

Exploration of Exercise Motivation and Adherence Among Individuals Living with Cancer  
Following Participation in a Structured Group-based Exercise Program

A Thesis Presented to the  
School of Kinesiology  
Lakehead University

In Partial Fulfillment Of the Requirements  
for the Degree of Master of Science in Kinesiology,  
With Specialization in Gerontology  
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## **Acknowledgements**

I would like to express my deep gratitude to my supervisor, Dr. Joey Farrell for her guidance and support throughout my studies at Lakehead University. Her organizational skills, attention to detail, and expertise in research, has been instrumental for the completion of my thesis. She has taught me many important life lessons and helped me to realize my own potential, and for that I am forever thankful. I would also like to thank my committee members, Dr. Erin Pearson, and Tracey Larocque, who have been an invaluable source of knowledge and support. They believed in me throughout the tense and stressful moments and encouraged me to keep going even when I had doubts. I would also like to thank the participants who participated in this study. I feel fortunate to have met these inspirational women who shared intimate details regarding their personal lives and experiences with cancer. Their incredible perspectives on life greatly impacted my own views and I will never forget this experience because of them. I am also indebted to Sandra Blackburn, who has given me so much support in life and academics. Her wisdom and kind heart has impacted my life and I will always cherish our conversations, I am so thankful for my parents Doug and Judy Hurley, my greatest fans, who have always believed in me. They are my role models and I am so appreciative of their unrelenting support throughout my life journey. Lastly, I very thankful for my partner Dane Newbold, who has always stuck by my side. He has been my best friend, my rock, and my shoulder to cry on throughout the “ups” and “downs” of my university experience and encouraged me every step of the way.

## Abstract

**Background/Objectives:** Previous literature has found that exercise participation for individuals living with cancer has a multitude of benefits and is recommended for rehabilitation following cancer treatment. It has been suspected that more of these benefits may be obtained in a structured group-based exercise program due to the safe environment and support from instructors/group members. Exploration utilizing the Self-determination Theory was used to determine differences in exercise participation immediate versus long-term post participation in a structured group-based program. Furthermore, fulfillment of the basic psychological needs (autonomy, competence, relatedness) was assessed to determine different factors that influence motivation over time. **Method:** For both Phase One and Phase Two of this study 10 semi-structured interviews were conducted with women aged 37 years and older, living with cancer, and who were recruited from a structured group-based exercise program. All participants completed the Medical History Assessment form which gathered information regarding lifestyle factors and general health. Using NVivo and the basic psychological needs as a theoretical framework exercise motivation was explored for both Phase One and Phase Two. **Results:** According to participants interviewed immediate post program (Phase One), fulfillment of autonomy, competence, and relatedness was achieved while participating in a structured group-based exercise program. Participants indicated that the safe and comfortable atmosphere, as well as the support from the group played an important role in fostering their motivation towards exercise. Those participants interviewed long-term post program (Phase Two) had varied outcomes. Four participants continued exercise in a structured group-based exercise program and indicated that fulfillment of the basic psychological needs still remained present and impacted their adherence to exercise. The remaining participants had significantly lower levels of exercise participation and indicated a variety of barriers (e.g., injury, retirement) influencing exercise engagement. The lack of group support negatively impacted exercise outcomes for the less active individuals in this phase. **Conclusion:** The findings revealed that exercise in a structured group-based exercise program may provide more of the benefits associated with exercise for individuals living with cancer. Fulfillment of all three basic psychological needs did impact exercise motivation, which was evident for those who continued exercise over time. Further investigation into the role of the needs and long-term exercise participation for individuals living with cancer is necessary to gain a better perspective on how exercise programs can be modified appropriately for this population.

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## Introduction

According to the Canadian Cancer Society, an estimated 191,300 Canadians developed cancer and 76,600 died of cancer in 2014. It is also reported that although cancer is a disease that can occur at any age, it mostly affects Canadians aged 50 and older (Canadian Cancer Society, 2014). Many individuals living with cancer are highly motivated to seek information about lifestyle factors that may positively influence their recovery and long-term quality of life – including the role of physical activity and exercise (O'Mathuna, 2012). Based on previous research, it is evident that physical activity and exercise have physiological and psychosocial benefits for individuals living with cancer, including improved quality of life (Brunet & Sabiston, 2011).

Schmitz, Holtzman, and Courneya (2005) state that given the growing population of individuals living with cancer, there is a need to establish the extent to which physical activity is appropriate during and after treatment, as well as whether physical activity is effective for improving the health and well-being for individuals living with cancer across the cancer control continuum. The cancer control continuum includes primary prevention, early detection, screening, diagnosis, and treatment including supportive care and palliative care. Furthermore, Courneya and Karvinen (2007) believe that it is necessary to test effective exercise behaviour change interventions for individuals with cancer that can be delivered by cancer centers, community cancer care organizations, and fitness centers. If effective exercise behavior change interventions can be found, cancer organizations and fitness centers can implement these practices and encourage individuals living with cancer to engage in physical activity and exercise.

Motivating individuals to exercise is challenging in any population, due to the complex nature of the activity and the plethora of conflicting frameworks utilized in the literature (Courneya & Karvinen, 2007; Plonczynski, 2000). Although an abundance of health benefits

are inherent in habitual exercise, older individuals living with cancer may have unique exercise barriers as a result of their cancer and its treatments (Courneya & Karvinen, 2007). Some of the most commonly cited barriers for exercise participation include lack of motivation or self-discipline, lack of interest or enjoyment, lack of time, and fatigue (Lee, 2013; McMillan & Newhouse, 2011). Furthermore, Cancer is a complex disease, which encompasses multiple dimensions including cancer type, treatment type, symptom severity, and recovery/rehabilitation process. This must be taken into consideration when considering exercise interventions and ways to overcome barriers such as exercise motivation.

A multitude of theories have been used to assess exercise motivation, one of which is the self-determination theory and the basic psychological needs theory (Deci & Ryan, 2000). Research has examined the fulfillment of the three basic psychological needs (autonomy, competence, and relatedness) to describe exercise motivation in a variety of population groups, including individuals living with cancer (Wilson, Mack, & Grattan, 2008). However, limited research has looked at exercise motivation and fulfillment of the basic psychological needs for individuals living with cancer following participation in a structured group-based exercise program.

## **Cancer**

Cancer is the term used to describe a group of over 200 different diseases that have one common feature—cells that undergo a series of genetic mutations that allow them to grow and divide indefinitely (National Cancer Institute, 2014). According to the National Cancer Institute (2014), there are five main categories of cancer including: Carcinoma (cancer that begins in the skin or in tissues that line or cover internal organs), sarcoma (cancer that begins in bone, cartilage, fat, muscle, blood vessels, or connective tissue), leukemia (cancer that starts in blood-forming tissue such as the bone marrow), lymphoma (cancers of the lymphatic system) and myeloma (cancers that begin in the cells of the

immune system), and central nervous system cancers (cancer that begins in the tissues of the brain and spinal cord). If the genetic material (DNA) of a cell is damaged or changed, mutations can occur that affect normal cell growth and division. If this occurs, cells do not die when they should and new cells form when the body does not need them, these extra cells form a mass of tissue called a tumor. A tumor can be benign or malignant. Benign tumors are not cancerous and do not spread to other parts of the body, whereas malignant tumors are cancerous, invade nearby tissues and spread to other parts of the body (National Cancer Institute, 2014). Although cancer comprises over 200 different diseases, the four most common cancers—lung, breast, prostate, and colorectal—account for over 55% of all new cancer cases and over 50% of all cancer deaths each year (National Cancer Institute, 2014). Men and women are disproportionately affected by cancer; two out of five Canadians (46% of men and 41% of women) are expected to develop cancer during their lifetime, and one out of four Canadians (28% of men and 24% of women) are expected to die from cancer. As the type of cancer can vary with each individual, the stage and severity of cancer can vary as well. Staging describes the severity of a person's cancer based on the size and/or extent of the original tumor and whether or not cancer has spread in the body (National Cancer Institute, 2014). Staging is important for selecting appropriate treatment and estimating prognosis. The Public Health Agency of Canada states individuals must take the necessary steps to reduce their risk of developing cancer and that early detection is very important. The most common ways to reduce cancer risk include not smoking, eating well, being more active, protecting skin from the sun, and seeing your doctor when your health changes (Public Health Agency of Canada, 2013). The major demographic determinant of cancer risk is aging (Canadian Cancer Society, 2014). According to the National Cancer Institute (2014) 78% of all cancer cases and 81% of all cancer deaths occur in adults aged 60 years and over, where 43% of all cancer cases and 60% of all cancer deaths occur in adults aged 70 years and over. Over the last several decades, survival rates for some cancers have

increased owing to earlier detection, more effective treatments, and better supportive care (Courneya & Karvinen, 2007). This may result in a larger population of older individuals living with cancer and/or the effects of treatment.

**Cancer and aging.** Aging can be broadly defined as changes that occur over the course of life (National Institute of Aging, 2012). Physical decline may be a normal result of aging; however the reasons for these changes are of particular interest to gerontologists. Specifically, gerontologists look for what distinguishes normal aging from disease, as well as why older adults are increasingly vulnerable to diseases such as cancer. Most people diagnosed with cancer are aged 65 years and older, and many diagnosed younger live to become older survivors (Blank & Bellizzi, 2008). Despite the finding that older men and women are disproportionately affected by cancer, remarkably little attention has been given to cancer in gerontology and geriatric communities, and even less to aging processes in oncology (Blank & Bellizzi, 2008). Most of the focus in geriatric oncology has been directed to functional effects, rather than the psychological impacts and social relationships (Blank & Bellizzi, 2008). By exploring the age-related impact of cancer, research and clinical practice will benefit from research focusing on the psychological and social changes associated with aging (Blank & Bellizzi, 2008). As described by Blank and Bellizzi, (2008) age affects screening, treatment options, and the overall experience of cancer. Due to the advancements in cancer treatment an increase in older individuals living with cancer will be seen and the variability of treatment effects must be taken into consideration.

**Cancer and treatment side effects.** According to the Canadian Cancer Society (2014), people with cancer may experience a variety of symptoms or side effects, such as nausea, diarrhea, pain or fatigue. This can affect an individual's physical/emotional well-being and quality of life; therefore appropriate measures must be used to cope with cancer and/or its treatment. The causes, severity and length of time someone experiences symptoms and side effects varies from person to person (Canadian Cancer Society, 2014). Although

advancements in treatment options offer a positive outlook for surviving the disease (Brunet & Sabiston, 2011), individuals living with cancer may face limitations in activities of daily living, functional limitations, and psychological disability (Courneya et al., 2004). The most common treatments for cancer include surgery, radiation therapy, and systemic therapies (i.e., drugs) such as chemotherapy, and hormone therapy (National Cancer Institute, 2014). Side effects from these medical interventions include detriments in physical functioning and quality of life, increased risk for secondary cancers, and other major health conditions such as cardiovascular disease and obesity (Alfano & Rowland, 2006; Stanton, 2006). Cancer and its treatments may ultimately lead to long-term limitations in individuals living with cancer such as lymphedema, osteoporosis, digestive problems, and memory problems (Canadian Cancer Society, 2014). Various cancer treatments may have adverse effects that exercise does in fact counteract, including pain, fatigue, impaired cardiorespiratory capacity, reduced quality of life, and suppressed immune function (O'Mathuna, 2012). Living with cancer and the effects of treatment is difficult for most individuals. An older cancer survivor can experience different side effects depending on the treatment type he/she is receiving. An individual who undergoes radiation therapy may experience localized pain and skin burning whereas a chemotherapy patient may experience extreme nausea and fatigue (Canadian Cancer Society, 2014). The same principle can be applied to any of the other modalities used to treat cancer. Coping with the effects of cancer and its treatments must be individualized and target all components of health and wellness including physical, social, emotional, and spiritual wellness.

**Coping with cancer.** Living with cancer is an experience that can affect the body, mind, and spirit. Older individuals living with cancer are often faced with having to employ coping strategies while simultaneously dealing with age-related disabilities, such as deterioration in mobility, vision, and strength (Courneya & Karvinen, 2007). According to Ganz and colleagues (2003), an individual living with cancer may experience social and/or

emotional issues such as widow-hood, retirement, and inadequate social support, which may adversely affect their ability to effectively cope with cancer during and after treatment. Not only can an older individual living with cancer experience emotional reactions during treatment, but also when treatment ends and how he/she feels afterwards. This type of reaction could manifest from the changes associated with normal aging as well as changes that may occur during treatment. Individuals living with cancer will experience different types of emotional responses that may be positive or negative. For example, an individual may feel satisfaction about personal relationships that have deepened or discover increased confidence that comes with finding strengths within oneself. However, some emotional reactions might include conflicting feelings such defeat or being alone. Some individuals may feel relieved once cancer treatment has ended, or some may feel like they have many unanswered questions. These might involve issues such as whether or not the cancer is gone for good, unsure of what will happen next, or how they will continue on without their cancer team. In serious cases individuals may experience feelings of depression, anxiety, or fear related to their cancer (Temel et al., 2009). Anxiety and fear may be caused by the individual's concern of uncontrolled pain, dying, what happens after death, what happens to loved ones, fear of treatment; doctor visits and tests may also cause apprehension (Canadian Cancer Society, 2014).

An individual who is diagnosed with cancer may feel overwhelmed with emotions therefore he/she must rely on coping strategies, in order to stay emotionally and physically strong (Rodriguez, 2009). Some examples of coping strategies might include ensuring adequate nutrient intake, stress management, enrolling in support groups, staying connected with loved ones, and engaging in physical activity and exercise. Healthy eating habits, or nutrition therapy, is essential for helping individuals with cancer to have more energy, maintain body weight and strength, keep body tissue healthy, and fight infection (National Cancer Institute, 2014). Healthy eating habits can help these individuals deal with the effects

of cancer and its treatment and have a better chance of recovery and quality of life (National Cancer Institute, 2014). Support groups are also available through cancer care organizations, and community/online services, which may also help individuals' cope throughout the cancer continuum.

Although these coping methods are extremely important, clinicians in the past have excluded physical activity and exercise as an essential component for health and well-being for individuals living with cancer. Furthermore, physical activity and exercise as a coping method and helping individuals with the functional affects associated with cancer and its treatments has little attention. More attention is needed regarding quality of life during and after treatment (Hacker, 2009; Hearst, 2009; O'Mathuna, 2012; Wilson, Mack, & Grattan, 2008), including the role that physical activity and exercise (i.e., structured versus unstructured) may play (Courneya & Karvinen, 2007).

### **Physical Activity and Exercise**

The terms physical activity and exercise are used frequently and interchangeably in the literature, even though they are not the same. The World Health Organization (2014) defines physical activity as any bodily movement produced by skeletal muscles that requires energy expenditure, including exercise (i.e., cardiovascular, resistance training). Haas (2011) describes exercise as a planned, structured, repetitive activity (i.e., a subset of physical activity), which includes both structured exercise and all unstructured bodily movement that results in energy expenditure. An example of a structured form of exercise would be a group-based fitness class. A study conducted by Mutrie et al. (2007), revealed that group-based exercise provides functional and psychological benefits (i.e., enhanced mood) for women with breast cancer. This emphasized the importance of physical activity for individuals living with cancer and the inclusion of exercise opportunities in cancer rehabilitation services (Mutrie et al., 2007). In comparison, exercise that is unstructured would be more self-

directed, allowing the individual to make up activities at home or in the environment (i.e., cardiovascular/weight training combinations, walk/run, bicycle ride). Unstructured activity allows time for creativity and self-expression whereas structured activity encourages more socialization, development of motor skills and may help to improve self-confidence. While both structured and unstructured exercise inclusion have positive outcomes for individuals, there is a need for research to explore how these two different exercise environments influence continued participation and long-term benefits.

**Benefits of exercise.** Given the growing population of individuals living with cancer (approximately 2.5% of Canadian population), there is a need to establish the extent to which exercise is appropriate for these individuals during and after treatment, as well as whether exercise is effective for improving health and well-being across the cancer control continuum (Canadian Cancer Society, 2014; Schmitz et al., 2005). Research has proven that a multitude of benefits can be attained from physical activity, aerobic exercise, and resistance training (Warburton, Nicol, & Bredin, 2006) including physical, psychological and social benefits. Physical benefits include improvements to cardiopulmonary fitness, muscle strength, body composition, balance, flexibility, bone health and fatigue (O'Mathuna, 2012). Psychological benefits include a significant reduction in stress, anxiety, depression, and self-esteem (Pekmezi et al., 2012; Temel et al., 2009; Warburton et al., 2006; Wilson, Blanchard, Nehl, & Baker, 2006). Social benefits include meeting new people, developing friendships, and broadening social network. Specific symptoms caused by cancer and some of the adverse effects associated with treatment may be counteracted by exercise including: unintended loss or gain of body weight, loss of muscle mass, nausea, vomiting, and difficulties eating or digesting food (O'Mathuna, 2012). To date, a number of reviews have reported on the effects of physical activity and exercise for individuals living with cancer, and investigated specific outcome variables such as quality of life, fatigue, psychosocial well-being, and physical functioning (Burnham & Wilcox, 2002; Hacker, 2009; Hearst, 2009; Loprinzi & Cardinal, 2013;

McMillan & Newhouse, 2011). In addition to the multiple health benefits that an individual living with cancer can incur through regular engagement in exercise, benefits also include taking his/her mind off cancer and treatments, recovering from surgery, coping with stress, gaining more control over life, maintaining a normal lifestyle, and overall improvement to health and well-being (Schneider, Eveker, Bronder, & Meiner, 2003).

Burnham and Wilcox (2002) studied the effects of aerobic exercise on physiological and psychological variables for cancer patients (15 female and 3 male) aged 40 to 65 years of age following cancer treatment. Participants performed lower-body aerobic exercise three times a week for 10 weeks; results revealed statistically significant increases in aerobic capacity ( $p < 0.001$ ), a significant decrease in body fat ( $p < 0.001$ ), and a significant increase in quality of life ( $p < 0.001$ ). Participants were receptive to exercise intervention following cancer treatment indicating the need to include low or moderate intensity exercise during the rehabilitation process. In particular, structured exercise (i.e., group-based exercise programs) may provide more of these benefits than unstructured exercise, due to the support that individuals receive from instructors and other participants taking part in the program (Temel et al., 2009). In a structured group-based exercise program, individuals would experience the benefits of exercise as well as the benefits attained from a supportive group. In a study conducted by Temel and colleagues (2009) the feasibility of a hospital-based exercise program for patients with advanced non-small cell lung cancer was examined using the Functional Assessment of Cancer Therapy-lung and Functional Assessment of Cancer Therapy-fatigue scales. The structured exercise sessions were supervised and took place in a group format (8-10 patients), each lasting 90 to 120 minutes. Findings from this study indicated that a structured group-based exercise program could improve symptom burden and functional capacity in cancer patients. This program was supervised, which, in contrast to home-based exercise (unstructured) ensured not only the safety of medically ill participants but also the accuracy and reliability of adherence rates to the exercise sessions (Temel et al.,

2009). Therefore unstructured exercise may be more challenging for individuals, as it requires them to independently create exercise regimes and have the motivation and determination to continue exercise over the lifespan. By encouraging older individuals living with cancer to engage in structured types of exercise we may see an increase in exercise participation and health benefits received (Temel et al., 2009).

Although an increasing number of studies have found exercise to be a feasible and safe treatment option for individuals living with cancer (Matthews et al., 2007; O'Mathuna, 2012; Schneider et al., 2007; Thorsen, Courneya, Stevinson, & Fossa, 2008), engagement in regular exercise often decreases during and after cancer treatment (Hefferon, Murphy, McLeod, Mutrie, & Campbell, 2013; Wilson et al., 2006). Based upon these observations, it seems that there is considerable reason for examining appropriate exercise regimens that may be suitable for older individuals living with cancer with a view to ensuring long-term engagement.

**Exercise guidelines for individuals living with cancer.** In general, individuals living with cancer are encouraged to be as physically active as their abilities and conditions allow and to avoid inactivity (Schmitz et al., 2012). Although some physical activity is better than none, recommendations emphasize the importance of at least 150 minutes per week of moderate-intensity aerobic physical activity (or 75 minutes per week of vigorous intensity) or an equivalent combination, as well as two to three strength training sessions per week (Pekmezi et al., 2012). Moderate activities are those that can be done while talking (e.g., gardening, biking, walking briskly), while vigorous activities are those that are difficult to do while talking (e.g., hiking uphill, jogging, aerobic dancing; O'Mathuna, 2012). Despite these recommendations and many benefits to be gained from an active lifestyle, a period of inactivity usually occurs during (and after) cancer treatment leading to physiological and/or psychological concerns (Pekmezi et al., 2012; Schmitz et al., 2005). Older individuals living with cancer may report numerous barriers for exercise participation during the cancer

continuum. Disease specific barriers include nausea, fatigue, and pain (McMillan & Newhouse, 2011; Pekmezi et al., 2012). Other barriers that may influence participation in exercise include lack of time, enjoyment, and social support from family and friends. Depending on the individual and his/her circumstance, he/she may struggle to fulfill multiple roles at work and home which can leave little time for personal care. Others may find it difficult to find family members or friends to participate in exercise with, which many have reported to be extremely influential for regular participation (Schutzer & Graves, 2004).

Hefferon et al. (2013) interviewed 83 females living with breast cancer (aged 29-76 years) five years post diagnosis regarding their perceived barriers to exercise. Findings from this study included three main themes: physical barriers (e.g., the ageing process, cancer treatment and other physical co-morbidities, fatigue, and weight gain); contextual/environmental barriers (e.g., employment, traditional female care-giving roles, proximity/access to facilities, seasonal weather), and psychological barriers (e.g., lack of motivation, fears, dislike of gym, not being the 'sporty type')(Hefferon et al., 2013).

Furthermore, a lack of knowledge and confidence regarding the safety of physical activity during and/or after treatment also can hinder the adoption of physical activity and/or the return to normal pre-diagnosis activity levels (Pekmezi et al., 2012). Many older individuals living with cancer may be unaware of which types of exercises are appropriate or how to properly perform movements given the effects of cancer treatment and their functional abilities. When disease and non-disease related barriers are combined, an older individual living with cancer may be discouraged to seek information regarding exercise and lack the motivation to engage in an active lifestyle. According to Hefferon et al. (2013), advocating the use of activity immediately after diagnosis may enhance exercise motivation for individuals living with cancer and help to overcome associated barriers.

### **Motivation to Exercise**

Considering the additional unique barriers older individuals living with cancer may experience, enhancing motivation to exercise is challenging (Courneya & Karvinen, 2007; Hearst, 2009; Hefferon et al., 2013). A lack of motivation can broadly be explained by two orders of factors: first, individuals may not be sufficiently interested in exercise or value its outcomes enough to make it a priority in their lives; second, individuals may not feel sufficiently competent to perform physical activities, feeling either not physically fit or skilled enough to exercise, or they may have health limitations that present a barrier to activity (Teixeira et al., 2012). Older individuals living with cancer may experience a lack of motivation to exercise resulting from these factors or a combination of both, as well as the barriers discussed previously, thereby adding to the complexity of increasing exercise motivation for older individuals living with cancer.

