University of Alberta

Physical Activity Preferences and Type 2 Diabetes: Exploring demographic, cognitive and behavioural differences

by

Cynthia Christine Forbes

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Abstract

The overall purpose of this study was to examine physical activity counselling and program preferences in a sample of adults with type 2 diabetes. This thesis was exploratory in nature and employed a mixed-methods approach. The research consisted of two studies. Study One was a quantitative, secondary analysis of survey data of a national sample of adults with type 2 diabetes. Study Two was a qualitative follow-up study employing telephone interviews. Both studies showed common preferences for types of activity including walking as the most preferred behaviour and the preference of engaging in activities with others. Overall, participants viewed physical activity positively; however, there was a tendency towards misunderstanding physical activity-related terminology. Tailoring interventions and physical activity programs to the specific needs and interests of individuals is an important component for health professionals and researchers in facilitating this behaviour.

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I would like to acknowledge and thank all the people who volunteered their time to participate in my research. I hope the valuable information and insight gathered in this thesis will contribute to improving quality of life for people with type 2 diabetes.

Finally, there are not enough words to express the thanks I have for my friends and family, especially my husband Nathan, and my parents Rob and Darlene. Without their constant support, love and encouragement, this thesis would not have been possible.

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Chapter One – Introduction

1.0 Overview of Chapter

This chapter provides a brief overview of the role physical activity has in the prevention and management of type 2 diabetes. The importance of tailoring physical activity programs to the preferences of individuals with type 2 diabetes and the rationale for this research is presented.

1.1 Introduction

Diabetes mellitus is a serious health concern in Canada and across the globe [World Health Organization (WHO), 2006; Canadian Diabetes Association (CDA) Clinical Practice Guidelines Expert Committee, 2008]. In Canada, approximately 5-7% of the population over age 12 have diabetes. When examining only people over the age of 64, this prevalence increases to 17% (Health Canada, 2002). Of all the cases of diabetes mellitus, about 90-95% are adult-onset, termed type 2 diabetes (Centers for Disease Control, 2003; Hux & Tang, 2003). This chronic disease also creates a significant economic burden on the health care system (Health Canada, 2002). In Canada, the total cost of diabetes and its chronic complications is estimated to be $3.7 billion (US) per annum (Dawson, Gomes, Gerstein, Blanchard, & Kahler, 2002).

An important part of the prevention and management of type 2 diabetes is lifestyle behaviour. Maintaining lifestyle habits such as healthy eating, not smoking and participating in regular physical activity can help prevent and manage this chronic disease

(Pan, et al., 1997; Spelsburg & Manson, 1995). Aerobic and resistance-based physical activity plays a lead role in the management of type 2 diabetes with many physiological (CDA, 2003; Sigal, Kenny, Wasserman, & Castaneda-Sceppa, 2004) and psychological benefits (Lysy, Da Costa, & Dasgupta, 2008) for those with type 2 diabetes. In addition, resistance training may be a more feasible form of physical activity (over aerobic activities) for people with type 2 diabetes that have complications with mobility (Plotnikoff, 2006; Eves & Plotnikoff, 2006).

Despite encouraging evidence of the health benefits gained from both aerobic activity and resistance training, the majority of people with type 2 diabetes do not engage in these activities (Plotnikoff, 2006; Health Canada, 2002). The *Diabetes in Canada Report* issued by Health Canada (2002) states that 65% of those with type 2 diabetes are physically inactive according to guidelines for aerobic activity which is higher than the general population at 56% (Craig & Cameron, 2004). As for resistance training, participation rates are even lower at 12% reported in a large type 2 diabetes population sample (Plotnikoff, Mayhew, Birkett, Loucaides & Fodor, 2004).

