adulthood reported higher average levels of guilt across the post-treatment time, compared to participants without a history of weight cycling. As for the slope prediction, there was a non-significant cross-level effect of weight cycling on the association between within-person body weight and weight-related guilt. The final model accounted for 12.95% of the total variance in the weight-related guilt slope.

4.4.2.2 Weight-related Shame

Complete data for Level-1 and Level-2 models are reported in Table 4.3. Similar to guilt, a significant intercept (i.e., average levels of shame) was estimated, suggesting that average levels of shame were significantly different from zero. The slope (i.e., within-person association between weight and shame) was also significant, whereby participants experienced higher levels of shame during study times in which participants’ body weight was higher, as compared to lower, than average. Further, the analysis confirmed significant variability around the average intercept, (variance component = 0.70, $\chi^2 = 3535.16$, $p < .001$), as well as the average within-
person body weight slope (variance component = 0.10, $\chi^2 = 216.19, p = .01$).

The Level-2 model aimed to explain the variability in overall levels of weight-related shame and in the within-person relationships between objective body weight and shame by predicting the Level-1 coefficients by the between-person effects of weight cycling and the covariates. Similar to findings with guilt, there was a significant effect on the intercept for weight cycling. Specifically, participants with higher perceived weight cycling in adulthood reported higher average levels of shame across the post-treatment time than participants with lower levels of weight fluctuation. The final model accounted for 7.25% of the total variance in shame.

In terms of slope prediction, a significant cross-level interaction effect was estimated for weight cycling (Figure 4.1). Follow-up analyses showed that higher than average body weight was significantly related to increased levels of weight-related shame, but only among women who reported having a history of stable weight throughout adulthood ($coefficient = 0.61, SE = 0.16, p < .001$). In contrast, this association was not significant among their counterparts who reported weight cycling throughout adulthood ($coefficient = -0.23, SE = 0.20, p = .26$).

![Figure 4.1. The moderating influence of pre-cancer body weight cycling on the within-person associations between objective body weight and weight-related shame among women treated for breast cancer.](image-url)
4.4.2.3 Depressive Symptoms

See Table 4.3 for complete Level-1 and Level-2 models. A significant intercept (i.e., average levels of depressive symptoms) was estimated, suggesting that average levels of depressive symptoms were significantly different from zero. The slope (i.e., within-person association between weight and depressive symptoms) was not significant, whereby women did not experience higher levels of depressive symptoms at times when objective body weight was higher, versus lower, than average. Further, the analysis confirmed significant variability around the average intercept (variance component = 0.153, $\chi^2 = 938.25, p < .001$), but not for the average within-person body weight slope (variance component = 0.001, $\chi^2 = 194.79, p = .08$).

The Level-2 model aimed to explain the between-person effects of weight cycling and the covariates (i.e., age, menopausal status, stage of breast cancer at diagnosis, and breast cancer treatment type) on the variability in average levels of depressive symptoms and deviations in depressive symptoms. There was a significant effect on the intercept for weight cycling, whereby women who had a history of weight cycling, versus stable weight history, reported higher average levels of depressive symptoms across the post-treatment time. There was no significant cross-level interaction effect for weight fluctuation. The final model accounted for 13.91% of the total variance in the depressive symptoms slope.

4.5 Discussion

In this longitudinal study of women treated for breast cancer, pre-cancer weight cycling and weight changes during survivorship were tested as predictors of psychological well-being (i.e., weight-related guilt, shame, and depressive symptoms). Based on the findings, within-person increases in objective body weight predicted increased weight-related shame, but not guilt or depressive symptoms. Women with a history of weight cycling pre-cancer reported higher average levels of weight-related guilt, shame, and depressive symptoms across the first year post-treatment, compared to women who had a history of stable weight pre-cancer. Contrary to the hypothesis, higher body weight predicted weight-related shame only among women who had a stable weight. In the first empirical examination of concurrent changes in weight and mental
health in women treated for breast cancer, this study highlights how an accumulation of weight cycling in adulthood has long-term psychological consequences.
Table 4.3. Results of Level-1 and Level-2 analyses for weight-related guilt, shame, and depressive symptoms. Note. Level – 1 model had 172 df. Level – 2 had 160 df. *p < .05, **p < .001

<table>
<thead>
<tr>
<th>Covariates</th>
<th>Weight-related Guilt</th>
<th></th>
<th>Weight-related Shame</th>
<th></th>
<th>Depressive Symptoms</th>
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<tbody>
<tr>
<td></td>
<td>Intercept β (SE)</td>
<td>T-ratio</td>
<td>Slope β (SE)</td>
<td>T-ratio</td>
<td>Intercept β (SE)</td>
<td>T-ratio</td>
</tr>
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<td></td>
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</tr>
<tr>
<td>Level - 1</td>
<td>2.57 (0.07)</td>
<td>38.45**</td>
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<td>1.19</td>
<td>2.19 (0.07)</td>
<td>33.86**</td>
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<td>-0.01 (0.06)</td>
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In support of the hypothesis, women experienced higher levels of shame during times when weight was higher than average, but this association did not extend to guilt or depressive symptoms. There are several potential explanations to illuminate this pattern of findings. It is likely that gains in weight are perceived as “failures” that are attributed internally and represent an inadequate self (Conradt et al., 2008). In fact, attributions of control are commonly made in regards to weight (Ogden, Avenell, & Ellis, 2011b), and may be particularly exacerbated when contextualized to a breast cancer diagnosis, whereby gains in weight may also reflect the self as ineffective at mitigating “modifiable” risk factors that contribute to disease (Friedman et al., 2007). In contrast to shame, guilt does not threaten identity or global aspects of the self, but rather occurs as a result of specific behaviours that are viewed to be socially undesirable (e.g., eating calorie-dense foods post-treatment when trying to maintain weight). Given that weight itself is not a specific behavioural construct (but perhaps arguably a consequence of several undesirable health behaviours, weight changes per se are likely not predictive of feelings of weight-related guilt. This finding highlights the differential associations of experiences of weight-related shame and guilt (J Tracy & Robins, 2004).

Similarly, within-person fluctuations in depressive symptoms were not significantly predicted by fluctuations in weight. This finding was surprising given the robust complex and bidirectional weight and depression relationship, and empirical evidence that weight loss predicts improved mood (Faulconbridge et al., 2009). However, the majority of extant research has examined depressive symptom outcomes following a weight management intervention rather than natural changes over time. Furthermore, similar to our pattern of findings, a meta-analysis examining the effect of intentional weight loss and changes in depressive symptoms (Fabricatore et al., 2011), found that within-person reductions in weight were not related to within-person reductions in depressive symptoms. In the current study, it is likely that the fluctuations in weight in between each 3-month wave of data collection were not sufficient to elicit observable changes in global negative mood and symptoms of depression – despite eliciting negative changes in body- and weight-specific outcomes. It is also possible that more sizable changes in weight may predict depressive symptoms, or that depressive symptoms increase after a cumulative exposure to increased weight. Research is needed to examine the acute and micro fluctuations of weight on depressive symptoms, and further research is needed to track within-person changes in weight over time beyond the first year post-treatment of breast cancer.
Another notable finding in this study illustrates that women with a history of weight cycling before cancer diagnosis reported worse psychological wellbeing outcomes (i.e., higher shame, guilt, depressive symptoms) in the first year post-treatment, compared to women with stable pre-cancer weight. The adverse psychological and physical effects of weight cycling in generally healthy populations are well-documented (Brownell & Rodin, 1994; Field, Manson, Taylor, Willett, & Colditz, 2004). In fact, Tylka and colleagues (Tylka et al., 2014) emphasize that “research conducted around the world for the past 25 years has repeatedly shown that weight cycling is inextricably linked to adverse physical health and psychological well-being.” (pg. 4).

The current study is the first to elucidate the chronic and long-lasting psychological consequences of adulthood fluctuations in weight in women treated for breast cancer. Women with perceptions of weight cycling in adulthood have likely experienced chronic and repeated failures to achieve their ideal body weight (Demark-Wahnefried et al., 2012), and the acute stress caused by a cancer diagnosis may serve to amplify the psychological consequence of weight cycling. The accumulation of these experiences, combined with societal beliefs of controllability of weight (Tylka et al., 2014), may contribute to weight-related guilt, shame, and depressive symptoms that persist in the year post-treatment. Due to the retrospective self-report nature of the weight cycling data in this study, further research is needed to examine the long-term psychological effects of observed intentional and unintentional weight changes in women during the pre-diagnosis trajectory of breast cancer.

In light of the cumulative findings that pre-cancer weight cycling predicted weight-related guilt, shame, and depressive symptoms, but post-treatment weight changes did not, important conclusions can be drawn. For example, even though the majority of the literature has focused on psychological effects that are elicited in the first year post-treatment (Fobair et al., 2006; Schubart et al., 2014), these findings highlight the need to also examine predisposing weight-related factors prior to diagnosis. In fact, targeting subsets of women with a history weight cycling before breast cancer may help prevent and mitigate developing psychological concerns post-treatment. This information can be used by oncologists and primary care physicians to identify women at diagnosis who are at high-risk for the development of psychological concerns post-treatment. Further, this finding may have important implications for weight loss recommendations and the current weight-focused paradigm (Tylka et al., 2014), whereby global recommendations for weight loss may lead to a cascade of weight regain and weight cycling, that
may be more detrimental to psychological health than actual weight (Mehta et al., 2014). Specifically, it may be useful to target the weight-related messages and recommendations made by health practitioners in oncology practice.

It was hypothesized that the relationship between weight fluctuations in the first year post-treatment would be strengthened for women who had a history of weight cycling pre-diagnosis. Contrary to this hypothesis, the relationship between weight and weight-related shame was only significant for women who had a history of stable pre-cancer weight. It is possible that women with a cumulative and on-going history of struggling with weight experience consistently high weight-related shame (as evidenced by stable reports of this emotion across the year) – and these women may have higher thresholds for managing short-term fluctuations in weight. Meanwhile, women who are accustomed to stable weight are presumably less equipped to manage the psychological effects of weight fluctuations – especially during the highly vulnerable immediate post-treatment period of the cancer trajectory, as reported by past research (Knobf, 1986). The post-treatment period is a particularly vulnerable time in the cancer trajectory that causes women to confront the distressing physical and psychological changes caused by cancer and cancer-related treatments (Helms et al., 2008; O’Dea, 2006).

4.5.1 Limitations, Future Direction, & Conclusion

Despite the important contributions that this study makes to the literature on weight indicators and psychological outcomes in breast cancer, several limitations are worth considering. First, the pre-diagnosis weight cycling measure consisted of a retrospective self-reported assessment. Notwithstanding evidence that perceptions of weight are independently relevant to psychological factors beyond objective assessments of weight (Brener, Eaton, Lowry, & McManus, 2004), future population-based research should prospectively follow women’s weight gain and loss patterns and track incidence of breast cancer. Second, the observational nature of the data precludes the ability to make explicit temporal associations between weight and psychological outcomes – and it is possible that women may experience increases in weight during times when they feel more body- and weight-related shame, or that this relationship is bidirectional and complex. Future research is needed to tease apart the contributions of weight indicators of psychological health. Third, since the present study was meant to assess naturally occurring fluctuations in weight post-treatment, it is not possible to disentangle the effects of intentional
and non-intentional weight changes (i.e., pregnancy, pharmacologically-induced) – which may differentially impact psychological outcomes (Caan et al., 2008). And finally, while the current study intended to examine the high-risk first year post-treatment period, it is possible that the temporal design missed the development of psychological effects of weight – given evidence that weight remains relatively unchanged immediately post-treatment, but increases considerably in the late post-treatment period (Makari-Judson et al., 2007). Researchers are encouraged to assess psychological effects of weight fluctuation using longer follow-up designs.

Notwithstanding, as the first study to assess both within- and between-person fluctuations in weight and psychological factors during a high-risk period of cancer survivorship, the findings of this work make considerable contributions to the current literature. Collectively, it can be concluded that fluctuations in weight pre- and post-diagnosis appear to have differential and unique associations with psychological outcomes. Notably, a cumulative history of weight cycling appears to be more psychologically detrimental overall, compared to more acute gains in weight that are experienced post-treatment. Due to the psychopathology associated with chronic experiences of global and body and weight-related shame (Tiggemann & Slater, 2004), strategies to mitigate the experience of this negative emotion are necessary for women treated for breast cancer. Further, health promotion interventions aimed at women treated for breast cancer should include appropriate psychoeducation on internalized weight stigma, as a robust predictor of weight-related shame (Ratcliffe, Ellison, Ratcliffe, & Ellison, 2015), particularly among women with a history of weight cycling, and a history of failed weight management attempts. And finally, the present finding that weight cycling post-treatment has psychological consequences, may reflect the endorsement of weight loss (and ultimate regain) that is perpetuated by our weight-normative society (Olson, Visek, McDonnell, & DiPietro, 2012). Challenging the current weight-normative approach and adopting a weight-inclusive paradigm (Tylka et al., 2014) may be the key to physical and psychological health and well-being of women throughout the cancer trajectory.
Chapter 5: Bridging Text

The main findings from Chapter 4 can be summarized as:

1. In the first year after treatment for breast cancer, women experienced the most weight-related shame, but not guilt, or depressive symptoms, when their weight was heavier than usual. It is possible that shame is the most salient response to self-relevant ‘failures’ regarding weight.

2. Women with a history of cycling weight pre-cancer experienced worse overall weight-related guilt, shame, and depressive symptoms, compared to women with a stable history of pre-cancer weight. This finding extends past research on the psychological consequences of excess weight (Tylka et al., 2014), to highlight the enduring consequences of social stigma around higher weight throughout the cancer trajectory.

3. Women with a stable, rather than cycling, history of weight pre-diagnosis experienced worsened effects of weight on shame. It is possible that women with stable weight are less equipped to manage the psychological effects of fluctuations in weight after breast cancer. To better elucidate this pattern of effects, changes in pattern from pre- to post-cancer weight cycling need to be considered.

Based on the findings from this longitudinal study, it can be concluded that weight-cycling pre-cancer and changes in weight post-treatment have important implications for emotional consequences. However, the observational nature of these data preclude any conclusions on temporal associations between weight change and psychological consequences. Further, this work does not consider the potential for changes in perceived weight cycling patterns pre-diagnosis to post-cancer. As such, Chapter 5 presents an intensive longitudinal study utilizing a daily diary design to examine the effects of daily self-weighing on weight-related guilt and shame, and to assess the extent to which pre- and post-cancer weight cycling contribute to the acute effects of weight change on emotional consequences.
Chapter 5

Emotional consequences of self-weighing: A daily diary study in women with comorbid breast cancer and obesity

5.1 Abstract

Breast cancer is often comorbid with overweight and obesity, with approximately 65% of women receiving a cancer diagnosis also reporting excess weight. Since higher weight can worsen cancer outcomes and survival, behavioural intervention of self-monitoring weight is commonly recommended in clinical practice. However, given emerging evidence that self-weighing may have psychological consequences, the present study aims to examine the effects of daily self-weighing on body-related emotions in a sample of women (n = 52) with a history of breast cancer, who are seeking to manage their weight. Based on daily diary methodology, women reported higher levels of both acute (i.e., immediately after self-weighing) and distal (i.e., cumulative throughout day) shame and guilt during days in which their weight was higher than average. Further, significant cross-level three-way interaction effects emerged, whereby the relationships between daily weight and distal guilt and shame were moderated by the extent to which women weight-cycle both pre- and post-diagnosis. Drawing on these preliminary findings, we can conclude that weight cycling both pre- and post-cancer have important implications for psychological well-being, and discourage against the use of self-weighing as an effective strategy for this vulnerable subset of women with obesity.
5.2 Introduction

The complex, multifactorial, and bi-directional link between obesity and breast cancer is well-documented (Morimoto et al., 2002). Specifically, obesity is associated with higher risk of breast cancer development (Eliassen et al., 2006), more advanced stage at diagnosis (Reeves et al., 2007), increased risk of recurrence (Chan et al., 2014), and higher cancer-related mortality (Protani et al., 2010). Additionally, breast cancer treatment contributes to weight gain and changes in body composition, with estimates of 50% to 96% of women treated for breast cancer reporting increased weight (Harvie, 2010; Helms et al., 2008; Vance et al., 2011). As this additional treatment-related weight gain can worsen survival outcomes and mortality, weight management using behavioural intervention is often recommended for women in the survivorship period (Chlebowski et al., 2002). In addition to diet and exercise, regularly self-monitoring weight has been identified as a key behaviour associated with long-term weight management (Butryn, Phelan, Hill, & Wing, 2007). It is thought that consistently monitoring weight helps individuals to maintain weight loss by identifying acute gains in weight, and responding by making diet and exercise changes to halt subsequent gains in weight. However, psychologists urge caution regarding frequent self-weighing (Dionne & Yeudall, 2005), citing adverse psychological consequences including exacerbated body image concerns, mood disturbance, depressive symptoms (Ogden & Mundray, 1996; Ogden & Whyman, 1997), and pathological eating and exercise behaviours (McFarlane, Polivy, & Herman, 1998; Putterman & Linden, 2004). Dionne and Yeudall (2005) particularly caution against frequent self-weighing in subsets of the population that are vulnerable to weight-related feedback. For example, due to the salience of managing weight for cancer-related survival (Demark-Wahnefried et al., 2012), it is likely that women with a history of breast cancer may be particularly susceptible to the negative consequence of self-weighing (VanWormer, French, Pereira, & Welsh, 2008).