To assess and understand exercise motivation, familiarization with associated terminology is essential. Most importantly, a widely accepted definition of motivation is that it represents the hypothetical construct used to describe the internal and/or external forces that lead to the initiation, direction, intensity, and persistence of behaviour – thus motivation leads to action (Vallerand, 2004). If an individual engages in exercise for the pleasure of learning, internal forces would be driving exercise participation. In comparison, if an individual engages in exercise to derive a reward non-related to the activity itself, external forces would be driving exercise participation (Vallerand, 2004). In recent years, research has looked at motivation for exercise participation. After reviewing exercise and motivation literature, Teixeira et al. (2012) found that some motives (i.e., skill development) stemmed from intrinsic orientation whereas others (i.e., body appearance or weight) were more extrinsic. Exercise motivation can have negative associated motives such as health pressures or threats, drive for thinness, and/or striving for an attractive image. Positive motives such as health

promotion, increasing strength, reducing pain, or increasing energy can also influence exercise motivation (Teixeira et al., 2012). Based on this information, Markland and Ingledew (2007) justify how motivations cannot be easily defined as either intrinsic or extrinsic, as it depends on what the motive means to the individual. Based on this justification, exercise programs in particular should focus on accommodating to individuals needs regarding exercise involvement. Karvinen et al. (2007) conducted one of the first studies to examine exercise motivation and age, which compared young, middle-aged and older individuals living with bladder cancer. Participants were followed over a three-month period and significant differences were found among each age cohort. For the older individuals living with cancer attitude towards exercise and their perceived ability to perform exercises were the most influential for exercise intention. A variety of other studies have found significant links to exercise engagement for individuals living with cancer and intrinsic motivation using a Self-Determination Theory perspective (Lloyd & Little, 2010; Teixeira et al., 2012; Wilson et al., 2006).

**Self-determination theory (SDT).** Among many theories of human motivation, SDT examines the effects of different types of motivation and how they influence the behaviour of that individual. Deci and Ryan (2000) describe the SDT as it originates from a humanistic perspective, and how it is fundamentally centered on the fulfillment of the basic psychological needs, self-actualization, and the realization of human potential. SDT is a comprehensive and evolving macro-theory of human personality and motivated behaviour (Deci & Ryan, 2000), and distinguishes whether or not behaviours occur due to intrinsic or extrinsic types of motivation. According to SDT, intrinsic motivation is defined as doing an activity because of its inherent satisfaction, which enables a person to experience feelings of enjoyment, personal accomplishment, and excitement (Deci, 1975). An older individual living with cancer may choose to partake in recreational sport and/or exercise for the enjoyment or challenge of participating in the activity. In contrast to intrinsic motivation, extrinsic motivation is the most

controlled form of motivation and involves a behavioural response to an external threat or demand (Milne et al., 2008). An example of extrinsic motivation would be if an individual living with cancer decides to partake in exercise to avoid disapproval from a physician or family members. According to SDT, behaviours such as physical activity are regulated by motives that reside along a self-determination continuum, which is anchored at the extremes by controlling (e.g., to please other people, satisfy contingent self-esteem) and autonomous (e.g., personal importance of the behaviour, enjoyment of the activity) reasons for participation (Wilson et al., 2006). Extrinsic motivation is adjacent to introjected regulation, another component residing along the continuum, which refers to a situation where an individual participates in exercise out of obligation or coercion and wanting to avoid negative feelings, or to sustain personal self-worth (Wilson et al., 2003). In contrast, the autonomous self-regulations reflect participation through personal volition and choice. Another component along the continuum, identified regulation, occurs when an individual participates in a behaviour that she/he may not find inherently enjoyable, but is performed as the individual recognizes the value in it. In turn, perceived value in exercise may lead to more positive motivational consequences such as greater interest, more confidence and longer persistence (Deci & Ryan, 1971). As described by Vallerand and Fortier (1998), in addition to the self-determination continuum, a state of amotivation has also be proposed; referring to situations where an individual has no motivation toward engaging in a particular behavior. Refer to Figure 1 below for an overview of the SDT continuum.

Behaviour	Non Self-determined			Self-determined		
Type of Motivation	Amotivation	Extrinsic Motivation			Intrinsic Motivation	
Type of Regulation	Non Regulation	External Regulation	Introjected Regulation	Identified Regulation	Integrated Regulation	Intrinsic Regulation
Locus of Causality	Impersonal	External	Somewhat External	Somewhat Internal	Internal	Internal

**Figure 1: SDT Continuum (Deci & Ryan, 2000).**

The extent to which a person's motivation will be controlled or autonomous is influenced by the type of support received from significant others. According to Deci and Ryan (1985), when a significant other offers understanding of that person's perspective, supports choice, acknowledges feelings, and minimizes pressures and controls, more autonomous self-regulations develop. It is within an autonomously supportive social context that the development and maintenance of more autonomous self-regulations can occur. Predictors of maintained behaviour change could be attributed to autonomous support, which in turn influence autonomy and competence (Williams & Deci, 1996; Williams et al., 2006).

Milne et al. (2008) conducted a randomized cross-sectional study examining exercise motivation for 60 individuals living with breast cancer while engaged in structured exercise program. Data from this study provided promising evidence that supervised aerobic and resistance exercise following breast cancer treatment led to intrinsically motivated exercise behaviour which could lead to longer term exercise adherence (Milne et al., 2008). It was also recognized that in earlier stages of exercise adoption, extrinsically motivated reasons such as weight loss dominated motivation, whereas after completion of the exercise program, it was found that participants' exercise regulations became more intrinsic. Although studies have examined exercise motivation for individuals living with cancer, the sample population is typically middle-aged female breast cancer survivors, indicating the need to test motivation theories across more diverse cancer survivor groups and ages (Cho et al., 2012; Milne et al., 2008). Additionally, longitudinal studies that examine changes in motivation following an exercise program would give researchers insight on how to foster intrinsic motivation across cancer care continuum and promote incentives associated with exercise (Schneider et al., 2003). The basic psychological needs can assist researchers to obtain an understanding of what influences and drives autonomous motivation.

**Basic psychological needs.** A meta-theory within SDT is the concept of basic psychological needs which is central to understanding both the satisfaction and supports

necessary for high quality, autonomous forms of motivation (Ryan & Deci, 2002). The basic psychological needs that Deci and Ryan (1985) identified are competence, autonomy, and relatedness. Competence refers to a person's ability to interact effectively within his/her environment while conducting challenging tasks, autonomy is concerned with how autonomous or controlled a person perceives their choices to be, and relatedness refers to the degree to which someone feels a sense of connectedness to others in the immediate environment (Deci & Ryan, 1985). The three psychological needs – of autonomy, competence, and relatedness are essential for understanding the “what” (i.e., content) and “why” (i.e., process) of goal pursuits (Deci & Ryan, 2000). A further claim is that each of these three needs plays a necessary part in optimal development so that none can be thwarted or neglected without significant negative consequences (Deci & Ryan, 2000).

Early studies (e.g., McCready & Long, 1985) focusing on the satisfaction of basic psychological needs in an exercise context typically assessed only one SDT-based psychological need and provided mixed evidence regarding the importance of psychological need satisfaction (Wilson et al., 2008). Later research investigated the development of instrumentation, where instruments were adapted to assess all three psychological needs within exercise (Wilson et al., 2003). Results from these studies indicated that fulfillment of all three needs, could significantly influence a more self-determined type of motivation (Edmunds, Ntoumanis, & Duda, 2007). Past studies have predominantly sampled active or recently active populations to gain a better understanding of the motivational processes underpinning exercise engagement, while recent research is particularly interested in the specialized populations, such as those living with cancer, which have been sampled less often.

Edmunds, Ntoumanis, and Duda (2008) used an experimental design to investigate changes in autonomy, competence, and relatedness alongside other motivational processes and consequences within the SDT framework for women (18 to 53 years) participating in a

10-week exercise program. Participants were either exposed to an SDT-based (25 participants) or typical (31 participants) teaching style. In creating the SDT climate, the instructor focused on promoting autonomy support by taking the perspectives of the participants into consideration, acknowledging their feelings, and providing them with opportunities for choice. The exercises that the participants wanted to do were then the same exercises that the control group would do, while the instructor would continue with her regular teaching style. Therefore both groups received comparable work-outs. The SDT-based group reported a significant increase in competence, autonomy, relatedness as well as higher adherence rates within the program compared to the control group. Although competence proved to have the most significant results in the SDT-based group, compared to the control group participants, those in the SDT-based group displayed a significantly greater linear increase in relatedness (Edmunds et al., 2008). These findings further support claims by Milne et al. (2008) in which the development of relatedness in conjunction with autonomous support provided by fitness instructors has the potential to enable an older individual living with cancer to develop a sense of belonging, and integrate exercise into his/her sense of self as a survivor (Milne et al., 2008).

Distinguishing between autonomous (intrinsic) and controlled (extrinsic) motives compliments a growing body of evidence supporting SDT as a framework for understanding motivational processes in physical activity contexts with individuals living with cancer (Wilson et al., 2006). Within SDT, controlled forms of extrinsic motivation are expected generally to regulate (or motivate) short-term behaviour, but not to sustain maintenance over time (Teixeira et al., 2012). While it may be hypothesized that satisfying the basic psychological needs is necessary to enhance motivation for individuals living with cancer participating in a structured group-based exercise program, the continuation of exercise and healthy lifestyle behaviours post-intervention has not been examined closely.

## **Adherence to Exercise**

Adhering to an exercise regimen can be difficult (Knols, Bruin, Shirato, Uebelhart & Aaronson, 2010); the addition of the multi-faceted components of a cancer diagnosis makes adherence all the more challenging (Teixeira et al., 2012). According to the Public Health Agency of Canada (2010), majority of older adults are physically inactive (57%), with activity levels tending to decrease with age. Additionally, older adults who have chronic conditions or lack of energy or motivation are less likely to be physically active (Shang, Wenzel, Krumm, Griffith, and Stewart, 2012). Exploring factors for enhancing exercise motivation over a period of time may give some insight on how to overcome barriers and influence long-term adherence for older individuals living with cancer. Adherence to exercise can be defined as the extent to which individuals' exercise behaviours correspond with the exercise prescription (Hacker, 2009). Implementing exercise programs has been an ongoing area of interest for oncologists and exercise/oncology researchers; however, exercise adherence over time still remains one of the most complex problems to address.

In a study conducted by Shang et al. (2012), exercise related adherence patterns were analyzed among 126 cancer patients (21 years and older) receiving active cancer treatment. Participants were recruited from a university teaching hospital and community cancer center. An intervention and control group was used to identify factors related to exercise adherence. Physical activity was measured by a daily exercise log, and a pedometer was used to measure activity and fatigue level for both groups, and to configure the weekly exercise minutes and exercise sessions (Shang et al., 2012). Adherence rates were measured based on the ACSM guidelines of 85% of minimum adherence to exercise prescription. Individual adherence rates were calculated as the percentage of adherent weeks out of the total prescribed weeks. Those participants who adhered for more than two thirds of the program were defined as group adherents. Results from this study indicated that baseline physical fitness, fatigue, treatment related mood disturbance, marital status, and

past exercise history significantly predicted exercise adherence. One must understand that exercise adherence in this context does not provide information regarding how exercise levels change over time (Shang et al., 2012). Furthermore, adherence rates to an exercise program for individuals may be the same, however exercise patterns, long-term effects, and benefits may be different (Shang et al., 2012).

According to Pickett et al. (2002), success in maintaining physical activity depends on repeated adoption or resumption of activity after periods of inactivity. Factors that may affect exercise adherence include age, gender, employment status, treatment type, exercise history, psychosocial factors (Shang et al., 2012), time to perform the activities, transportation to and from a supervised program, or simply lack of interest (ONS, 2013). Exercise adherence can also be influenced by type of cancer, treatment, and symptoms such as nausea or fatigue (ONS, 2013). Researchers have found that patients' baseline inactivity, treatment type, and treatment-related symptoms are correlated with a decrease in exercise motivation (Milne et al., 2008). Exercise history may also play a role in adherence to exercise for older individuals living with cancer. This refers to whether or not the individual was already participating in exercise prior to cancer diagnosis and treatment. For example, Pickett et al. (2002) conducted a study in which examined adherence to a walking program for women receiving cancer treatment for newly diagnosed breast cancer. The influence of disease symptoms and treatment side effects on exercise levels were also examined in order to help suggest methods that may improve future clinical trials of moderate-intensity exercise in similar populations. The results of this study suggested that women who exercised regularly before receiving a breast cancer diagnosis attempted to maintain their exercise programs; whereas women who led sedentary lifestyles previously may have benefitted more from a structured exercise program integrating information and support related to exercise adherence strategies (Pickett et al., 2002).

As illustrated, many factors can affect adherence to exercise programs, which also

leads one to believe that research on adherence and maintenance of exercise over a longer period of time following these programs is lacking. Exercise and health professionals must find methods of encouraging older individuals living with cancer to maintain exercise behaviours following participation in exercise programs. Ideas include encouraging partners to exercise together, ensuring that goals are realistic and achievable, varying the exercise routine, identifying an exercise plan that is enjoyable to the individual, encouraging journal entries of exercise completed to see efforts and improvements, maintaining contact with the individual over time, helping individuals to identify and overcome barriers to exercising, and identifying opportunities for incorporating exercise into daily activities (Adkins, 2009; Hacker, 2009). Due to the several factors that influence exercise adherence, a multipronged approach is needed for increasing compliance. Setting unrealistic goals or “overdoing it,” especially during the initial phases of exercise adoption, are common mistakes (Hacker, 2009). As explained by Hacker (2009), a one-size-fits-all approach for prescribing exercises in people with cancer is not practical, as individual needs vary across disease groups and the cancer trajectory.

According to Milne et al. (2008), to foster exercise motivation and longer persistence an individual must experience feelings of autonomy, competence, and relatedness. When exploring fulfillment of these needs, individualized perspectives from individuals living with cancer will help researchers paint the bigger picture. Several studies have looked at predictors of long-term engagement from a quantitative perspective. They found that poor physical health, depressive symptoms, and lower emotional health-related quality of life were associated with less physical activity and exercise (Hefferon et al., 2013). However, to our knowledge, no research has looked at the unique barriers that may affect exercise adherence over this period of time. (Hefferon et al., 2013). Qualitative research is perfectly suited in situations such as these, where the nature of the impacts are to be investigated. Due to the fact that cancer is increasingly being viewed as a chronic illness requiring long-term

management (even beyond the formal treatment phase), there is a growing need for evidence-based rehabilitation interventions for individuals living with cancer (Knols et al., 2010). Exercise adherence, as it relates to the maintenance of exercise behaviours over time, has not been looked at in current research. Furthermore, limited research has been conducted on basic psychological needs fulfillment for individuals living with cancer and the motives that influence long term exercise behaviours following participation in a structured group-based exercise program.

### **Structured Exercise Programs for Individuals Living with Cancer**

Given the heterogeneity of cancer types, a one-size-fits-all approach to exercise and cancer is unlikely to be effective. Exercise regimens for individuals living with cancer have been examined using various study designs, different activities, and with varying levels of methodological rigor. All of these factors lead to complexity and variability in the methodologies, and must be taken into account when making recommendations for individuals living with cancer (O'Mathuna, 2012). Barriers to exercise for older individuals living with cancer such as fatigue (McMillan & Newhouse, 2011) and/or fear/anxiety should be recognized when building a structured exercise program. Furthermore, the literature is lacking in regards to the exploration of exercise motivation and program outcomes in relation to fulfillment of autonomy, competence, and relatedness (Edmunds et al., 2008; Teixeira et al., 2012).

The goals of a structured exercise program for individuals living with cancer should include alleviating symptoms, improving functional capacity, restoring muscle function, and providing personal support and encouragement (Knols et al., 2010). These characteristics are important, as there is increasing evidence that individuals living with cancer may benefit from physical exercise programs in terms of improvement in fitness levels, physical activity and quality of life (Knols et al., 2010). To ensure appropriateness of exercise regimes,

testing individuals for their level of exercise tolerance prior to initiating a structured exercise program will increase the likelihood of success (ONS, 2013). Pre-tests would give individuals the opportunity to report any psychological or physical barriers affecting their participation in exercise. Testing may consist of health questionnaires, lab tests, physical examinations, aerobic capacity, and muscular strength (ONS, 2013). If an exercise program gives participants the ability to have fun and meet new people, while offering support and encouragement within a safe monitored environment, commitment to regular physical activity is more likely to occur (Schneider et al., 2003). Positive program features can influence adherence to exercise programs for older adults. According to a research study conducted by Schneider et al. (2003), participants reported five categories that reflected positive features of an exercise program: guidance and supervision, free services, program is good, access to information, and interest. Older individuals living with cancer must have adequate support from qualified instructors to feel comfortable performing exercises safely as well as having access to programs and information regarding physical activity without being a financial constraint (Schneider et al., 2003). Although these are essential for adherence to exercise programs, it is unknown whether these program characteristics reflect or promote adherence to long term exercise behaviours following program participation.

In a study conducted by Temel et al. (2009), the feasibility and potential benefit of a structured outpatient exercise program for 25 patients with newly diagnosed and advanced lung cancer. Taking into consideration the small sample size, the participants who completed the program experienced a significant improvement in their lung cancer symptoms. A major strength in this study was that the structured program was supervised, which in contrast to home-based programs, ensured not only the safety of participants, but also the accuracy and reliability of adherence rates (Temel et al., 2009). Participants, who lack knowledge regarding exercise, may have experienced less anxiety when performing the activities, as someone was there to guide them. This evidence supports the importance of implementing structured

exercise programs for individuals living with cancer that are safe, and that positive effects can be seen in terms of physical and psychosocial well-being. Effective collaboration across healthcare disciplines, such as oncology nursing, medicine, physical therapy, and exercise specialists, is the key to ensuring the safety of people with cancer beginning an exercise program (Hacker, 2009).

The majority of existing literature currently focuses on young to middle-aged individuals living with cancer (Cox, 2003; Pinto, Eakin, & Maruyama, 2000) specifically looking at women with breast cancer (Milne et al., 2008). Only recently have researchers begun to examine health behaviour outcomes in older individuals living with cancer using a variety of health behaviour models (Teixeira et al., 2012) and expanded to other cancer types. Furthermore, it is evident that there is limited research on fulfillment of basic psychological needs (autonomy, competence, and relatedness) for individuals living with cancer following participation in a structured exercise program and whether or not exercise behaviours are sustained. Due to the unique barriers that individuals living with cancer may face throughout the cancer care continuum, a more in depth exploration of exercise motivation and long-term exercise adherence is necessary. Research on exercise motivation from the perspective of SDT has grown considerably in recent years (Teixeira et al., 2012); however limited research to date has explored need satisfaction and motivation over time based on the unique experiences of older individuals living with cancer. To obtain a more in-depth understanding of how needs satisfaction plays a role in exercise motivation, the perspectives of those living with cancer and the experiences that guide those behaviours must be taken into consideration.

### **Purpose**

The purpose of this study was to investigate exercise motivation for individuals living with cancer based on basic psychological needs (autonomy, competence, relatedness) fulfillment immediate-post and long-term-post participation in a structured group-based exercise program.

## **Method**

To address the purpose of this study, a qualitative approach was taken. One-on-one semi-structured interviews were conducted to allow participants to voice their own opinions and share personal experiences regarding involvement in a structured group-based exercise program. Using semi-structured interviewing, exercise experiences were explored and participant comments were examined while taking into consideration the specific research context (Miller & Glassner, 2011). By using a qualitative approach, this allowed for a deeper and richer understanding of the experiences among individuals living with cancer immediately post and long-term post program involvement. Ashing-Giwa (2004) claims that qualitative interviewing allows for a more in depth perspective on the research topic of interest, emphasizing the importance of open dialogue between the researcher and target population while conducting interviews. Data collection took place in a comfortable setting (i.e., participant homes, coffee shops, university office) and at the convenience of the participants. A directed content analysis approach was taken for this study, in which the SDT and the basic psychological needs were used as a theoretical framework and the themes were allowed to emerge from the data (Hsiu-Fang & Shannon, 2005). Inductive reasoning was also used in which themes emerged from the data by close examination and constant comparison (Hsiu-Fang & Shannon, 2005). Fulfillment of basic psychological needs was explored via qualitative interviewing for both Phase One and Phase Two. Phase One was completed as a preliminary project and Phase Two was completed subsequently.

### **Type of Design**

As described by Rudman (2008), qualitative research helps to identify concepts to understand individuals' lives and contribute evidence to support rehabilitation and social theories. To gain a better perspective on the experiences of individuals living with cancer following engagement in a structured group-based exercise program, one-on-one semi-

structured interviews were used as an in-depth examination of this phenomenon. Utilizing a directed content analysis approach (Hsieh & Shannon, 2005), the basic psychological needs were used to develop initial coding categories (Potter & Levine-Donnerstein, 1999).

Participants were asked a series of pre-established open-ended questions. Specific concepts and terminology used within the basic psychological needs framework was used to develop interview questions and to ensure that the content was congruent with the tenets of each need. Participant responses were interpretive and the multiple social realities that exist among participants were examined.

Preliminary data analysis occurred in conjunction with data collection throughout this study. This included transcribing interviews, making notes, coding, and grouping participant responses into categories/themes. As described by Patton (2002) the analysis process requires creativity and the challenge is being open to multiple possibilities and changing patterns of thinking while implementing trustworthiness strategies, which will be discussed further below.

### **Structure of Research Study**

Phase One of this study was conducted as a preliminary project, which took place in December 2012 and in December 2013. Phase One consisted of 10 semi-structured interviews, five in each time period, exploring program involvement and personal experiences, cancer coping methods, and exercise motivation based on the basic psychological needs fulfillment for individuals living with cancer. Convenience and purposeful sampling was used to select participants from two sessions of the program: October to December 2012 and October to December 2013. The interviews were conducted within a two-week timeframe immediately following the selected structured group-based exercise program. Refer to Appendix B for complete semi-structured interview guide for Phase One.

*Phase Two* was conducted during a follow-up period of 7 to 12 months post-program

completion. Phase Two consisted of 10 semi-structured interviews, four interviews took place in December 2013, and 6 interviews took place in July 2013. To explore basic psychological needs fulfillment since the completion of the program, participants were asked to describe exercise participation (e.g., structured/unstructured, individualized) since completion of the program, non-disease and/or disease related specific barriers, and to reflect on their overall cancer experience. Participants in the program were randomly selected within this timeframe and recruitment ceased based on saturation rate among participant responses (Denzin & Lincoln, 2000). Refer to Appendix C for complete semi-structured interview guide for Phase Two.

### **Research Context/Setting**

Rudman (2008) describes the importance of the research context in qualitative research; this is of particular importance when exploring the degree to which individuals living with cancer engage in physical activity and exercise. A structured group-based exercise program that provides support and exercise education is essential to ensure that participants feel safe and comfortable in this specific environment. The context for this research study was the WE-Can program, which was developed in 2010 by an interprofessional community network organized through Lakehead University and the Thunder Bay Regional Health Sciences Center. The WE-Can program was introduced as a pilot project with accompanying support from the Centre of Education and Research on Aging and Health (CERAH) and the City of Thunder Bay Canada Games Complex. The primary purpose of this pilot project was to study the effectiveness and feasibility of a structured group-based exercise program for individuals receiving, or who recently completed treatment for cancer, living in Thunder Bay and region. The main goal of the WE-Can program is to support individuals living with the repercussions of having cancer to remain physically active and incorporate active living as a part of their recovery while improving and restoring physiological and psychosocial well-

being. The program is based in a community setting, thus removing the stigma of being sick in which a clinical setting may impose and barriers associated with individuals transferring from a clinical to a community setting are also removed. Participants have access to parking and facility resources (i.e., program information, public swimming pool, and fitness equipment), and social support and networking opportunities from facility staff and other members.