A significant proportion of adults with type 2 diabetes report that physical activity is a difficult part of self-care (Nelson, Reiber, & Boyko, 2002; Plotnikoff, Brez, & Hotz, 2000). One explanation may be that among this population there is a perception that medication is superior to maintaining physical activity because of its convenience and more immediate effects (Krug, Haire-Joshu, & Heady, 1991). The benefits of medication are readily observed whereas noticeable improvements from physical activity are delayed which may discourage people to continue this behaviour (Plotnikoff et al., 2000; Krug et al., 1991). Other explanations may be that adults with type 2 diabetes are not receiving

the education, encouragement and support regarding physical activity as they do with other forms of self-treatment (Kirk, Mutrie, MacIntyre, & Fisher, 2003).

In light of the observed difficulties the type 2 diabetes population reports with participating in, and maintaining regular physical activity, there has been a recent effort to examine the demographic and psychosocial determinants of this behaviour (Plotnikoff, 2006; Plotnikoff et al., 2006). Within this population, associations have been reported between physical activity and age and sex (Plotnikoff et al., 2006; Hays & Clark, 1999; Nelson et al., 2002; Nothwehr & Stump, 2000) as well as with some social-cognitive constructs (i.e., self-efficacy, social support, outcome expectations, and outcome expectancies) (Plotnikoff, Trinh, Courneya, Karunamuni & Sigal, 2008; Plotnikoff, Courneya, Trinh, Karunamuni & Sigal, 2008; Plotnikoff, Lippke, Courneya, Birkett & Sigal, in press; Plotnikoff, Lippke, Courneya, Birkett & Sigal, 2008; Kingery & Glasgow, 1989; Padgett, 1991; Pham, Fortin, & Thibaudeau, 1996; Skelly, Marshall, Haughey, Davis, & Dunford, 1995; Wilson et al., 1986). However, research on this population regarding the preferences in the delivery of physical activity programs has been very limited.

The American College of Sports Medicine states exercise prescription guidelines *"cannot be implemented in an overly rigid fashion by simply applying mathematical calculations to test data"* and *"individual preferences for exercise must be considered to improve the likelihood that the individual will adhere to the exercise program"* (American College of Sports Medicine, 2000). These statements have been supported by research showing that tailoring physical activity interventions to the needs and preferences of the target audience is more effective then taking "one-size-fits-all" generic

approaches (Booth, Bauman, Owen, & Gore, 1997; Zinman, Ruderman, Campaigne, Devlin, & Schneider, 2004; Koenigsberg, Bartlett & Cramer, 2004; Hooker et al., 2005).

Research with the general population (Thompson & Wankel, 1980; Booth et al., 1997; Salmon, Crawford, Owen, Bauman & Sallis, 2003), older adults (Mills, Stewart, Sepsis & King, 1997; Wilcox, King, Brassington, & Ahn, 1999; Cohen-Mansfield, Marx, Biddison & Guralnik, 2004) and chronic disease groups such as heart disease (Ruland & Moore, 2001; Moore & Kramer, 1996), cancer (Denmark-Wahnefried, Peterson, McBride, Lipkus & Clipp, 2000; Jones & Courneya, 2002; Vallance, Courneya, Jones & Reiman, 2006; Karvinen et al., 2006; Jones et al., 2007; Karvinen, Courneya, North & Venner, 2007; Courneya et al., 2008; Rogers, Courneya, Verhulst, Markwell & McAuley, in press) and type 2 diabetes (Wood, 2002; Wanko et al., 2004) have examined physical activity preferences. Only a few of these studies however, have examined in-depth physical activity preferences as their primary research question.

It appears that only two studies that have focused on physical activity preferences in the diabetes population. Wood (2002) examined the physical activity practices and preferences of different ethnic groups, while Wanko and colleagues (2004) surveyed individuals at a diabetes clinic with predominately African American patients. To our knowledge, the association between demographic factors (e.g., age and sex) and physical activity-related social-cognitive constructs (e.g., self-efficacy) and behaviour with physical activity preferences has yet to be examined in the type 2 diabetes population.

1.2 Overall Rationale

Type 2 diabetes is creating significant strain on individuals and society. Evidence has shown that physical activity is an effective strategy for the management of this chronic disease, however, more than half of the population with type 2 diabetes is not active enough to gain health benefits. Examining various physical activity preferences and tailored physical activity approaches may help researchers and practitioners understand patient attitudes and motivation towards physical activity.