Yet despite the identification of weight gain as the most distressing side-effect after breast cancer (Figueiredo et al., 2004; Hurd Clarke, 2000), there is a paucity of research identifying the specific psychological outcomes associated with excess weight in women treated for breast cancer. In a qualitative study aimed to address this gap, it was reported that women experienced considerable psychological distress associated with changes in body weight, particularly feelings of guilt and shame which were exacerbated by the health-related risk that excess weight gain carries (Pila, Sabiston, Taylor, Arbour-Nicitopoulos, to be submitted). In a follow-up
longitudinal study, women reported higher shame during assessments when their weight was higher than usual, and that a history of pre-cancer weight cycling predicted higher sustained levels of guilt, shame, and depressive symptoms. However, the observational nature of these data precludes the ability to make explicit temporal association between weight and psychological outcomes, and it is not possible to disentangle the effects of intentional compared to non-intentional weight change which may differentially impact psychological outcomes (Caan et al., 2006). In addition, assessments were collected every 3-months in the first-year post-treatment, thus impeding an understanding of more acute and transient changes in weight that may occur during shorter time frames. To address these gaps, the present investigation aimed to understand the acute effects of self-weighing or viewing weight feedback on guilt and shame among women with a history of breast cancer who are actively managing their weight.

Shame and guilt have been identified as important body-related emotions among individuals with obesity (Conradt et al., 2007), and may be particularly salient in the context of breast cancer (Pila et al., under review). In fact, theories of body image in oncology (White, 2000a) and self-objectification (Fredrickson & Roberts, 1997) posit that undesirable changes to appearance that threaten the ideal self (e.g., weight gain) will negatively impact affective states, and self-conscious emotions may be particularly salient among socially endorsed standards for appearance. Specifically, shame and guilt are associated with perceptions of failure when societal ideals are not attained, and thus inextricably tied to discrepancies between actual and ideal weight (White, 2000), and weight management efforts which are often met with “failure”, or weight loss and subsequent regain (Conradt et al., 2007, 2008). In fact, since weight maintenance behaviours are very challenging to initiate and sustain (Tylka et al., 2014), and there is a socially ingrained belief that weight is controlled voluntarily and the sole responsibility of the individual (Tiggemann & Rothblum, 1997), weight-related guilt and shame are highly salient consequences of weight change. As chronic experiences of shame and guilt have been tied to psychopathology (Bessenoff & Snow, 2006a; Kim et al., 2011; Swan & Andrews, 2003; Tiggemann & Kuring, 2004), it is essential to examine these emotions as consequences of self-weighing for women with a history of breast cancer.

Within the self-weighing literature, researchers have identified that some individuals may be particularly vulnerable to the effects of frequent weight feedback (Dionne & Yeudall, 2005). One such risk factor is pre-existing concerns and preoccupation around weight (McFarlane et al.,
Indeed, a history of weight cycling has also been identified as an important individual-level factor that may contribute towards worsened psychosocial symptoms in the survivorship period for breast cancer (Fazzino et al., 2017). Weight cycling also functions to moderate the relationship between within-person weight and guilt and shame over time in this population (Pila, Sabiston, Castonguay, Arbour-Nicitopoulos, & Taylor, n.d.) Weight cycling is thought to be a result of intentional weight loss efforts, whereby the body is forced to maintain a weight-suppressed state, which often consists of dietary rigidity and compensatory exercise (Cooper & Shafran, 2008; Tylka et al., 2014). In a seminal review by Tylka and colleagues (2014), it is stated that “research conducted around the world for the past 25 years has repeatedly shown that weight cycling is inextricably linked to adverse physical health and psychological well-being” (pg. 4). The well-documented evidence that psychological comorbidities contribute to worsened cancer outcomes (Guthrie et al., 2004) highlights the importance of examining how weight cycling may modulate the emotional effects of self-weighing.

5.2.1 The present study

The overarching aim of the present study is to examine the acute emotional outcomes associated with daily self-weighing in women with a history of breast cancer, who are engaging in weight management. Specifically, the objectives are to (i) examine the proximal (i.e., acute, morning assessment) and distal (i.e., cumulative, evening assessment) effects of daily self-weighing on weight-related emotions (i.e., shame, guilt), and (ii) to assess if the effects of self-weighing on emotional outcomes vary as a function of weight characteristics including a history of pre- and post-cancer weight fluctuation. The present study is based on objectification theory (Fredrickson & Roberts, 1997) which states that women experience negative body-related emotions such as shame when their body does not fit idealized societal standards, and the multidimensional model of body image in oncology (White, 2000a), which describes how cancer-related changes to the body contribute to negative body-related emotions when there is a degree of investment in what the body looks like. Drawing on these theoretical frameworks, it is hypothesized that women will report higher weight-related shame, and guilt, and when their weight is higher, as compared to lower, than their average. Further, it is hypothesized that these associations will be strengthened as a function of women’s pre-cancer, and post-cancer weight cycling (Pila, Castonguay, Sabiston, Arbour-Nicitopoulos, submitted), such that women who have a history of weight cycling will experience more guilt and shame in response to higher weight. Further, it is expected
that women with a stable pre-cancer weight history and cycling post-cancer weight history will experience the most negative emotional responses.

5.3 Methods

5.3.1 Participants

Participants ($n = 52$) were women who had previously or were currently attending the Wharton Medical Clinic (WMC), a referral-based behavioural weight management program with several locations in the Greater Toronto Area. WMC functions in accordance to the principles of the National Institutes of Health Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults (2000), and provides services that include nutritional consultations, exercise prescription, diagnostic testing, and educational groups. All WMC clinics are publicly funded and all services are provided at no charge to the patient, and thus offering a unique representative sample of individuals seeking weight management in the community. Detailed program protocols have been outlined previously, and include body weight measurements at each visit, and recommendations for weekly self-weighing (Liu, Wharton, Sharma, Ardern, & Kuk, 2013).

The potential list of participants was drawn from a sample of approximately 5600 women who have attended at least one visit at WMC since the clinic’s establishment in 2007. Eligible participants ($n = 213$) were contacted if they met the following selection criteria based on their electronic medical records: (i) had consented to be contacted for WMC research studies, (ii) identified as a woman, (iii) were previously treated for breast cancer within the past 15 years. Data to determine eligibility criteria was drawn exclusively from patients who had provided written consent to release their medical data prior to receiving care at WMC. The current study was approved by the University of Toronto Research Ethics Board, and facilitated by a research collaboration between WMC and the University of Toronto. To abide by ethical standards, the list of potential participants was prepared by the WMC clinic staff and released to the research, only after ethical approval.

Eligible participants were contacted via telephone and informed of the study protocol, their standard ethical rights as patients and participants (i.e., study participation would not alter treatment at WMC in any way, freedom to withdraw consent at any time without influencing
treatment). Interested participants were further screened for their ability to access email and web-based surveys, and willingness to participate in daily self-weighing for a 7-day period. Of the women that were successfully reached \((n = 97)\), 56 women expressed interest in the study (57.7% recruitment rate). Four participants withdrew prior to the start of the study, citing change in time commitment \((n = 2)\) and illness \((n = 2)\) as reasons. The remaining sample of 52 women provided verbal and written consent and were enrolled in the study.

5.3.2 Measures

5.3.2.1 Daily Assessment

5.3.2.1.1 Weight

In each day’s morning assessment, participants were instructed to weigh themselves on their personal scales at home, or a scale that was provided from the research team \((n = 2)\) participants without a scale), and record their weight. The process of self-weighing was repeated three consecutive times each morning, and an average of three weights was used in the analysis. The repeated measure of weight was not a measure of accuracy, but rather ensured participants were sufficiently exposed to the number on the scale.

5.3.2.1.2 Weight-related emotions

The State Shame and Guilt Scale (Marschall, Sanftner, & Tangney, 1994) was used to assess state shame and guilt in response to exposure to weight. Participants were instructed to answer each question in response to: “When you think about your body weight right now (i.e., the number on the scale), how do you feel?” The 5-item subscale was used for shame (i.e., “I want to sink to the floor and disappear”), and 5-item subscale for guilt (i.e., “I feel bad about something I have done). The item scores had Cronbach’s alpha \((\alpha)\) coefficients ranging from \(\alpha = .89-.92\) for shame, and \(\alpha = .84-.90\) for guilt, in the morning assessment. The same assessment of state guilt and shame was repeated in the evening survey, with the adapted instructions: “When you think about today's body weight (e.g., the number on the scale this morning), how do you feel right now?”. The item scores presented \(\alpha = .88-.90\) for shame, and \(\alpha = .86-.89\) for guilt, in the evening assessment.
5.3.2.1.3  Weight preoccupation

A 2-item assessment of weight preoccupation was created for this study to assess the daily level of preoccupation with weight. The items ranged on a 1 (not at all) to 7 (very much) scale, and participants were asked in the evening to answer the following questions in response to weighing themselves that morning, “how often have you thought about the number on the scale?” and “how often has your weight been on your mind?” The mean of the two items was taken, with higher scores representing higher daily weight preoccupation. Pearson’s correlations for these 2-items ranged from \( r = .89 \) to \( .96 (p < .001) \).

5.3.2.2  Post-study assessment

5.3.2.2.1  Weight characteristics

Pre-cancer weight cycling was assessed using a one-item measure whereby participants rated the perceived stability of their body weight throughout adulthood: 1 (very stable; little to no weight changes per year), 2 (fairly stable; weight changed by less than 2 lbs per year), 3 (fairly unstable; weight changed by 2 to 5 lbs per year) and 4 (very unstable; weight changed by more than 5 lbs per year). Criteria for meaningful weight change was defined based on past recommendations for women with breast cancer (Ingram & Brown, 2004) such that participants who self-rated as 1 (very stable) or 2 (fairly stable) were coded as ‘non-cyclers’ and participants who rated 3 (fairly unstable) or 4 (very unstable) were classified as ‘weight-cyclers’. This measure has been used successfully in past research with women treated for breast cancer (Pila, Sabiston, Castonguay, et al., n.d.). In addition to pre-cancer weight cycling, the same question was adopted to determine post-cancer weight cycling whereby women were asked to describe their adult weight status since finishing primary treatment for breast cancer. The distinction between pre- and post-cancer patterns of weight cycling was made based on previous evidence that women perceive changes in their pattern of weight cycling as a function of breast cancer treatment (Pila, Sabiston, Taylor, & Arbour-Nicitopoulos, n.d.).
5.3.2.2 Demographics

Participants also completed sociodemographic assessments for age, current weight, height, ethnicity, stage of breast cancer diagnosis, type of breast cancer treatment, and any medical or psychiatric diagnoses received from a medical professional.

5.3.3 Procedures

A daily diary approach was used, which is a type of experience sampling technique that assessed behaviours, emotions, and cognitions in “real time” in the natural environment (Stone & Shiffman, 1994). This approach has several advantages over typical self-report methods, including enhanced ecological validity and reduced retrospective recall bias, and involves repeated assessment over time (Shiffman et al., 2008), which allows examination of the temporal ordering of psychological consequences of self-weighing. Daily diary methods are well-suited for the present study to examine acute outcomes associated with self-weighing.

Following identification of eligibility, the primary author contacted all participants via telephone to invite them to the study. Interested participants received detailed instructions, provided verbal consent over the phone, and scheduled the date and time for the start of data collection. Participants were asked to select a “typical week” when they were following their regular routines, and scheduled personalized morning and evening times to receive their surveys.

At the start of the first survey, participants provided written informed consent in addition to previous verbal consent. Each day, participants received a morning reminder email to weigh themselves and immediately complete the morning surveys, followed by a link to the evening surveys. Both links and reminder emails were sent at predetermined times personalized to each participant’s waking and sleeping schedule. The morning assessment was meant to capture real-time acute outcomes associated with self-weighing, and the evening assessment was meant to capture a cumulative account of cognitions and behaviours across the course of the day, and since the morning survey. This procedure was repeated for seven consecutive days, for a total of 14 assessments. On any morning or evening where participants did not complete the survey, a follow-up reminder email was sent. The majority of participants (79%) completed each survey on time, and the remaining participants missed up to 5 of the 14 surveys. Following the daily assessment, participants received a final link to the post-study survey to assess demographics.
including self-reported patterns of weight fluctuation. At the end of the study assessment week, participants were mailed a $50 cheque to compensate for their time in the study. At this time, participants also had the opportunity to provide written feedback regarding the study protocol, and were unprompted to focus on any aspect of the study. An overview of participant’s narratives have been included in the reporting of the results to contextualize the quantitative findings, and provide depth to women’s experiences with self-weighing.

5.3.4 Analytic Strategy

Preliminary analyses (i.e., descriptive statistics, bivariate correlations, inter-class correlations) were calculated using SPSS v23. Main multilevel analyses were conducted using HLM 7.0. Superior to alternative multivariate analyses, multilevel modeling can manage within-person data, such as weight-related emotions, that are nested hierarchically within days of the week. Missing values for between-person variables (i.e., weight fluctuation) were replaced using expectation maximization methods. All other missing within-person data were accounted for using maximum likelihood estimation methods in multilevel modeling. In a preliminary step, unconditional models were estimated to examine the natural temporal patterns of main study variables (i.e., weight, guilt, shame, weight preoccupation). In each model, the slope represented the average linear change over the week across all participants, and the between-person variable associated with this slope indicated whether participants differed in the rate of change.

Multilevel models were tested separately to predict within-person variability in (i) weight-related guilt and (ii) shame assessments collected immediately following morning self-weighing, and (iii) cumulative assessments of shame, and (iv) guilt in the evening. The analyses yielded four separate models. Specifically, Level-1 models tested the extent to which a participants’ daily body weight predicted within-person variability in acute (i.e., morning) post-weighing guilt and shame, as a function of time (i.e., number of days in the study). In these Level-1 models, the intercept represents women’s average levels of weight-related guilt and shame, while the slope represents the within-person associations between body weight and weight-related shame and guilt. Similarly, Level-1 models tested the extent to which a participants’ daily body weight, and degree of weight preoccupation, predicted within-person variability in distal (i.e., evening) weight-related guilt, and shame, as a function of time.
In the second step, both acute and cumulative Level-2 models were estimated to examine whether the between-person effects of perceived pre-cancer weight cycling, or post-cancer weight cycling would moderate the effects of within person changes in body weight on levels of participants’ weight-related guilt and shame. The Level-2 intercept represents the average levels of weight-related guilt/shame, and the slope values represent the within-person associations between body weight and guilt/shame. For Level-2 predictors, standard z-scores were calculated prior to analyses. In the third step, a follow-up Level-2 model investigated the presence of interaction effects by including an interaction term for weight cycling (i.e., pre-cancer X post-cancer weight cycling), to the previously estimated Level-2 model to examine the differential associations between weight and shame/guilt, and weight cycling, as a function of pre- and post-cancer weight cycling. Significant three-way interactions between Level-1 (i.e., weight) and Level-2 terms (i.e., the interaction between pre- and post-cancer weight cycling) were followed up by estimating the simple slopes. The slopes modelled associations between weight and guilt/shame for groups of women who had stable vs. cycling post-cancer weight, using the dichotomous predictor variables as reference points, separately for women with stable vs. cycling pre-cancer weight. All models used restricted maximum likelihood estimation and robust standard errors were reported.