**Program structure.** WE-Can is a 10-week structured exercise program with two, 60 to 75 minute classes per week incorporating cardiovascular, muscular strength and endurance, and flexibility components (Refer to Appendix G). Therefore one complete session of the WE-Can program encompasses 20 structured group-based exercise classes with approximately 8 to 10 individuals per class. Participants may have been encouraged to participate in the program by their physiotherapist and/or oncologist, and some participants may have selected the program based on hearing about it through word of mouth from a friend, family member, or past participant.

According to program instructor and based on the size of the fitness classrooms and access to equipment, 8 to 10 participants fit are ideal for recruitment. Prior to and at the end of each session, medical history and functional ability fitness assessments are conducted by the program supervisor and a physiotherapist with lymphedema management expertise. Participants are also asked to complete a questionnaire that examines perceptions of functional ability, health, fatigue levels, quality of life, and program satisfaction. Prior to each exercise class, participant vitals are conducted consisting of seated resting blood pressure and heart rate, oxygen saturation level, and forehead/temporal temperature along with a pain scale in relation to cancer treatment side effects and symptoms that ranges from 0 to 10. Participant heart rates are monitored throughout the class by use of heart rate monitors (Polar, model FS2) to ensure participants maintain a safe target heart rate range (based on 55%-85% of maximum heart rate using the Karvonen method). At least two volunteer

Kinesiology students attend each class to document participant exercises and heart rates during class sessions and provide modifications to exercises where needed. Other features that are incorporated intermittently into the WE-Can program are three, 1½ hour educational sessions: home-based exercise programming (exercise handbook given to each participant with instructions on how to perform exercises properly and safely at home); relaxation, meditation, and breath-work (incorporated in warm up and cool down), and a session providing nutritional information. Once participants complete the 10-week session, they receive a certificate acknowledging them as a WE-Can graduate and their success throughout the program.

**Environment, supervision, and group support.** The WE-Can program is held at the Canada Games Complex, a community fitness center, which offers all citizens of Thunder Bay and region the opportunity to participate in a variety of social, recreational, competitive, instructional, and therapeutic activities (City of Thunder Bay, 2014). Due to fundraising within Lakehead University and the TBRHSC, WE-Can is free for participants and they have access to the fitness center at no cost on the days when they have WE-Can classes. The accessible and multi-purpose community facility offers participants of the WE-Can program a safe and enjoyable environment. At each class, WE-Can participants receive ongoing guidance and support from program staff, allowing them to perform exercises properly within a safe environment. Participants are encouraged to use exercises learned throughout the program at home as a form of unstructured exercise. The exercise education that the participants receive throughout the program is important for helping them make healthy lifestyle decisions during and after the program is completed. WE-Can participants are encouraged to work together as a group and are ensured that support from staff will always be present.

### **Participants**

A combination of convenience and purposeful sampling was used in this study for

participant recruitment. As described by Mack et al. (2005) purposeful sampling is one of the most common sampling strategies used to group participants according to preselected criteria relevant to the particular research question. For this study participants were graduates from the WE-Can program (individuals who have completed a 10-week session) and met inclusion criteria pertaining to each research study stage (described below). No males were available for recruitment. Majority of the participants in the WE-Can Program were over the age of 50, therefore there was no age requirement to be eligible for this study.

**Phase One: Inclusion criteria.** To be eligible for Phase One of this study, participants who had recently completed a 10-week session of the WE-Can program (within a two week timeframe) were considered. This was to ensure that program experiences were recent, providing for a more accurate reflection during the interview process and reducing the likelihood of recall bias.

**Phase Two: Inclusion criteria.** Participants who had completed the WE-Can Program within 7 to 12 months were recruited for Phase Two,. An adequate amount of time since participation in program had passed, allowing participants to determine the amount of exercise they incorporate into their daily living, if at all.

## **Procedure**

**Phase one.** Prior to conducting Phase One, permission from the facility supervisor and program coordinator was obtained in order to contact participants (Appendix A). Participant recruitment for stage one was during the last class of each of the two WE-Can programs which the student research investigator attended. Participants were given a brief oral description of the study, and then asked for their participation in a one-hour interview session, within the two weeks following the program. A sign up sheet was available for those who decided to volunteer at that time. They also had the opportunity to take the information home before deciding to commit to the study. A study information letter was given to the

participants (Appendix B), which indicated that the interviews would be digitally tape-recorded. Participants were also informed of any potential risks or benefits associated with participation. This study explored personal information regarding each cancer experience; therefore participants were aware of the sensitivity of the subject at hand and how this research study may provide educational benefits regarding the inclusion of exercise for individuals living with cancer. Among the 10 female participants who agreed to take part in stage one, an agreed upon meeting place and time was arranged. After receiving consent from the participant (Appendix C), the medical history assessment form (Appendix D) was completed. Semi-structured interviews took place at participant homes (6), coffee shops (1), or at a private office (3) at Lakehead University. An interview guide was used to gather data for Phase One (Refer to Appendix E). Open-ended questions were developed based on SDT and basic psychological needs literature. Interviews for Phase One explored participants' experiences in the program, exercise motivation based on basic psychological needs fulfillment, and program satisfaction. For example, participants were asked questions such as "What influenced you to join the WE-Can program?", "How has the WE-Can program influenced your life?", "What motivated you to attend classes regularly and complete program?", "Did you enjoy the group aspect of the program?", and "What has helped you cope throughout your cancer experience?."

**Phase two.** Before conducting Phase Two of this study, permission was requested from the program coordinator to contact those participants who participated in the WE-Can Program (Appendix A). Once granted, the 10 participants were contacted via telephone by the researcher and given a brief description of the details pertaining to Phase Two of this study. Similar to Phase One, participants were informed that the study consisted of tape-recorded semi-structured interviews. Participants were made aware of the sensitivity of this research study pertaining to individuals living with cancer and how educational benefits may be attained regarding exercise and health. An information letter (Appendix B) was provided to

the participant (via email or home delivery), which included researcher contact information. For those who were interested, a meeting time and place was agreed upon according to participant preference. Participants were informed of the interview process (similar to Phase One) completed the medical history assessment form (Appendix D) and had the opportunity to ask any questions pertaining to the study. Semi-structured interviews included open-ended questions exploring exercise motivation based on basic psychological needs fulfillment during the follow-up period post program completion (Appendix F) Exercise motivation and adherence was the main focus for Phase Two of this study. For example participants were asked questions such as “Since completion of WE-Can program how have you incorporated physical activity and exercise into your life?”, “What types of physical, psychological, and/or emotional barriers (if any) influenced your ability to engage in exercise since program completion?”, “What do you find motivates you to engage in exercise?”, and “Please describe if you have felt supported since completion of the program, in terms of coping with the cancer experience and the inclusion of exercise as a coping mechanism.” WE-Can participants were informed that notes would be taken throughout the interview, in order to gather data and to ensure that accurate responses were documented. The participants understood that at any point during the interview they had the right to not answer any of the questions and that confidentiality would be held to the highest degree. Participants were informed that interviews would be tape-recorded and that their responses would be used to support academic research relating to cancer and exercise.

### **Analysis**

Qualitative data collected from both Phase One and Phase Two was transcribed and coded using NVivo (reference), a qualitative data analysis computer software program, in order to pull out major themes from the interviews. NVivo is intended to help organize and analyze non-numerical or unstructured data. Data review and analysis was done in

conjunction with data collection. As indicated, interviews were transcribed and coding was done by manually searching the document, as well as using NVivo. This included highlighting (words, lines, sentences) and attaching memos and annotations. Memos indicated whether or not participants' personal comments and unique insights coincide with the basic psychological needs (autonomy, competence, and relatedness). Queries (e.g., text searches, word frequencies) were also conducted to help make links between participant comments and basic psychological needs. To explore autonomy, questions were developed to explore the participants' volition for engaging in exercise and text searches were conducted for the words "decision" and "choice". To explore competence, questions were developed to explore the participant's ability to perform challenging tasks (e.g., exercise), and in particular highlighting barriers or physical limitations that may influence behaviour outcomes. Text searches for competence included "limitations", "fear/afraid", and "pain" among other related words. To explore relatedness, participants were asked to describe the types of exercise included into their current lifestyle and the environments in which exercise takes place. Text searches for relatedness included "group", "connection", and "support". Furthermore, participants were asked whether or not exercise was completed in a group setting or in solidarity. NVivo helped to organize transcriptions and group/theme data into various subthemes. This software allowed for a convenient way to classify, sort and arrange information, examine relationships in the data, test theories, and identify trends.

**Trustworthiness.** Morrow (2005) describes trustworthiness as the "rigor" in qualitative research or validity that paradigms may be thought of as relevant across most research designs. To ensure trustworthiness, Guba (1981) proposed four criteria that should be considered by qualitative researchers; credibility (internal validity), transferability (external validity/generalizability), dependability (reliability), and confirmability (objectivity). One key criterion is credibility, through which researchers seek to ensure that a study measures or tests what is actually intended (Shenton, 2004). This includes specific procedures such as

the line of questioning pursued in the data gathering sessions and the methods of data analysis comparable from those that have been successful. To ensure credibility for this study familiarity with the culture of individuals living with cancer was obtained before data collection, which is essential for establishing a relationship of trust between parties (Guba, 1981). This was established by extensive cancer diagnosis/treatment literature review, specifically in relation to exercise motivation and participation. WE-Can participants invited to be a part of this study had the opportunity to refuse to participate in the project to ensure that the data collection sessions involved only those who were genuinely willing to take part and share personal insights freely (Guba, 1981). Contributing to credibility, colleagues and peers gave feedback regarding data analysis and findings throughout the duration of this project. Reflective commentary was also used to evaluate the project as it developed and to make note of patterns that emerged within the data collected and theories generated.

Transferability refers to the ability to transfer the study to other populations in other settings (Shenton, 2004). Due to the fact that populations and contexts are so specific in qualitative research it is impossible to demonstrate that findings and conclusions are applicable to other situations and populations. Therefore to address transferability, contextual information was recorded and provided in full detail and patterns/themes that emerged were documented manually throughout the duration of data analysis. To ensure dependability processes within the study were reported in detail, enabling future researchers to repeat work, if not necessarily to gain the same results (Guba, 1981). This included details regarding the research design, data collection and data analysis. Confirmability refers to reducing researcher biases. The difficulty of ensuring confirmability, considering that tests and questionnaires are designed by humans, the intrusion of the researchers' biases was inevitable (Guba, 1981). Research subjectivity – called biases in quantitative research – is celebrated rather than seen as something to be shunned; it is viewed as an opportunity rather than a problem (Finlay, 2002). Steps were taken to ensure that the work's findings are

the results of the experiences and ideas of the participants, rather than characteristics and preferences of the researcher.

Member checking, which was completed by summarizing information and then questioning the participant to determine accuracy (Shenton, 2004), is considered the most important provision that can be made to enhance a study's credibility (Guba, 1981). Member checking took place "on the spot" in the course, and at the end, of the data collection dialogues. WE-Can participants were also given the opportunity to read transcripts of dialogues in which they have participated. This was to ensure that the words matched what the participants actually intended and that the articulations were accurately captured. Since the findings of a qualitative project are specific to a small number of particular environments and individuals, it is impossible to demonstrate that the findings and conclusions are applicable to other situations and populations (Guba, 1981).

## Findings

### Thematic Summary

In accordance with Self-Determination Theory (Deci & Ryan, 2000), the Basic Psychological Needs (i.e., autonomy, competence, relatedness; Deci & Ryan, 1985) were used as a framework to explore exercise motivation for women who completed the WE-Can Program. Those who were interviewed immediate post program had completed the WE-Can Program in December 2012 or December 2013, while those who were interviewed long-term post program had completed the program in December 2013 or July 2013 (e.g., 7-12 months following program completion). Within the framework of the basic psychological needs, a number of subthemes emerged from the interviews describing facilitators and barriers towards exercise participation. Autonomy was explored by allowing the participants to share their unique reasons for initially joining the program and whether or not they decided to incorporate exercise into their daily lives following completion. Throughout each interview, notes were taken regarding any external influences or pressures that may have influenced exercise participation for these individuals. Competence was explored by allowing the participants to discuss their previous exercise experience, and specific barriers or physical/psychological limitations they may have encountered while engaging in exercise. Relatedness or the connection created amongst participants was explored by allowing them to share their thoughts on group-based exercise and in particular how they enjoyed a program tailored specifically for individuals living with cancer. Overall, participants were asked to compare attitudes toward exercise prior to, during, and following participation in the WE-Can Program.

Each individual shared different perspectives on the WE-Can Program, the meaningfulness of exercise, and how their cancer experience shaped their lives in many different ways. The findings from this study are presented below using the basic

psychological needs as a theoretical framework for each phase. Subthemes that contribute to the fulfillment of autonomy, competence, and relatedness will be listed and described below each corresponding need. Upon examining each phase, this layout will give a temporal picture of how the different facilitators and/or barriers contributed towards exercise engagement for participants immediate post program and long-term post program. Multiple subthemes were derived from the data, which, at times, overlap to some degree between more than one psychological need. In the event that this was the case, quotes were strategically placed to best represent each need in accordance with its definition in order to best depict how the participants truly felt with regards to their exercise experience.

### **Phase One: Immediate Post Program**

**Recruitment and participant demographics.** For phase one of this qualitative research project, all of the participants resided in Thunder Bay and had an average age of 62.6 years old. Data was gathered from the medical history assessment form, on which the participants recorded information regarding their health, exercise involvement, and other lifestyle factors influencing well-being. For phase one of this study eight of the participants had breast cancer, one had non-Hodgkin's lymphoma, and the remaining participant had lung cancer. Half of the participants were in the retirement phase of their lives. The participants who were employed had careers as a physiotherapist, respiratory therapist, home esthetician, or craft artisan. Prior to diagnosis participants engaged in various types of exercise including skiing, swimming, yoga, and walking. Similar to existing literature (Teixeira et al., 2012), all of the participants reported low impact and minimal frequency of exercise during their cancer treatment, which included walking and yoga. During the WE-Can Program a few participants incorporated some stretching and strengthening exercise at home outside of the program. Refer to Table 1 for additional demographic and health information for the participants in Phase One of this study.

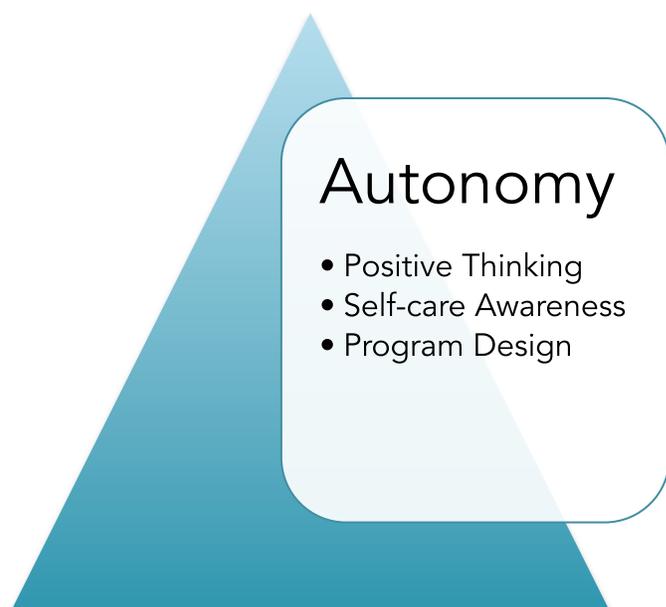
Table 1. Participant Demographics

Participant	Age	Marital Status	Type of Cancer	Employment Status	Exercise Preferences Prior to Cancer Diagnosis	Exercise Preferences During Cancer Treatment	Exercise Preferences Outside of WE-Can Program (throughout program duration)
<b>Margaret **</b>	63	Married	Breast	Self Employed	Walking.	Walking, Stairs	Walking, weights
<b>Brenda**</b>	36	Married	Breast	Employed	Very Active – yoga, walking, running, strengthening	Walking	Recreational Activities with family (e.g. swimming, going to the park)
<b>Anne**</b>	60	Married	Non-Hodgkin's lymphoma	Retired	Very Active (swimming, squash, cross country skiing)	Walking	Cardiac Rehabilitation Program, Gardening, Limited walking
<b>Jenelle**</b>	63	Married	Breast	Retired	Running, Yoga	Yoga	Weights, Mats, Other structured group-based exercise program
<b>Cindy**</b>	47	Single	Breast	Self Employed	Very Active - Glider, Yoga, Pilates, Strengthening	None	Physiotherapy exercises, Glider
<b>Barb*</b>	89	Widowed	Lung	Retired	Inactive	None	None
<b>Laura*</b>	72	Married	Breast	Retired	Walking	Walking	Walking, Stretching
<b>Betty*</b>	70	Married	Breast	Retired	Walking, Public Gym Facility (3xweek)	Walking, Yoga	Walking, Stretching
<b>Patty*</b>	63	Married	Breast	Self Employed	Cycling, walking	None	Walking
<b>Deborah*</b>	65	Married	Breast	Employed	Walking	Walking	Walking

Note 1: Pseudonyms have been used to protect participant confidentiality.

Note 2: Participants from December 2012 \*, Participants from December 2013 \*\*

**Autonomy.** Not to be confused with internal locus of control or independence, autonomy refers to volition and to integrate activity in one's sense of self (Deci & Ryan, 2000). To gain a sense of whether or not participation in the program was due to autonomous motivation (engaging in an activity with a sense of choice and willingness) rather than controlled motivation (engaging in an activity with a sense of pressure or coercion) participants were asked a variety of questions (Deci & Ryan, 2000). For example, participants were asked how they heard about the WE-Can Program and why they decided to join. Individuals indicated that they had heard about the WE-Can Program from other participants who had completed the program previously, cancer center healthcare workers, and their social worker and/or physiotherapist. Autonomy was evident for these participants through their comments made on the importance of personal choice, desire to seek a program tending to the specific needs for individuals living with cancer, and how the program contributed towards their well-being. A variety of subthemes emerged from participant's comments, and indicating what contributed towards their exercise participation in the context of this need. A summary of subthemes that emerged for Phase One can be seen below in *Figure 2*.



**Figure 2: Subthemes within Autonomy (Phase 1).**

**Positive thinking.** Many of the participants described periods of time throughout their cancer diagnosis and treatment when they felt depressed, angry, and/or defeated. Dealing with these overwhelming feelings had different impacts and lasting effects for each participant. It was not until they realized the importance of positive thinking throughout their cancer journey that quality of life improved and they felt more able to accept change into their lives of their own accord. “Positive thinking” can be described as one’s life satisfaction, self-esteem, and optimistic outlook (Caprara & Steca, 2005). This positive outlook on life played an important role for participants as they made a volitional choice to participate in the program and incorporate healthy behaviours into their lives. Deborah described how the emotions experienced (related to her cancer) negatively influenced her desire to be active. Once she realized how this was impacting her health, Deborah incorporated positive thinking and gained a better perspective on life.

*“So there were days that I didn’t get out for a walk, I just stayed home with the emotions and it just taught me that life is too short to dwell on a lot of things that’s for sure... I don’t. I find I’m not worrying about the little things anymore because they aren’t important. You know, you’re alive... and live your life.” – Deborah*

Another participant, Brenda, described how changing her attitude and switching her frame of mind to focus on the positive aspects of life gave her peace of mind.

*“I was somehow able to change the way I thought of things and just focused on what I could do at the present moment, and I have been able to continue that on ever since... and when I could switch the way that I thought it made a huge difference... every day I would think of five things I was grateful for and I would say them to myself before I go to bed... and I continue on with that now...” – Brenda.*

Demonstrating the notion of positive thinking and relating to autonomy concepts, Brenda declares, “ I can’t control what happens in six months so there’s no point in worrying

about that, take one day at a time.” She mentioned reading a quote once, how it resonated with the way she felt, and gave her peace of mind. “If there’s something you want to change, change it. If you can’t change it, change the way you think about it.” Brenda indicated that she has accepted what she is and is not in control of. This realization is undertaken volitionally as part of positive thinking. Furthermore, accepting there are certain things beyond one’s control is a choice.

Another participant, Cindy, described how she is very pragmatic and maintained a positive attitude regarding her cancer. She further described how this outlook allowed her to focus on what needed to be done in terms of coping and living a healthy lifestyle.

*“But I’m also very pragmatic, I just believe that everything does evolve, unfold, and move forward exactly how it should and that I can only deal right now with what I know and just what do we need to do... and with that kind of attitude I don’t worry about a reoccurrence or what’s going to come down a year or two from now or whatever... so I’m pragmatic... just do what we need to do... and I will continue to think of more ways to manage and cope with all that I’m left with” – Cindy.*

Cindy has a positive perspective on how she can manage and cope with her illness. Similar to Brenda, Cindy has accepted that there are some things beyond one’s control, demonstrating volitional positive thinking.

**Self-care awareness.** Participants discussed how their health and well-being had become a primary focus demonstrating the emergence of the subtheme self-care awareness. This included taking more time to engage in exercise and doing the things that improve their quality of life. For instance Deborah discussed how her cancer affected her family and for the majority of her cancer journey, the well-being of her family was her primary concern. Making the choice to join a program was something that Deborah felt she deserved and truly needed to do for herself.

*“I was kind of worried about everybody else first and now I’m taking more time for me. Yeah that’s why I thought I’m taking this exercise program for me. I’m going to make time for it and do it “ – Deborah.*

Another participant explained how she does not focus on the negative outcomes of her cancer rather on what she must do to be healthy.

*“I figure as long as I’m healthy, I try not to dwell on it. But at the same time it makes me think that I need to do things that I want to do. That if I want to feel healthy then I need to get healthy. If I want to go and do things, go do them now while I can – when I – during the year of my diagnosis I had decided I should retire because what’s the point of going back to work, enjoy yourself while you can, so I just did retire. Just this week” – Anne.*

Anne stated that she is aware of her cancer prognosis, and made significant life choices to improve her overall wellness, which includes doing things while she is still able to enjoy them, including recently becoming retired so she has more time for herself.

**Program design.** Different aspects of the program such as comfortable environment, supportive instructors, and tailored for individuals living with cancer, was described by participants as very influential towards their continued exercise participation. In accordance with Deci and Ryan (1985), to develop more autonomous self-regulations, the environment of a structured group-based program must offer participants support, acknowledge their feelings, and place minimal pressure on participants. Participants were instructed throughout the program by the instructors to only do what felt right, not to exert themselves to the point of feeling pain, and most importantly, to listen to their own bodies. Each participant made it very clear that joining the WE-Can Program was a personal choice to improve health, well-being, and quality of life. Laura discussed how the environment of the program allowed her concerns about exercise to disappear and that she knew pushing herself to be active was within her own control.