There is limited research regarding physical activity preferences for people with type 2 diabetes. There may also be demographic (i.e., sex and age), social-cognitive and/or behaviour differences regarding physical activity preferences in this population. The literature to date, however, has been silent in this regard.

The results of research on physical activity preferences may guide practitioners and researchers to design effective and practical physical activity programs for people with type 2 diabetes. Considering patients' preferences for physical activity counselling and programming may help increase motivation to begin or maintain a physical activity program. This, in turn, may help lower health care costs and improve quality of life for those with and affected by the disease.

1.3 Overall Study Purpose

The overall purpose of this study is to examine physical activity counselling and program preferences in a sample of adults with type 2 diabetes.

1.4 Study Objectives and Thesis Plan

The research from this thesis is exploratory in nature and employs a mixed-methods approach. The research consists of two studies.

Study One is a quantitative, secondary analysis of survey data of a sample of adults with type 2 diabetes. The objectives of this study are to determine: (1) physical activity preferences, (2) whether there are any relationships between physical activity-related (i) social-cognitive and, (ii) behaviour constructs with physical activity preferences, and, (3) whether the results of the above two objectives are influenced by age and/or sex.

Study Two is a qualitative study using telephone interviews among younger and older men and women to explore: (1) a deeper understanding of physical activity preferences; (2) the understanding of physical activity guidelines; and, (3) the meaning of 'physical', 'aerobic' and 'resistance activity'. The results from Study Two will provide a more comprehensive understanding of the quantitative data from Study One regarding physical activity-related counselling and programming preferences.

The thesis begins with an introductory chapter (Chapter One) and a review of the literature (Chapter Two). Study One (Chapter Three) and Study Two (Chapter Four) are presented following the literature review. Each study contains a specific introduction, methods, results and discussion section. Due to the mixed paper-based format of this thesis, there will be some redundancy between the literature review (Chapter 2) and introduction sections of Study One (Chapter 3) and Study Two (Chapter 4). A conclusion chapter (Chapter Five) summarizes and integrates the results of both studies and provides general recommendations and future directions. Detailed results tables for

Study One (Appendix I), detailed discussion of potential theory (Appendix II), instruments for both studies (Appendix III and Appendix IV), and ethical approval (Appendix V) are included as appendices.

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Chapter Two - Literature Review

2.0 Overview of Chapter

This chapter presents the prevalence and burden of diabetes (Section 2.1), the role (Section 2.2), and the prevalence (Section 2.3) of physical activity in the diabetes population. The correlates of physical activity in the general population and people with type 2 diabetes (Section 2.4) are also presented. This is followed by a summary of the available literature on physical activity counselling and programming (Section 2.5) preferences.

2.1 Prevalence and Burden of Diabetes

Diabetes mellitus is a serious health concern in Canada and worldwide [Canadian Diabetes Association Clinical Practice Guidelines Expert Committee (CDA), 2008]. Nearly 180 million people worldwide currently live with diabetes, and this is expected to almost double by the year 2030 [World Health Organization (WHO), 2006]. In Canada, approximately 5-7% of the population over age 12 have diabetes and the prevalence for those over age 64 is 17% (Health Canada, 2002). Of all the cases of diabetes mellitus, about 90-95% are type 2 [Centers for Disease Control (CDC), 2003; Hux & Tang, 2003]. The prevalence of type 2 diabetes in Canada is increasing, with Lipscombe and Hux (2007) reporting a 69% incline of this disease over a 10-year period (1995-2005) in Ontario adults.

The increasing prevalence of type 2 diabetes is in part related to the aging population, a significant rise in obesity rates, and an increase in sedentary lifestyles

[CDA, 2008; American College of Sports Medicine (ACSM) and Amercian Diabetes Association (ADA), 1997; Wing et al., 2001; Zinman, Ruderman, Campaigne, Devlin, & Schneider, 2004]. Between 60 and 90% of type 2 diabetes cases are related to obesity or weight gain (Anderson, Kendall, & Jenkins, 2003). Increases in weight have an effect on blood chemistry such as elevated blood glucose.