5.4 Results

5.4.1 Preliminary Findings

The sample of participants \( n = 52 \) ranged in age from 36 to 71 years old with a mean age of 57.4 \( (SD = 8.9) \) years. Participants identified predominantly as White (90.2%), post-menopausal (76.5%), married or living with a life partner (64.7%), and having attained at least a college degree or technical diploma (54.9%). Women were diagnosed predominantly with Stage 1 (35.3%), followed by Stage 3 (25.5%) breast cancer. Five women (13.2%) were diagnosed with a recurrence of breast cancer, between 1 to 12 years prior to this study, and an average of 5.2 years prior. Treatments included lymph or axillary node dissection (71.4%), radiotherapy, (73.5%), lumpectomy (69.4%), chemotherapy (53.1%), single or double mastectomy (51.1%), and hormonal therapy (34.7%). Average BMI was 35.3 kg/m\(^2\) \( (SD = 6.12) \), and 64.7% of women reported a history of pre-cancer weight cycling, while 78.4% reported a post-treatment history of weight cycling. Most women (61.5%) reported gaining weight post-treatment, ranging between 5
to 70 pounds ($M = 29.9, SD = 15.81$), and had last attended the weight management clinic approximately 9 months prior ($SD = 8.2$). Almost half of the sample (47.0%) received a diagnosis of a comorbid medical condition from a health care provider, predominantly Type 2 diabetes (50.0% of women with medical diagnosis), and 41.2% of women had received a psychiatric diagnosis, predominantly of major depressive disorder (85% of women with psychiatric diagnosis). Approximately 23% of women reported both medical and psychiatric diagnoses. Intra-class correlations are reported for weight (ICC = .97), acute guilt (ICC = .85) and shame (ICC = .83), and cumulative guilt (ICC = .63) and shame (ICC = .71), and weight preoccupation (ICC = .60). Further descriptive statistics are presented in Table 5.1 and bivariate correlations are presented in Table 5.2. Findings from the unconditional models report a non-significant linear change of weight ($\beta = -0.05, SE = 0.06, p = .32$), evening guilt ($\beta = -0.01, SE = 0.02, p = .75$), and both morning ($\beta = -0.01, SE = 0.01, p = .63$), and evening shame ($\beta = -0.02, SE = 0.04, p = .41$), and weight preoccupation ($\beta = 0.01, SE = 0.05, p = .84$). Regardless, there was significant between-person variability for both assessments of guilt and shame ($\sigma^2 = 0.005$ to 0.10, $p < 0.05$), and weight preoccupation ($\sigma^2 = 0.09, p < 0.001$), indicating that some individuals had scores that fluctuated over time in guilt, shame, and weight preoccupation, despite the lack of significant average change across the entire sample.
Table 5.1. Means, standard deviations, and frequencies of main study variables (N = 52)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Score Range</th>
<th>Mean (SD) or Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current BMI</td>
<td>27.05 – 52.12</td>
<td>35.34 (6.17)</td>
</tr>
<tr>
<td></td>
<td>25.00 to 29.99 kg/m²</td>
<td>11.5%</td>
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<td></td>
<td>30.00 to 34.99 kg/m²</td>
<td>46.0%</td>
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<td>35.00 to 39.99 kg/m²</td>
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<tr>
<td></td>
<td>≥ 40.00 kg/m²</td>
<td>13.8%</td>
</tr>
<tr>
<td>Current weight (kg)</td>
<td>53.68-149.07</td>
<td>93.15 (20.37)</td>
</tr>
<tr>
<td>Emotions (Weekly mean)</td>
<td>1-5</td>
<td></td>
</tr>
<tr>
<td>Weight-related guilt (AM)</td>
<td></td>
<td>1.67 (0.90)</td>
</tr>
<tr>
<td>Weight-related shame (AM)</td>
<td></td>
<td>1.54 (0.71)</td>
</tr>
<tr>
<td>Weight-related guilt (PM)</td>
<td></td>
<td>1.54 (0.84)</td>
</tr>
<tr>
<td>Weight-related shame (PM)</td>
<td></td>
<td>1.36 (0.53)</td>
</tr>
<tr>
<td>Weight Preoccupation (Weekly mean)</td>
<td>1-7</td>
<td>2.43 (1.62)</td>
</tr>
<tr>
<td>Perceived weight cycling pre-cancer</td>
<td>1-4</td>
<td></td>
</tr>
<tr>
<td>Very stable</td>
<td></td>
<td>8.3%</td>
</tr>
<tr>
<td>Fairly stable</td>
<td></td>
<td>22.9%</td>
</tr>
<tr>
<td>Fairly unstable</td>
<td></td>
<td>22.9%</td>
</tr>
<tr>
<td>Very unstable</td>
<td></td>
<td>45.8%</td>
</tr>
<tr>
<td>Perceived weight cycling post-cancer</td>
<td>1-4</td>
<td></td>
</tr>
<tr>
<td>Very stable</td>
<td></td>
<td>2.1%</td>
</tr>
<tr>
<td>Fairly stable</td>
<td></td>
<td>14.6%</td>
</tr>
<tr>
<td>Fairly unstable</td>
<td></td>
<td>14.6%</td>
</tr>
<tr>
<td>Very unstable</td>
<td></td>
<td>68.8%</td>
</tr>
</tbody>
</table>
Table 5.2. Bivariate Pearson’s and Spearman’s correlations for main study variables.

<table>
<thead>
<tr>
<th></th>
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<th>5</th>
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<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Pre-cancer weight cycling\textsuperscript{a}</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Post-cancer weight cycling\textsuperscript{a}</td>
<td>.18</td>
<td>--</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>3. Weight consistently stable\textsuperscript{a}</td>
<td>-.45\textsuperscript{**}</td>
<td>-.67\textsuperscript{**}</td>
<td>--</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Weight consistently cycling\textsuperscript{a}</td>
<td>.83\textsuperscript{**}</td>
<td>.55\textsuperscript{**}</td>
<td>-.37\textsuperscript{**}</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Weight (Weekly mean)</td>
<td>.23</td>
<td>.46\textsuperscript{**}</td>
<td>-.30\textsuperscript{*}</td>
<td>.42\textsuperscript{**}</td>
<td>--</td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>6. Weight-related guilt (AM mean)</td>
<td>.11</td>
<td>.36\textsuperscript{*}</td>
<td>-.30</td>
<td>.23</td>
<td>-.04</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>7. Weight-related guilt (PM mean)</td>
<td>-.07</td>
<td>.23</td>
<td>-.09</td>
<td>.06</td>
<td>-.12</td>
<td>.96\textsuperscript{**}</td>
<td>--</td>
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<td></td>
</tr>
<tr>
<td>8. Weight-related shame (AM mean)</td>
<td>.15</td>
<td>.38\textsuperscript{*}</td>
<td>-.31</td>
<td>.28</td>
<td>.10</td>
<td>.81\textsuperscript{**}</td>
<td>.71\textsuperscript{**}</td>
<td>--</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Weight-related shame (PM mean)</td>
<td>-.13</td>
<td>.38\textsuperscript{*}</td>
<td>-.13</td>
<td>.10</td>
<td>-.16</td>
<td>.71\textsuperscript{**}</td>
<td>.76\textsuperscript{**}</td>
<td>.97\textsuperscript{**}</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>10. Weight preoccupation (Weekly mean)</td>
<td>.03</td>
<td>.13</td>
<td>-.21</td>
<td>.02</td>
<td>-.13</td>
<td>.67\textsuperscript{**}</td>
<td>.58\textsuperscript{**}</td>
<td>.40\textsuperscript{**}</td>
<td>.26</td>
<td>--</td>
</tr>
</tbody>
</table>

Note: \textsuperscript{*}p < .05, \textsuperscript{**}p < .001. \textsuperscript{a}Spearman’s rho. Pre- and post-cancer weight cycling variables (0 = stable, 1 = cycling). Weight consistently stable variable (0 = not consistently stable, 1 = consistently stable), and Weight consistently cycling (0 = not consistently cycling, 1 = consistently cycling). In the sample, \( n = 4 \) (7.8%) women reported consistently stable pre- and post-cancer weight, \( n = 11 \) (21.6%) reported stable to cycling weight, \( n = 4 \) (7.8%) reported cycling to stable weight, and \( n = 29 \) (56.9%) reported consistently cycling weight pre- and post-cancer.
Main findings

The models predicting acute shame and guilt are summarized in Table 5.3. Both models revealed significant intercepts suggesting that average levels of shame ($\beta = 1.51, SE = 0.11, p < .001$) and guilt ($\beta = 1.61, SE = 0.11, p < .001$) were significantly different from zero. In both models, the slopes were also significant, whereby participants reported higher levels of shame ($\beta = 0.07, SE = 0.02, p < .001$) and guilt ($\beta = 0.10, SE = 0.03, p < .001$) during days of the week in which their body weight was higher, as compared to lower, than average. Further, the analysis confirmed significant variability around the average intercept for guilt (variance component $= 0.71, \chi^2 = 2406.55, p < .001$) and shame (variance component $= 0.59, \chi^2 = 1869.74, p < .001$), as well as the average within-person body weight slopes (variance component $= 0.01, \chi^2 = 217.05, p < .001$; variance component $= 0.01, \chi^2 = 176.10, p < .001$), respectively for guilt and shame.

Meanwhile, the Level-2 models revealed a significant effect on the intercept for post-cancer weight cycling for acute guilt ($\beta = 0.21, SE = 0.07, p < .01$), but not shame ($p = 0.08$), whereby participants with a history of weight cycling post-cancer reported higher average levels of guilt across the week, compared to participants without a history of post-cancer cycling. No significant cross-level effects emerged, suggesting that the relationship between each emotion and weight did not vary as a function of participants’ weight cycling histories. Further, the addition of the interaction term at Level-2 did not produce any significant effects at the intercept or slope level in the models for guilt nor shame. The final models accounted for 7.9% and 5.4% of the total variance in acute weight-related guilt and shame, respectively.

The models predicting cumulative daily guilt, and shame, had significant intercepts suggesting that average levels of guilt ($\beta = 1.56, SE = 0.11, p < .001$) and shame ($\beta = 1.47, SE = 0.10, p < .01$) were significantly different from zero. In both models, the slopes were also significant, whereby participants reported higher levels of guilt ($\beta = 0.06, SE = 0.03, p < .05$) and shame ($\beta = 0.07, SE = 0.03, p < .05$) during days of the week in which their body weight was higher, as compared to lower, than average, when controlling for the effects of daily weight preoccupation. Further, both guilt and shame models confirmed significant variability around the average intercepts (variance component $= 0.58, \chi^2 = 1840.35, p < .001$; variance component $= 0.46, \chi^2 = 1997.06, p < .001$), as well as the average within-person body weight slope (variance component
= 0.02, $\chi^2 = 113.75, p < .001$; variance component $= 0.03, \chi^2 = 207.97, p < .001$), respectively for
guilt and shame.

Level-2 models did not reveal a significant effect on the intercept for either weight cycling
variable on daily cumulative guilt or shame, suggesting that history of weight cycling did not
significantly impact average levels of either emotion across the week. Further, no significant
cross-level interaction effects emerged, suggesting that the relationship between each emotion
and weight did not vary as a function of participants’ weight cycling histories. However, the
addition of the interaction term at Level-2 produced a significant effect between daily weight,
guilt/shame, and pre- and post-weight cycling ($\beta_{\text{guilt}} = 0.09, SE = 0.03, p < .01; \beta_{\text{shame}} = 0.08, SE$
$= 0.03, $p < .01$). Follow-up simple slopes analyses revealed that women whose weight remained
stable at both pre- and post-cancer reported a significant positive slope in weight and guilt
($\text{coefficient} = 0.07, SE = 0.02, p < .01$), and weight and shame ($\text{coefficient} = 0.07, SE = 0.03, p < .05$). In contrast, the relationship between weight and each emotion was not significant for
women whose weight was stable pre-cancer and shifted to cycling post-cancer ($p_{\text{guilt}} = 0.17$;
$p_{\text{shame}} = 0.35$). Meanwhile, women who reported pre-cancer weight cycling experienced a steeper
positive slope in the relationship between weight and guilt, and weight and shame, if their weight
continued to cycle post-cancer ($\text{coefficient}_{\text{guilt}} = 0.11, SE = 0.04, p < .01; \text{coefficient}_{\text{shame}} = 0.13,$
$SE = 0.05, p < .05$), compared with women whose weight stabilized ($\text{coefficient}_{\text{guilt}} = 0.05, SE$
$= 0.03, $p < .05$; $\text{coefficient}_{\text{shame}} = 0.09, SE = 0.04, p < .05$). The interaction effects are depicted in
Figure 5.1 for guilt and Figure 5.2 for shame. The final models accounted for 12.9% and 6.9% of
the total variance in acute weight-related guilt and shame, respectively.

5.4.3 Qualitative feedback

At the end of the study week, 22 participants (42%) provided open feedback on the study
protocol. Of the sample that provided feedback, the majority ($n = 13$) provided additional
information that they felt could help the research team understand their responses (i.e.,
predominantly reasons for not exercising), while the remaining women ($n = 8$) reported that self-
weighing had negative emotional and sometimes health behavioral effects. No participants
reported that self-weighing was a positive experience or conferred any behavioral benefits, with
the exception of increased awareness of “health” as broadly defined by the participant. Among
descriptions of negative experiences of weight monitoring, one participant reported “I could see daily weighing as beneficial to maintaining weight, but while trying to lose weight it felt very defeating”. Another participant described negative emotional experiences with self-weighing: “[I felt] shame and regret for allowing myself to have sunken into such a dismal situation, hurt by comments & looks at my weight by strangers while feeling good about having worked so hard to lose as much as I have.” Furthermore, other participants indicated negative effects on their weight management efforts: “The study actually set me back in my weight loss efforts. […] My focus was diverted from making healthy food choices to the number on the scale. It is obvious that for me at least, daily or even weekly weigh ins doesn't work”. Similarly, other participants also noted: “I found I was quite focused on the numbers and actually gained a bit during the week. I thought about food all the time and felt bad about my failure to reduce that number” and “I weigh myself regularly, but don't focus on it that much. The more I weighed myself the worse I felt, the more anxious I became, the more I ate, the more weight I gained throughout the week”. This qualitative feedback has been included with the intention of contextualizing quantitative findings, and in light of inability to systematically analyze open-ended feedback, these reports ought to be cautiously interpreted.
Table 5.3. Results of Level-1 and Level-2 analyses for models predicting (i) acute weight-related guilt and (ii) shame.

<table>
<thead>
<tr>
<th></th>
<th>Acute weight-related guilt</th>
<th></th>
<th>Acute weight-related shame</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intercept</td>
<td>Time</td>
<td>Weight</td>
<td>Intercept</td>
</tr>
<tr>
<td></td>
<td>$\beta$ (SE)</td>
<td>T-ratio</td>
<td>$\beta$ (SE)</td>
<td>T-ratio</td>
</tr>
<tr>
<td><strong>Level 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.62 (0.12)</td>
<td>13.50**</td>
<td>-0.03 (0.01)</td>
<td>-1.86</td>
</tr>
<tr>
<td><strong>Level 2: Main Effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-cancer cycling</td>
<td>0.01 (0.13)</td>
<td>0.03</td>
<td>-0.02 (0.01)</td>
<td>-1.94</td>
</tr>
<tr>
<td>Post-cancer cycling</td>
<td>0.20 (0.07)</td>
<td>3.11*</td>
<td>-0.01 (0.01)</td>
<td>-0.46</td>
</tr>
<tr>
<td><strong>Level 2: Interactions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre- X Post-cycling</td>
<td>-0.03 (0.06)</td>
<td>-0.46</td>
<td>0.01 (0.01)</td>
<td>1.21</td>
</tr>
</tbody>
</table>

*Note: Level 1 models had 49 df. Level 2 had 47 df. *p < .05, ** p < .001.
Table 5.4. Results of Level-1 and Level-2 analyses for model predicting cumulative weight-related guilt and shame.