*“I think it was the motivation to get myself going and pushing and knowing that I had to come here... your motivation was altogether different. You know, I thought well, I can’t do this, I can’t do that, but once you knew you were here, it sort of disappeared. You forgot about your little illness or why you didn’t want to come” – Laura.*

Deborah described how she knew she had to do something, thus taking charge to increase the amount of exercise incorporated into her life. The nature of the program, being specifically tailored for individuals living with cancer, was what initially sparked her interest and informed her decision to join.

*“I heard about it [WE-Can] at the cancer clinic in the hospital and I was very interested in joining a group of people similar to me and getting into some sort of exercise class, I needed to do something.” – Deborah.*

Another participant commented on how wonderful the WE-Can Program was and how grateful she was for the time and effort put forth by the program instructors and volunteers. For example, Laura indicated that because the program was comprised mostly of volunteers, she felt like she wanted to give back and show her appreciation by attending each class. This accountability towards the program, Laura described as being very influential towards her exercise participation.

*“Well, I just felt people were volunteering their time I would have to do my part in it. You know, just appreciate people that are giving their time to help us out so that’s why I was motivated and I felt encouraged to come, the people that were volunteering, that was my way of paying back, you know, attending the classes” – Laura.*

Thus the presence of supportive instructors and volunteers influenced this participant’s volitional choice to adhere to the program and continue exercise behaviours.

**Competence.** According to Deci and Ryan (2000), competence can be described as an individual’s ability to control an outcome, or experience mastery (e.g., perfecting a skill set). A variety of subthemes emerged from participants’ comments in relation to this need,

and indicating what contributed towards their exercise participation. A summary of subthemes that emerged for Phase One can be seen below in Figure 2.



**Figure 3: Subthemes within Competence (Phase 1).**

**Exercise environment.** Throughout the interviews, the importance of the exercise environment (e.g., physical and social) consistently emerged as a subtheme, which, according to the participants, directly influenced their competence to engage in exercise behaviours. Participants reported multiple features of the exercise environment that they enjoyed including the support and encouragement from group members and instructors, tailored instructions to complete challenging exercises, and modifications to exercise to meet individual needs. Laura discussed how at the start of the program she felt limited in the types of exercises she was able to perform. However, as the program continued, a level of trust was built due to the support of the instructors and the comfortable exercise environment, thereby contributing towards enhancing mastery, which in turn influenced her feelings of competence.

*“At the beginning it was challenging because of the restrictions, I was afraid to push myself, so I got motivated seeing other people doing it, I was encouraged, and you sort of pushed yourself, cause’ you knew that somebody was watching you, so you weren’t going to hurt yourself, and that was motivation” – Laura.*

Similar to Laura, Anne discussed how much she loved the program and how there were always instructors and/or volunteers assisting with each exercise (i.e., a supportive social environment). She describes how the exercises were challenging but in the long-term worthwhile, as she felt more energetic as the program progressed.

*“It was awesome really. And I just loved coming to the classes. I have to admit they tired me out. I was just pooped after some of them. But, the last few weeks I didn’t find I was as tired. So yeah, they were very challenging but very very worthwhile. I cannot complain. I really liked that there was so many of you really, in some ways I wish I would have asked more questions, but then you don’t think about it at the time”  
- Anne.*

Additionally, Brenda discussed how she had experienced physical decline throughout her cancer journey and how the program was a perfect fit, as it allowed her to work at her own pace. By having control of her progression throughout the program, Brenda felt more capable to perform exercises thus influencing her competence and exercise participation throughout the program.

*“I feel healthy... but I work with a bunch of really fit people and I’m not quite at where I was before and able to do what they are... I’m getting closer, I’m able to do more than I thought, but it’s hard to work to get up there... and it was just nice to be in an exercise class. If I signed up for some of the exercise classes I did before I think I would be discouraged because I wouldn’t have been able to keep up. And so it was nice to go at my own pace” – Brenda.*

Another participant discussed how exercise variety in the program was very appealing to her and how the program taught her many valuable educational lessons regarding exercise. Educational information evidently was very important and influential towards exercise participation, experience, and enjoyment; thus influencing feelings of competence.

*“So the WE-Can program... when I started that it offered a whole variety of exercises. I had never been on a treadmill before um, you know, it just offered so much variety, I was amazed at everything we did there... with the balls and the belts and the elastic bands rather I guess you call it... and I learned too that you should warm up and cool down and I never did that before I just, you know, did what I did, and I never thought to stretch before I went out walking, you know it taught me a lot” – Patty.*

The quote below further supports how the participants were given information that was deemed valuable by them regarding exercise throughout the program and were encouraged to continue the different types of exercises at home. For example, Betty believed that she would continue exercising and that her frequency may even increase given that she had some of the equipment at home to use.

*“I think that I’ll continue on, I do have an exercise ball at home, I’m taking it out of the box, and I do have the bands, and so, yeah, I think that my exercise regime will increase” – Betty.*

This quote further supports how education and exercise instruction provided throughout the program influences how capable participants feel to perform new skills, using unfamiliar equipment with ease. Participants described how crucial exercise education was towards their perceived competence to exercise. For example, Anne described how she was exercising at a gym prior to her diagnosis and using all different types of exercise equipment. However, when it came to stretching and increasing her flexibility, the program helped guide her to perform exercises properly.

*“Well I guess, before I was diagnosed... I was going to the gym. I was using the equipment, I was using the bike and all that, and I was really really good, going five days a week, I just go right after work so I get it over with. But I knew I had to do more weights and stuff. So I started going to a personal trainer and I never really enjoy that stuff even this program, it’s hard work right so I knew that, mat work that we did, with all the stretching and flexibility is what I needed to do. And so coming to the program, it showed me how to do it, and um I knew I needed it but I didn’t know how to do it” – Anne.*

Based on the information shared by participants the education and guidance they received throughout the program enhanced their competence and allowed them to overcome any perceived risks associated with exercise. The program itself also enhanced the exercise experience for the participants to the degree that some felt competent to engage in exercise at home.

*“Um, and it’s given me some basics of how to do it at home which is important. I hope I remember, I probably won’t remember it all but I should be able to remember enough of it. Now that we have the books too. And you know I hope to be able to drop into the WE-Did. I know I can’t regularly” – Anne.*

Overall, components of the exercise environment (e.g., exercise facility, program instructors, exercise education) clearly impacted participants ability to perform skills efficiently thus contributing towards the fulfillment of competence.

**Role of goals and achievement.** Throughout the interviews it appeared that the role of goals and achievement influenced perceived competence for the women in this study. Participants indicated that achievements made throughout/following the program (e.g., weight loss/gain, increased strength) influenced their perceived ability to engage in exercise. This also changed how they viewed certain exercises that they originally thought were too difficult to perform prior to program involvement. For example, Anne discussed how physical

improvements were evident, and how achieving these goals influenced her motivation to keep exercising in the program.

*“Well, it [WE-Can] has given me the motivation. Looking at the improvements before and after helped me to see how I have improved over 10 weeks. Makes me wish I could stay in it for another 10 weeks but I know you can’t...” – Anne.*

Similar to Anne, Betty indicated that the improvements seen throughout the program were surprising and that the goal of losing weight and increasing energy is what influenced her to keep going to exercise class.

*“I improved in everything! It really amazed me... I think that’s one of the things that kept me coming here... because I had a goal in mind, I wanted to lose weight... I wanted to be more energized... and it’s done that for me! Surprisingly!” – Betty.*

Anne continued to discuss how the program helped her to understand the importance of exercise inclusion and proper nutrition to enhance well-being. Anne held the program responsible for the goals achieved, as it allowed her to understand the essential components of a healthy lifestyle thus greatly impacting her desire to engage in exercise competently.

*“I knew I needed to do it all, the exercising and changing the way I eat. The program made me do it really, if I didn’t have the structure. I need structure. This has really brought structure in and accountability. If I exercise, it’s all together, you just have to do it all” – Anne.*

Other participants described how their energy levels increased throughout the program, influencing their competence, and in turn, exercise motivation. The increase in energy and endurance was a benefit received from exercise participation allowing the participants to engage in even more activity outside of the program environment.

*“Well it benefitted me, I got more energy... I was able to walk, I was able to do more stuff around the house... I was still limited to my activity at home... like I don’t have*

*the same energy, but through the WE-Can I was able to get off my puffer when I did go for a walk, my endurance was up and I just felt overall healthier” – Laura.*

Similar to Laura, Anne indicated that the greatest facilitator influencing her exercise participation was the desire to feel better. She discussed how challenging it was to physically move around and do the things that she enjoyed because of discomfort and weight gain. The goal of feeling better acted as an incentive for Anne to join the program and allowed her to feel competent while performing exercises in the program.

*“I just felt like I couldn’t do half of the things I used to do... I felt very uncomfortable and I gained so much weight on chemo...I just felt terrible and I want to feel better again... Yeah, so I knew I needed some kind of incentive. It’s not that I don’t know that you’re supposed to exercise and you’re supposed to do your weights and stuff, but sometimes the motivation is just not there. I need something to help motivate me” – Anne.*

Similar to Anne, Mabel’s goal was to feel stronger and healthier, which in turn influenced her exercise motivation. Mabel indicated how she was aware of the effects of growing older and discussed the importance of counteracting the effects of aging via exercise. Longevity and maintaining the ability to exercise is very important to Mabel.

*“Oh my goodness sakes, what motivates me? Probably... I like to volunteer at different places and stuff and I want to be able to do that. I don’t wanna... I look around at these seniors and I don’t wanna get that way, so I better start. If I do my exercises, and you do, your joints feel better, everything does, so I think it’s just looking into getting older now, you want to stay healthy and I think exercise is part of it” – Mabel.*

Overall, improvements seen throughout the program and immediately following completion impacted the way these women viewed themselves and exercise. The changes

that occurred evidently influenced their competence to engage in exercise, as they realized they could be successful at attaining set goals.

**Physical limitations.** Participants indicated that physical limitations negatively influenced their perceived competence to engage in exercise behaviours. Physical limitations were a result of cancer treatment effects (e.g., surgery, hormone therapy), injury, or other chronic disease symptoms. However, most participants indicated how exercise within the program helped to combat some of these issues and influenced perceived competence towards exercise. For example, Anne discussed how she is weak in her feet and arms due to previous injuries. She indicated that some degree of fear is experienced when exercising in terms of experiencing pain or re-injuring herself. These limitations appeared to influence how competent Anne felt to perform activities involving the injured parts of her body.

*“Well I knew I would have some limitations with my feet um... maybe a little bit of fear with my arm. I have really weak arms, I’ve had shoulder injuries in both arms, and my left arm is particularly sore this last while, so maybe fear that I would re-injure it. But I was being pretty careful” – Anne.*

Furthermore, Anne explained how treatment caused pain in her hands. However, since she has been participating in exercise her hand strength has increased substantially.

*“Well my hands have been sore since I have been on the maintenance chemo, they are even sore now, and my strength has increased in my hands, like doubled I think which I find really amazing cause my hands have been sore and even that itself is great” – Anne.*

Similar to Anne, Patty discussed how she had to miss a few of the classes due to pain in her neck. However as she continued exercise throughout the program, the pain ceased and her competence to perform exercises was enhanced.

*“Unfortunately there were about 4 classes I wasn’t able to attend, which bothered me a lot, because this was something offered to me that I really appreciated, and um I*

*noticed improvement, I had neck pain and the pain was so strong that, about 3 to 4 times a day I felt like I might pass out, um I would just lean on something, and it would pass. But anyway, amazingly enough, when I got into the exercise program, that pain went away and it hasn't come back so I am very grateful for that" – Patty.*

In particular, treatment effects appeared to influence participants' perceived ability to perform exercise behaviours despite their exercise experience. Although participants in this study came from a variety of exercise backgrounds (e.g., limited vs. frequent exercise participation), those who had always included exercise into their lives, also indicated how getting back into their regular routine a challenge and how cancer treatment effects set them back physically as well as emotionally. For example, Brenda indicated that she had always been very active, and acknowledged the difficulty of having to completely start over. Therefore although she was familiar with exercise, cancer treatment effects influenced her perceived competence to engage in exercise.

*"I was always active from a young age so I built on that, ... I never felt like I had to start from scratch again and that was hard" – Brenda.*

Although participants were impacted by a variety of physical limitations (e.g., injury, treatment effects) influencing their competence to perform exercise throughout the program, it was apparent that many of these symptoms decreased thus enhancing competence and overall well-being for these individuals.

**Relatedness.** According to Deci and Ryan (1985), relatedness refers to the degree to which an individual feels a sense of connectedness to others in the immediate environment. To gain a sense of how connected participants felt with instructors and group members throughout the WE-Can Program they were asked what they enjoyed most about the program and how those aspects influenced their motivation to exercise. The majority of participants discussed how they enjoyed the group aspect of the program and indicated that supportive connections were made between group members in addition to volunteers and

instructors. Various subthemes emerged from the interviews contributing toward fulfillment of relatedness for participants. A summary of subthemes found within the need relatedness in Phase One can be seen below in Figure 3.



**Figure 4: Subthemes within Relatedness (Phase 1).**

**Sense of cohesion.** Sense of cohesion was another subtheme that emerged from the interviews to demonstrate fulfillment of relatedness. This refers to cohesiveness as a group as well as group members connecting on an individual level. Among all of the participants there was a shared commonality of a cancer diagnosis and treatment experience, and many commented on how that factor helped to create strong bonds and friendships between group members. Instructors promoted a non-judging atmosphere throughout the program allowing participants to perform exercises to the best of their ability. The support from the instructors allowed participants to feel more comfortable and connect with other group members.

*“Yeah no bad things about it [WE-Can Program], good things like I say. I found how easy it was to get to know people when you’re all doing the same kind of thing you know, I mean they weren’t looking at me saying well she can’t do it you know” – Barb.*

Similarly, Betty discussed how she felt more comfortable exercising with individuals who are in a similar situation and the friendships that were gained over the course of the program.

*“Well it was comfortable for me being with people, that maybe don’t have the same problems as I have, but it was good to know that there are other people that are in your situation, and that you can be comfortable with and do a program like this, and gain in friendships and what not”- Betty.*

Participants reported that *the connection or cohesiveness* in a structured group-based exercise program greatly impacted communication and teamwork among participants. Based on the comments from participants, this unique connection among group members appeared to have a positive influence for continued exercise participation throughout the program.

***Empathy and understanding.*** Participants discussed how much they enjoyed the program and how connected they felt to others as a result of the empathy and understanding shared among group members, instructors, and volunteers. Due to the familiarity of cancer and the similar experiences among participants, a comfortable and open space was available for individuals to discuss what they were going through. This greatly impacted the degree to which participants felt connected among group members throughout the program, and in turn contributed towards exercise participation.

*“The group itself was wonderful, the instructors and the participants – everybody knew what everybody was going through and all that... I suppose that may have been a part of the reason for the way everyone was, cause we’re all kind of familiar with each other’s problems in one way or another” – Deborah.*

Another participant indicated how empathy in the program enhanced feelings of cohesiveness, subsequently impacting relatedness. Laura found that group members were so understanding and supportive through the good times and the bad and how it encouraged her to come to class.

*“I think there was one day that I felt bad... but once I got here it was okay. And then I went home to rest. You know I just didn’t feel like it, I had a rough night, but once I got here, it was just altogether different, you see everybody else, and it was a good group. We laughed and we cried. We went through the struggles together” – Laura.*

Margaret discussed the importance of instructors understanding cancer and associated effects from treatment while guiding participants to perform various types of exercises. According to Margaret, the instructors in the program acted as counselors for the participants where they could receive one-on-one support and empathy for their condition.

*“The instructors are great for pushing you... and yeah you know having one on one basically... they’re like counselors too, you know encouraging us, but not to the point where we are hurting ourselves. I think that’s the difference between this and like going to a gym and getting a trainer or something... they don’t understand how much a cancer patient hurts... especially if you’re on chemo drugs for the five years... or hormone blockers... and we have peripheral neuropathy... you know fingers and your feet... it’s very frustrating to even think about starting something on your own... it’s much easier to just say, here’s a perfect program for you! Do it! Like, why would you waste that opportunity?” – Margaret.*

Evident in this participant’s statement, having the opportunity to be in a program that is “perfect” for individuals living with cancer should not be overlooked. The empathy and understanding demonstrated by the group members, instructors, and volunteers contributed greatly to the connections made throughout the program.

**Social support.** All participants indicated that social support was critical for coping with their cancer and engaging in exercise throughout the program. Social support stemmed from family, friends, co-workers, the health team, church community, and individuals in the group-based exercise program. All of the participants indicated that they received the most support from family and friends throughout their cancer experience. In fact, many of the participants

reported that their decision to join the WE-Can Program would not have been possible without the support and encouragement from their family and friends.

*“I guess the point is that I had so many people behind me, if I had done this on my own maybe I might not have stayed... but because so many people were behind me saying this is what you need, I figured I am certainly not going to disappoint these people after they had been so good to me, so I did” – Barb.*

Additionally, some of the women discussed how their faith provided them with emotional strength and how the connection made with the church community gave them the additional support that they needed to engage in healthy lifestyle behaviours.

*“I think basically the person that I am and the foundation that I have... I have a very strong faith, um prayer, spirituality, whatever you want to call it, and within that I have a lot of people in my life” – Cindy.*

Participants also indicated that the social support received throughout the WE-Can Program was very influential and facilitated exercise behaviours. For instance Laura described how the social support received throughout the program motivated her to engage in exercise. Laura explained how prior to the WE-Can Program she experienced depression and the program, and watching the other participants perform the different exercises, influenced the way she looked at her disease. She adds how on top of the support received from the program, her family was also there encouraging her exercise participation.

*“Well I did more exercise, like walking, I got more involved with trying to do activity at home... just to get myself... I think my point was, that I was getting tired a lot because I was feeling sorry for myself, cause’ I had this, so therefore my cop out was, oh I’m tired so I’ll lay down, but I think I was using it because I was going through depression. You know, feeling sorry for myself. So I think the WE-Can motivated me, because you saw somebody else doing things that you weren’t able to do at the beginning. And life goes on. You can’t let... I always say, cancer is not going to get*

*me, I will get it. So that's my motivation. I have support from my husband and my husband was out of town for six months but my kids and that, you know, they were at home, and so I had encouragement from my son and my daughter" – Laura.*

On the contrary, one individual indicated that social support through a group-based exercise program was not a crucial component contributing towards her exercise participation. Cindy indicated that she had always preferred individualized exercise out of her own home; therefore, the socializing aspect of the program was not a crucial component for her. As described by Cindy, the only reason she decided to join the program was because she had been unsuccessful at reaching her goals on her own and wanted the expertise of fitness instructors. Cindy's intention was to regain lost strength and lose unwanted weight, which was caused by the cancer treatment and hormone therapy. Cindy had high expectations that the instructors in the WE-Can Program would help to get her back into the physical condition she once was prior to her cancer diagnosis. Although Cindy did physically improve, the results were not what she expected which caused frustration and negatively affected her opinion of the program.

***Accommodating the program to meet individual needs.*** Throughout the interviews, participants frequently made comments regarding the design of the program and how it accommodated and met their specific needs while participating in exercise. Accommodations were made for participants such as unique instructing styles and modifying exercises for those with limitations. The connections made and the trust that developed between participants and instructors appeared to impact exercise participation; thus influencing the fulfillment of relatedness. Anne described the importance of support from the instructors, moving beyond 'traditional exercise' to engage participants in a unique and enjoyable way.

*“I felt very supported when I came... you guys were all very friendly and made it fun. It gives you a sense of accomplishment when you go... Tammy (program instructor) says something about ‘don’t say you can’t do it, cause you probably can’... so if it’s something that I wouldn’t do at home... but because you guys are there, with encouragement, kind of push us to do things... that I wouldn’t do at home. So it just felt very comfortable... and all the friends too” – Anne.*

Anne’s statement makes the connection between competence (i.e., the sense of accomplishment achieved when engaging in exercise), and relatedness (i.e., the encouragement from instructors and overall how these combined influence exercise motivation). Additionally instructors made it clear that every human body is different therefore modifications were always made for those with specific limitations.

*“We are all in the same boat and it takes away any of those negative feelings like ‘I have to do as good as everyone else’, it’s so different than a gym because going to a gym is very intimidating if you’re not a physically fit person, the gym is really intimidating. Here everyone is in the same boat, everybody has limitations, you work within our limitations, so it’s a much more comfortable atmosphere to be in” – Margaret.*

By tailoring the needs of each individual person in the program, participants could let go of any intimidations they may have had regarding exercise, and enjoy the comfortable atmosphere with other group members; thus influencing the fulfillment of relatedness.

**Phase one summary.** Participants interviewed immediately following participation in the structured group-based program clearly identified multiple subthemes that contributed to the fulfillment of the basic psychological needs autonomy, competence, and relatedness. Participants indicated the importance of exercise inclusion and how a program specifically designed for individuals living with cancer influenced autonomous behaviours and self-determined motivation. Each individual had her own specific limitations, which influenced her

perceived competence to engage in exercise. Participants indicated that the support received throughout the program and the positive exercise environment played an important role in their exercise motivation. Participants reported that special bonds and friendships were created throughout the program, and that having cancer brought the participants together in a unique way. The majority of the participants commented on how they wished that the program would never end and a few mentioned that they would try to sustain exercise behaviours long-term. One participant specifically indicated that the program was used as a coping method throughout her cancer journey, “With the WE-Can everybody was positive, they have always been positive, so I like the group, I like the instructors, I like everything about the program and that helps me to cope and stay strong you know” – Kathy. Despite several reports of positive experiences throughout the program, the participants did not share future exercise intentions.

### **Phase Two: Long-term Post Program**

**Participant recruitment and demographics.** All of the women in Phase Two resided in Thunder Bay or surrounding area with an overall average age of 61.7 years. Four of the participants in Phase Two also took part in Phase One of this study while the remaining participants were interviewed for the first time. All of the participants in Phase Two had breast cancer; only one of these women was receiving treatment concurrent to program involvement as well as during the interviews for this study. Other than this participant receiving cancer treatment, no other cancer reoccurrences were reported since completion of the WE-Can Program. When asked how participants had occupied their time since completion of the program, they described activities, which included work, travel, caregiving, developing personal relationships and friendships, hobbies (e.g., crafting, volunteering), unstructured/structured exercise, and enjoying retirement. Whether or not it was occasional or every day, walking was the most common exercise reported by all of the participants. As

indicated in the medical history assessment form or mentioned throughout the interviews, other types of physical activity that the participants incorporated into their lives included stretching, unstructured recreational activities such as cycling, and structured recreational activities such as aquabics. Only one of the participants indicated that she performed a regular exercise routine using her own equipment at home. The participants reported no major health changes since the completion of the WE-Can program. Additional demographic information is illustrated in Table 2.

Following the December 2013 session of the WE-Can Program, a follow up program called WE-Did was offered to WE-Can program graduates. The WE-Did Program follows the same structure as the WE-Can program and can accommodate 15 to 20 participants. Four of the participants who took part in Phase Two of this study have been enrolled in this program and currently attend the two evening classes every week on a regular basis.