Long-term complications from type 2 diabetes include vascular health problems such as retinopathy, nephropathy and neuropathy (CDA, 2008; Health Canada, 2002). Diabetes also increases the risk for other chronic diseases (e.g., heart disease and stroke) and premature death [ADA & National Institute for Diabetes, Digestive and Kidney Diseases (NIDDKD), 2002].

This chronic disease also creates a significant economic burden on the health care system (Health Canada, 2002). Dawson, Gomes, Gerstein, Blanchard and Kahler (2002) analyzed costs of diabetes and its related chronic complications in the Canadian population. The results indicated that the total cost of diabetes and the chronic complications was approximately $3.7 billion (US) per annum. When costs from undiagnosed individuals were estimated, this figure increased to approximately $5.0 billion (US) per annum.

2.2 Lifestyle changes: the role of physical activity

Lifestyle changes that include diet and physical activity can be effective for delaying or preventing diabetes and its secondary complications. For example, it was reported that a mean group weight loss of 6.8 kilograms was associated with significant positive effects on glycemic control, fasting blood glucose, insulin levels, high-density

lipoprotein (HDL) cholesterol and triglycerides levels at one year, in adults with type 2 diabetes (Anderson et al., 2003; Wing, Koeske, Epstein, Nowalk, Gooding, & Becker, 1987). Even more promising is moderate increases in physical activity and a 5% loss of initial body weight can help to reduce the risk of developing type 2 diabetes by 58% (Anderson et al., 2003).

Physical activity plays a lead role in the prevention and management of type 2 diabetes, especially glycemic control (CDA, 2003; Zinman et al., 2004; Boulé, Haddad, Kenny, Well, & Sigal, 2001; Ronnemaa, Mattila, Lehtonen, & Kallio, 1986) and improvement in other cardiovascular risk factors such as hyperinsulinemia, increased insulin sensitivity, reduced body fat percent, lower blood pressure and better lipid profiles (Lehmann, Kaplan, Bingisser, Bloch, & Spinas, 1997; Schneider, Khachadurian, Amorosa, Clemow, & Ruderman, 1992). Engaging regularly in moderate intensity physical activity and having good cardiopulmonary fitness has been shown to decrease mortality rates of those persons with type 2 diabetes by about 45 to 70% (Wei, Gibbons, Kampert, Nichaman, & Blair, 2000). In a meta-analysis, Boulé and colleagues (2001) reported that regular moderate intensity physical activity has also been associated with a decrease in glycosolated haemoglobin (A1C) to a level that reduces the risk of complications linked with type 2 diabetes.

In terms of those at risk for type 2 diabetes, the Chinese Da Qing Study (Pan et al., 1997), the Finnish Diabetes Prevention Study (Laaksonen et al., 2005; Lindstrom et al., 2003; Tuomilehto et al, 2001) and the United States Diabetes Prevention Program (DPP) (Knowler et al., 2002; Diabetes Prevention Program Research Group, 2002) were

three large, randomized controlled trials (RCTs) showing that lifestyle interventions involving physical activity and diet can help to prevent the onset of type 2 diabetes.

The Chinese Da Qing Study was an RCT that included 577 participants with impaired glucose tolerance (IGT) and therefore were at an increased risk to develop type 2 diabetes. The participants were randomly assigned to one of four intervention groups (control, diet only, physical activity only, or diet plus physical activity). Data from the six year follow-up revealed an incidence of type 2 diabetes of 67.7% in the control group, 43.8% in the diet only group, 41.1% in the physical activity only group, and 46% in the diet plus physical activity group. The three intervention groups all had significantly reduced risk of type 2 diabetes when compared to the control group indicating that diet and/or physical activity lifestyle interventions can help delay or prevent type 2 diabetes (Pan, et al., 1997).