<table>
<thead>
<tr>
<th>Cumulative weight-related guilt</th>
<th>Intercept</th>
<th>Time</th>
<th>Weight</th>
<th>Weight Preoccupation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\beta$ (SE)</td>
<td>T-ratio</td>
<td>$\beta$ (SE)</td>
<td>T-ratio</td>
</tr>
<tr>
<td>Level 1</td>
<td>1.56 (0.11)</td>
<td>14.58**</td>
<td>-0.01 (0.02)</td>
<td>-0.73</td>
</tr>
<tr>
<td>Level 2: Main Effects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-cancer cycling</td>
<td>-0.09 (0.11)</td>
<td>-0.78</td>
<td>0.01 (0.02)</td>
<td>0.47</td>
</tr>
<tr>
<td>Post-cancer cycling</td>
<td>0.13 (0.12)</td>
<td>1.11*</td>
<td>0.02 (0.02)</td>
<td>1.22</td>
</tr>
<tr>
<td>Level 2: Interactions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre- X Post-cycling</td>
<td>0.01 (0.10)</td>
<td>0.10</td>
<td>0.01 (0.02)</td>
<td>0.76</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cumulative weight-related shame</th>
<th>Intercept</th>
<th>Time</th>
<th>Weight</th>
<th>Weight Preoccupation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\beta$ (SE)</td>
<td>T-ratio</td>
<td>$\beta$ (SE)</td>
<td>T-ratio</td>
</tr>
<tr>
<td>Level 1</td>
<td>1.47 (0.10)</td>
<td>15.35**</td>
<td>-0.03 (0.01)</td>
<td>-1.74</td>
</tr>
<tr>
<td>Level 2: Main Effects</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-cancer cycling</td>
<td>0.04 (0.10)</td>
<td>0.38</td>
<td>0.02 (0.01)</td>
<td>1.29</td>
</tr>
<tr>
<td>Post-cancer cycling</td>
<td>0.06 (0.11)</td>
<td>0.60</td>
<td>0.02 (0.02)</td>
<td>1.33</td>
</tr>
<tr>
<td>Level 2: Interactions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre- X Post-cycling</td>
<td>0.06 (0.09)</td>
<td>0.64</td>
<td>-0.01 (0.01)</td>
<td>-0.79</td>
</tr>
</tbody>
</table>

*Note: Level 1 models had 49 df. Level 2 had 47 df. *p < .05, ** p < .001.
Figure 5.1. Cross-level interaction between daily body weight and guilt, by pre- and post-cancer weight cycling. Sample size for women with pre- to post-cancer stable weight \((n = 11)\), stable pre-cancer weight to cycling post-cancer weight \((n = 4)\), pre-cancer cycling weight to stable post-cancer weight \((n = 4)\), and consistent history of cycling weight \((n = 29)\).

Figure 5.2. Cross-level interaction between daily body weight and shame, by pre- and post-cancer weight cycling. Sample size for women with pre- to post-cancer stable weight \((n = 11)\), stable pre-cancer weight to cycling post-cancer weight \((n = 4)\), pre-cancer cycling weight to stable post-cancer weight \((n = 4)\), and consistent history of cycling weight \((n = 29)\).
5.5 Discussion

In the present study, the proximal and distal effects of daily self-weighing on weight-related emotions (i.e., shame, guilt) were evaluated. In addition, the effects of self-weighing on emotional outcomes as a function of pre- and post-cancer weight cycling were assessed. In support of the hypotheses, women reported higher weight-related shame and guilt, both acutely after self-weighing, and distally in the evening, on days when their weight was higher than their personal average. Contrary to the hypothesis regarding between-person effects, pre- and post-cancer weight cycling did not emerge as independent moderators of the associations between weight and guilt/shame. However, a three-way interaction effect emerged when considering the temporal effect of pre- to post-cancer cycling, for both guilt and shame. Specifically, women who had a history of weight cycling both pre- and post-cancer reported the strongest positive association between daily weight and each emotion. Surprisingly, the interaction effect was not sustained for women whose weight was stable pre-cancer and started to cycle post-cancer. As the first empirical examination of emotional consequences of self-weighing, this study highlights how minor fluctuations in weight can negatively contribute to affective states, and how a history of weight cycling can exacerbate these acute effects.

The finding that minor gains in weight have adverse emotional effects was consistent with our hypothesis, and theoretical tenets of objectification theory and models of body image in oncology, whereby undesirable changes in appearance (White, 2000a) and habitual body monitoring (Fredrickson & Roberts, 1997) can directly contribute to worsened affective states. Drawing on past literature with healthy undergraduate samples (Ogden & Evans, 1996), the negative effects of self-weighing are dependent on whether the weight-related feedback is discrepant to the individuals goal weight, whereby negative psychological outcomes will be present in individuals who reported higher weight in an experimental task. Overall, the limited body of literature on the acute effects of self-weighing has focused exclusively on outcomes of body image satisfaction/dissatisfaction, self-esteem, negative mood, and depressive symptoms and predominantly among college aged females or adolescents (Dionne & Davis, 2004; McFarlane et al., 1998; Mills & Miller, 2007; Mills, Shikatani, Tiggemann, & Hollitt, 2014). Consistently, this work presents “deteriorations in mood” (Ogden & Whyman, 1997), with some considering the number on the scale as an “emotional barometer” for how women will feel (McFarlane et al., 1998 pg 312; Mintz et al., 2013). The present study expands this body of
literature in three important ways. First, it adds to the fairly limited acute psychological outcomes to include weight-related self-conscious emotions of guilt and shame, which are closely tied to perceived failure in socially desirable goals (Conradt et al., 2008), and predictors of goal-directed health behaviours (Sabiston, Brunet, Kowalski, et al., 2012). In corroboration with the quantitative findings, women’s qualitative feedback provides important insights on the distress caused by self-weighing that may not always be captured by emotion scales. Second, it examines the self-weighing phenomenon in a unique sample of women who are at high risk of experiencing negative psychological concerns, and supports past assertions that self-weighing should not be recommended for susceptible subsets of the population (Dionne & Yeudall, 2005). And finally, the present study is the first to examine self-weighing outcomes in the natural environment (i.e., women self-weighing daily in their own homes), thereby contributing to ecologically valid findings that cannot be captured in laboratory-based experiments.

Further, the present findings advance the current dearth of literature linking weight and self-conscious emotions by examining acute outcomes of guilt and shame, considering these theoretically-relevant affect states have been predominantly overlooked in weight-related contexts (Conradt et al., 2007, 2008). In the only study to examine the associations between weight and self-conscious emotions of guilt and shame in women treated for breast cancer, researchers (Pila, Sabiston, Castonguay, Arbour-Nicitopoulos, & Taylor, submitted) reported higher levels of shame during times when weight was higher than average, and attributed this relationship to perceptions of failure that are commonly associated with higher weight (Ogden et al., 2011b). Further, the authors suggest that this relationship is exacerbated when contextualized to a breast cancer diagnosis, given knowledge that higher weight worsens disease outcomes (Friedman et al., 2007). In fact, due to the emotional demands of breast cancer diagnosis and treatment, and the pressure to maintain weight post-treatment, women treated for breast cancer may experience psychological effects from consistent weight feedback that may impair efforts for weight management (Demark-Wahnefried et al., 2005), and impact cancer-related survival (Chlebowski et al., 2002). Understanding the effects of frequent self-weighing among this high risk subset of women is necessary to improve the psychological and physical health of women treated for breast cancer.

Another key finding in the present study considered women’s histories of weight cycling, and the impact of this history on acute effects of weight changes. Contrary to our hypotheses, and past
literature on pre-cancer weight cycling (Pila et al., to be submitted), a history of weight cycling pre- or post-cancer did not modulate the relationship between weight and each self-conscious emotion. This finding is contrary to past literature on acute effects of self-weighing whereby women with restrained eating behaviours (i.e., history of chronic dieting) would experience exacerbated consequences of self-weighing (McFarlane et al., 1998; Mills & Miller, 2007; Winstanley & Dives, 2005). However, the interaction between pre- and post-cancer weight cycling emerged as a significant effect, suggesting that a comprehensive and inclusive history of women’s weight histories needs to be considered in the daily affective experiences around weight. Specifically, in the present study, women who had a history of weight cycling pre-cancer that was maintained post-cancer experienced the most emphasized and strongest relationship between weight changes and negative emotion. It is probable that women with a history weight cycling have a history of chronic and repeated failures to achieve their goal body weight (Tylka et al., 2014), which combined with the stress of managing disease risk (Demark-Wahnefried et al., 2012), may contribute to negative self-conscious emotions around weight that persist many years after the end of treatment. Combined with past evidence on self-weighing that identified women who report chronic and habitual dieting patterns (McFarlane et al., 1998; Mills & Miller, 2007) as highest risk, it is likely that even nuanced weight-related changes that occur as a result of a breast cancer diagnosis contribute to negative affective experienced when exposed to weight feedback. As such, this subsample of women with a persistent history of weight cycling are likelier at highest risk of psychological comorbidities and should be targeted in subsequent research.

Surprisingly, for participants who had stable weight pre-cancer, and developed a pattern of cycling weight post-cancer, the relationship between weight and emotions was no longer significant. This pattern of finding was differential to all other groups of women with varied patterns of weight cycling (i.e., stable to stable, cycling to stable, and cycling to cycling). This finding was both surprising in context of the present investigation, and based on past research where women with a stable weight history experienced a stronger association between weight and shame (Pila et al., submitted). It is possible that women who had a longstanding adult history of stable weight attributed the cause of their newfound weight cycling to external cancer-related diagnostic and treatment reasons that are outside of their volitional control, thereby attenuating the self-conscious emotions response (Tracy & Robins, 2004). Further longitudinal research is
needed to elucidate the nuanced effect of the chronicity of weight cycling as a predictor of weight-related guilt and shame.

It is also noteworthy that the aforementioned interaction effect was observed only for distal, and not acute, assessments of guilt and shame. As the distal measurements were collected in the evening and participants were prompted to consider their cumulative emotional state relating to weight, it is possible that evening assessments are more dispositional in nature, or tap into the trait-like features of weight-related emotions (Conradt et al., 2007). It is also likely that the ruminative preoccupation with weight throughout the day contributed to a stronger emotional response during retrospective recall in the evening. In fact, rumination or preoccupation with weight has been identified as a theoretically pertinent factor in conceptualizations of self-objectification, and is closely linked to self-conscious emotions of shame (Grabe, Hyde, & Lindberg, 2007; McKinley & Hyde, 1996). As such, a dispositional variable such as history of weight cycling has the capacity to modulate more cumulative and sustained emotional reactions, compared to acute responses immediately after self-weighing. It is possible that this same mechanism is at play in past reports where weight cycling has been identified as a moderator of the weight and emotions relationship (Pila et al., under review).

5.5.1 Limitations and Future Directions

Notwithstanding the novel findings of this daily diary study for a vulnerable subset of women with obesity treated for breast cancer, there are several limitations worth noting. First, the weight cycling measures consisted of a retrospective self-reported assessments. Albeit evidence that perceptions of weight are independently relevant to psychological factors beyond objective assessments of weight (Brener et al., 2004), future population-based research should prospectively follow women's weight gain and loss patterns across the lifespan, to capture weight patterns both before incidence of breast cancer, and after treatment. Relatedly, given the aging sample of women that was captured in this study, future studies should consider including a measure of cognitive impairment, given that age-related deficits to memory may impact self-reported assessments. Second, there was a large range in the years since the end of primary treatment for breast cancer in this sample, with most women in the later survivorship stage, thereby making a diagnosis of cancer a distal factor for consideration for weight management efforts. It is expected that breast cancer would be an acute factor in managing weight in the
earlier stages post treatment, and future research should sample women in the acute survivorship stage. Third, women were drawn from a set of weight management clinics based on past attendance and convenience sampling, and may not necessarily be treatment-seeking for obesity. Nevertheless, all women had a weight loss goal and reported actively trying to manage their weight, which is appropriate for a study trying to examine a sample of women in the pursuit of weight loss in the context of breast cancer. Future research should consider a large range of women with a history of breast cancer who are actively seeking treatment for obesity. Fourth, the present study assessed emotional responses only after self-weighing as affective responses were contextualized to weight, rather than more commonly utilized global measures of affect. Future studies should include a pre-weighing assessment of guilt and shame to elucidate the degree of emotional change as a result of self-weighing. Fifth, the categorization of pre- to post-cancer weight cycling yielded unequal and undistributed sample sizes, which may dilute the extent to which group-based comparisons can be made. Future research should purposefully sample women in each distinct category of weight cycling to examine the consequences of self-weighing. And finally, the present study did not assess the frequency of self-weighing that women engaged in outside of the 7-day assessment. Despite the robust evidence that self-weighing has negative acute effects, the frequency of self-weighing more generally (i.e., number of times per week engaged in self-weighing behaviours) is less consistently associated with negative consequences among female populations (Pacanowski, Bertz, & Levitsky, 2014). Future intensive longitudinal research should also include measures of frequency of self-weighing behaviours.

5.5.2 Implications & Conclusion

Despite the preliminary nature of this study, there are several important implications to note. Specifically, this study challenges common recommendations about the effectiveness of self-weighing for weight management, among women treated for breast cancer. Although weight feedback may encourage adherence to weight management regimen, there is substantial evidence to suggest it is a psychological detrimental behaviour, which can be especially problematic if there are minimal losses or gains in weight. This is particularly relevant in light of well-documented evidence that weight fluctuations over days or weeks are common, and often attributed to water retention, other comorbidities, pharmacological reasons, and a variety of other reasons that may be outside of the individual’s control (Heatherton, Herman, & Polivy, 1991).
Furthermore, frequent self-weighing and exposure to weight-related feedback may contribute towards maladaptive engagement in eating and exercise behaviours, which may further undermine weight management efforts and psychological health (Linde et al., 2007). Considering that weight management is notoriously difficult, psychologically demanding, and leads to a cycle of extreme behaviour change, weight loss, and regain, it is imperative to consider other weight-neutral paradigms in the management of obesity (Tylka et al., 2014), and compassion-focused approaches that manage related psychological distress (Adams & Leary, 2007). And notably, while there is substantial evidence to highlight the detrimental effect of weight gain post-treatment, there is limited evidence that post-diagnosis weight loss can improve cancer outcomes (Irwin et al., 2005), thereby hampering the utility of weight management recommendations for women treated for breast cancer. In conclusion, challenging the current weight-normative approach and adopting a weight-inclusive paradigm (Tylka et al., 2014) may be the key to promote the well-being of women with comorbid breast cancer and obesity.
Chapter 6

6 General Discussion

Breast cancer is the most common occurring cancer in Canadian women, with nearly 26,000 new diagnoses per year (Canadian Cancer Society, 2011). Due to significant improvements in cancer detection and treatment in developed countries, the proportion of women who survive breast cancer is large and growing (Siegel, Ward, Brawley, & Jemal, 2011). Nonetheless, there are widely reported psychological consequences that women face post-treatment and throughout the course of their remaining lives (Burstein & Winer, 2000). As a result, researchers are focusing attention on women’s quality of life after treatment. One of the most commonly cited and distressing side-effects of treatment is changes to weight and body composition, which have been reported in most women after treatment (Demark-Wahnefried et al., 1993). Gains in weight and undesirable changes to body composition are reported many years post-diagnosis, and suggest the importance of examining weight changes in later stages of survivorship (Campbell et al., 2007; Rio et al., 2002; Vance et al., 2011). This is especially pertinent due to the increased risk that weight gain poses on the development of weight-related comorbid disorders like diabetes, cardiovascular events, hypertension, increased psychological distress, reduced quality of life, and increase risk of cancer-related recurrence and mortality (Demark-Wahnefried et al., 2001).

Among women with breast cancer, there is a limited understanding of the psychological consequences associated with weight gain, and the detrimental patterns of weight gain (i.e., weight cycling) that may predict psychological adversities. The current mixed-methods research program attempted to fill these gaps in the literature.

In Study 1, a constructivist paradigm was used to interview women who expressed weight concerns after treatment for breast cancer. The objective of this study was to explore women’s experiences around weight concerns and preoccupation across the cancer trajectory. Overall, women reported that weight-related concerns and preoccupations contributed to psychological distress and worsened mental health. Women described feeling preoccupied with their weight and seeking to manage their weight throughout adulthood, and the exacerbated intensity of these concerns after receiving the diagnosis and treatment for breast cancer. Women also described their pervasive concerns around weight within the context of managing other stressors throughout adulthood (i.e., financial, marital, interpersonal, etc.), which all cumulatively
contributed to impaired mental health and well-being. These findings highlight the nuances and complexities of women’s lives when dealing with comorbid weight concerns and breast cancer, and thus necessitate the need to examine weight concerns beyond cancer diagnosis and treatment. This qualitative work provided a comprehensive extension of past quantitative (Przedziecki et al., 2013) and qualitative investigations (Brunet et al., 2013; Halbert et al., 2008; Maley et al., 2013; Pedersen et al., 2016) findings by focusing exclusively on a weight-concerned subset of women. Further examination of weight-preoccupied women, and consideration of women’s histories of weight changes prior to cancer will best elucidate the degree of weight-related distress that women may face in survivorship. In addition, women identified that a major component that led to weight-related distress was the internalized and explicit pressure to manage weight, and the repeated cycle of weight gain, loss, and regain that often plagues weight management efforts (Tomiyama, 2014; Tylka et al., 2014). Accordingly, it is necessary to examine how both pre- and post-cancer patterns of weight change impact women’s psychological health and well-being.