**Table 2: Participant Demographics**

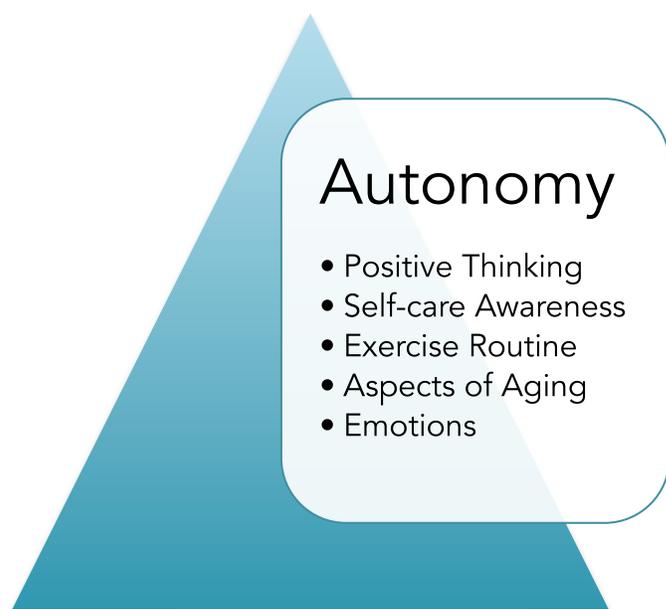
Participant	Age	Marital Status	Type of Cancer	Type of Treatment	Time Since Treatment	Cancer Related Surgery	Employment Status	Current Exercise (structured and/or unstructured)
<b>Margaret</b> */***	63	Married	Breast (left) (Stage 2)	Chemo-therapy Radiation Hormone Therapy	> 12 months	Lumpectomy	Self-employed	Walking, lifting, stairs.
<b>Stacy</b> **	63	Single	Breast (left)	Radiation Hormone Therapy	> 12 months	None	Unemployed	Walking
<b>Sheryl</b> **	63	Single	Breast (right) (Stage 2)	Radiation	> 12 months	None	Retired	WE-Did, Aqua fit, Walking
<b>Mabel</b> **	69	Married	Breast	Radiation	> 12 months	Mastectomy	Retired	WE-Did, Walking, Stretching
<b>Betty</b> **/***	71	Married	Breast	Chemo-therapy, Radiation	> 12 months	Double Mastectomy	Retired	Walking
<b>Kathy</b> **	50	Married	Breast (DCIS)	Chemo-therapy	> 12 months	Double Mastectomy	Yes – Modified Duty	Walking, Stretching, WE- Did
<b>Cindy</b> */***	47	Single	Breast (right)	Radiation Hormone Therapy	> 12 months	Lumpectomy	Self-employed	Stretching, Mat/Ball work
<b>Anne</b> */***	65	Married	Breast	Chemo-therapy	Treatment every 3 months	Mastectomy	Retired	Swimming, Aquabics, Treadmill, Bike
<b>Margaret</b> *	65	Married	Breast (right) (Stage 2)	Radiation Chemo-therapy	> 12 months	None	Retired	None
<b>Donna</b> **/***	61	Married	Breast (Right) (Stage 2)	Radiation	> 12 months	Lumpectomy	Yes	Walking, Cycling, WE-Did

Note 1: Pseudonyms have been used to protect participant confidentiality.

Note 2: Participants 7 months post program \*, Participants 1 year post program \*\*

Note 3: Participants who participated in Phase One and Phase Two \*\*\*

**Autonomy.** To gain a sense of whether or not participants demonstrated volition in accordance with the tenets of autonomy (i.e., decision, choice), participants were asked questions exploring reasons for including exercise or not into their current lifestyle, and what informs their decision-making. A variety of levels and forms of exercise were evident among participants. All participants were aware of the benefits associated with exercise and emphasized the importance of exercise in their lives. Although all participants expressed awareness of exercise benefits, some included only a limited amount in their daily regimen (e.g., walking occasionally). A variety of subthemes emerged from participant's comments indicating barriers and facilitators towards their exercise participation. A summary of subthemes that emerged for autonomy is illustrated in Figure 5.



**Figure 5: Subthemes within Autonomy (Phase 2)**

**Positive thinking.** Similar to Phase One positive thinking was a subtheme that emerged from the interviews. Caprara and Steca (2005) named the common latent dimension underlying life satisfaction, self-esteem, and optimism as “positive thinking”. The majority of participants indicated that keeping a positive attitude was the most important coping mechanism used throughout their cancer journey. In turn, this attitude influenced

participants' volitional choice to be active, and to continue these behaviours following the program. Kathy in particular described how having a sense of humour, laughing often, and enjoying life was important for staying strong. Kathy is one of the few participants who continued with frequent exercise participation following the program, which appeared to be influenced by her positive attitude.

*"Yes you know, we were given a diagnosis of cancer but it's not the end of your life if you just don't look at it that way but you just stay positive and have hope, so for me, just to try and stay strong, stay positive – sense of humour, like I love to laugh, and joke around so I use a lot of my humour" – Kathy.*

Kathy continued to describe how positive group members and instructors were in both the WE-Can and WE-Did Program and how it helped her cope and stay strong. The positive attitudes of those around her evidently influenced her volition to participate in exercise following the program thus enhancing continuous autonomous behaviours.

*"I think just be positive – and then with the WE-Can and WE-Did I mean everybody was positive, they have always been positive, so I like the group, I like the instructors, I like everything about the program and that helps me to cope and stay strong, you know?" – Kathy.*

Similar to Kathy, Cindy also discussed how it is easier to battle cancer with a positive attitude. Cindy explained in detail how cancer influences many dimensions of your health and how it can help you cope with the side effects from cancer treatment.

*"The side effects and the leftovers from the cancer treatment are wide, they're consuming, they're constricting and there's no current end to that. So, physically, psychologically, mentally, and emotionally, it's much easier to battle cancer and be very positive and say we're going to get through that" – Cindy.*

Cindy, having always been very active, discussed how she has always engaged in individualized exercise at home. Cindy indicated how positive thinking can impact her

physical and psychological health and well-being, thus demonstrating her volitional choice to incorporate exercise into her current lifestyle. Overall, positive thinking stemmed from the cancer diagnosis itself, in which participants had to face their illness, and accept how it had impacted their lives in many ways. For many of the participants, coping with their illness, and finding the volition to incorporate healthy lifestyle behaviours, was easier to do by remaining positive throughout the cancer journey.

**Self-care awareness.** A subtheme of self-care awareness emerged from the interviews as participants described how focus and attention must be placed on their health and well-being. The participants described self-care awareness as an awareness towards psychological and physical well-being. This awareness towards their health in turn influenced their autonomous decision to continue exercising on a regular basis. In one instance, Kathy indicated how she has spent the majority of her life caring for her family, and now she is taking time for her to be healthy. Kathy discussed how having cancer made her realize that incorporating healthy lifestyle behaviours is essential.

*“It’s not just because I’ve had cancer, but I think about all the years I dedicated to my son and helping him and stuff like that and I kind of lost myself, and so now... it’s kind of bad that I ended up with cancer to realize, ‘hey you gotta get back in the health thing’, you know I would just be tired and doing things with my son or for my son all the time but I wasn’t taking the time for myself to do the things that I needed to do to stay healthy so I’m just happy doing things now that make me healthy – keep me healthy – and that’s why I do it.” – Kathy.*

By focusing on her own health and well-being, Kathy demonstrates the volition to engage exercise behaviours, thus contributing towards the fulfillment of autonomy. Kathy also discussed different ways of coping and how to feel at peace with oneself. She expressed a unique aspect to self-care that incorporates emerging herself in peaceful surroundings.

*“Mindfulness skills, and calming, and meditation, and all that kind of stuff, and I love being around nature and by the water, and that’s where I feel really connected with nature and I’m just at peace” – Kathy.*

Similar to Kathy, Cindy discussed how her diet has changed drastically since her diagnosis and throughout cancer treatment. Cindy demonstrates the volition to accept her illness and do what is necessary to remain healthy, thus contributing towards the fulfillment of autonomy.

*“I now have over two cups of frozen berries in a smoothie everyday there’s supplements and vitamins, herbs, things that like which were always taken they have just been adjusted to my current condition now, um yeah...But what do I eat, I eat chicken, I eat salmon, I eat deep water cold fish, crab, basset fish, I’m very high in protein and because of the lymphedema – oh and I guess the other thing is I’m doing the alkaline thing where I drink lemon water all day, green tea” - Cindy*

Sheryl discussed how prior to her cancer diagnosis her health was compromised due to stress, therefore after she completed cancer treatment, exercise participation was her primary focus and concern. Sheryl clearly indicated that she made the conscious decision to incorporate exercise into her life, thus contributing towards the fulfillment of autonomy.

*“Well before my cancer diagnosis and treatment I wasn’t very active, and I attribute my health to some environmental conditions of too much stress, too many decisions that were made that weren’t healthy based decisions, so when I finished my cancer treatment, and this was back in Calgary, I found a group similar to WE-Can but it’s not as structured but a place where cancer survivors could go for activity, and it was only once a week and so when I moved here I really was looking for where can I get the same... cause’ I left Calgary and knew that was a key component for my wellness” – Sheryl.*

In particular Sheryl indicated as a component of her self-care, was recognizing the social needs she required to feel content with her life. She discussed how raising a family has always taken priority and that now she has adequate time to incorporate exercise and socializing with others. Sheryl indicated that exercising is a conscious decision she makes each week, thus clearly contributing towards the fulfillment of autonomy.

*“I think what I recognize is um I have social needs that – when I was working full time and so busy with raising a family I didn’t really address my social needs and so again time, opportunity, I’ve met some really nice people and oh hey isn’t that nice – there’s another dimension to life then being so busy and raising a family and paying your bills and so I’ve really found that a part of my life – and it’s a conscious change – conscious decision I make each week” – Sheryl.*

Overall, participants indicated how having cancer influenced their out look on self-care, which included different aspects such as nutrition and exercise inclusion. The desire to adopt a healthier lifestyle influenced participants’ volition to engage in long term exercise behaviours.

**Exercise routine.** Within the interviews, exercise routine or in other words exercises regularly followed by participants as a part of their lifestyle, emerged as a subtheme. Some participants indicated that they did not think about actively doing exercise, it was just something they automatically did without question and included in their daily routine. This mirrors the concept of integrated regulation, in which participants have a conscious valuing of behaviour, integrated into the sense of self, although not inherently enjoyable (Deci & Ryan, 2000). For example, Donna described how having a routine worked best for her to autonomously engage in exercise behaviours. Donna indicated that she truly did not enjoy exercise, but was aware that it must be incorporated into her life.

*“It’s the hardest part, for me the trick with exercise cause’ I don’t really like it, it’s to not think about it, it’s like brushing your teeth, you just do it in a routine, and you don’t like*

*– if I ever ask myself psychologically do I want to do this, I’m finished, because the answer would be no. I want to sit on the deck and have a glass of wine (laughs) I do not want to go and walk on the treadmill, so you just have to go... without thinking” – Donna.*

Another participant described how one’s exercise routine could be easily broken by frequently making excuses to not exercise. Mabel described how retirement in particular has given her ample time to include exercise into her daily routine. Mabel appeared to have the mindset to continue exercise behaviours and explained how an exercise routine influenced her volition to remain active.

*“I’m hoping I can keep it up... not because I can’t because I’m retired, you just have to take the time, no more of this I’ll do it later, no I do it first thing in the morning, I find that’s the best for me, if you let the day go on, something always comes up, somebody always comes over or they phone” – Mabel.*

All of the participants currently participating in a structured group-based exercise program (e.g., WE-Did) emphasized the importance of including exercise into their daily routine. The one individual who preferred individualized exercise also indicated that exercise has always been a part of her routine. Those participants who indicated lower levels of exercise did not mention exercise routine as an important factor influencing volition to participate in exercise.

**Aspects of aging.** Due to the fact that the majority of the participants are in the retirement stage of their lives, different aspects of aging were discussed as influencing participants’ autonomy to engage in exercise. Participants indicated that certain aspects of aging acted as facilitators (e.g., awareness) and as barriers (e.g., physical decline, fatigue) towards exercise participation. For example, Betty demonstrated how she has made the volitional choice to be inactive due to her age and the effects associated with growing older. Betty described how she feels like she has been “slowing down” over time, and how this has

impacted her decision to engage in very limited exercise, thus aging acts as a barrier towards exercise participation.

*“Well, I don't walk like I used to... I used to do five miles a day at a fast pace, well I don't do that anymore... I think age has a lot to do with it, you just slow down for some reason... and I don't feel like it's my weight holding me back... I don't feel like I'm that much over weight that I can't go out and do the exercise that I want to do... I just feel like maybe I've slowed down a bit because of age...” – Betty.*

Furthermore, Betty described that she makes the volitional choice to incorporate other activities into her life (e.g., relaxing, reading), which may or may not involve any form of exercise. Although it is important that she includes activities in her life that bring her joy, she is missing the potential health benefits to be received by exercise participation.

*“Now I prefer just to sit and read. Sit on my deck... Maybe I'll go for a walk, maybe I won't (laughs)...” – Betty.*

Donna on the other hand described how her age has influenced the way she thinks about health and is consciously aware of how aging and cancer are critical factors that influence how hard she must work at maintaining her health. Thus taking into consideration of the effects of aging Donna had made the volitional choice to overcome this barrier, and increase overall exercise levels; thus clearly supporting fulfillment of autonomy.

*“I think after the cancer diagnosis, the part about maintaining your health became more prevalent in my motivation to exercise, and concurrent just with turning 60 which you know was just before my cancer diagnosis, I was 61, so that's sort of a milestone where you realize you know, I better get cracking and um really look after my health, I mean I considered myself to be very healthy but I'm also aware that once you past 60 to stay healthy, you need to work at it, so I became more conscious of that health part of it, between the aging and the cancer” – Donna.*

Similar to Donna, some of the participants reported how being older and in the retirement stage of life has allowed them more time to incorporate exercise into their lives. Sheryl discussed how now that she is retired, she is seeking out activities where she can meet new friends. In particular, common interests are sought out, including the inclusion of exercise in a group-based setting. Now that work is not taking up most of Sheryl's time, the inclusion of exercise is not as difficult to incorporate, thus she makes the volitional choice to engage in exercise fulfilling this aspect of her life and demonstrating autonomous behaviours.

*"I haven't been working since 2012, since the fall of 2012, so I consider myself retired, its been hard to accept that I'm retired but, I'm not actively looking for work and I'm spending my time – because I have returned to Thunder Bay after an absence I'm meeting new people, I'm seeking out activities where there's common interests of what I like to do and with that comes meeting new people and new experiences" – Sheryl.*

Aspects of aging, such as retirement clearly influenced participants' outlook on exercise and what they value as important aspects to include into their lives. For some this meant partaking in activities that do not involve exercise but bring them some form of enjoyment. For others aging impacted the amount and the type of exercise included into their life, thus demonstrating how it may contribute towards the fulfillment of autonomy in this respect.

**Emotions.** Some of the participants in this study reported psychological aspects of their health as both negatively and positively influencing their autonomy towards exercise participation. For example, one participant discussed how her emotions (e.g., sadness, stress) controlled her energy levels and impacted the choices she made regarding exercise engagement. Sheryl explained that the emotions usually stemmed from personal relationships between family members rather than issues related to her cancer experience. Sheryl expressed awareness of this barrier towards exercise participation and indicated that

exercise itself was the best solution. She explained how exercise has helped her to achieve psychological and physical well-being, therefore she makes the volitional choice to push through the emotions and engage in exercise.

*“Not that I go out every day feeling not well but I know that every day, when I come home I’m going to feel better. So it’s that physical well-being that you feel, but it’s the mental and the social side of it too that you just feel more whole I guess, then not doing it” – Sheryl.*

In contrary, another participant discussed how unstructured/individualized exercise has benefitted her psychological well-being and how this in turn contributed towards her volitional choice to engage in exercise. In particular Donna reported that walking is a type of activity that she can do in solitude, allowing her to spend time to think. This opportunity evidently influences Donna’s autonomy to engage in exercise behaviours.

*“I walk by myself because I like walking, I like listening to music and walking, because for me it has a psychological benefit, it’s meditative, and I do a lot of work in my brain when I walk, in a good way” – Donna.*

Although not discussed in full detail, one participant appeared to be dealing with psychological issues, which may have negatively influenced her overall health and quality of life. Although this participant thoroughly enjoyed the WE-Can Program, and indicated the importance of exercise inclusion she has not continued any form of exercise following the program. When asked if she intends to incorporate exercise back into her life, she did not indicate any interest. Although more information would be needed to make such a claim, it is clear that this participant experienced psychological barriers towards her exercise participation, thus inhibiting the fulfillment of autonomy.

Another participant discussed how when she first started the WE-Can Program, there were times when she would experience anxiety while participation in exercise. However, she has indicated how a year later, she has been able to understand the sensations experienced

with exercise participation and how her confidence to engage in exercise is much higher now. This improvement has been influential towards her volition to continue exercise thus contributing towards the fulfillment of autonomy.

*“My heart was racing too fast, I couldn't get my breath, and it was hot, then my head would get in it, and I just had to stop, and now, well a year later, the intensity is higher and my confidence is higher, It's okay that your heart rate is higher, because you're working harder – you can breath, its not too hot, and so all of what was problematic before isn't there now, and I'm able to continue but – so yeah those would have been things that interfere before – its usually everything in my head would say I can't do it, its too much, I'm gonna fall over, I'm gonna faint – but I'm not feeling that way, I haven't had that feeling” – Sheryl.*

Overall, it was evident how the variety of emotions experienced prior to, during, and following exercise participation could act as a facilitator or barrier towards exercise participation. Participants clearly indicated how these emotions impacted their volition to engage in exercise, and in particular how exercise helped them to overcome barriers influencing the fulfillment of autonomy.

**Competence.** To gain a sense of the participants' ability to conduct challenging tasks within their environment (Deci & Ryan, 1985), participants were asked to reflect back and share their experiences prior to, during, and following the WE-Can Program. Additionally, participants were asked to discuss any physical and/or psychological limitations in regards to exercise participation, which may have been related or unrelated to their cancer and treatment. The majority of participants indicated that their competence to engage in exercise had not drastically changed since the completion of the program, while a few indicated restricted or modified participation due to physical and/or psychological limitations (e.g., injury, treatment effects, emotions). A variety of subthemes emerged from participant

comments indicating barriers and facilitators towards their exercise participation. A summary of subthemes that emerged for competence is indicated in Figure 6.



**Figure 6: Subthemes within Competence (Phase 2).**

**Exercise environment.** Similar to Phase One, throughout the interviews, participants made it clear that the exercise environment (e.g., physical and social) greatly impacted their competence to perform exercise behaviours. Due to the fact that some participants continued exercise in a structured group-based exercise program, while others continued unstructured/individualized exercise, exercise environment was described differently. For those participants who continued exercise in a structured program they compared it to their experience in the WE-Can Program. For example, Betty reflected back to her experience in the WE-Can Program and attributed the structure of the program to her reason for exercising and motivation to be active. Kathy indicated that although some exercises are more challenging to perform, instructors offer modifications to perform those exercises safely and without concern of being injured. This feature of a structured program influences participants' ability to perform skills efficiently, thus contributing towards the fulfillment of competence.

*“You know there are obviously some exercises that – in the WE-Can group and the WE-Did group that were a little bit hard for me to do so the instructors were able to show me how to modify those exercises so that I’m still working those muscles groups, so I might be doing a plank on a chair, opposed to being on the floor” – Kathy.*

Similar to Kathy, Mabel described how she was unable to do certain exercises on her own at home, but while in the program she was able to challenge herself because she felt safe and supported. Having the instructor’s support and physical presence throughout each class clearly impacted Mabel’s perceived competence while engaging in exercise.

*“Well I have a heck of a time on that ball, but you know somebody was always behind me so it was alright “ – Mabel.*

For another participant engaging in exercise out of the comfort of her own home gives her a sense of comfort. This aspect of the exercise environment for Cindy influenced her ability to perform and perfect skills, in a comfortable exercise environment, thus contributing towards the fulfillment of competence.

*“I like getting up and exercising in my pajama’s and then having my shower, rather than leaving my home and so yes, I’ve always preferred to stay within the home” – Cindy.*

Based on the different responses, the type of exercise environment that best facilitates exercise depends on the individual. Overall, most of the participants did indicate that they preferred exercise in a group-based structured program, in particular for assisting them to overcome barriers associated with their cancer. Thus exercise environment greatly contributed towards the fulfillment of competence for participants in this study.

**Sense of cohesion.** Sense of cohesion as a means to enhance competence for participants, emerged from the interviews. Similar to Phase One, cohesiveness among participants was seen more predominantly for those who had continued exercise in a structured group-based exercise program. Participants indicated that the support of the group

members and instructors in the program helped them to challenge themselves and push a little harder at each class. For example Kathy indicated how she would like to progress at her own pace throughout the program and how the other participants in the program have helped her to create specific goals, that they are attainable, and not to give up hope. This encouragement and support from other group members has influenced Kathy's exercise behaviours, thus influencing her perceived competence.

*"I feel competent that I can do the exercises to the best of my ability, and yep I'm okay with that, and it was funny that – I even said to the ladies in my group just about two weeks ago... I just wish one day I could be like you guys and be down there on the floor doing your planks or whatever so, I haven't given up hope totally, I just know one day I could get there" – Kathy.*

Kathy evidently feels competent to engage in exercise however declared that she would not go out and get a gym membership anywhere. She described that it is the uniqueness of this group of individuals in the program that allow her to exercise comfortably.

*"I mean I could go anywhere and get a membership right now, so I feel competent enough that I can go and do it, but I don't want that because I enjoy being with the women in the group, I'm loving it. Put men in there, it doesn't matter to me, and I just love the whole atmosphere" – Kathy.*

Similar to Kathy, Betty described how throughout the WE-Can Program she really enjoyed exercising in a group atmosphere. In particular she commented on how each person has limitations that are different, which eased her mind and motivated her to keep exercising and influenced overall feelings of well-being. However, throughout the program and since completion of the program, Betty indicated that she has not continued or increased levels of activity. This included not joining another structured group-based program and not incorporating exercise at home. For Betty, there are still apprehensions impacting her perceived ability to perform exercises, thus thwarting the fulfillment of competence.

*“Well I enjoyed the group exercise, it was fun to do with everybody, you see what everybody’s limits are and you think well gee I can do things better than the other person but you don’t know what their physical problems are... that kind of motivates you to make yourself feel better, but as far as coming home and doing them... uh, I don’t know I just never really ever did them... because there was a program you went and did it to the best of your ability” – Betty.*

Furthermore, Betty indicated how exercising with the other women in the group influenced her to maintain exercise behaviours throughout the duration of the program. Her reason for not continuing exercise in a group atmosphere following the WE-Can Program was not clear. However, for those participants who decided to continue exercise in a structured group-based program, the connection between group members was reported as significantly influencing exercise enjoyment and overall long-term participation.

**Aspects of aging.** Various aspects of aging emerged from the interviews, in which the participants described as directly influencing their ability to conduct tasks within their immediate environment (Deci & Ryan, 2000). A few of the participants discussed how their levels of exercise changed over the years, which they attributed to the natural process of aging. Participants discussed how their physical abilities have been impacted by a combination of their cancer as well as their age and how exercise in particular has helped them cope. For example, Donna described specifically how exercise helps to lubricate her joints and gain strength, which is important as she grows older.

*“But there’s something about exercise in your joints that generates lubrication in your joint, so that actually helps, yeah so other than that I’m just not physically as strong, as I would like to be, and because you are compounding all of this with the natural process of aging” – Donna.*

Furthermore, Donna continued to describe that her energy levels and strength are different now that she is older, which requires her to work harder at an exercise regime. It was evident that aging acted as a barrier towards her exercise participation; however she adapted to these changes and understood that she will be required to work harder to achieve skill mastery.