The Finnish Diabetes Prevention Study (DPS) recruited 522 middle-aged, overweight individuals who also had IGT. The participants were randomly assigned to either the lifestyle intervention group or the usual care control group. The intervention group received circuit-structured resistance training and recommendations to increase overall physical activity as well as nutritional counselling from a nutritionist. The first year of this three year study was the most intense with the second and third years acting as the maintenance period. The control group was given general physical activity and dietary advice at the beginning of the study and attended an annual physical with a physician. The goals stated for the intervention groups included a reduction in body weight, dietary and saturated fat and an increase in physical activity and dietary fibre. The intervention group significantly improved (versus the control group) in all these

stated outcomes. Weight loss was 4.5 and 3.5 kg in the intervention group and 1.0 and 0.9 kg in the control group at one and three years respectively. There were also improvements in glycemia and lipemia levels in the intervention groups over the span of the study (Laaksonen et al., 2005; Lindstrom et al., 2003; Tuomilehto et al., 2001).

The American DPP's main purpose was to determine if a lifestyle intervention or metformin could prevent or delay the onset of type 2 diabetes. A secondary purpose of the study was to compare the efficacy of lifestyle modification versus metformin and to see whether these differences would be influenced by age, sex or ethnicity. A total of 3,234 non-diabetic Americans were recruited from 27 different centres and randomly assigned to one of three different intervention groups (standard lifestyle recommendations plus metformin, standard lifestyle recommendation plus placebo, and an intensive lifestyle-only modification program). The standard lifestyle information was in the form of an annual 20-30 minute session in which participants were encouraged to follow the Food Pyramid and increase their physical activity. The intensive lifestyle intervention included goals of 7% initial body weight loss through healthy eating habits and at least 150 minutes per week of moderate intensity physical activity. This information was delivered through a 16-lesson course covering dietary habits, physical activity and behaviour modification. Over an average of 2.8 years, the incidence of diabetes was 58% lower in the lifestyle-only group and 31% lower in the metformin group then the placebo group. The lifestyle-only group had a diabetes incidence rate of 39% lower than the metformin group. Treatment effects did not significantly differ among age, sex and ethnicity groups (Knowler et al., 2002; DPP Research Group, 2002).

The results from these three studies alone indicate a strong relationship between lifestyle interventions and preventing or delaying the onset of type 2 diabetes.

With regards to lifestyle interventions with people already diagnosed with type 2 diabetes, there are only a few notable studies. One such study by Sigal et al, (2007) investigated the benefits of aerobic, resistance and a combination of the two activities on HbA1C. This study had four groups; aerobic training only, resistance training only, combined aerobic and resistance training, and a sedentary control group. Exercise training was conducted over 22 weeks. The researchers concluded that either aerobic or resistance training improved glycemic control in those with type 2 diabetes but combined aerobic and resistance training had a greater effect than the either the aerobic or resistance only training groups.

Another study, conducted by the Look AHEAD (2007) research group, compared the effectiveness of an intensive lifestyle intervention and the usual-care condition of diabetes support and education in a sample of adults with type 2 diabetes. This study was the first large clinical trial to compare an intensive lifestyle intervention (ILI) with the usual-care diabetes support and education (DSE) groups. Participants in the intervention arm attended group and individual meetings throughout 12 months while adhering to a program designed to modify diet and physical activity behaviour. This study demonstrated clinical significant weight loss ($8.6 \pm 6.9\%$) and significant improvement in associated cardiovascular risk factors after one year of the intervention. Mean fasting glucose and mean A1C decreased more among the ILI group than the DSE group ($p<.001$).