Informed by the qualitative findings from Study 1 whereby women described weight concerns as distressing, and weight management as a self-relevant failure, Study 2 was developed. Using a prospective longitudinal design, this study assessed how naturally occurring changes in weight predicted perceptions of failure and mental health (i.e., weight-related guilt, shame, and depressive symptoms). Women in the first year post-treatment for breast cancer reported the highest levels of weight-related shame during times when their weight was higher than average. This finding was likely due to women perceiving weight gains as failures that threaten global aspects of the self (Conradt et al., 2008; Ogden, Avenell, & Ellis, 2011a). In fact, guilt experiences and depressive symptoms were not affected by weight changes in this study. Since this study focused on naturally occurring changes in weight, there remains a limited understanding of the intentionality of weight management, thus urging future studies to examine the relationship between weight and psychological outcomes among women who are intentionally managing their weight.

Further, Study 2 uncovered that a history of pre-cancer weight cycling was an important predictor of overall weight-related guilt, shame, and depressive symptoms in the first-year post-treatment. However, in additional analyses, the within-person relationship between weight and shame was only retained for women who had a stable, rather than cycling history of pre-cancer.
weight. This finding was notably surprising, given that a prior history of weight cycling, coupled with current excess weight, was expected to exacerbate experiences of weight-related shame. It is likely that women with stable weight are less equipped to manage the psychological effects of fluctuations in weight after an acutely stressful event like breast cancer (Helms et al., 2008; O’Dea, 2006). Further research is needed to tease apart the temporal relevance of weight cycling, and examine if patterns of change from pre- to post-cancer weight cycling better explain this relationship. Taken together, the findings from this study contribute to the growing evidence that weight cycling is psychologically damaging (Brownell & Rodin, 1994; Field et al., 2004). This is only the second study to examine the psychological effects of weight fluctuation and to consider pre-cancer history of adulthood weight patterns (Fazzino et al., 2017), and the first study to examine these associations longitudinally. Notably, Study 2 findings contribute to emerging practical recommendations to shift towards weight-neutral practices, rather than promoting weight loss which is inextricably linked to weight cycling (Tylka et al., 2014). As the first study to suggest the longstanding negative consequences of weight cycling for psychological health, this work may have important practical implications for promoting weight-neutral practices to mitigate the negative impact of weight-related distress on mental health in women treated for breast cancer.

Building on the findings from the first two studies, Study 3 was designed to utilize intensive longitudinal methodology in a sample of women treated for breast cancer who were actively engaged in weight management. In this study, the main objectives were to assess (i) the effects of daily self-weighing on weight-related guilt and shame, and (ii) the extent to which pre- and post-cancer weight cycling contributed to emotional consequences of self-weighing. It was established that when women’s daily weigh-in revealed a higher weight than usual, higher levels of guilt and shame were reported, both immediately after self-weighing, and in the evenings when reflecting on their weight. This finding is corroborated by past evidence on self-weighing in university-aged females with and without disordered eating (McFarlane et al., 1998; Mills & Miller, 2007; Ogden & Evans, 1996; Ogden & Whyman, 1997), and extends the literature to include a unique and high risk subset of women who may be particularly vulnerable to the effects of self-weighing (Dionne & Yeudall, 2005). Further, women who had both a history of pre- and post-cancer weight cycling experienced the most exaggerated guilt and shame responses after self-weighing. As such, it can be concluded that a cumulative history of weight cycling has
detrimental acute effects that impact women’s psychological states in their daily lives. This finding is supported by evidence that women with a history of chronic dieting are at higher risk of experiencing the negative consequences of self-weighing (Mills & Miller, 2007; Winstanley & Dives, 2005). Further, it is likely that a history of chronic and repeated failures at weight management, combined with cancer-related stress, contributed to the observed negative emotions around weight. It is important to specify that only the interaction between pre- and post-cancer weight cycling (rather than pre- and post-cancer weight cycling individually) moderated the acute relationship between self-weighing and each emotion. While contrary to Study 2 which focused on sustained affective responses over the year, Study 3 suggests that a comprehensive consideration of women’s lifetime weight histories is necessary to understand the daily type of emotional responses that result from acute exposure to weight feedback.

In summary, the three interrelated and sequential studies presented in this research program: (i) described the complexities of women’s psychosocial experiences with weight concern across the cancer trajectory, (ii) identified weight-related guilt, shame, and depressive symptoms as important psychological markers of distress in relation to weight change and weight cycling, and (iii) described the acute emotional consequences associated with daily self-weighing, and the extent to which a comprehensive history of weight cycling modulated these relationships. By identifying a high-risk subset of women treated for breast cancer, this program of research challenges the current weight-focused paradigms, and urges consideration for more compassionate methods to help women cope with the psychological challenges associated with excess weight throughout the cancer trajectory.

6.1 Theoretical Implications

6.1.1 Multidimensional model of body image in oncology

After White’s (2000) initial criticisms of the unidimensional state of body image research in oncology, there has been a focus on multiple cognitive, perceptual, and affective domains of body image (Helms et al., 2008). Nevertheless, most body image investigations in breast cancer populations have focused on body image as an index of overall quality of life (Hartl et al., 2003), thereby discouraging theoretically-driven investigations on the complex and multifaceted dimensions that encompass one’s body image. Specifically, empirical investigation on the
nuanced nature of the affective domain of body image have largely been ignored. In fact, Brunet and colleagues (2013) urged for researchers to examine the variety of body-related emotions, including self-conscious emotions, that women are likely to experience beyond the treatment phase of breast cancer. Body-related self-conscious emotions have been operationalized as focused on how the body looks – focused on weight and shape, and how the body functions – focused on physical performance (Castonguay, Sabiston, Crocker, & Mack, 2014; Castonguay, Sabiston, Kowalski, & Wilson, 2016). Informed by these tenets, this program of research is the first to focus on the weight-related component of body-related self-conscious emotions among women treated for breast cancer.

White’s (2000) model stipulates that women with a perceived or actual change in appearance (i.e., weight) will experience negative emotions related to appearance and/or the body (i.e., weight-related shame and guilt) if there is a discrepancy between the actual and ideal physical self and there is strong investment in the attribute under threat (i.e., importance of weight management). The present program of research was one of the first to apply White’s model to weight concerns in women with breast cancer. Specifically, the present study identified weight-related self-conscious emotions as two important “body image emotions” as outcomes of weight change in the context of breast cancer. In support and extension of White’s (2000) model, Study 2 and Study 3 conceptualized changes in weight as predictors of higher levels of body-related guilt and shame, with Study 3 directly testing the temporal nature of this association. Importantly, the studies found inconsistent patterns between each emotion, and across chronic and acute methods of assessment, thereby advancing current conceptualizations to suggest the unique role of different emotions, at both the state and trait level.

Further, White’s (2000) model importantly considers the degree of investment in the body and physical appearance as a key precursor to body image disturbances after cancer diagnosis and treatment. In White’s (2000) model, investment is conceptualized within both (i) the body image schema, defined as “a cognitive structure that represents the sum of previous experience”, and meant to function as a template for evaluating body image experiences, and (ii) investment in body image change, which is the degree of cognitive importance placed on the changes to appearance. Unlike many other studies of body image in oncology (White & Hood, 2011), the present investigation considered the degree to which weight-related investment and women’s weight-related experiences impacted their feelings about weight post-treatment. Perceptions of
weight cycling pre-cancer (Study 2 & 3) and post-cancer (Study 3) were used as proxies of both weight-related schemas and investment. Specifically, it was assumed that women’s weight-related schemas would be considerably influenced by their chronic and pervasive patterns of weight change throughout adulthood, combined with a personal investment in weight management, thus reflecting a cognitive investment in the weight domain of body image. These assumptions were supported by findings from Study 2 and Study 3, whereby perceptions of an accumulation of adulthood weight cycling contributed to worsened weight-related emotions in the extended stages of survivorship. This collective set of findings underscores the importance of considering the affective dimension of body image in oncology, and introduces weight-related self-conscious guilt and shame as relevant emotions to explore in oncology populations. However, the current investigation precludes a comprehensive test of White’s (2000) model which also outlines compensatory behaviours as outcomes of body-related emotions. Future research is needed to examine the potential for compensatory behaviours (i.e., avoidance, obligatory exercise, restricted eating) that may result in response to these negative emotions, and integrate relevant models, such as the compensatory health beliefs model (Rabiau, Knäuper, & Miquelon, 2006).

6.1.2 Objectification theory

Objectified body-consciousness (McKinley & Hyde, 1996) and self-objectification perspectives (Fredrickson & Roberts, 1997) have guided much of the development in the body image and weight concern literature. As such, these perspectives are notably underscored in the present investigation. Specifically, objectification theory posits that women’s life experiences routinely include sexual objectification, thus socializing women to view the self as an object worthy of evaluation primarily based on the body and physical appearance (Fredrickson & Roberts, 1997). This internalization of societal objectification is manifested as body surveillance or the act of habitually monitoring the body, and making efforts to fit within societal standards of appearance. In the present program of research, monitoring weight and efforts to manage weight are conceptualized as an index of body surveillance. In Study 1, women reported an unwavering desire to reduce their weight and engaging in daily monitoring of weight, most often without acknowledgement of the internalized societal standards driving these goals. Further, Study 3 experimentally heightened body surveillance by assigning women daily self-weighing. Consistent with tenets of objectification theory (Noll & Fredrickson, 1998), women reported
heightened shame (and guilt) during assessments when their weight was higher than average. It is of noteworthy mention that fluctuations in weight over the week were minimal, suggesting that negative affective states may be induced by very minor changes to body weight.

These findings further extend self-objectification theory to include weight-related guilt, in addition to shame, as an important consequence of body-surveillance. In fact, Calogero and Pina (2011) posit that body guilt defined as “regret and remorse over how the body looks and a desire for reparative action to ‘fix’ the body” (pg. 1), ought to be included in the objectification model, given that women report guilt, in addition to shame, when social attention and potential for evaluation is directed towards their bodies. In fact, it has been documented that women, compared to men, report higher global (Else-Quest, Higgins, Allison, & Morton, 2012) and body-specific guilt and shame (Pila, Brunet, Crocker, Kowalski, & Sabiston, 2016). And objectification theory (Fredrickson & Roberts, 1997) postulates that these psychological experiences contribute to the disproportionality higher rate of conditions that are observed in women versus men (i.e., depression, sexual dysfunctions, eating disorders). Findings from Study 2 (e.g., weight cycling predicting higher guilt and shame), and Study 3 (e.g., higher weight predicts higher guilt and shame) seem to support the extension of objectification theory (Calogero & Pina, 2011) to include guilt, in addition to shame. Overall, the current program of research utilizes a framework of self-objectification to highlight the potential strength of weight surveillance as a predictor of negative affective consequences.

To gain a comprehensive understanding of objectification theory contextualized to weight monitoring, future research should assess other components of the model as outcomes, including appearance anxiety, motivational states, and awareness of internal bodily states (Moradi & Huang, 2008). Of additional importance, future work seeking to apply objectification frameworks to weight-concerned women treated for breast cancer ought to examine body shame, and guilt as mediators of the relationship between weight-related surveillance (or weight characteristics) and depressive and eating disorder symptoms, as per the original tenets of the theory (Fredrickson & Roberts, 1997; Noll & Fredrickson, 1998). In Study 2 of this program of research, depressive symptoms were tested as a direct outcome of weight, rather than as an outcome via mechanisms of weight-related shame, as proposed by the original theory. This limitation was due to sample size restrictions that precluded the ability to conduct multilevel mediation analyses (Preacher, Zyphur, & Zhang, 2010). Future research is necessary to test body
shame (and guilt) as mediators of the relationship between weight monitoring and psychological outcomes. Overall, further research advancements rooted in objectification frameworks will contribute towards understanding the effects of weight monitoring and surveillance on mental health consequences that disproportionally affect women.

### 6.1.3 Process model of self-conscious emotions

Further discussion is warranted for the consideration of guilt contextualized to weight within frameworks of emotion (Calogero & Pina, 2011). The process model of self-conscious emotions (Tracy & Robins, 2004; 2006) details the appraisal antecedents of non-contextualized self-conscious emotions, and can be useful in understanding how weight-specific guilt and shame are elicited, and how they may motivate consequent behaviours. Specifically, this theory conceives that guilt is elicited from specific, unstable, and controllable behavioural transgressions, and it triggers a desire to “correct” the self and rectify the situation that elicited the negative emotion. In contrast, shame is elicited from global, stable, and uncontrollable attributions made about the self, thereby triggering avoidance of situation that elicited the undesirable evaluation of the self (Tracy & Robins, 2004; 2006). As such, guilt may lead to motivate adaptive behaviours (i.e., compensation or correction), and shame to motivate maladaptive behaviours (i.e., avoidance or retreating). However, despite evidence that guilt is adaptive in interpersonal contexts (R. Dearing & Tangney, 2011; Gino & Pierce, 2009), body- or weight-specific guilt appears to be much more complex, thereby questioning the adaptive nature of guilt (Calogero & Pina, 2011). Specifically, the basic tenet of body- or weight-guilt having adaptive functions rests on the assumption that women should be encouraged to pursue health behaviours that correct or fix their physical appearance and weight. This assumption inherently endorses implicit societal beliefs that women’s bodies are to be controlled and evaluated, and ought to achieve specific societal standards (Fredrickson & Roberts, 1997).

For example, some of the basis for body-related guilt as an adaptive emotion relies on evidence that body-related guilt is associated with higher levels of physical activity behavior (Sabiston et al., 2010). However, this work does not consider the specific reasons for engaging in physical activity, which heavily relies on the adaptive capacity of body or weight-related guilt. It is likely that when body-specific guilt is associated with desirable health behaviours, such as physical activity, it may be a result of responding to an undesirable body-related behaviour such as
overeating with excessive compensatory exercise (Mond & Calogero, 2009). And health behaviours motivated by appearance management are closely linked to disordered eating and maladaptive exercise behaviours (Calogero & Pedrotty, 2004; Davis, Kennedy, Ravelski, & Dionne, 1994). Further appearance motivated health behaviours are associated with globally maladaptive health outcomes (Vartanian, Wharton, & Green, 2012). Additionally, it is highly unlikely that weight-related guilt will be alleviated by ascribing to societal prescriptions for health behaviour (i.e., regular exercise and dietary restraint), given that these ideals are very difficult to attain (Calogero, Boroughs, & Thompson, 2007). Indeed, tenets of the process model that suggest guilt results from controllable attributions related to effort (Tracy & Robins, 2006) are quite problematic in weight-specific contexts, given the inherent assumption that weight is under the individual’s volitional control. This is particularly problematic when considering evidence that weight has a strong biological basis and weight loss is incredibly challenging to sustain (Bacon & Aphramor, 2011), and the consistent evidence that cancer treatments promote weight gain (Harvie, 2010). Thereby, despite the seemingly health promoting consequences of guilt, body-specific guilt is more likely to result in dysfunctional behaviours compared to generalized guilt because it is more difficult to repair a failed action about the body than it is to apologize or attest to do better in the future (Calogero et al., 2007; Calogero & Pina, 2011). Considering this evidence, Calogero and Pina (2011) have suggested “body guilt to be detrimental, not adaptive, to women’s psychological and physical health” (pg. 437). As such, considering both weight-related shame and guilt as emotional consequences of weight is imperative.

6.1.4 Integration of theoretical frameworks

Collectively, the current program of research contributed to a unique understanding and comprehensive integration of theoretical frameworks of body image in oncology (White, 2000b), self-objectification (Fredrickson & Roberts, 1997), and attributional antecedents to guilt and shame (J Tracy & Robins, 2004, 2007), within the context of weight concerns in women treated for breast cancer. Specifically, tenets of the body image model in oncology (White, 2000b) are useful in explaining how perceived or actual changes in weight after treatment predict negative weight-related emotions, and are modulated by one’s cumulative history of weight cycling and efforts for weight management. Meanwhile, principles of objectification theory (Fredrickson & Roberts, 1997), and related theoretical advancements (Calogero & Pina, 2011), suggest how
cancer-related changes are strongly linked with gendered internalizations of appearance, which consequently impact psychological health outcomes (e.g., depression) directly, and indirectly through weight-related emotions. In addition, the process model of self-conscious emotions (Tracy & Robins, 2004, 2007) underscores how weight-related attributions contribute to both feelings of guilt and shame, and challenge appraisals of the locus of control in weight-related contexts. In fact, all three models emphasize components of controllability, and seem to collectively suggest the deleterious consequences of a high degree of control over the body’s appearance (Lindberg, Hyde, & McKinley, 2006). The integration of these theories presents a prosperous avenue to understand the weight-related experiences and mental health outcomes of women after breast cancer. Further research is needed to measure the specific constructs postulated by each theory, test the direct associations with guilt and shame, and examine potential compensatory behaviours that may be motivated by these negative emotions. Collectively, this work will advance current knowledge of the relationship between weight and psychological health and well-being.