*“So how much of it is just you have to work a lot harder and be more rigorous about an exercise regime, when you're my age which is 63, than ten years ago, like there's a big difference in my body, and my energy and just my natural strength, so I have to work at it” – Donna.*

Similar to Donna, Mabel discussed how the older she becomes, the more important it is to remain active. Mabel indicated that if you are sedentary, it is more difficult to engage in exercise therefore she incorporates a little bit of exercise into each day. Mabel is aware of how age can impact one's ability to perform exercises, therefore this knowledge influences her exercise participation and fulfillment of competence.

*“I'm taking it more serious now and I know it's important... I think the older you get. Stretching is very important you know because when you sit and don't do much, then you really feel it, when you try to do it... so if you do a little bit everyday your whole well-being is better, so that's what I'm trying to do now, well now since the WE-Can Program, it started it right, so I said now I'm going to keep on doing this” – Mabel.*

According to these participants, awareness of the different aspects of aging and how it can influence an individual's physical and psychological well-being is very important. Some of the participants attributed this knowledge towards their previous exercise experiences in the WE-Can Program. Anticipation of the changes associated with aging allowed the participants to feel more competence to engage in exercise, thus facilitating continuous behaviours long-term post program.

**Physical limitations.** Participants reported physical limitations as influencing their exercise participation following completion of the WE-Can Program. This included various treatment effects such as weight gain from hormone therapy and upper-body limitations from breast removal surgeries. It was evident that these cancer treatment-related effects may compromise competence for individuals to participate comfortably in exercise. For example, Cindy described joint pain that she experienced as a result from taking medications following her cancer treatment. She indicated that this symptom did not completely restrict her from participating, but rather did not allow her to engage in high intensity exercise that she was used to incorporating into her exercise regime prior to cancer diagnosis.

*“Side effects of the medication – among other things is joint pain, and so when I first went on that Arimadex I had quite a lot of joint pain it’s like arthritic pain but it’s not arthritis – no one can really explain the cause of it, although, and including my oncologist... but – my GP (General Practitioner) said estrogen has a lubricating function in your joints, so if that’s the case that’s a logical thing because that’s the medication sucking the estrogen out of your body so it has all” – Cindy.*

Furthermore, Cindy explained that she also experienced effects from other chronic diseases such as her fibromyalgia. Cindy clearly indicated how the symptoms from fibromyalgia inflicted a great amount of pain on her, and how exercise was essential in helping her cope with those symptoms. Due to the fact that Cindy experiences symptoms from hormone therapy as well, she explained how it is difficult to detect the source. Cindy indicated that she incorporates exercise into her life when she can, thus contributing towards the fulfillment of competence.

*“I had what they would call the fibro flare ups – and the other side effect of this aromatase is pain in your joints and your bones – so it’s kind of hard to know is it the fibro or is it the drug?... Yes, there is nothing preventing me – short of recovering from*

*these injuries or recovering from what's going on... you know, there's nothing – how can I say this... when I am able to exercise, I exercise, and I factor it in” – Cindy.*

Similar to Cindy, Sheryl discussed how the inclusion of exercise is essential for improving her range of motion and reducing pain. This aspect of exercise drives Sheryl to continue engaging in exercise behaviours, thus contributing towards the fulfillment of competence.

*“It's not important, it's an essential. If I don't do these stretches, strengthening's, or range of motions, I will be inhibited in range of motion and I will be in pain so it's absolutely necessary – there's not a question that there has to be some form of – if the word is exercise, you know it's mandatory” – Sheryl.*

Based on the information provided by the participants, physical limitations as a result of cancer treatment, other chronic diseases, or injury clearly impact their perceived competence to engage in exercise. Whether or not exercise is completed in a structured or unstructured environment does not impact how physical limitations may be perceived.

**Relatedness.** To gain a sense of how connected participants felt with others in the program as well as their immediate environment (Deci & Ryan, 1985), they were asked to reflect on their experience in the program as well as discuss current involvement in exercise and the environments in which those exercises were performed. Participants discussed how a special connection among group members in a structured group-based program can be formed and due to the uniqueness of this population, the shared commonality of cancer brought participants together in a special way. A variety of themes emerged from the interviews which directly impacted the fulfillment of relatedness in an exercise context. A summary of subthemes that emerged for relatedness is included in Figure 7.



**Figure 7: Subthemes within Relatedness (Phase 2).**

**Sense of cohesion.** A subtheme that emerged from the interviews was a sense of cohesion in which participants indicated how the cohesiveness in the group atmosphere and ability to connect with other participants directly influenced their exercise participation. Participants indicated that they were able to share their feelings and experiences with other group members, which helped them put their own thoughts regarding their cancer and exercise in perspective. For example, Mabel discussed how understanding how other individuals living with cancer view different aspects of life, helps to form a special bond amongst participants in a group atmosphere. As Mabel has continued exercise in a structured group-based exercise program, the sense of cohesion clearly plays a large role in her exercise participation, thus contributing towards the fulfillment of relatedness.

*“I think it was a good program you know, and it’s just connection with other people that had cancer, or how they feel about it, how they deal with it, you know, you put it all together you get different views and ideas and thoughts”. – Mabel.*

Additionally in this quote, Mabel refers to the unique connection made with other individuals who have had cancer, and how they were able to comfortably share these

experiences. Participants indicated how within the WE-Can and WE-Did Program they had the opportunity to share and connect with individuals alike. Mabel described the WE-Can and WE-Did Program as both being very unique and that she disliked other support groups she had been too (i.e., breast cancer support groups) because of the focus on negativity and self-pity.

*“I went to one, and it wasn’t for me, because everybody is there crying why me...*

*You know, and I’m like why not me, I’m not different than anybody else”. – Mabel.*

In particular, the WE-Can Program and WE-Did Program, although aimed at accommodating the needs for individuals living with cancer did not focus on the illness, rather the wellness of each individual. Overall, this aspect of the program influenced Mabel to feel more connected and in turn facilitated exercise participation.

Similar to Mabel, Donna also commented on how supportive the instructors were towards her exercise participation. In particular, Donna explained how she would not engage in exercise on her own and how the group aspect must be present to facilitate her exercise participation and the fulfillment of relatedness.

*“Well it’s fine for now, and it suits my lifestyle for now, uh but I wouldn’t do it on my own, but I can go and I can be with the group and the group is an important motivator, and I mean I always like the instructors, that was very good” – Donna.*

Similar to Phase One, participants who continued exercise in a structured group-based exercise program also discussed how the instructors were able to modify exercises and provide education in regards to exercise, nutrition, and ways of incorporating a healthy lifestyle. In comparison, those who perform primarily unstructured or individualized exercise, would lack the supportive aspect of structured programs thus this would not contribute towards the fulfillment of relatedness for those participants.

The cohesiveness between participants in a structured group-based exercise program was particularly strong due to the empathy and understanding demonstrated by group

members. This aspect only emerged for those participants (n=4) who had continued exercise in the WE-Did Program, and tied directly to sense of cohesion among group members thus fostering relatedness. For example, Sheryl emphasized how important it was that the group members would listen to her if she wanted to open up, and how they truly understood any struggles she may have been going through. Participants indicated that this deep understanding among participants could only be found in a program designed specifically for individuals living with cancer. Sheryl further expanded that even her lifelong friends outside of the program did not relate and she discussed how she rarely opened up to them during times of need.

*“Right, it’s very easy in the WE-Can and the WE-Did; we go there, and not that we talk about this, but if you have a day that you’re not a hundred percent, everybody knows and understands it and you don’t go into deep discussions but if you wanted to – if I wanted to I would know that those people would understand within the group whereas new friends or friends that I meet even my lifelong friends they rarely ask about anything and I don’t feel comfortable talking to them so it’s my challenge” – Sheryl.*

Sheryl described the connections made with the program as very “powerful” and she truly believed that the time spent in the program impacts individuals even after the program has ended.

*“Yeah, and it’s unfortunate you know the nature of a start and finish event you know it’s over – it starts and it’s over but during that time some powerful connections are made, and so it’s been nice to see some of those people – I’m very open minded to most things so had there been a formalized opportunity to try to connect beyond that I would have – but again I have more time than a lot of people so, but yes there were very special connections made there” – Sheryl.*

Sense of cohesion and fulfillment of relatedness appeared to be the strongest factor influencing exercise participation. Most participants indicated the group aspect of exercise programs and the shared commonality among those living with cancer as very influential towards their ability to connect with others, and in turn contributing towards the fulfillment of relatedness.

**Social support.** Social support was another subtheme that emerged within the interviews, which participants indicated as a critical component for facilitating long-term exercise participation. In particular participants described social support as the ability to socialize in a comfortable setting allowing them to experience enjoyment outside of their busy lifestyle. For example, one participant discussed how she has never been successful at continuing individualized exercise and how a group atmosphere with supportive instructors and group members was more effective.

*“This has been a pattern throughout my life that I go to exercise classes I have never really been good at doing an exercise program at home, I’ve never been able to get into the habit of doing it and sustain it and I don’t even – I think well... my motivation for exercise is because I think it’s good for me and I feel better after I’ve done it but I actually hate it and I mean I’m speaking a bit too strongly but I don’t enjoy it, and I find it much more palatable to do in a group – because the instructor – and we’ve had outstanding instructors in WE-can and WE-Did, they were excellent for motivating and – just the social interaction is very good” – Donna.*

Similar to Donna, Kathy described how participants supported one another throughout the program in which they performed exercises together, overcame similar challenges, and shared life experiences with one another. The social support received from participants in a structured group-based program, particularly WE-Can, greatly impacted this participants’ motivation to exercise and the fulfillment of the need relatedness.

*“I don't know if I'm the youngest one in there, but I think I am, and I'm telling you... all their wisdom about the different things that helped them through their diagnosis and treatment and everything... We've all talked so it's kind of like we're having a fun support group, even though we're on the treadmill running side by side or whatever and we're talking and you know it's nice because everybody shares and you know if you're not there one week it's like 'Hey where ya been?' or 'How ya doin?' or 'You okay?', you know so you have the emotional support. We have that little bit of comradery in class too because I like to joke around 'oh c'mon girls work harder', or c'mon we're not sweatin' enough!', so I like to joke around, we have some good laughs” – Kathy.*

Similar to Kathy, Sheryl discussed the social benefit from exercising in a group, which she indicated was “key” in her physical activity regimen. She described how she enjoyed both structured and unstructured types of exercise but the group activity is a very influential component directly impacting her fulfillment of relatedness.

*“I think what I've come to know is I like both, I like my time when I can walk, and I like the lack of structure, with those kinds of things, but I love group activity, it's key for me, the WE-Can program came along right at the right time and it was so perfect – I like the structure of a group, the discipline, the fact that I don't have to be the leader I can be a follower – and WE-Can in particular because the commonality is our health that's a great sense of support for me, but even when I go to yoga or to pickle ball it's a group – I get a great social benefit from it” – Sheryl.*

Additionally, exercise in a structured group-based exercise program has been the greatest sense of support for Sheryl. Socializing and meeting new people has fulfilled a certain component of Sheryl's life that she had not experienced before. Having gone through a separation with her husband during her cancer, the connection made with people within her exercise groups has enriched her life and has given her happiness.

*“What I recognize is – I have social needs that – when I was working full time and so busy with raising a family I didn’t really address my social needs and so again time, opportunity, I’ve met some really nice people and oh hey isn’t that nice – there’s another dimension to life than being so busy and raising a family and paying your bills and so I’ve really found that part of my life” – Sheryl.*

Sheryl’s comments regarding social interaction provide evidence that the connection made with other people in an exercise context can facilitate continued exercise participation. Sheryl also indicated the inclusion of socializing as a “conscious change” which she has made, demonstrating the presence of autonomous behaviours.

Within the realm of social support, Donna described her relationship with her partner as a positive motivator towards exercise participation. She described how influential his encouragement was on those days when her energy levels were low and how his support greatly impacts her exercise participation and fulfillment of the need relatedness.

*“I would say a positive, like a motivator, like a positive thing is my partner, he is very very supportive and I mean even the days that I don’t feel like going to WE-Did, like I’ll come home from work some days and be really tired, I don’t just feel like going and he’s very encouraging, I mean most of the time – because I really like it, most of the time I want to go, but even if I don’t want to go he really motivates me, he’s a positive force not a barrier”- Donna.*

Similarly to Phase One, since the completion of the program, Cindy indicated that she preferred individualized exercise as it fits better with her lifestyle. Although she reported that socializing in a group and the connection among participants was not an important factor to facilitate exercise participation, she was aware of why group exercise may be important for some people.

*“I think it provides a very necessary element for a lot of people – a lot of people also join for the socialization and the ability to meet new people which I think is great” – Cindy.*

Cindy also discussed a negative experience while in the group, where she reached out to another participant without any reciprocation. This may have influenced her desire to not reach out and connect with the other participants in the program.

**Phase Two Summary.** Phase Two looked particularly at exercise involvement spanning a 7-12-month period since completion of the structured group-based exercise program, and the different barriers and facilitators that impacted adherence to exercise over time. While this phase explored changes over two different time frames, based on participant responses and considering that the follow up phases were so close together in time, no apparent differences were found between those seven months post to one year post program. Similar to Phase One, a few participants indicated that positive thinking contributed to their psychological well-being, which in turn influenced their exercise participation. Coincidentally, those participants who were currently participating in a structured group-based program emphasized the importance of having a positive attitude and also appeared to pay more attention to their health in general. Various aspects of aging seemed to contribute towards exercise participation as most participants were in the retirement stage of life. Some individuals indicated that they had more time to engage in exercise, while others had interest in other types of activities (e.g., reading, knitting). Effects from treatment, injury, and or other chronic disease-related symptoms acted as barriers towards exercise participation for some individuals. Participants reflected back to participation in the WE-Can Program and acknowledged the importance of instructors and exercising in a structured program specifically tailored for individuals living with cancer. It was very clear that the bonds created throughout the program facilitated enhanced exercise participation for the participants. Most participants described the WE-Can Program as a “perfect fit” for individuals with cancer and

while living with the effects from treatment and attributed this primarily to the support and guidance provided by instructors. Although participants were aware of the follow up WE-Did Program, many of them did not decide to participate. The four participants who did enroll in the WE-Did Program had overall higher self-reported levels of exercise engagement including other unstructured types of activities outside of the program (refer to participant demographics). Those individuals who are participating in the WE-Did Program currently (n = 4) also had more recent and vivid memories of how the group and the connection with other participants played an important role in their exercise participation. The remaining participants incorporated lower levels of exercise into their lives and did not report sharing the same bonds that were created when they were in the WE-Can Program.

## Discussion

The findings from this study represent a variety of concepts related to exercise participation for individuals living with cancer and the fulfillment of the three basic psychological needs: autonomy, competence, and relatedness. The basic psychological needs were used as a framework to explore participant experiences in the program and determine how these experiences influenced their exercise participation and adherence over time. This study was comprised of two phases, one in which participants were interviewed immediately (within 2 weeks) post program completion (Phase One) and another in which participants were interviewed long-term (7 months to 1 year) post program completion (Phase Two). Specifically, this study looked at how exercise behaviours may have changed over a period of time since completion of a structured group-based exercise program. The participants' experiences were based on personal reflection and responses were impacted by each individual's unique cancer experience and health status at the time of the interview. Participants interviewed immediately following and long-term post program commented on the positive aspects of the program, what they enjoyed about their experiences, and how the program influenced their physical and psychological well-being. Due to the varying exercise capabilities, each individual shared something different that she had learned in the program and how it influenced her perspective on exercise. All of the participants in this study emphasized the importance of exercise inclusion in their lives in relation to their cancer experience.

Although the overall response regarding exercise in the program was positive, exercise intent following the participation was not explored at that time. Based on previous research conducted on the topic of cancer and exercise motivation (Milne et al., 2008), it was suspected that participants would develop a positive exercise motivational profile, potentially leading to long-term exercise adherence. Phase Two of this study was developed to help

shed light on how participation in a structure group-based exercise program might influence long-term exercise adherence and whether the fulfillment of the basic psychological needs played a role or not.

Participants interviewed long-term post program reflected back between seven months and a year to when they had attended the program, and recalled different facilitators and barriers that influenced their exercise participation. Similar to Phase One, each participant made it very clear that the inclusion of exercise throughout her cancer journey was essential. Varied levels of exercise engagement were evident for participants in Phase Two. Overall, program outcomes were varied for the participants and the fulfillment of the basic psychological needs differed among participants since completion of the structured group-based exercise program. A deeper discussion of the fulfillment of autonomy, competence, and relatedness immediately post and long-term post program follows to help better understand how exercise behaviour was influenced.

### **Autonomy and Exercise Adherence**

Exploring basic psychological needs fulfillment following participation in a structured group-based exercise program intended for cancer survivors was the primary purpose of this study. Additionally, we wanted to take a closer look at long-term exercise adherence, and how fulfillment of each psychological need played a role. Kasser and Ryan (1999) explain, “when people act autonomously, they do so with a sense of personal freedom and volition, rather than out of fear, obligation or undue concern or dependence on others” (p. 935). Subthemes contributing to the need autonomy can be seen in Figure 8. Subthemes have been categorized in different groups: reoccurring subthemes in both Phase One and Phase Two, subthemes that only appeared in Phase One, and subthemes that only appeared in Phase Two.

Reoccurring Subthemes in Phase 1 and Phase 2	Subthemes Only in Phase 1	Subthemes Only in Phase 2
<ul style="list-style-type: none"> <li>•Positive Thinking</li> <li>•Self Care Awareness</li> </ul>	<ul style="list-style-type: none"> <li>•Program Atmosphere</li> </ul>	<ul style="list-style-type: none"> <li>•Exercise Routine</li> <li>•Aspects of Aging</li> <li>•Emotions</li> </ul>

**Figure 8: Subtheme similarities/differences between phases.**

**Reoccurring subthemes for autonomy (phase 1 and phase 2).** A reoccurring subtheme in both Phase One and Phase Two was positive thinking. Various studies have been conducted exploring how psychological attributes, such as positive thinking, promote longevity and favour health generally. For example, Ryff and Keyes (1995) conducted a factor-analytic study exploring psychological well-being, in which a sample of adults (N=1108), aged 25 and older, participated in telephone interviews. Ryff and Keyes developed six dimensions of wellness, which included autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, and self-acceptance. Although age and sex differences impacted outcomes in well-being for participants, the key aspect of positive functioning was confirmed, similar to findings in theories of health and well-being.

Similar to these findings, participants in both Phase One and Phase Two identified that positive thinking and being grateful for life impacted their health, well-being, and particularly influenced their desire to incorporate exercise into their lives. Based on the responses of the participants, it appeared that positivity influenced their volitional choice to participate in the program and encompass a healthy lifestyle. In Phase One, it was apparent that this positive attitude was supported and enhanced by the program, as participants expressed enthusiasm regarding exercise participation. In Phase Two, those participants who emphasized the importance of positive thinking were those currently participating in a structured group-based program. Although there is no concrete evidence to support this

notion, it appears that activity in this setting facilitated a more positive outlook on life for those participants.

A reoccurring subtheme in both Phase One and Phase Two was self-care awareness. Participants described how their decision to engage in exercise behaviours was influenced by self-care awareness. Current literature supports the importance of self-care as it has been shown to support one's health and well-being particularly in old age (Sacco-Peterson & Borell, 2004). The majority of participants in this study are entering or residing in old age and must be able to cope with the effects of their cancer as well as other comorbidities. Participants indicated that they spent most of their lives caring for loved ones, and are now aware that focus and attention must be placed on their own personal health and well-being. According to Deci & Ryan (2000), if awareness is inhibited, an individual is typically less able to engage in effective self-regulation, which is why awareness plays a key role in the process of healthy, integrated functioning. Thus self-care awareness facilitated exercise participation for some participants interviewed immediately (Phase One) and some participants interviewed long-term post (Phase Two) program completion. Having a cancer diagnosis seemed to influence almost all of the participants when participating in the WE-Can Program initially. Many of them wanted to incorporate exercise and improve their health after going through treatment and experiencing associated effects. Although some participants in Phase Two still emphasized the importance of taking care of one's self, significantly less participants discussed this topic in detail. This may indicate that the desire to engage in healthy lifestyle behaviours not long after diagnosis and treatment is more prominent, in comparison to a significant amount of time where the mindset and motivation has worn off.

**Subthemes for autonomy (phase 1).** Participants in Phase One described how the program atmosphere, tailored to those living with cancer, influenced their autonomy and desire to engage in exercise behaviours. A variety of studies have explored how the concept of autonomy support can influence more autonomous self-regulations (Deci & Ryan, 2000).

According to Deci and Ryan (1985), autonomy support can be described as the interpersonal behaviour that teachers (e.g., instructors, volunteers) provide during instruction to identify, nurture, and build intrinsic motivation. To further expand, more autonomous self-regulations develop if the instructors support choice, acknowledge feelings, and minimize pressures (Deci & Ryan, 1985). Based on the responses from the participants, throughout their cancer journey they received autonomy support from their family, friends, health team, and also the instructors and volunteers in the WE-Can Program. The autonomy support appeared to influence the participant's ability to maintain consistent adherence throughout the 10-week period by facilitating their attendance at each class. Participants indicated that classes were missed due to travel, and/or sickness of short duration (unrelated to cancer).

In a study conducted by Williams, Grow, Freedman, Ryan, and Deci (1996), patients with morbid obesity participated in a six month supervised low-calorie diet program and then participated in a 23 month follow up. Those participants who experienced the program staff as more autonomy supportive also reported more autonomous reasons for participating, and in turn had better attendance and maintained weight loss at the 23 month follow up. Similarly in this study, the supportive atmosphere of the program appeared to contribute to greater program outcomes including increased strength, balance, weight gain/loss, and higher levels of self-reported confidence and well-being. Although the program is structured, it encompassed a flexible atmosphere allowing for autonomous decision making to occur. Therefore participants had the freedom of choice when it came to performing each exercise, and modifications were made working within each individual's limitations. For example, if a participant did not want to perform a plank on the floor due to discomfort, then instructors would modify this exercise for the participant to be performed against the wall. Thus the participant could comfortably work the same muscle groups and receive similar associated benefits.

Four of the participants interviewed long-term post program had joined the follow up WE-Did Program. According to these participants, this follow up structured group-based exercise program encompassed the same autonomy supportive environment as WE-Can. It was also evident that those participants who continued participation in a structured group-based exercise program made the autonomous decision to include a wider variety of different types of exercises in their lives compared to those who did not continue. Based on their comments throughout the interviews as well as the types of activities that they indicated incorporating into their lives on the medical history assessment form, participants who were not engaging in exercise through a structured program overall had much lower exercise levels. Participants understood the importance of regular activity, but there was an apparent disconnect between knowing and doing. Paralleled to findings by Williams et al. (1996), autonomous behaviours were less prevalent among participants who did not have the inclusion of autonomy support in their current lifestyle. Those who continued regular exercise behaviours in a structured group-based exercise program appeared to engage in active pursuits more often and experience more positive program outcomes physically and psychologically.