2.2.1 Resistance Training

Resistance training has recently been added to the CDA Guidelines (CDA, 2003; CDA, 2008), the American College of Sports Medicine (ACSM, 2000), and the American Diabetes Association's (ADA, 2002) physical activity recommendations for type 2 diabetes. Engaging in resistance training over time leads to an increase in muscle mass which, regardless of fat loss, may be linked to an improvement in glucose disposal rate, glycogen storage activity, GLUT4 receptors on skeletal muscle and glucose tolerance (Eves & Plotnikoff, 2006; Castaneda et al., 2002; Dunstan et al., 2002; Dunstan et al., 1998; Ishii, Yamakita, Sato, Tanaka, & Fujii, 1998; Fluckey et al., 1994). Resistance training can lower A1C (Pan et al., 1997), improve insulin sensitivity (Ivy, 1997), glycemic control (Castaneda et al., 2002; Dunstan et al., 2002; Dunstan et al, 1998; Ishii et al, 1998; Maiorana, O'Driscoll, Goodman, Taylor, & Green, 2002), and quality of life (Jette et al., 1998).

Resistance training may also be a more feasible type of physical activity for people with type 2 diabetes that have mobility limitations (Plotnikoff, 2006; Eves & Plotnikoff, 2006). A significant number of people with type 2 diabetes have decreased mobility because of overweightness/obesity, foot problems, angina, and balance problems (Plotnikoff, 2006; Fiatarone-Singh, 2000). Participating in resistance training may provide a safe form of physical activity with relatively few difficulties (Eves & Plotnikoff, 2006). Indeed, some adults who have such complications may prefer resistance training to aerobic activity (Dunstan et al., 2002). Aerobic physical activity such as brisk walking may seem insurmountable because of fatigue, shortness of breath and pain (Fiatarone-Singh, 2000; Dunstan et al., 2002; Willey & Fiatarone-Singh, 2003).

Progress and improvement is also easily quantifiable with resistance training by seeing increases in the amount of weight lifted or repetitions performed which may be more motivating to perform than other forms of physical activity (Plotnikoff, 2006). This proximal success with this mode of activity may build self-confidence and may lead to more physical activity endeavours such as aerobic training. Two randomized, controlled trials found that older adults with type 2 diabetes reported adherence rates of about 90% to a resistance training program (Castaneda et al., 2002; Dunstan et al., 2002). A study by Sigal et al, 2007, which compared aerobic only, resistance only and combined (i.e., both aerobic and resistance activity) training groups, found median attendance rates of 80% for aerobic only, 85% for resistance only and 86% for the combined activity group.

2.2.2 CDA Physical Activity Guidelines

The 2008 CDA Clinical Practice guidelines recommend that people with type 2 diabetes engage in moderate intensity physical activity for at least 150 minutes every week over at least three non-consecutive days. The guidelines also recommend participating in resistance training at least three times per week to help the management of type 2 diabetes (CDA, 2008).

The previous section presented the main studies investigating the benefits of physical activity for diabetes prevention and management. The CDA's physical activity guidelines are stated at the end of the above section. The following section outlines potential risks specific to people with type 2 diabetes when engaging in physical activity.

2.2.3 Potential risks of physical activity

Aside from standard risks (e.g. physical injury in contact sport, falls) that the general population face when partaking in certain activities, physical activity can be associated with risks and complications specific to the type 2 diabetes population. There are cardiovascular risks associated with type 2 diabetes that increase with the severity of diabetes (McCully et al., 2002; Wilmore et al., 2001). Physical activity may trigger angina pectoris, myocardial infarction, arrhythmias, and sudden death in those with pre-existing coronary artery disease (Li, Culver & Ren, 2003). Long-term complications, such as diabetic autonomic neuropathy, may be worsened by exercise and may lead to arrhythmia (Chipkin, Klugh, & Chasan-Taber, 2001). Further, people with type 2 diabetes that also have an abnormal exercise echocardiogram are at higher risk for myocardial infarction than those with a normal echocardiogram (Elhendy, Arruda, Mahoney, & Pellikka, 2001). This suggests that for some people with type 2 diabetes, physical activity itself may be a risk factor.

Careful attention to long-term complications associated with type 2 diabetes is important when considering a new physical activity program (ADA, 2002; Gregg et al., 2002). An exercise stress test should be performed on people with type 2 diabetes who are over 35 years of age to ensure that any ischemic cardiac diseases do not go undiagnosed (Smith, Dykes, Douglas, Krishnaswamy, & Berk, 1999; Mazzeo & Tanaka, 2001; Redberg et al., 2002; Li et al., 2003).