6.2 Conceptual Implications

6.2.1 Frameworks of weight stigma

Embedded in recent conceptualizations of weight stigma, the collective findings from this program of research challenge current weight-focused paradigms among women treated for breast cancer (Tomiyama, 2014; Tylka et al., 2014). In a seminal review to explain mechanisms that perpetuate weight gain in individuals living with overweight or obesity, Tomiyama (2014) describes a cyclical model, whereby perceived or actual weight stigma functions to further perpetuate weight gain through various behavioural, emotional, and physiological responses. The resulting gain in weight exposes the individual to further experiences of weight stigma. Weight stigma is conceptualized as any social devaluation of individuals for weight-related reasons, and may comprise “prejudice, negative stereotyping, and discrimination towards those people” (pg. 1). As such, weight stigma conceptualizations can encompass internalized negative evaluations of weight that may be experienced via weight monitoring and body surveillance. Drawing on this conceptual framework, weight stigma may be one mechanism that perpetuates weight gain and negative psychological experiences among women treated for breast cancer. Given that the current studies do not directly assess perceived or internalized weight stigma, this proposed
mechanism is merely speculative. Nevertheless, drawing on Tomiyama’s (2014) conceptual model and considering the present investigation within a conceptual framework of weight stigma, may be fruitful for advancing the current understanding of weight-related psychological distress.

Furthermore, the emotional component of Tomiyama’s (2014) model has specific relevance to the current investigation. Specifically, this model suggests that weight stigma elicits negative emotional responses of shame (i.e., negative evaluation of weight), which consequently activate the psychobiological stress response of cortisol secretion (Dickerson & Kemeny, 2004) – a process that further contributes to weight gain. The model further stipulates that shame is likely elicited from repeated and failed attempts at losing weight. Given that the present investigation found that women reported higher levels of shame if they had a history of weight cycling (i.e., repeated and failed attempts at losing weight), the next step in this research would be to test if weight-related shame activates the cortisol response. In fact, it may be via this cortisol mechanism that weight cycling is associated with worsened physical and psychological health (Dionne & Yeudall, 2005). Considering women’s weight-related psychological experiences using a framework of weight stigma will be helpful in elucidating these specific mechanisms.

### 6.2.2 Conceptualizations of guilt and shame

Another important and related implication of this program of research is the contextualization of guilt and shame specifically to weight, given that weight is the most common physique-related domain of concern after breast cancer (White & Hood, 2011). Even since White’s (2000) call for more research to consider women’s overall investment in the body, the majority of the work has focused on breast cancer specific disfigurements to the body that are strictly contextualized to the cancer experience (i.e., loss or deformation of breasts). This strict focus on contextualized cancer-related symptoms has overlooked more global concerns that may be present prior to cancer, and may be exacerbated due to diagnosis or treatment including weight changes. Current empirical investigations of weight-related guilt and shame have been limited to accounts of women with overweight or obesity (Conradt et al., 2007, 2008), or young adult women (Castonguay et al., 2012), despite practical and conceptual application to special populations that may be particularly vulnerable of experiencing these affective states, such as breast cancer survivors. In fact, one very recent study addressed this issue and contextualized guilt and shame
to the body among women post-treatment for breast cancer, finding that body-related shame predicted decreased physical activity over time (Castonguay et al., 2017). The present program of research further addresses this gap by both contextualizing shame and guilt to a specific body-related domain, and by focusing on weight – the body image domain that presents the most importance after breast cancer (Brunet et al., 2013; White & Hood, 2011). Further, a lens of weight stigma and bias may be useful in examining weight-related guilt and shame in women with breast cancer. The next step in advancing this body of literature is to assess internalized and perceived weight stigma via validated questionnaires (Durso & Latner, 2008; Puhl & Brownell, 2006) and empirically test the complex relationship between changes in weight, weight stigma, and weight-related guilt and shame. To date, there have been no empirical investigations of weight stigma and bias in women treated for breast cancer, despite the highly relevant likelihood of stigmatization of excess weight when it is associated with increased disease risk (Bennett et al., 2005; Friedman et al., 2007).

Overall, the present investigation urges the integration of literatures in weight stigma and self-conscious emotions of guilt and shame, and to consider the applicability of weight stigma in breast cancer and other obesity-related diseases. It has been reported that women with overweight and obesity consistently face overt social stigma, prejudice, and discrimination regarding their weight, and these experiences consequently lead to feelings of weight-related shame (Puhl & Heuer, 2009). In addition to the actual or perceived weight stigmatizing that individuals with overweight may experience at the expense of others, the *internalization* of anti-fat attitudes among individuals with weight concerns (Schwartz, Vartanian, Nosek, & Brownell, 2006), bears conceptual similarity to dispositions of weight-related shame and guilt (Conradt et al., 2007). Despite the inherent shame- and guilt-focused nature of weight stigma (Puhl & Suh, 2015), there has not yet been a systematic program of research to operationalize these constructs, and integrate them in a conceptual framework. The future integration of weight stigma frameworks is imperative for the advancement of literature in weight-related shame and guilt, and the applicability of these experiences to relevant conditions such as breast cancer.

### 6.3 Methodological Implications

The current mixed-method program of research represents the first attempt to comprehensively evaluate the observational and temporal associations between weight changes and emotional
consequences, in the broader lifespan context among women treated for breast cancer. Based on recommendations for combining qualitative and quantitative methods (Creswell, 2003), the present set of studies provide a comprehensive understanding of women’s psychological experiences around weight change after breast cancer. Specifically, the use of qualitative methodology in Study 1 enabled a flexible exploration of women’s concerns around weight, and helped to identify important factors and patterns in women’s experiences to inform the program of research. Purposeful sampling methodologies were highly valuable for understanding the nuances and complexities of women’s experiences as all women interviewed expressed concern over their weight soon after treatment, and persistent concerns around their body and physical appearance were assessed prospectively over time. Based on constructivist epistemology and an idiographic phenomenological approach, the unique similarities and differences within and across women’s accounts were captured.

Informed by the findings from the qualitative study, the longitudinal design used in Study 2 was focused on the first-year post-treatment which is a vulnerable time where women navigate the challenges of diagnosis and treatment (Ganz, Kwan, Stanton, Bower, & Belin, 2011). Notably, this study also considered women’s weight histories, particularly patterns of weight cycling, as these factors were identified as highly relevant for managing weight-related psychological distress after treatment (Fazzino et al., 2017), and appropriately consider the stability of women’s weight-related experiences across the lifespan (Pila et al., 2017; Tiggemann, 2004). And despite recommendations for longitudinal research to examine weight concerns and psychological distress (Fazzino et al., 2017), Study 2 is the only known research to date using a prospective longitudinal design to examine relationships between women’s weight changes and psychological indices of distress (i.e., guilt, shame, depressive symptoms). Further, it is the first study to examine the natural concurrent development of weight and psychological distress in breast cancer. Observational studies that allow researchers to systematically collect data on these processes over time, without intervening to alter the processes (i.e., promote weight loss), are necessary to determine the extent of intervention necessary, and to identify the psychological constructs of importance. It was observed that a history of perceived weight cycling was a more robust predictor of psychological distress compared to naturally occurring fluctuations in weight post-treatment. Therefore, methodological designs that permit an examination of women’s lifetime history with weight have important clinical implications, and may challenge current
paradigms that support weight management as a necessary tool for rehabilitation after breast cancer (Demark-Wahnefried et al., 2012).

The methodological contributions of Study 2 are also related to the analytical framework. Examining both between-person (i.e., weight cycling) and within-person (i.e., changes in weight) differences in weight patterns helps to integrate evidence that weight and psychological distress have the tendency to change uniquely across women (Vance et al., 2011). The design of this study yielded insights into the extent to which within- and between-person weight characteristics contribute to psychological distress, and necessitate further research to use longitudinal methodologies and multilevel modeling to differentiate between unique effects both across and between individuals (Curran & Bauer, 2011). Considering weight may change substantially among patients across the post-treatment period (Irwin et al., 2005), it is imperative for further research to examine the concomitant and temporal effects of weight on psychological distress indices.

The intensive longitudinal daily diary design of Study 3 directly addressed the methodological limitations of Study 2, and provided further understanding of the proposed associations between weight changes and indices of psychological distress. In Study 3, women were sampled based on their desire to manage weight, thus focusing on a subset of women who are most vulnerable to weight-related psychological distress. Furthermore, the sampling in Study 3 helps to differentiate between intentional and unintentional weight changes, give that all women are in the active pursuit of weight loss (Fabricatore et al., 2011). Additionally, a self-weighing protocol was used in Study 3 that allows for the temporal discrimination between the constructs of interest – a design strength that is not possible using observational longitudinal designs measuring concurrent effects (Wickham & Knee, 2013). Finally, the design of Study 3 allows for a test of the acute or state-level emotional outcomes associated with weight, thus adding to Study 2 examining more dispositional or trait-level emotional constructs. The distinction between trait and state guilt and shame is important (Tangney & Fischer, 1995; Tangney et al., 1996) given that self-conscious emotions can function as both momentary responses to acute stimuli (i.e., weight feedback) or as stable affective dispositions, particularly when contextualized to weight (Conradt et al., 2007). Further, the daily diary sampling technique in Study 3 allows for behaviours and emotions to be assessed in “real time” in the natural environment (Stone & Shiffman, 1994), and has several advantages over typical observational self-report methods.
Specifically, this method has enhanced ecological validity, reduced retrospective recall bias, and allows for the examination of temporal ordering of the psychological consequences of weight feedback (Shiffman et al., 2008). However, the question remains if this pattern of findings is specific to women with a history of breast cancer, or if the emotional effects of self-weighing are consistent across all women with weight concerns.

Lastly, the consideration of the measures used to assess (i) weight cycling, and (ii) guilt and shame in the current investigation necessitate discussion. Current operational definitions of weight cycling vary substantially, and there are no universally recognized standards for assessing weight cycling in the general population. Researchers agree that weight cycling refers to “weight changes in opposite directions, that is, a weight loss followed by a weight gain, or vice versa” (Taing et al., 2012), however there exists a substantial variability in the way this weight change is assessed. For example, some researchers assess net weight loss or gain in adulthood, alternatively known as an assessment of weight suppression (Keel & Heatherton, 2010), or the degree of fluctuation between highest and lowest adulthood weight, as was observed in a study with women treated for breast cancer (Fazzino et al., 2017). Other researchers assess the frequency of weight loss and regain cycles, and others yet assess the magnitude of weight loss in each cycle (Field et al., 2004). Even still, there is disagreement in the number of cycles and magnitude of weight loss throughout one’s adulthood that constitutes a meaningful index of weight cycling (Vance et al., 2011). Due to evidence that perceptions of weight changes independently predict psychological factors beyond objective assessments of weight (Brener et al., 2004), Studies 2 and 3 utilized a perceived measure of weight cycling throughout adulthood. This type of assessment allowed women to reflect on their cumulative adulthood history of weight, and utilized weight change criteria that was based on past recommendations for women with breast cancer – defining weight change of at least 5 pounds per year as unstable (Ingram, Carolyn; Brown, 2004). Despite the evidence for the utility of this operationalization of weight cycling in women with breast cancer, other researchers in healthy female samples use more stringent criteria for weight cycling (i.e., intentional weight loss three or more times of at least 10 pounds; Field et al., 2004). As such, future research is crucial to examine if other indices of weight cycling (i.e., frequency of cycles; intentionality) differentially impacts psychological concerns in breast cancer.
With respect to assessments of guilt and shame, Study 2 utilized the WEB-SG (Conradt et al., 2007) to assess trait-level weight-related guilt and shame. This assessment taps into dispositional and stable aspects of guilt and shame, and describes the degree to which individuals have a natural tendency to feel guilty or ashamed about their weight, rather than more general aspects of appearance (Castonguay et al., 2014). This construct likely captures the degree to which individuals have internalized weight stigma and anti-fat bias, which are implicit and stable in nature (Schwartz et al., 2006). As such, this assessment has several strengths: (i) it is suitable for longitudinal designs because it assesses frequency of occurrence, (ii) it is contextualized to capture cognitive and behavioural components of weight preoccupation, and (iii) it overcomes challenges by other weight-related shame and guilt measures which are scenario-based and may include scenarios that are not applicable to women with breast cancer (Body Image Guilt and Shame Scale; (Thompson, Dinnel, & Dill, 2003)). Meanwhile, Study 3 utilized the State Shame and Guilt Scale (Marschall et al., 1994) as an acute assessment of each emotion, with contextualized instructions to weight value observed on the scale. This assessment of state guilt and shame is appropriate in a daily diary design since it captures the intensity of each emotion based on phenomenological descriptors, and can be easily contextualized to different contexts by adapting only the instructions of the scale. Still, other assessments of state guilt and shame have shown promise, such as 1-item measures of each emotion used in daily diary designs (Conroy & Metzler, 2003). Therefore, future research should consider the utility of other state emotion measures in response to weight, and test the validity of emotion-specific measures among women with breast cancer.

Overall, the present investigation has a series of methodological strengths and has the capacity to contribute towards the advancement of emotion, weight, and body image literature in breast cancer populations. Specifically, the use of a qualitative design with weight-preoccupied women in Study 1 was important in identifying specific factors and patterns in women’s experiences with weight, and helped to inform the following studies. The use of a prospective longitudinal design in Study 2 was essential to understand how changes in weight over the first unstable year post-treatment impacted emotional outcomes, while the use of a daily diary design in Study 3 elucidated the temporal ordering of weight and consequent emotions. Finally, the use of perceptual weight cycling variables, and the assessment of both frequency and intensity of guilt and shame allow for a comprehensive understanding of the associations of interest.
6.4 Practical Implications

6.4.1 Overview of practical implications

The cumulative findings from this program of research have important practical and clinical implications. In support of theoretical propositions of self-objectification (Fredrickson & Roberts, 1997) and the multidimensional models of body image in oncology (White, 2000b), women treated for breast cancer experience a range of psychological sequelae (i.e., negative emotions of weight-related guilt, shame, and depressive symptoms) because of weight cycling and treatment-related weight changes. As a result, it is pertinent to target the negative emotional experiences that seem to be inextricably tied to weight changes and weight management efforts, rather than continue to promote unrealistic and distressing standards for weight management (Tylka et al., 2014). There are implications for clinical weight management, in addition to the need for psychotherapeutic intervention strategies to help offset the adverse mental health consequences due to weight and to promote optimal health and well-being in the survivorship phase of breast cancer.

6.4.2 Identifying high-risk subsets

Based on qualitative evidence from Study 1, and corroborated by quantitative findings from Study 3, converging research and clinical attention to subsets of weight-preoccupied women is imperative. Like much of the body image literature that identifies a subset of body dissatisfied women at increased risk of psychopathology (Stice & Shaw, 2002), it appears that a subset weight-concerned women treated for breast cancer are at high risk of psychological adversity. In clinical oncology care, it may be helpful to utilize screening tools that identify and consequently target women with pre-existing concerns around their weight at diagnosis, and aid in the prevention of these concerns from exacerbating as a result of treatment-related changes to weight. In addition to systematic screening and intervention aimed at higher-risk women, findings from Study 2 insinuate the need to more broadly reconsider weight management recommendations made to all women in survivorship care.

6.4.3 Challenging weight-focused interventions

Standard care to reduce risk of breast cancer recurrence and to improve treatment outcomes for
women with overweight or obesity is embedded in behavioural intervention for weight management (Demark-Wahnefried et al., 2012). To test one component of this standard intervention (VanWormer et al., 2009), Study 3 was designed to promote examination of the psychological effects of self-weighing, and found that this weight feedback may have detrimental effects on emotional well-being. Effects were noted even in response to very minor gains in weight, which is particularly problematic given that weight fluctuations over days or weeks are commonly experienced across individuals (Heatherton et al., 1991). As such, these findings call for a change in the current paradigm that promotes high vigilance around weight within current weight management protocols. In fact, exposure to weight feedback has also been linked to maladaptive patterns of dieting and exercise, which serve to further undermine psychological well-being (Linde et al., 2007). When examining other behavioural intervention strategies for weight management, a review of randomized controlled trials for women after breast cancer only presents a small sample of studies with modest improvements in weight, the majority of which report short term follow-up, substantial attrition, and no assessment of weight cycling, or psychological indices (Reeves, Terranova, Eakin, & Demark-Wahnefried, 2014). Further, there is limited evidence that post-diagnosis weight loss can improve cancer outcomes (Byers & Sedjo, 2011; Irwin et al., 2005). In conjunction with findings from the current study which emphasize the psychological consequences of weight cycling, minor gains in weight, and repeated failed efforts at weight management, it is imperative to consider other weight-neutral paradigms in the management of obesity in breast cancer. In fact, the current weight-normative approach that perpetuates restrictive dieting and unrealistic exercise regimes, is thought to lead to a pattern of weight loss, inability to sustain restrictive patterns over the long term, subsequently causing weight regain (Olson et al., 2012). As the weight-normative approach is the standard of care in obesity management in breast cancer (Demark-Wahnefried et al., 2012), it is likely that the current weight management protocols and weight stigmatizing health care systems perpetuate psychological challenges (Tylka et al., 2014) for women in survivorship. In light of this evidence, it may be more critical to focus on helping women manage their psychological weight-related distress after breast cancer, rather than necessarily promoting behavioural weight loss.