**Subthemes for autonomy (phase 2).** A subtheme that only occurred in Phase Two was 'exercise routine'. Participants that continued exercise in structured group-based exercise program indicated how incorporating exercise routine into your daily lifestyle is key for enhancing exercise participation. A few participants described their dislike for exercise, and how it must be an unconscious decision that they make. According to Dishman, Sallis, and Orenstein (1985), a daily routine that reinforces participation and helps to minimize limitations should include a structured time and place. Furthermore, the exercise environment must be flexible to accommodate participant preferences and fluctuations in motivation thus influencing long term objectives within a reasonable timeframe (Dishman, Sallis, & Orenstein, 1985). The follow up WE-Did Program offers participants' structure as well as allowing them

to work within their own limitations thus providing an ideal environment for incorporating exercise as a routine. Those participants that were engaged in unstructured or individualized exercise did not indicate that exercise was included as a part of their routine, thus supporting that routine may enhance volition to engage in exercise, and in turn contributing towards autonomy.

Various 'aspects of aging' emerged as a subtheme for Phase Two contributing towards autonomy. Participants interviewed long-term post program completion described how aging acted as a barrier and a facilitator towards exercise participation. Older individuals living with cancer have to cope with effects from cancer, while concurrently dealing with age-related disabilities, such as deterioration in mobility, vision, and strength (Hearst, 2009). Hearst (2009) describes how psychological issues such as depression and/or anxiety, or social and emotional issues such as widowhood, retirement, and declining social support may also affect individuals as they age. These factors may have impacted some of the participants' volitional choice to be inactive over the period of time since completion of the program.

Many of the women in this study had recently retired or had been retired for many years. Some of the women found that they had an abundance of time available for exercise inclusion while other women made the choice to be active when they wanted, or if they wanted to. It was clear that for some individuals they preferred doing other activities or hobbies such as reading or knitting, rather than exercising. Participants described their age as influencing their motivation to exercise as well as their physical abilities. A few of the participants simply stated that they were not able to do what they used to anymore. Others mentioned how they noticed a decline in their strength and energy levels, which they attributed to growing older. Responses from the participants in the long-term post program phase indicated that doing the things that they enjoyed with the people that they cared about, in other words "quality of life", was more important as they grew older.

On the contrary, participants who had continued exercise in a structured group-based exercise program experienced the opposite, and considered their age to be a facilitator towards exercise participation. Understanding the changes associated with growing older influenced them to make the volitional choice to engage in exercise more frequently. Research in exercise outcomes for older individuals living with cancer is becoming more prominent (Teixeira et al., 2012) however exploring barriers towards participation, such as aspects of aging, has had little attention thus demonstrating the importance of this topic. Although there is not clear answer as to why aspects of aging emerged as a subtheme in Phase Two, one might assume that as time progressed, the natural process of aging has occurred and effected participants in some way.

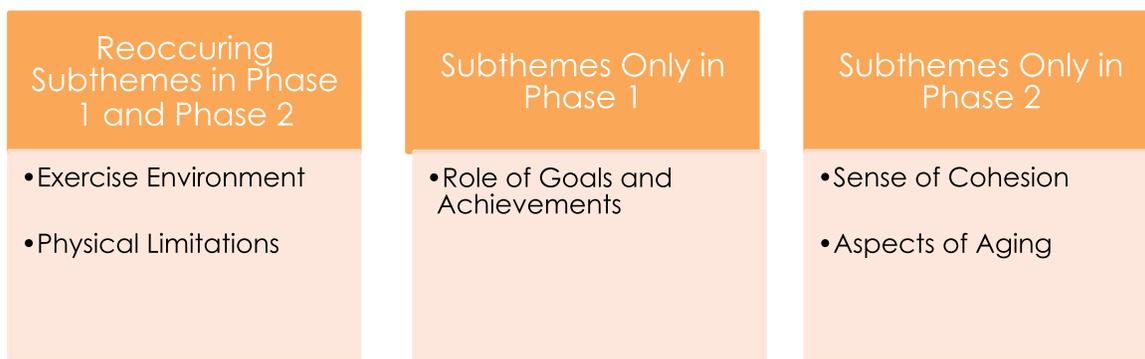
Another subtheme that emerged in Phase Two was 'emotions'. Participants indicated that throughout their cancer journey, a variety of different emotions (e.g., sadness, anger, stress) arose, impacting different aspects of their lives. Congruent with existing literature (Teixeira et al., 2012), while processing one's cancer diagnosis and throughout cancer treatment in particular, psychological effects may have contributed towards the different emotions experienced by the participants. Some participants who were interviewed long-term post program described how these emotions would result in physical outcomes such as decreased energy (i.e., fatigue), which in turn influenced their choices regarding exercise engagement. The participants expressed awareness of this barrier, and indicated how exercise itself was the best way to overcome the emotions. Thus to achieve psychological well-being, participants made the volitional choice to push through, and engage in exercise.

Overall participants in Phase One discussed more specific aspects of the program such as program design contributing towards the fulfillment of autonomy. Due to the fact that treatment was more recent for some participants, the importance of self-care awareness appeared to be a main reason for participating in the WE-Can Program initially. Participants discussed having a greater appreciation of life having gone through cancer, thus

incorporating healthy lifestyle behaviours at that time was essential. Participants whom continued exercise in a structured group based exercise program following WE-Can demonstrated more volition towards exercise than those who did not. Higher exercise rates and adherence to exercise patterns appeared for those participants in a structured program.

### Competence and Exercise Adherence

In pursuit of exploring basic psychological need fulfillment for participants following participation in a structured group-based program and how it may impact long-term exercise adherence, a closer look at competence is needed. According to Teixeira et al. (2012) “experiences of competence vary upon success or failure at challenging physical tasks or as a function of feedback from, for example, a fitness professional” (p. 3). Subthemes contributing to the need competence can be seen in Figure 9. Subthemes have been categorized in different groups; reoccurring subthemes in both Phase One and Phase Two, subthemes that only appeared in Phase One, and subthemes that only appeared in Phase Two.



**Figure 9: Subtheme similarities/differences among phases.**

**Reoccurring subthemes for Competence (phase 1 and phase 2).** A reoccurring subtheme that appeared in Phase One and Phase Two was ‘exercise environment’. Throughout the interviews participants described certain aspects of the exercise environment that directly influenced their perceived competence to engage in exercise behaviours. Furthermore a level of trust was built between the participants and the program staff due to

the supportive nature of the program and safe exercise environment. This contributed directly towards the participant's ability to enhance mastery, and in turn influence competence. In a study conducted by Puente and Anshel (2010), 238 college students participated in a study exploring perceived competence and autonomy and the relationship between the individuals' perception of their instructor's interaction style and their motivation in an exercise setting. The results from this study can be paralleled to Puente and Anshel (2010) and revealed that competence and autonomy did in fact mediate the relationship between perceived instructor's interacting style and self-determined regulation. The participants in the WE-Can Program reported that the positive and constructive feedback presented through instructor teaching styles in the exercise environment impacted perceived competence throughout the program. Participants discussed how once the level of comfort was developed they felt more confident when exercising and started to push themselves a little more at each class. The fact that both of these studies had similar findings speaks to how salient the exercise environment can be across contexts. Edmunds, Ntoumanis, and Duda (2007) not only support this relationship, but also describe how the support from instructors positively influences intrinsic motivation, which is important for understanding exercise behaviour and sustaining it in the long term.

According to Deci and Ryan (2002), all people seek challenges that are optimal for their capacities and the skills to undertake these challenges. For the women in this current study, the social context or exercise environment in which these skills were acquired and where differences in learning were supported, enhanced their sense of competence. Related literature (Deci & Ryan, 2000) has found that environments that enhance competence involve positive feedback to participants and freedom from demeaning evaluations of performance. Furthermore, environments that participants described as fun, safe, comfortable, and supportive, where they could learn, make mistakes, ask questions, and solve problems enhance overall levels of competence (Lloyd & Little, 2010). In a study conducted by Lloyd and Little (2010), 20 women (26-45 years old) participated in semi-

structured interviews exploring how psychological well-being is influenced by physical activity using SDT as a framework. In terms of competence, Lloyd and Little found that the women stepped out of their comfort zone to participate in new activities, gained confidence, and a sense of success as they learned new skills in a comfortable exercise environment. The knowledge participants gained throughout the WE-Can Program evidently influenced participants, and they could recall many things learned throughout the program. Following program completion, a few of the participants reported that they purchased exercise equipment that was used throughout the program such as exercise bands and exercise balls, which have now been incorporated into their regular exercise routine long-term post program.

Although the majority of the participants appeared to have relatively high levels of competence regarding exercise participation, most indicated that they did not enjoy or feel as comfortable performing individualized exercise at home and that they would prefer to exercise in a structured group-based exercise program. This supports the notion that exercise in a structured program may influence fulfillment of the need competence, thus leading to more autonomously motivated behaviours (Temel et al., 2009). One participant indicated that she preferred to exercise out of the comfort of her home. However, this individual had previous exercise experience prior to her cancer diagnosis and involvement in the program, perhaps influencing her competence to comfortably engage in exercise on her own. Those individuals who continued participation in the WE-Did Program indicated that they enjoyed the challenging environment of the program and were amazed with the progress made thus far. The presence of the instructors encouraging the participants to challenge themselves at each class, influenced better program outcomes including improved self-confidence and improved strength. Therefore those who were not in the WE-Did Program, were not immersed in this type of exercise environment, which may have impacted their competence towards exercise.

Another subtheme that reoccurred in both Phase One and Phase Two was 'physical limitations'. Participants in both phases reported physical limitations negatively influencing their ability to engage in exercise. According to a literature review conducted by Teixeira et al. (2012), limitations that present a barrier to activity in turn influence fulfillment of competence. For participants in Phase One, many of their experienced limitations caused apprehension towards exercise in general, and many of the participants associated fear with exercise. However, as the program progressed participants were able to overcome many of the barriers and realized that in many cases exercise made them feel better. Due to the support from the instructors and program staff, participants were guided through the exercises working within their limitations. For participants in Phase Two, reported periods of inactivity since the completion of the program were either due to injury, other chronic disease symptoms, and/or effects from cancer treatment/hormone therapy. Research conducted by Courneya et al. (2004) supports the notion that treatments in particular may lead to long term physical and/or psychological limitations for individuals living with cancer. Other physical limitations reported by participants resulted from hormone supplements that they were required to take following treatment. For example, some participants indicated weakness in their upper body due to breast removal surgeries thus tightness of the fascia was experienced as well as decreased range of motion in the shoulder joint. Other participants reported treatment effects such as weight gain or joint pain caused from hormone therapy. Although participants in both phases indicated various limitations acting as barriers towards exercise participation, continued exercise patterns still remained varied. Meaning that some participants who experienced limitations still engaged in exercise, while those participants that did not experience limitations remained inactive. Although we can imply that limitations can negatively impact skill mastery and the fulfillment of the need competence, no apparent connection can be made towards continuous long-term exercise participation.

**Subthemes for competence (phase 1).** A subtheme that occurred in Phase One contributing towards competence was ‘role of goals and achievements’. Participants discussed specific goals that they had created prior to and throughout the program such as weight loss/gain, increased strength, flexibility, and/or balance. According to Gagne and Deci (2005), with regards to identified regulation, individuals are more likely to express volition when the behaviour is congruent with personal goals and identities. Participants in Phase One had varying degrees of improvements including physical (e.g., increased range of motion) and psychological (e.g., higher self-confidence) aspects. As participants progressed throughout the program these improvements influenced their confidence to efficiently perform exercises, thus contributing towards the fulfillment of competence. These feelings of “achievement” and “success” were in part due to challenges being set “at the right level” and women being able to acquire skills at their own pace. Deci, Vallerand, Pelletier, and Ryan (1991), indicated that the SDT has been linked to various educational outcomes across different age cohorts. It was found that teacher’s who were more autonomy supportive, enhanced intrinsic motivation and increased achievement in students. This highlights how autonomous support may enhance competence in some circumstances. This highlights how the basic psychological needs may overlap at times, working together to facilitate motivation towards a specific behaviour. Thus participants in the program indicated that the support received from the instructors contributed to their perceived competence to engage in exercise throughout the WE-Can Program.

**Subthemes for competence (phase 2).** A subtheme that occurred in Phase Two was ‘sense of cohesion’. Cohesiveness between group members who had continued exercise in a structured group-based exercise program evidently influenced their perceived competence to participate in exercise. The bonds created among group members in the program while achieving common goals were indicative of group cohesion. In a study conducted by Midtgaard, Rorth, Stelter, and Adamsen (2006), 55 cancer patients undergoing

chemotherapy participated in an exercise program for six weeks. Qualitative interviews were conducted post program completion and revealed that group cohesion maximized peak performance potential by patients. Midtgaard and colleagues emphasized togetherness while allowing the patients an opportunity to let their illness fade into the background. Participants in this current study used the reinforcement and encouragement from each other to challenge themselves throughout the program. Participants who had continued participation in a structured group-based exercise program indicated that togetherness among group members greatly impacted their ability to perform exercises in a structured group-based exercise program.

Another subtheme that emerged in Phase Two was 'aspects of aging', in which participants indicated how aging influenced their perceived competence to engage in exercise. Some participants described how there had been a decline in their exercise participation since the program ended, which they attributed to growing older and the natural process of aging. The decrease in strength and/or energy was understood by the participants to be a normal part of aging. Some of the women acknowledged how they were not capable of exercising at the same level compared to before their cancer diagnosis and treatment. Due to the fact that these participants had no interfering symptoms related to their cancer and/or treatment, they attributed this change to their age. Although participants indicated that their exercise competency had declined somewhat in this respect, it did not influence them to become completely inactive; rather, it adjusted the amount of exercise they included into their current lifestyle. On the contrary, other participants in Phase Two discussed how they must include more exercise into their lifestyle to combat the effects associated with aging as well as their cancer. These participants also indicated that they experienced overall well-being by incorporating more activity into their daily regime. Overall, these findings further support existing literature (Courneya et al., 2004), which states that individuals living with cancer not only have to cope with the effects from treatment but also the effects of aging. Due to the

benefits associated with exercise for individuals living with cancer, by increasing participation, participants may experience less barriers associated with growing older.

### **Relatedness and Exercise Adherence**

To thoroughly understand how exercise participation was influenced for participants in this study, a deeper understanding of relatedness is needed. Deci and Ryan (2000) defines relatedness as feeling a meaningful connection with others in one's immediate environment. Subthemes contributing to the need relatedness can be seen in Figure 10. Subthemes have been categorized in different groups; reoccurring subthemes in both Phase One and Phase Two, subthemes that only appeared in Phase One, and subthemes that only appeared in Phase Two.

Reoccurring Subthemes in Phase 1 and Phase 2	Subthemes Only in Phase 1	Subthemes Only in Phase 2
<ul style="list-style-type: none"> <li>•Sense of Cohesion</li> <li>•Social Support</li> </ul>	<ul style="list-style-type: none"> <li>•Empathy and Understanding</li> <li>•Accommodating Program to Meet Individual Needs</li> </ul>	<ul style="list-style-type: none"> <li>•None</li> </ul>

**Figure 10: Subtheme similarities/differences among phases.**

**Reoccurring subthemes for relatedness (phase 1 and phase 2).** Reoccurring subthemes that emerged in Phase One and Phase Two included 'sense of cohesion', and 'social support'. Participants in Phase One reported cohesiveness among group members given that they had all been through a cancer journey and experienced associated effects from cancer treatment. In a study conducted by Gu, Solmon, Zhang, and Xiang (2011), 121 female college students enrolled in aerobics classes and completed questionnaires

assessing group cohesion and motivation. Sense of cohesion or “group cohesion” as predominantly seen in the literature, refers to how the group as a social structure affects individuals motivation and motivational outcomes (Gu et al., 2011). Results in this study confirmed that there is in fact an apparent relationship between group cohesion and motivation for the participants, thus providing insight to environments that may help promote motivation in structured exercise classes. Participants in Phase One reported how comfortable the WE-Can Program was in the sense that they could share their feelings and thoughts with other group members. Participants highlighted how the WE-Can program in particular was special, because of the shared bond of having had cancer among participants. Although there are different cancer types and different treatment effects, the participants all felt that they were supported by the other group members, and by individuals who could truly understand their situation. Participants also discussed the connections made with the program instructor and volunteers, indicating that without their support they may have not successfully completed the program. Similar to results found by Gu and colleagues, the WE-Can Program provided a suitable environment in which group cohesion greatly impacted exercise participation, and in turn the fulfillment of relatedness.

In Phase Two responses from participants who continued exercise in a structured group-based exercise program were congruent with those in Phase One. Due to the fact that the WE-Did Program has a similar program structure as WE-Did, these results are not surprising. Another study conducted by Spink, Ulvick, Crozier, and Wilson (2014) explored group cohesion and adherence within an unstructured exercise setting for 125 young female and male adults. Results indicated that cohesion among individuals was significantly related to adherence (Spink et al., 2014). Although this is in an unstructured exercise setting, Spink and colleagues state how there is a “growing body of evidence indicating that individuals’ exercise participation is influenced by those around them” (p. 293). Therefore the cohesiveness that has been created for those engaging in a structured exercise setting, most

likely will influence long-term adherence for those participants. Participants whom did not continue exercise in a structured group-based exercise program did not indicate that a sense of cohesion with others.

As mentioned, the subtheme 'social support' emerged throughout the interviews in Phase One and Phase Two. The importance of social support has been noted in the literature regarding psychological well-being. According to Henderson and Ainsworth (2003) social support can provide individuals with a comfortable space for sharing thoughts and feelings as well as a greater sense of control over their lives through emotional support, companionship, reciprocity, and potential partners for exercise. Key features of exercise settings that facilitate positive outcomes include social support, enjoyment, and self-determination (Adamson & Parker, 2006; Coleman & Iso-Ahola, 1993). Throughout both phases participants spoke strongly about the importance of social support in their lives and how it influenced their exercise participation. In particular, many of the women reported how socializing in a group exercise setting allowed them to focus on their own enjoyment and well-being, and created a space away from their busy lifestyle (e.g., work, taking care of children, caregiving). In a study conducted by Currie (2004) 30 mothers (average age 37.3) took part in a 12-week exercise program. Following completion of the program qualitative interviews were conducted which explored aspects of their well-being. Women reported a greater sense of well-being mainly due to having their own space and getting a break from their busy schedule and taking care of their families. This opportunity allowed the women to value themselves as individuals, challenge restrictions on personal freedom, and cope with their daily lives as mothers (Currie, 2004). Particularly in Phase Two of this study, the participants' who reported the importance of social connections made in exercise settings, included more types of exercise into their lives including participation in other structured group-based exercise programs (i.e., Pickle Ball – type of structured exercise). One participant indicated that she preferred individualized exercise compared to group-based

exercise, thus she did not value the socializing or support aspect of a structured program. This individual explained how she has always been active, and enjoys exercising out of the comfort of her own home. This participant discussed how while in the WE-Can Program she had reached out to another participant without any reciprocation. This negative experience may have discouraged the participant to make any further connections with other group members in the program. Although group exercise was not something that this participant enjoyed she discussed how the socialization and the ability to meet new people is important for some people. While individualized exercise is better than no exercise at all, it does not offer the same benefits as a structured program (e.g., social support, instructor teaching styles). One of the WE-Did Program participants indicated that she incorporates individualized exercise into her life as well, and that there should be a balance of both.

**Subthemes for relatedness (phase 1).** A theme that emerged from the interviews in Phase One was 'accommodating to meet individual needs'. This was described by the participants as the specific features of the WE-Can Program that accommodated the specific needs of participants. A discussion of how these features influenced the fulfillment of relatedness will be described below. Participants in Phase One could recall many aspects of the program and indicated that they enjoyed the group aspect of the program and how the social environment fostered their ability to connect with other group members. Due to the autonomy support received within the program (Deci & Ryan, 2000) participants indicated that the program was adaptable, allowed them to make their own decisions, and how there was no competition among group members. More importantly participants also indicated that there was no pressure from instructors to engage in specific exercises if they did not feel comfortable to do so. Participants who continued exercise in the WE-Did Program described similar aspects contributing to their ability to connect to other group-members as well as instructors in the program. Due to the fact that individuals discussed personal details regarding their cancer experience, a level of trust was built which the participants

emphasized as an important feature of the program. One individual however, did indicate that the program did not meet all of her needs adequately. Furthermore, she explained how the program started off very simple, and she was looking for a more challenging exercise environment. Due to the fact that each individual is different, the program starts with the basics and then progressively becomes more difficult. Due to the variety of barriers experienced by an individual living with cancer while participating in exercise, this feature of the program was appreciated. Although this participant was not satisfied with the physical outcomes following the WE-Can Program, she did indicate that knowledge regarding exercise was gained and she did still value the experience.

**Subthemes for relatedness (phase 2).** There were no unique subthemes that emerged within the interviews in Phase Two, other than sense of cohesion and social support as already discussed. Interesting outcomes were revealed for many of the participants in the follow-up phase of this study, however due to the fact that six of the 10 participants were not engaging in any group-based exercise, the fulfillment of relatedness was not found.

### **Summary**

The individuals in this study have had the opportunity to reflect on their cancer experience, which has appeared to impact personal growth over time for some. Many participants in this study discussed how they have a commitment to their physical health and have demonstrated how important they feel it is to invest in themselves and others. Many of the participants discussed how having cancer changed their outlook on life. They no longer “sweat the small stuff” rather they focus on improving their quality of life and personal relationships with others. According to Deci and Ryan (2000) predictions of social circumstance and task characteristics has been guided by an “overarching hypothesis that intrinsic motivation is facilitated by conditions that enhance psychological need satisfaction, whereas undermining intrinsic motivation will result when conditions thwart need satisfaction”

(p. 233). In other words, different factors such as the exercise environment and the task at hand, greatly impact the degree to which the psychological needs are satisfied, thus influencing intrinsic motivation. Deci and Ryan (2000) also discussed how the psychological needs influence individuals' natural tendencies to internalize regulation, thus emphasizing the importance of understanding the rationale behind regulation. Furthermore, relatedness and competence supports internalization, however for regulation to become more integral to one's self, supports for autonomy are also required (Deci & Ryan, 2000). Research conducted in this area has discovered that external pressures act as a barrier towards internalization of intrinsic regulations (Deci & Ryan, 2000). Participant comments indicated that those who continued exercise engagement through a structured group-based exercise program had a greater sense of autonomy support and autonomy need satisfaction over time. Supporting related literature (Deci & Ryan, 2000), the social-contextual characteristics and psychological needs played an important role in facilitating autonomous regulation over time for the participants. Thus those individuals who had social support within a group-based exercise environment appeared to fulfill psychological needs, and in turn enhancing exercise participation.

### **Strengths and Limitations**

Due to the fact that a limited number of studies have explored all three basic psychological needs, this study contributes towards research in exercise motivation for a specialized population. Furthermore, this contributes to more recent research that explores how the presence of the three needs together and in solitude influence motivation. Research on cancer and exercise typically focuses on young or middle aged individuals. Due to the fact that cancer most often affects individuals over the age of 65 years old, more research should be conducted on the older population with regards to barriers that may influence exercise

participation. Thus this study adds a missing perspective for this population, with a more in depth analysis using qualitative techniques.