2.3 Physical Activity Prevalence in the Diabetes Population

Despite the encouraging evidence of the health benefits for both aerobic and resistance training, the majority of people with type 2 diabetes do not engage in these activities (Plotnikoff, 2006; Health Canada, 2002). The *Diabetes in Canada Report* issued by Health Canada (2002) states that 65% of those with type 2 diabetes are physically inactive which is higher than the general population at 56% (Craig & Cameron, 2004). The same is true with respect to resistance training. A study by Plotnikoff, Mayhew, Birkett, Loucaides and Fodor (2004) found that only 12% of the study's 1193 participants with type 2 diabetes were engaging in some type of resistance training. These low participation rates illustrate the need for research focusing on motivation and adherence.

2.4 Demographic (age and sex) and Social-cognitive Correlates of Physical Activity

The following section reviews the literature on the demographic (i.e., age and sex) and social-cognitive correlates of physical activity in (1) the general adult population (Section 2.4.1), and (2) in the type 2 diabetes population (Section 2.4.2).

2.4.1 The General Population

Research in the general population has indicated that the majority of Canadians are insufficiently active to achieve health benefits (Canadian Fitness and Lifestyle Research Institute, 2007). Inactivity rates are higher within certain demographic groups

such as women, older adults, those with a disability, and people with lower education and income levels (CFLRI, 2007; Jones et al., 1998; Wen et al., 2002). In one of the largest Canadian studies on the topic, Plotnikoff and colleagues (2004) reported that key factors such as younger age, male sex, higher education level and higher perceived health status were significant correlates of physical activity in a sample of over 20,000 adults.

Evidence suggests that men are more likely to engage in physical activity, especially vigorous intensity activity, than women (Marcus & Forsyth, 1998). Plotnikoff and colleagues (2004) examined a large sample of Canadian adults and found that there were differences in physical activity correlates when comparing men and women. Booth, Owen, Bauman, Clavisi & Leslie (2000) also reported that more men than women were adequately active in a large sample (n=449) of older Australians (55% versus 38% respectively).

Evidence also suggests that adherence to a physical activity regimen is influenced by age. Canadian population data show levels of engaging in at least moderate physical activity decreases with successive age groups (CFLRI, 2007). A published review also reports that many studies have found physical activity is inversely associated with age (Trost, Owen, Bauman, Sallis, & Brown, 2002). In a sample of people aged 50 years and over physical inactivity rates were lowest among the 50-64 age group and highest among those 85 years of age or more (Kruger, Ham and Sanker, 2008).

Key Social-cognitive Constructs

Social-cognitive constructs have been associated with physical activity levels in the general population as well. For example, a large Australian study found that self-efficacy and social support were significantly associated with physical activity levels

(Booth et al, 2000). Indeed, a prominent review by Dishman, Sallis and Orenstein (1985) concludes that physical activity-related knowledge, beliefs, attitudes, and outcome expectations influence disposition to adopt or maintain physical activity.

Differences in physical activity-related, social-cognitive variables have also been found between genders in the general population. Many studies suggest that women report there are more barriers to their exercise because of the domestic responsibilities of their gender. In a study by Eyler and colleagues (1998) using focus groups of minority women, many participants from the groups suggested that gender roles were significant with regards to physical activity participation. While lack of time is a common cited barrier in both sexes, many women cite lack of time due to family obligations (Eyler et al., 1998; Marcus & Forsyth, 1998; Tavares & Plotnikoff, in press). Men generally have higher self-efficacy than women (Netz & Raviv, 2004). When examining the relationship between social support and physical activity, evidence suggests this association is more consistent for women than men, especially if the source of support is the family (Marcus & Forsyth, 1998). Clearly, gender differences exist for specific social-cognitive variables associated with physical activity and therefore it may be useful to tailor interventions and programs appropriately.