The present set of findings support Tylka and colleagues (2014) proposition that the current dominant focus on weight loss and weight management is in contradiction of the delivery of ethical health care and public health promotion. The commonly prescribed and revered pursuit of
weight loss may be detrimental in the face of growing evidence that weight loss is not sustainable (Bacon, Stern, Van Loan, & Keim, 2005) and results in weight cycling which is consequently associated with adverse health (Brownell & Rodin, 1994). As such, the authors suggest a paradigm shift to remove the emphasis on weight for the achievement of optimal health and well-being. A weight-inclusive approach promotes the uniformity of health care practices (i.e., promoting physical activity engagement) regardless of weight status, and irrespective of any weight-related intent. The weight-inclusive model of practice (Tylka et al., 2014) recommends that health care providers (i) recognize weight-related biases such as stereotypes of individuals with excess weight, (ii) support plans for sustainable health behaviour change and, (iii) improve access to weight stigma free health care opportunities (e.g., exercise facilities that accommodate all bodies, and training staff who promote health improvement rather than weight loss).

Considering evidence from Study 1 that women avoid health care practitioners due to fear of ridicule for excess weight, especially in relation to breast cancer risk, adoption of weight-inclusive paradigms in health care practice may likely promote treatment adherence and greater engagement in medical care. Future research is needed to test how a weight-neutral and inclusive approach may help mitigate psychological consequences in weight preoccupied women after breast cancer.

6.4.4 “Health At Every Size” interventions

The main weight-inclusive evidence-based prescription is the Health At Every Size movement (HAES; Bacon & Aphramor, 2011), which emphasizes the adoption of intuitive eating behaviours (i.e., mindfully responding to hunger and satiety cues to determine when and what to eat), and enjoyable lifestyle physical activity (i.e., engaging in enjoyable bodily movement without an appearance or weight-related goal). Based on the evidence from this program of research, this type of approach may be highly beneficial for meeting the needs of weight preoccupied women treated for breast cancer. Although there has not been any previous application of the HAES approach in women with breast cancer, there is evidence to suggest its utility based on findings from older women with overweight and obesity. A review of the randomized controlled trials utilizing the HAES approach (Bacon & Aphramor, 2011), reported that HAES interventions, compared to traditional weight loss trials, contributed to improve biological markers (i.e., blood pressure), health behaviour engagement (i.e., increased levels of physical activity), and psychological markers (i.e., improved self-esteem and body image).
Further, individuals engaged in HAES vs traditional trials had greater adherence to treatment – a core issue identified by women in the qualitative study. Therefore, the weight-inclusive HAES approach may be a primary guideline for clinicians to apply in the care of women treated for breast cancer who present with weight concerns, and to protect against weight-related psychological distress.

6.4.5 Compassion-focused interventions

A broader psychotherapeutic strategy that may aid in the management of weight concerns in women treated for breast cancer is self-compassion or compassionate-focused therapies. Initially introduced in 2003, self-compassion is an internal coping tool that uses self-directed acceptance, kindness and empathy during times of perceived failure or suffering (Neff, 2003). Contrary to self-critical and self-blaming thoughts that are commonly associated with excess weight, self-compassion urges the objective observation of cognitions and emotions with empathy and kindness. For example, in healthy females, self-compassion is linked with lower body dissatisfaction, objectified body consciousness, body shame, and social physique anxiety (Mosewich & Kowalski, 2011). Additionally, Wasylkiw and colleagues (2012) reported that self-compassion predicted less worries around weight and overall body preoccupation, and buffers against eating pathology that is often associated with weight cycling (Ferreira, Pinto-Gouveia, & Duarte, 2013; Finley-Straus, 2011; Kelly, Carter, & Borairi, 2014; Webb & Forman, 2013). As such, the utility of self-compassion interventions in breast cancer have been proposed (Przezdziecki et al., 2013).

Since breast cancer survivors report negative emotions and tend to attribute the cause of their breast cancer to controllable factors (Friedman et al., 2007) compassion-focused interventions may be effective (Gilbert, 2009), in that they focus on recognizing self-critical thoughts and using mindfulness to reframe cognitions to be more accepting, empathetic and compassionate. After breast cancer, women would likely benefit from adopting a compassionate attitude towards the causes of their cancer, and the body-related changes occurring from treatment. Specific techniques include self-kindness (e.g., acknowledging weight gain as a part of the treatment process), mindfulness (e.g., objectively acknowledging how weight gain is very common during treatment), and common humanity (e.g., fostering sense of connectedness with other survivors). In fact, Przezdziecki and colleagues (2013) initially proposed that breast cancer survivors who
foster self-compassionate attitudes are likely to better cope with difficult cancer-related changes in appearance and counter self-blame, guilt and shame responses that lead to depression. Specifically, the researchers found that comfort with post-treatment weight was a significant mediator in the link between body image and depression symptoms, whereby women who were more comfortable with their weight experienced less depressive symptoms. Although the study was cross-sectional, it highlights the potential utility of using self-compassion to mitigate the impact of negative self-conscious emotions on overall mental health after treatment for breast cancer. Future compassion-focused interventions for women treated for breast cancer may include self-directed writing exercises to build the tenets of self-compassion (Mosewich & Kowalski, 2011), or group-based psychotherapies (Gilbert, 2009) to foster the social connection and common humanity perspective with other women.

6.4.6 Conclusion of practical implications

The integrated findings from this program of research suggest important practical directions to promote the psychological health and wellbeing of weight-concerned women treated for breast cancer. A critical step is to challenge the current weight-focused paradigms in the management of breast cancer, and rather developing strategies to alleviate the emotional consequences associated with weight changes and weight management efforts. Achieving this shift in paradigms will require advancements of research in the utility of weight-neutral and compassion-focused techniques to weight management after breast cancer. Consequently, these research advancements may spur a call to action to bridge the gaps in clinical practice. Future efforts should be targeted at forming community based collaboration to improve the standards of care for women with comorbid overweight/obesity and breast cancer. Integration of community-based advocacy groups such as the Canadian Obesity Network, the Canadian Association of Psychosocial Oncology, and the Canadian Breast Cancer Foundation, may be fruitful in this endeavor. Specifically, collaborations between these organizations may target patient-centered psychoeducational tools that promote intuitive eating and enjoyable physical activity practices, and clinician-targeted tools to implement weight-inclusive models of care in the treatment of women after breast cancer.
6.5 Limitations

Despite the contributions of this program of research, there are several broader limitations to note. First, all three studies focused on women who were treated for breast cancer, with the rationale that the weight-related implications on cancer survivorship would more readily precipitate psychopathology. Nonetheless, comparison groups of age-matched controls without breast cancer would be needed to test the assumption that a cancer diagnosis impacts weight-related distress. Furthermore, the potential implications of cancer specific and age-related psychological consequences can only be identified with comparison groups or within long-term cohort studies following women over time before a cancer diagnosis. Second, the three studies consisted of samples of self-selected women in the early to late survivorship stages post-treatment, thereby requiring retrospective recall of women’s experiences during diagnosis and treatment. To strengthen the ability to draw conclusions, future population-based surveillance research should capture women’s experiences immediately after diagnosis and throughout the course of treatment, ideally by integrating research protocols within oncology care. Third, all three studies primarily sampled women in the later survivorship stage (i.e., diagnosis more than 5 years ago), whereby the acute psychological effects associated with cancer may be subdued. Indeed, this sample of women are likely experiencing the distal psychological consequences of breast cancer. Fourth, although guilt and shame were conceptualized as emotional consequences in the current studies, these emotions are an ordinary part of the human affective spectrum, and may not necessarily surpass clinically relevant thresholds. Despite the strong associations between weight-related self-conscious emotions and psychopathology (Conradt et al., 2007), caution is necessary in the interpretation of these findings as strictly pathological. Future research is needed to examine the extent to which weight-related guilt and shame are associated with clinically standardized markers of psychopathology, and the establishment of clinical cut-off scores would be useful. Fifth, the current research considers breast cancer as a contextual factor of women’s experiences, rather than exploring the complexities of the individual cancer experiences, including diagnosis and treatment. To optimally explore the experiences of women with breast cancer, researchers should assess and include a large range of cancer-specific variables (i.e., treatment type, cancer stage, reoccurrence, etc.) in the analysis and interpretation of their findings. And finally, the observational nature of each study hinders the ability to draw temporal conclusions between weight and psychological distress. In fact, it is theoretically
possible that there is a cyclical relationship, whereby increases in weight are distressing, and this distress further perpetuates gains in weight. These overarching limitations to this program of research ought to be considered in future research.

6.6 Future Directions

The findings from the current investigation, in light of the aforementioned limitations, precipitate the need for further research. First, other highly relevant conceptual and theoretical psychological constructs ought to be considered in their role within the weight and psychological distress relationship. Most prominently, future studies would highly benefit from an assessment of internalized and perceived weight stigma – which are robust predictors of weight-related emotions (Ratcliffe et al., 2015), and have been proposed to indirectly mediate the relationship between weight and psychosocial consequences (Pila, Sabiston, Brunet, Castonguay, & O’Loughlin, 2015; Tylka et al., 2014). In addition, other tenets of the theoretical frameworks that informed this work should be considered (i.e., self-objectification related to weight, investment in changed weight, automatic thoughts related to weight), as well as testing proposed relationships within these frameworks (i.e., weight-related shame as a mediator of weight surveillance and depressive symptoms). Further, the extent to which indices of weight-related distress (i.e., shame and guilt) impact compensatory behaviours, as per White’s (2000) model and drawing on compensatory behaviour models (Rabiau et al., 2006), would provide important insights as to how negative weight-related emotions motivate efforts for exercise and dieting behaviours.

The present investigation focused solely among women post primary treatment, and primarily in the extended phase of survivorship (Study 1 and Study 3), thus resulting in a series of unanswered questions that precipitate further research. There was a strong rationale for sampling women in the later stages of survivorship (i.e., ensuring women passed the acutely stressful stage of diagnosis and undergoing treatment; are currently managing the later-stage effects of primary and secondary treatments that have implications for weight, (Makari-Judson et al., 2007). Nevertheless, the focus on this later stage in survivorship precludes a detailed understanding of how weight may differentially impact psychological health at different stages of the cancer care continuum. Longitudinal cohort studies tracking women with overweight and obesity should be conducted to measure the incidence of breast cancer and associated weight-related distress, and
track indices of psychological health throughout treatment and into later stages of survivorship. Understanding the full scope of the associations between weight and psychological indices are necessary to (i) elucidate the temporal nature of weight and distress, (ii) overcome limitations related to self-report retrospective assessments of weight, (iii) examine the unique phases of the cancer care trajectory where weight concerns may be most salient, and (iv) track the development of further psychopathology related to chronic experiences of negative emotions, and symptoms that span beyond clinical thresholds. However, due to the resource-related drawbacks associated with conducting a study of this caliber, researchers could also use experience sampling study designs with various cohorts of women across the cancer care trajectory to determine temporal associations between changes in weight and psychological distress. To target another main limitation of the present investigation, future research should also sample age-matched women without a history of breast cancer, to precisely tease apart the degree to which cancer-related factors impact weight-related psychological distress rather than developmentally-related effects of aging. For example, both Study 2 and Study 3 would benefit from a comparison control group of cancer-free women with weight concerns to examine if the strength of associations and the relationship between weight changes and psychological distress differs as a function of a cancer diagnosis. In addition, large observational cohort studies would allow for comparisons of various subgroups of women (i.e., lower socioeconomic status, higher risk ethnicities) that may be at highest risk of developing obesity-linked breast cancer.

Finally, as the overall goal of this research program is to inform empirically-supported psychosocial interventions to mitigate the negative psychological consequences of weight changes for women in survivorship, several recommendations exist for future intervention research. First, due to the promise of self-compassion as protective factor against weight concerns in women with breast cancer (Przezdziecki et al., 2013), researchers may consider testing how compassion-focused techniques (Neff & Germer, 2013) could be integrated to alleviate weight-related psychological distress. There has been promise for self-guided written psychoeducational interventions that women may be able to complete at home (Mosewich & Crocker, 2013), brief prompt-based interventions that may be delivered by clinicians during routine care (Leary, Tate, & Adams, 2007), and more intensive compassion-focused psychotherapies that are delivered in a group format (Gilbert, 2009). Although these interventions have shown promise in improving negative self-conscious emotions experiences,
and reducing psychopathology in individuals with obesity (Hilbert et al., 2015), further research is needed to determine their utility in women post-treatment for breast cancer. And finally, compassion-focused therapies are likely to contribute towards the reduction of internalized weight stigma, which have been identified as the cornerstone to improving the health and well-being of individuals afflicted with the psychological distress of obesity (Tylka et al., 2014).

6.7 Conclusion

In conclusion, this mixed-methods program of research contributes to the current body of literature in important theoretical, conceptual, methodological and practical ways. Most broadly, this work addresses the dearth of literature examining psychological consequences associated with weight changes in women treated for breast cancer, and will have important utility in guiding future research and intervention strategies to reduce negative self-conscious emotional experiences associated with weight. The inclusion of qualitative and quantitative designs that employ prospective and intensive longitudinal designs hold great value in understanding changes in weight and emotional outcomes both within and across individuals over time. Combined with the extant literature, the findings from this program of research confirm the extent to which women’s histories of weight cycling, both prior to, and after diagnosis, impact emotional outcomes associated with weight. Collectively, the present work provides insights on the chronic and stable nature of weight-related distress among women, and highlight breast cancer as an obesity-related chronic disease that may accentuate the stigmatizing effects of excess weight. It is hoped that the present research will help build person-centered survivorship care strategies that are being touted in research and practice. Specifically, this work can extend considerations of psychological health post-treatment for breast cancer, and promote weight-inclusive approaches that foster physical and psychological well-being for women across the weight spectrum.
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Schubart, J. R., Emerich, M., Farnan, M., Stanley Smith, J., Kauffman, G. L., Kass, R. B., &


Appendix A: Study 1 Interview Guide

Thank you for participating in this interview. Our research team is trying to understand women’s experiences with breast cancer and we are interested in your story. I will ask you to reflect on your whole experience starting before diagnosis to currently during survivorship. I will be asking about how breast cancer may have impacted your perceptions of your body, your overall emotional well-being and your health management behaviours. Please feel free to answer the questions using your own experience, or the experience of other breast cancer survivors more generally, or skip any questions you prefer not to discuss. During this interview – the more detail you can provide, the better for me to understand your experience. Specific examples are great. Do you have any questions before we begin?

- Can you tell me a bit about your experience with cancer.
- If you reflect on your adult life before cancer, how would you describe your weight (e.g., stable, fluctuating, etc.)?
  - Feelings about your weight?
- If you reflect on your experience, in what ways has breast cancer affected your weight?

When we initially discussed your participation in this interview, you mentioned you have some current concerns around your weight.

- Can you tell me about these concerns?
- How have these concerns changed throughout your experience with cancer?
  - During diagnosis, during treatment, post-treatment, extended survivorship?
- Have your weight concerns impacted your choices surrounding cancer treatment or care?
- In what ways have these weight concerns changed your health behaviours (e.g., physical activity, diet, sleep, stress management)?

Often women describe a complex emotional relationship with perceptions of their body during the cancer diagnosis, treatment and survivorship. It is not uncommon for women to feel internal and external pressures to maintain their weight during treatment (to reduce symptoms) and during survivorship (to reduce risk of cancer reoccurrence).