Limitations in a research study are worthy of consideration as they bear on avenues for future research. One recognizable limitation in this study is the fact that a different sample of participants took part in Phase Two of this study. Had the same participants in Phase One been recruited for Phase Two, a closer comparison of the changes over time could have been made. Thus more emphasis could have been placed on each individual and how experiences reflect exercise motivation over time. In addition to the fact that the women in this study chose to take part (self selection), they were also selected based on criteria of participating in a structured group-based exercise program. This limits understanding of basic psychological needs fulfillment for those engaging in unstructured individualized types of exercise.

### **Future Recommendations**

Future research on this topic should consider examining more diverse populations to give different perspectives towards exercise participation for those living with and beyond cancer. For example this might include extending research to men as well women, different cultural backgrounds, as well as different exercise backgrounds. This is mostly due to the fact that many factors can influence perspectives therefore it is important to take them into consideration when making assumptions regarding exercise participation for individuals living with cancer. A closer look at basic psychological needs fulfillment through individualized exercise or application of another suited theoretical framework may be of some interest as well to some researchers. Exercise benefits can still be received in these types of exercise environments, therefore if there are individuals who prefer exercise not necessarily in a group setting, then it is important for researchers to understand what it is about these environments that may enhance overall exercise participation. Researchers should also consider examining

behaviour change over a longer period of time (e.g., 1 year or more) to see what differences may arise. This may help researchers to determine other factors that may act as a facilitator or barrier towards exercise participation.

One participant in this study discussed how a group member had passed away previously. The participant commented on how this individual put forth so much effort during each exercise and always made it to class even throughout cancer treatment. Keeping this in mind, the participant discussed how on the days when she did not feel competent to engage in exercise (e.g., fatigue) she would think of the group member, and push herself out the door to class. More research should be conducted in this area to explore how learning through others can vicariously influence exercise motivation. Overall, this study contributes to literature in exercise and cancer, particularly focusing on how a structured group-based program may influence participation. Due to the fact that limited numbers of studies have qualitatively explored exercise motivation for participants' long-term post completion of an intervention program, this study gives a very unique perspective of how the basic psychological needs impact participation over time.

## Conclusion

The results from this study encompassed the unique perspectives from individuals living with cancer and an in-depth look at motives for engaging in exercise and how the basic psychological needs can change over time following participation in a structured group-based exercise program. As described by one of the participants, the nature of these exercise intervention programs is the 'start to finish' structure. The question remains: "Do exercise behaviours change following participation in an intervention program"? The participants interviewed immediately post program described how wonderful the program was, the great friendships that were made, and how they wished the program would never end. Many of the participants mentioned how the program was well suited to their needs and how it positively influenced their ability to cope with cancer and the associated effects. The participants experienced a variety of physical benefits from the program including increased strength, flexibility, balance, and weight gain/loss, which ultimately increased their self-esteem and confidence when performing the different types of exercises. The autonomously supportive environment appeared to impact the participants exercise motivation throughout the program. They described the environment of the program to be safe allowing them to complete the different exercises without fear of injuring themselves. The connections made throughout the program were evident however most participants did not remain in contact with the individuals in their group. Although it was clear that the program influenced fulfillment of the needs autonomy, competence, and relatedness, most participants did not attempt to seek the same encouragement, or continue exercise in a structured group-based exercise program following completion of WE-Can. Those who did not continue exercise in the WE-Did program incorporated low to moderate levels of exercise into their regular routine. (Refer to Table 2). Based on participant comments, of all the needs, competence appeared to be the most fulfilled for these individuals with autonomy and relatedness being compromised. The

women in this study may improve their health and well-being by participating in an activity that focuses on their own needs and interests. In order for the participants who are less active to enhance their physical and mental health, an increase in exercise participation in an environment, which fosters a sense of competence, confidence, and self-esteem is required (Lloyd & Little, 2010). The findings in this study further support that exercise levels for individuals living with cancer, both concurrently and prospectively, are associated with the level of autonomous motivation. The fulfillment of autonomy, competence, and relatedness was evident for those participants who continued autonomous behaviours immediately following the program, resulting in positive program outcomes and adherence to exercise in the long term. The inclusion of exercise specifically in a structured group-based exercise program is beneficial in addition to typical care for individuals living with cancer and provides long-term functional and psychological benefits (Mutrie et al., 2007). Similar to Milne et al. (2008) the results from this study demonstrate that a structured exercise program can positively affect the psychological needs and exercise motivation for individuals living with cancer in a way that is conducive to long-term exercise adherence.

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## **Appendices**

Appendix A – Letter of Permission

Appendix B – Participant Letter

Appendix C – Consent Form

Appendix D – Medical History Assessment Form

Appendix E – Interview Protocol: Phase One

Appendix F – Interview Protocol: Phase Two

Appendix G – WE-Can Program Model

## **Appendix A – Letter of Permission**

Dear Ms. Tracey Larocque,

My name is Ms. Maelyn Hurley, a masters' student at the School of Kinesiology through Lakehead University. I am planning to conduct a study titled "***Exploration of Exercise Motivation and Adherence Among Individuals Living with Cancer Following Participation in a Structured Group-based Exercise Program***", with the supervision of Dr. Joey Farrell. We would like to explore long-term exercise motivation and adherence for those participants who completed the WE-Can program and participated in a previous pilot study in December 2012 or 2013. With your permission, we would like to invite these ten WE-Can program graduates to participate in a one-on-one interview that will be arranged at their convenience. Participants will be informed that their involvement in this study is voluntary and that they may withdraw from the study at any given time. Please see attached documentation, which gives a more detailed description of this study. Should you have any questions or concerns please contact me and I would be happy to discuss this with you further.

Thank you for your consideration and I look forward to hearing back from you.

Yours truly,

Ms. Maelyn Hurley  
Graduate Student Researcher  
(807) 472-5254  
mhurley1@lakeheadu.ca

Dr. Joey Farrell  
Faculty Supervisor  
(807) 346-7754  
joey.farrell@lakeheadu.ca

**Appendix B – Participant Letter**

Dear Potential Participant,

We graciously welcome your participation in a research study entitled ***“Exploration of Exercise Motivation and Adherence Among Individuals Living with Cancer Following Participation in a Structured Group-based Exercise Program”*** to be carried out by Ms. Maelyn Hurley, a student in the Master of Science in Kinesiology with specialization in Gerontology program at Lakehead University. Your participation is requested as you are a WE-Can Program graduate and previously participated in a pilot study exploring program experiences and cancer coping methods.

Similar to the pilot study, a one-on-one interview will be conducted. You will also be asked to complete a medical assessment form and the FACIT-F Questionnaire, again, similar to the pilot study. The interview and questionnaire completion will require approximately one hour of your time. During this hour, we hope to obtain an understanding of how you have been feeling since the completion of the WE-Can program, if you have been able to implement physical activity and exercise into your current lifestyle, and what barriers you have faced during this time. To ensure quality, the researcher will take notes and the interview will be tape-recorded for data collection purposes. Following the interview, the researcher will transcribe the information provided and the script will be reviewed and analyzed to generate major themes that emerged during the conversations. If you wish to review the transcription and themes, to ensure they are consistent with your responses, you may do so during interview process as well as when they are completed. Please understand that your participation in this study is voluntary and that at any point throughout the study you may decline to answer a question or withdraw completely without penalty or consequence.

Although there are no direct benefits associated with your participation, this study will help us understand exercise motivation for individuals living with cancer, how to overcome potential exercise related barriers, and how structured group-based exercise programs can be designed to help foster long term healthy lifestyle behaviours. Confidentiality and anonymity will be maintained to the highest degree. Your identity and identifying features will not be included in the findings of this study. In addition, all data collected will be coded with a participant number to remove identity from these items, which will be kept separately from your consent form. The graduate student researcher and her supervisor will have access to the data collected during the course of this study, which will be securely stored in a locked filing cabinet or password protected computer at Lakehead University. The data, upon completion, will be stored for a minimum of five years with Dr. Joey Farrell, supervisor in the School of Kinesiology in accordance with the Lakehead University ethics policy.

If the information gathered in this study is published in a peer-reviewed journal or presented at a conference, participant anonymity and confidentiality

will be maintained. Upon completion of the study, you are welcome to a summary of the research results, which you may obtain by contacting the graduate student researcher. If you wish to pursue participation in this study, you will be asked to complete a consent form prior to the start of the interview session. If you have any questions or concerns at any point regarding during this investigation, please do not hesitate to contact either the graduate student researcher or her faculty advisor. This project has been approved by the Lakehead University Research Ethics Board. If you have any questions or concerns regarding the ethics, you may contact the Research Ethics Board at (807) 343-8283 or via email at [research@lakeheadu.ca](mailto:research@lakeheadu.ca).

Thank-you for your cooperation,  
Yours truly,

Ms. Maelyn Hurley  
Graduate student Researcher  
(807) 472-5254  
[mhurley1@lakeheadu.ca](mailto:mhurley1@lakeheadu.ca)

Dr. Joey Farrell  
Faculty Supervisor  
(807) 346-7754  
[joey.farrell@lakeheadu.ca](mailto:joey.farrell@lakeheadu.ca)

**Appendix C – Consent Form**

I have read and understand the information letter and agree to participate in the study ***“Exploration of Exercise Motivation and Adherence Among Individuals Living with Cancer Following Participation in a Structured Group-based Exercise Program”***, being conducted by Ms. Maelyn Hurley, a masters student in the School of Kinesiology at Lakehead University under the supervision of Dr. Joey Farrell.

I have read and understand:

- That there is no risk to my participation and that my participation may benefit my own knowledge, or other individuals with cancer.
- That my participation is completely voluntary and that I may withdraw or decline to answer questions at any point in this study.
- That I will be asked to complete a one-on-one, semi-structured interview.
- That I agree to be tape-recorded during the interview and that I will be given the opportunity to review the transcript of my interview information.
- That I will be asked to complete a medical assessment form, which explores physical, psychological, social well-being.
- That any data collected will be securely stored for a minimum of 5 years with Dr. Joey Farrell in the School of Kinesiology, at Lakehead University.
- That if I choose, I may contact the researcher by phone or e-mail, to obtain a summary of the findings from this study.
- That any information presented in the academic community will maintain my anonymity and confidentiality.

Please check the box if you wish to review interview transcripts

Please check the box if you wish to obtain a summary of results

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Name (Print Please)

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Signature of Participant

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Date

**Appendix D – Medical Assessment Form**

## WE-Can Medical History Form

**Participant No.:** \_\_\_\_\_

Name: \_\_\_\_\_ Date(Day/Month/Year): \_\_\_\_\_  
 Home Phone No.: (\_\_\_\_\_) \_\_\_\_\_ Work/Mobile Phone No.:(\_\_\_\_\_) \_\_\_\_\_  
 Address: \_\_\_\_\_ City: \_\_\_\_\_  
 Province: \_\_\_\_\_ Postal Code: \_\_\_\_\_  
 Date of Birth (DD/MM/YYYY): \_\_\_\_\_  
 Age in Years: \_\_\_\_\_ Sex: M/F

Referring Physician:	Family Physician:
Oncologist(s):	Surgeon(s):

### **CANCER HISTORY**

<b>Primary Cancer:</b>				
Stage:		Grade:		
<b>Secondary Cancer:</b>				
Stage:		Grade:		
<b>Current Cancer Status:</b> (Please check the most appropriate answer)	Plans to receive new treatment		Currently receiving treatment	
	< 6 months since last treatment		6 – 12 months since last treatment	
	> 12 months since last treatment		No treatment	

### **SOCIAL HISTORY** (please check the most appropriate answer)

**Marital Status:** (Please check the most appropriate answer)

Single		Common Law		Married	
Divorced		Separated		Widowed	

**Education:** (Please check the highest level of education reached)

Primary School		High School		Post-Graduate	
College		University			

**Employment:** (Please check the most appropriate answer)

Currently working		Unemployed		Retired	
Most Recent Job Description:					
Number of Years Worked:					

**PHYSICAL ACTIVITY HISTORY**

Have you been participating in any form of regular physical activity in the last 6 weeks?  
Y or N

Activity	Frequency (workouts/week)
_____	_____/_____
_____	_____/_____
_____	_____/_____

Duration (# min/session)	Intensity
_____/_____	Light/Moderate/Heavy
_____/_____	Light/Moderate/Heavy
_____/_____	Light/Moderate/Heavy

In the 6 months before your current diagnosis did you take part in regular physical activity?  
Y or N

Activity	Frequency (workouts/week)
_____	_____/_____
_____	_____/_____
_____	_____/_____

Duration (# min/session)	Intensity
_____/_____	Light/Moderate/Heavy
_____/_____	Light/Moderate/Heavy
_____/_____	Light/Moderate/Heavy

(\*Intensity: Light = slight change above normal state, Moderate= perspiration +breathing above normal rate, Heavy=heavy perspiration +heavy breathing)

Do you participate in any recreational sports? Y or N \_\_\_\_\_

Do you have previous gym experience? Y or N \_\_\_\_\_

Do you have any hobbies? Y or N \_\_\_\_\_

**LIFESTYLE HISTORY**

Do you currently smoke? Y or N

Are you an ex-smoker? Y or N

If yes, average # packs/day= \_\_\_\_\_/day #years = \_\_\_\_\_

Age started= \_\_\_\_\_ Age stopped= \_\_\_\_\_

Do you drink alcohol? (Beer/Wine/Hard Liquor) Y or N

If yes, how many drinks/week? = \_\_\_\_\_/week

Do you use alternative therapies? (Please check the appropriate boxes if yes)			
Acupuncture		Naturopath	
Herbal Remedies		Reflexology	
Massage Therapy		Meditation	
Chiropractic		Healing Touch	

**PATIENT SAFETY/INFECTION CONTROL**

Have you had a recent exposure to a hospital acquired infection? (i.e. MRSA, C-Difficile)	YES	NO
Have you had a recent respiratory illness? (i.e. pneumonia, )		
Have you had a new or worse cough?		
Have you had new or worse shortness of breath?		

**PAST MEDICAL HISTORY**

**Have you had surgery for your cancer?** Y or N

Type: \_\_\_\_\_ Date: \_\_\_\_\_ Lymph Node Removal ? Y or N Location: \_\_\_\_\_

Type: \_\_\_\_\_ Date: \_\_\_\_\_ Lymph Node Removal ? Y or N Location: \_\_\_\_\_

Type: \_\_\_\_\_ Date: \_\_\_\_\_ Lymph Node Removal ? Y or N Location: \_\_\_\_\_

**Did you experience an infection or post-surgical complications?** Y or N

Comment: \_\_\_\_\_

—

**Have you received chemotherapy?** Y or N Date

completed: \_\_\_\_\_

Any skin reactions or complications post-chemotherapy? \_\_\_\_\_

**Have you received radiation therapy?** Y or N Date

completed: \_\_\_\_\_

Any skin or nail reactions or complications post-radiation?

\_\_\_\_\_

**Have you received hormone therapy?** Y or N Date

Completed: \_\_\_\_\_

Any skin reactions or complications post-hormone therapy? \_\_\_\_\_

**Have you had surgery not including procedures for your cancer?** Y or N

Procedure: \_\_\_\_\_ Date: \_\_\_\_\_

Procedure: \_\_\_\_\_ Date: \_\_\_\_\_

**Do you have a history of any of the following medical conditions?**

(Please check the appropriate box(es))

Diabetes		Congestive Heart Failure	
Chronic Obstructive Pulmonary Disorder (COPD)		Anemia	
Hypertension (High Blood Pressure)		Asthma	
Hypotension (Low Blood Pressure)		Tuberculosis	

(Please check YES or NO to the following questions)	YES	NO	Date
Do you have a history of dizziness/vertigo?			
Do you have a history of sleeping problems?			
Do you have a history of unexplained weight loss?			
Do you have a history of infections?			
Do you have a history of cellulitis?			
Do you have a history of blood clots? (i.e. located in calf or lungs)			
Do you have a history of lymphedema?			
Do you wear compression stockings/sleeve/glove?			

**NEUROLOGICAL** (Please check the appropriate box(es))

Impaired Vision		Dizziness	
Corrected Vision		Numbness	
Impaired Hearing		Lightheadedness	
Loss of Sensation		Confusion	
Headaches		Disorientation	
Loss of Balance		Unusual fatigue	

Past nervous system surgeries, imaging, tests? Y or N

\_\_\_\_\_

**CARDIOVASCULAR** (Please check the appropriate box(es))

Chest Pain		Chest Tightness		Heart Palpitations	
Irregular Heart Rate		Dizziness		Ankle Swelling (Edema)	
Circulatory Problems		Radiating Pain In Arm		Pacemaker	

Past heart surgeries, imaging, tests? Y or N

\_\_\_\_\_

**RESPIRATORY** (Please check the appropriate box(es))

Dry Cough		Shortness of Breath with Activity		Shortness of Breath at Rest	
Wheezing		Hoarseness		Productive Cough	
Pain with Breathing		History of Pneumonia			

Past lung surgeries, imaging, tests? Y or N

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**GASTROINTESTINAL/GENITOURINARY** (Please check the appropriate box(es))

Poor Appetite		Constipation		Dentures	
Nausea		Diarrhea		Heart Burn	
Rapid Weight Gain		Colostomy		Special Diet	
Rapid Weight Loss		Rectal Bleeding		Uncontrolled Bowel Movements	
Uncontrolled Urine Voiding		Increase Urinary Frequency		Stress Incontinence	
Frequent Urination at Night		Urinary Tract Infection		Abdominal Bloating/Gas/Pain	

Past GI or GU surgeries, imaging, tests? Y or N

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**GYNECOLOGICAL** (Please check the appropriate box(es))

Pre-Menopausal		Post-Menopausal		Hot Flashes	
----------------	--	-----------------	--	-------------	--

Past gynecological surgeries, imaging, tests? Y or N

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**MUSCULOSKELETAL** (Please check the appropriate box(es))

Low Back Pain		Knee Pain		Hip Pain	
Ankle Pain		Neck Pain		Muscle Tears	
Muscle Spasm		Generalized Weakness		Stiffness	
Muscle Fatigue		Shoulder Pain		Elbow Pain	
Wrist Pain		Hand Pain		Foot/Heel Pain	
Loss of Range of Motion in Spine (Neck/Back)		Loss of Range of Motion in Lower Extremity		Loss of Range of Motion in Upper Extremity	

Past neck/back/hip/knee/ankle/shoulder/hand surgeries, imaging, tests? Y or N

---



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**Have you been referred to any of the following forms of supportive care?** (Please check the appropriate box(es))

Physiotherapy		Occupational Therapy		Speech Language Pathology	
Naturopath		Social Work		Clinical Dietician	
Supportive Care Counseling		Massage Therapy			

**Would you like to be referred to any of the following forms of supportive care?** (Please check the appropriate box(es))

Physiotherapy	<input type="checkbox"/>	Occupational Therapy	<input type="checkbox"/>	Speech Language Pathology	<input type="checkbox"/>
Naturopath	<input type="checkbox"/>	Social Work	<input type="checkbox"/>	Clinical Dietician	<input type="checkbox"/>
Supportive Care Counseling	<input type="checkbox"/>	Massage Therapy	<input type="checkbox"/>		<input type="checkbox"/>

**Are there any other medical problems or concerns that you would like to identify that have not been answered in the above assessment?** Y or N

\_\_\_\_\_

Assessment Reviewed By: \_\_\_\_\_ Date: \_\_\_\_\_

**Appendix E - Interview Protocol – Phase One**

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**Project: Exploration of Exercise Motivation and Adherence Among  
Individuals Living with Cancer Following Participation in a Structured  
Group-based Exercise**

Time of Interview:

Date:

Interviewee #:

**Questions:**

1. Have you participated in various types of physical activity or sport throughout your life? If so please be specific.
2. Describe the ways you are currently physically active outside of the WE-Can Program.
3. How did you hear about the WE-Can Program and what influenced you to join?
4. How has the WE-Can Program influenced your life? (What have you gained? Any limitations?)
5. Were you unable to attend any of the WE-Can classes? If so, please explain why?
6. What has motivated you to stay in the WE-Can Program and attend classes regularly?
7. Has your opinion of exercise and physical activity changed after participating in the WE-Can Program?
8. Did you feel that your needs were met throughout the duration of the WE-Can program?
9. Did you enjoy the group aspect of the WE-Can program?
10. What are the potential benefits or risks that you see associated with physical activity for individuals living with cancer?
11. Has your level of physical activity changed since your initial diagnosis? (pre, during, post treatment?)
12. Overall, how has having cancer influenced your life? (prompt: emotionally, physically, spiritually etc).
13. What has helped you cope through your cancer experience?
14. Is there anything else you would like to add?

Thank participant for participating in the study. Reiterate that confidentiality will be held to the highest degree.

**Appendix F – Interview Protocol – Phase Two**

**Project: Exploration of Exercise Motivation and Adherence Among Individuals Living with Cancer Following Participation in a Structured Group-based Exercise**

Time of Interview:

Date:

Interviewee #:

Date of program completion: \_\_\_\_\_

**Questions:**

1. Since completion of the WE-Can program how have you occupied your time? (i.e., work, school, caregiving)
2. Have you had any health changes (i.e., physical, psychological) over the last\_\_ months?
  - a. Prompt: These may be cancer related or non-related.
3. Overall, how would you rate your current health status? (0=poor, 10=excellent)
4. An exercise booklet was given to you at the end of the program including detailed descriptions of each exercise performed. How have you implemented this learning into your current lifestyle, if at all?
5. Since the completion of the WE-Can program, what types of exercise (if any) have you incorporated into your life?
  - a. Prompt: How often do you perform these exercises? (If so at all)
  - b. Prompt: How long are your exercise sessions?
6. What physical limitations (if any) have influenced your ability to engage in regular exercise since the program?
7. What other barriers (if any) have influenced your ability to engage in regular exercise since the program?
  - a. Prompt: i.e. Schedule/time/friends to exercise with/work/childcare
8. Keeping in mind these barriers, how competent do you feel when engaging in exercise?
9. How important is the inclusion of exercise into your current lifestyle?
10. In general, what motivates you to exercise?
11. How did the program influence your motivation?
  - a. Prompt: What are your thoughts on group exercise?
  - b. Prompt: What are your thoughts on individualized exercise?
12. How did your motivation change after the program (if at all)?
13. Besides exercise, how have you implemented healthy lifestyle behaviours into your life?
14. How have you coped with the effects of your cancer since completion of the program?
  - a. Prompt: Would you consider exercise as a coping mechanism? (Why or why not?)
15. What types of support have you received since the completion of the program?
16. What type of contact have you had with any of the WE-Can participants since the program ended (if any)?
  - a. If so, why? How has this impacted your life?
  - b. If not, please explain why?
17. Have you shared your knowledge regarding exercise with others?

Thank participant for participating in the study. Reiterate that confidentiality will be held to the highest degree.

**Appendix G - The WE-Can Program Model**

## The WE-Can Model

**Participants:** currently in treatment or 5 years post treatment, various cancer types

**Exercise program:** community & group-based  
• 2 days/wk, 1-1 ½ hrs/d, for 10 wks.

Cardiovascular  
Endurance

10 min cardio warm up  
5 min dynamic stretching

Muscular  
Strength &  
Endurance

15 min resistance training circuit  
set 1  
15 min resistance training circuit  
set 2

Cardiovascular  
Endurance

10 min cardio moderate -  
vigorous intensity (50-85%  
HRmax)

Flexibility

15 min (+) cool down &  
stretching