- Can you tell me about any weight-related pressures you felt throughout your experience with cancer?
- During diagnosis? During treatment? Early survivorship? Now?
  - Internal pressure (e.g., personal standards, desires)
  - Social (e.g., family and friends)
  - Healthcare providers
- In what sort of ways have you responded to these pressures (e.g., changed behaviour, coping strategies)?
- Ideally, what sort of support would you have needed regarding weight concerns throughout your experience with cancer?

Many breast cancer survivors speak to how weight concerns can impact their mood and emotions.

- For you, how have your weight concerns impacted your mood?
Has this changed throughout cancer?
• Has your weight or your concerns about weight caused you to feel self-conscious in any way - guilt, shame, embarrassment or envy?
• Has this changed throughout cancer?

We are nearing the end of the interview and I’m now hoping to review what we’ve discussed today.
• Overall, can you summarize how you think weight has impacted your experience with cancer?
• At this point, what do you think you would need to help manage your weight-related concerns and worries?
• Is there anything you would like to add that we have not discussed today?

NARRATIVES

Breast cancer survivors often describe feeling a range of emotions surrounding their weight and weight-management behaviours. Think of a specific experience when you felt guilty surrounding weight (e.g., being unable to maintain a specific weight, unable to maintain diet or exercise routine, feeling guilty for being concerned about your weight at all). Please describe this experience in detail, and include: (i) your thoughts, (ii) your feelings and (iii) your actions in regards to this experience.

How often do you experience guilt regarding your weight?
Never Rarely Sometimes Always

Think of a specific experience when you felt shame regarding your weight (e.g., felt like you were not able to manage your weight, etc). Please describe this experience in detail, and include: (i) your thoughts, (ii) your feelings and (iii) your actions in regards to this experience.

How often do you experience shame regarding your weight?
Never Rarely Sometimes Always

Think of a specific experience when you felt embarrassed about your weight (e.g., uncomfortable when stepping on scale at doctor’s office, etc). Please describe this experience in detail, and include: (i) your thoughts, (ii) your feelings and (iii) your actions in regards to this experience.

How often do you experience embarrassment regarding your weight?
Never Rarely Sometimes Always

Think of a specific experience when you felt envious regarding other’s weight (e.g., jealous that some women never gained weight during treatment, jealous that some women are not concerned with weight, etc). Please describe this experience in detail, and include: (i) your thoughts, (ii) your feelings and (iii) your actions in regards to this experience.

How often do you experience envy regarding weight?
Never Rarely Sometimes Always
Appendix B: Study 2 Surveys

Demographics

People living in Canada come from many different cultural and racial backgrounds. Please check all that applies to you:

- White
- Chinese
- South African (e.g., East Indian, Pakistani, Sri Lankan)
- Black
- Filipino
- Latin American
- Southeast Asian (e.g., Cambodian, Indonesian, Laotian, Vietnamese)
- Arab
- West Asian (e.g., Afghan, Iranian)
- Japanese
- Korean
- Other: Specify

What is your highest level of education?

- Did not complete high school
- High school diploma
- Some post-secondary, but did not complete diploma/degree
- College or technical diploma or certificate
- University undergraduate degree
- Post-graduate degree

What is your marital status?

- Single
- Married or living with a life partner
- Separated
- Divorced
- Widowed

What is your menopause status?

- Pre-menopausal
- Going through menopause
- Post-menopausal

Breast Cancer Information

What was the date of your first diagnosis for breast cancer? 

What stage of breast cancer were you first diagnosed with?

- Stage 0
- Stage I
- Stage II
Indicate which medical treatment you have received for breast cancer and the approximate date of the last treatment, if applicable:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Yes</th>
<th>No</th>
<th>Month/Year of last treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lymph or axillary node dissection</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lumpectomy</td>
<td>Yes</td>
<td>No</td>
<td>____________________________</td>
</tr>
<tr>
<td>Single mastectomy</td>
<td>Yes</td>
<td>No</td>
<td>____________________________</td>
</tr>
<tr>
<td>Double mastectomy</td>
<td>Yes</td>
<td>No</td>
<td>____________________________</td>
</tr>
<tr>
<td>Reconstructive surgery</td>
<td>Yes</td>
<td>No</td>
<td>____________________________</td>
</tr>
<tr>
<td>Chemotherapy</td>
<td>Yes</td>
<td>No</td>
<td>____________________________</td>
</tr>
<tr>
<td>Radiotherapy</td>
<td>Yes</td>
<td>No</td>
<td>____________________________</td>
</tr>
<tr>
<td>Hormonal therapy</td>
<td>Yes</td>
<td>No</td>
<td>____________________________</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td>____________________________</td>
</tr>
</tbody>
</table>

What was your usual weight, in pounds, before your breast cancer diagnosis? _____lbs

Describe your adult weight status before breast cancer diagnosis.

- [ ] Very steady adult weight (little to no weight losses or gains per year)
- [ ] Fairly steady adult weight (weight changed by less than 2 pounds per year)
- [ ] Fairly unstable adult weight (weight changed by 2 to 5 pounds per year)
- [ ] Very unstable adult weight (weight changed by more than 5 pounds per yr)
WEB-SG

Rate the extent to which you have felt these emotions in the last 3 months using the following scale: 0 = never, 1 = rarely, 2 = sometimes, 3 = often, 4 = always

Shame subscale
1. When I am in a situation where others can see my body (e.g., pool, changing room), I feel ashamed.
2. The appearance of my body is embarrassing for me in front of others.
6. When I think of the possibility that others can see my naked body, I would rather hide somewhere.
7. I am ashamed of myself when others get to know how much I really weigh.
10. I avoid exerting myself physically in front of others since I feel embarrassed.
12. Since the size of my clothes is embarrassing for me, I would rather avoid shopping for new clothes.

Guilt subscale
1. When I have eaten more than I want, I experience feelings of guilt.
3. When I eat fattening food (e.g., tarts), I get distressed by the feeling that I did something wrong.
5. When I can’t manage to work out physically, I feel guilty.
8. When I can’t get a grip on my weight, I blame myself.
9. I blame myself when I break a good resolution concerning my eating.
11. When I watch myself in the mirror, I feel guilty and decide to do more for my figure.

CES-D

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Rarely or none of the time</th>
<th>Some or a little of the time</th>
<th>Occasionally or a moderate amount of time</th>
<th>All of the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>I was bothered by things that don’t usually bother me</td>
<td>&lt; 1 day</td>
<td>1 – 2 days</td>
<td>3 – 4 days</td>
<td>5 – 7 days</td>
</tr>
<tr>
<td>I had trouble keeping my mind on what I was doing</td>
<td>&lt; 1 day</td>
<td>1 – 2 days</td>
<td>3 – 4 days</td>
<td>5 – 7 days</td>
</tr>
<tr>
<td>I felt depressed</td>
<td>&lt; 1 day</td>
<td>1 – 2 days</td>
<td>3 – 4 days</td>
<td>5 – 7 days</td>
</tr>
<tr>
<td>I felt that everything I did was an effort</td>
<td>&lt; 1 day</td>
<td>1 – 2 days</td>
<td>3 – 4 days</td>
<td>5 – 7 days</td>
</tr>
<tr>
<td>I felt hopeful about the future</td>
<td>&lt; 1 day</td>
<td>1 – 2 days</td>
<td>3 – 4 days</td>
<td>5 – 7 days</td>
</tr>
<tr>
<td>I felt fearful</td>
<td>&lt; 1 day</td>
<td>1 – 2 days</td>
<td>3 – 4 days</td>
<td>5 – 7 days</td>
</tr>
<tr>
<td>My sleep was restless</td>
<td>&lt; 1 day</td>
<td>1 – 2 days</td>
<td>3 – 4 days</td>
<td>5 – 7 days</td>
</tr>
<tr>
<td>I was happy</td>
<td>&lt; 1 day</td>
<td>1 – 2 days</td>
<td>3 – 4 days</td>
<td>5 – 7 days</td>
</tr>
<tr>
<td>I felt lonely</td>
<td>&lt; 1 day</td>
<td>1 – 2 days</td>
<td>3 – 4 days</td>
<td>5 – 7 days</td>
</tr>
<tr>
<td>I could not “get going”</td>
<td>&lt; 1 day</td>
<td>1 – 2 days</td>
<td>3 – 4 days</td>
<td>5 – 7 days</td>
</tr>
</tbody>
</table>
Appendix C: Study 3 Surveys

Demographics

Date of birth (day/month/year): __________

People living in Canada come from many different cultural and racial backgrounds. Please check all that applies to you:

___White
___Chinese
___South African (e.g., East Indian, Pakistani, Sri Lankan)
___Black
___Filipino
___Latin American
___Southeast Asian (e.g., Cambodian, Indonesian, Laotian, Vietnamese)
___Arab
___West Asian (e.g., Afghan, Iranian)
___Japanese
___Korean
___Other: Specify_____________

What is your highest level of education?

___Did not complete high school
___High school diploma
___Some post-secondary, but did not complete diploma/degree
___College or technical diploma or certificate
___University undergraduate degree
___Post-graduate degree

What is your marital status?

___Single
___Married or living with a life partner
___Separated
___Divorced
___Widowed

What is your menopause status?

___Pre-menopausal
___Going through menopause
___Post-menopausal

In the past, have you ever been diagnosed by a medical professional with a physical (e.g., diabetes) or psychiatric (e.g., depression) health concern? If so, please list your diagnoses:
Are you currently taking any medications prescribed by a medical professional? If so, please list your prescribed medications, and specify the condition they were prescribed for:

<table>
<thead>
<tr>
<th>Prescribed Medication</th>
<th>Condition prescribed for</th>
</tr>
</thead>
<tbody>
<tr>
<td>e.g., Effexor XR</td>
<td>Depression</td>
</tr>
<tr>
<td>e.g., Metformin</td>
<td>Type 2 diabetes</td>
</tr>
<tr>
<td>e.g., Soltamox</td>
<td>Breast cancer</td>
</tr>
</tbody>
</table>

Breast Cancer Information

What was the date of your first diagnosis for breast cancer? ______________________

What stage of breast cancer were you first diagnosed with?

- [ ] Stage 0
- [ ] Stage I
- [ ] Stage II
- [ ] Stage III
- [ ] Stage IV

Since your first diagnosis, have you experienced a re-occurrence of breast cancer?

- [ ] Yes
- [ ] No

If yes, what was the date(s) of your re-occurrence? ________________________________

Indicate which medical treatment you have received for breast cancer and the approximate date of the last treatment, if applicable:

- Lymph or axillary node dissection
  - [ ] Yes
  - [ ] No
  - Month/Year of last treatment:__________________

- Lumpectomy
  - [ ] Yes
  - [ ] No
  - Month/Year of last treatment:__________________

- Single mastectomy
  - [ ] Yes
  - [ ] No
  - Month/Year of last treatment:__________________

- Double mastectomy
  - [ ] Yes
  - [ ] No
  - Month/Year of last treatment:__________________

- Reconstructive surgery
  - [ ] Yes
  - [ ] No
  - Month/Year of last treatment:__________________

- Chemotherapy
  - [ ] Yes
  - [ ] No
  - Month/Year of last treatment:__________________

- Radiotherapy
  - [ ] Yes
  - [ ] No
  - Month/Year of last treatment:__________________

- Hormonal therapy
  - [ ] Yes
  - [ ] No
  - Month/Year of last treatment:__________________

- Other:____________
  - Month/Year of last treatment:__________________

What was your usual weight, in pounds, before your breast cancer diagnosis? _____lbs
Describe your adult weight status before breast cancer diagnosis.

- Very steady adult weight (little to no weight losses or gains per year)
- Fairly steady adult weight (weight changed by less than 2 pounds per year)
- Fairly unstable adult weight (weight changed by 2 to 5 pounds per year)
- Very unstable adult weight (weight changed by more than 5 pounds per yr)

Describe your adult weight status since finishing your primary treatment for breast cancer:

- Very steady weight (little to no weight losses or gains per year)
- Fairly steady weight (weight changed by less than 2 pounds per year)
- Fairly unstable weight (weight changed by 2 to 5 pounds per year)
- Very unstable weight (weight changed by more than 5 pounds per yr)

What is your height, in feet and inches? ______ ft. _______in.

Did you experience any changes in weight after finish treatment for breast cancer?

a. No changes in weight after completion of treatment
b. Gained approximately ______ lbs post-treatment
c. Lost approximately ______ lbs post-treatment

Has your weight impacted your choices around cancer treatment?

- No, my weight has not impacted my choices for cancer treatment
- Yes, my weight has impacted my choices for cancer treatment in the following way:

  ________________________________
  ________________________________
  (e.g., discontinuation of Tamoxifen)

For how long did you participate in the weight management program at Wharton Medical Clinic?

Weeks: ________

When was the last time you attended Wharton Medical Clinic?

Month: _______ Year: _________
Morning Survey

1. Please provide your email address:

2. Good morning! It is time for your morning weigh-in. Before doing anything else this morning, please step on the scale with minimal clothing and no footwear. Record the weight displayed on the scale (in pounds). Repeat this process again two more times. Record all three weights (in pounds).

   Weight #1
   Weight #2
   Weight #3

3. How does today’s reported weight compare to your usual weight?
   - Less than usual
   - About the same as usual
   - More than usual

4. What is your ideal or goal weight (in pounds)?

5. How does today’s reported weight compare to your ideal or goal weight?
   - Much more than my goal weight
   - Somewhat more than my goal weight
   - About the same as my goal weight
   - Somewhat less than my goal weight
   - Much less than my goal weight

6. How important is it for you to attain this ideal or goal weight?
   - Not at all
   - A little bit
   - Moderately
   - Quite a bit
   - Extremely
9. When you think about your **body weight right now** (e.g., the number on the scale), how do you feel?

<table>
<thead>
<tr>
<th></th>
<th>Not feeling this way at all</th>
<th>Feeling this way somewhat</th>
<th>Feeling this way very strongly</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel good about myself</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I want to sink into the floor and disappear</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I feel remorse, regret</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I feel worthwhile, valuable</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I feel small</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I feel tension about something I have done</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I feel capable, useful</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I feel like I am a bad person</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I cannot stop thinking about something bad I have done</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I feel proud</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I feel humiliated, disgraced</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I feel like apologizing, confessing</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I feel pleased about something I have done</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I feel worthless, powerless</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>I feel bad about something I have done</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
### Evening Survey

1. Please provide your email address:  

2. Since weighing yourself this morning...  

<table>
<thead>
<tr>
<th>Not at all</th>
<th>Very much</th>
</tr>
</thead>
<tbody>
<tr>
<td>...how often have you thought about the number on the scale?</td>
<td></td>
</tr>
<tr>
<td>...how often has your weight been on your mind?</td>
<td></td>
</tr>
</tbody>
</table>

4. When you think about today's **body weight** (e.g., the number on the scale this morning), how do you feel **right now**?  

<table>
<thead>
<tr>
<th>Not feeling this way at all</th>
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<td></td>
</tr>
<tr>
<td>I feel worthless, powerless</td>
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<td></td>
</tr>
<tr>
<td>I feel bad about something I have done</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix D: Ethical Approvals

Study 1 & Study 2 Ethical Approval

PROTOCOL REFERENCE # 28180

June 25, 2015

Dr. Catherine Sabiston
FACULTY OF KINESIOLOGY AND PHYSICAL EDUCATION

Dear Dr. Sabiston,

Re: Your research protocol entitled, “The impact of physical activity on physical and mental health among breast cancer survivors over time”

We are writing to advise you that a member of the Health Sciences Research Ethics Board (REB) has granted approval to an amendment (Received June 8, 2015) to the above-referenced research protocol under the REB’s delegated review process. This amendment approval letter only applies to what was outlined in the request form under section 5.a) or otherwise marked in the revised protocol.

Any changes to the approved protocol or consent materials must be reviewed and approved through the amendment process prior to its implementation. Any adverse or unanticipated events should be reported to the Office of Research Ethics as soon as possible.

Best wishes for the successful completion of your research.

Yours sincerely,

Elizabeth Peter, Ph.D.
REB Chair

Daniel Gyewu
REB Manager
Study 3 Ethical Approval

Other measures assessed in this study include daily assessments of Positive and Negative Affect (Watson, Clark, & Tellegen, 1988), and post-study assessments of Weight and Body-Related Shame and Guilt Scale (Conradt et al., 2007), guilt and shame items from Body and Appearance-related Self-Conscious Emotion Scales (Castonguay et al., 2014), Centre for Epidemiological Studies Depression Scale (Irwin et al., 1999), Self-Compassion Scale (Neff, 2003), Three-factor Eating Questionnaire (Stunkard & Messick, 1985), and motivation and competence for exercise (Levesque et al., 2006).