Certain cognitive variables have been found to be associated with physical activity and such relationships may be influenced by age. In a study by Jancey et al, (2007) with older adults (aged 65-74), walking self-efficacy was found to effect exercise adherence. The influence of social support on physical activity among older adults seems to be inconsistent. Some studies have found that older adults (aged 50 years and older) prefer to engage in physical activity alone rather than in a class setting (Mills, Stewart,

Sepsis & King, 1997; Wilcox, King Brassington & Ahn, 1999). Other studies have shown that social support is important however, this does not mean that they necessarily prefer class physical activity settings (Beauchamp, Carron, McCutcheon & Harper, 2007). Beauchamp and colleagues (2007) indicated that adults (mean age 53 years) preferred to exercise with others in the same age group whether in a class setting or an informal group. In another study (Rhodes, Martin & Taunton, 2001), adults participated in a group walking program with a 'group leader' in which they indicated the groups provided motivation and companionship, and found their 'leader' to be encouraging and helpful. Hence, a tailored program or having a choice of programs could influence a person to participate in physical activity more frequently.

The previous section outlined age and sex differences and physical activity-related, social-cognitive correlates among the general population. The next section reviews demographic and social-cognitive correlates in the specific type 2 diabetes population.

2.4.2 The Type 2 diabetes population

There has been a recent effort to research the demographic and psychosocial determinants of this behaviour (Allen, 2004; Plotnikoff, 2006; Plotnikoff et al., 2006). Within the population of people with type 2 diabetes, there have been associations found between physical activity with age and sex (Hays & Clark, 1999; Nelson, Reiber, & Boyko, 2002; Nothwehr & Stump, 2000). In the Canadian context, Plotnikoff and colleagues (2006) conducted a study to examine factors associated with physical activity among Canadians with type 2 diabetes. In a sample of 1,614 adults with type 2 diabetes,

of which 71.9% were not achieving recommended levels of physical activity, demographic factors found to be significantly associated with higher physical activity levels included a younger age and being male.

Research has also identified social-cognitive correlates within the type 2 diabetes population. Key constructs that appear to be associated with physical activity in this population include self-efficacy, social support, outcome expectations, and outcome expectancies (Kingery & Glasgow, 1989; Padgett, 1991; Pham, Fortin, & Thibaudeau, 1996; Skelly, Marshall, Haughey, Davis, & Dunford, 1995; Wilson et al., 1986). In a review by Allen (2004), results supported the relationship between self-efficacy and physical activity behaviour. The same review however, reported mixed results for the relationship between outcome expectancies and physical activity behaviour.

Barriers to regular exercise identified by the diabetic population include health issues, poor diabetes control, being too tired, and physical environment (Plotnikoff, 2006). Based on self-reports, it appears that adults with diabetes are not receiving the education, encouragement and support regarding physical activity as they do with other forms of self-treatment (Kirk, Mutrie, MacIntyre & Fisher, 2003) which may be another reason for low physical activity adherence rates.

The next section details the studies that focus on physical activity preferences in the general population, older adults, and chronic disease groups including adults with type 2 diabetes.

2.5 Exercise Preferences

The American College of Sports Medicine states exercise prescription guidelines *"cannot be implemented in an overly rigid fashion by simply applying mathematical calculations to test data"* and *"individual preferences for exercise must be considered to improve the likelihood that the individual will adhere to the exercise program"* (ACSM, 2000). There is also congruence in the literature that suggests it is important to gain an understanding of individuals' physical activity and program preferences as well as any barriers or negative factors, in order to facilitate physical activity. For example, Cohen-Mansfield, Marx, Biddison and Guralnik (2004) highlight the potential value of preference information as a way to increase motivation to engage in physical activity. Identifying preferences could be used to offer better and more enjoyable programs to individuals who don't fit into the broad "one-size-fits-all" strategy of program design (Booth, Bauman, Owen & Gore, 1997). Understanding how preferences are developed and what may influence specific preferences may also be important. For example, are there any social cognitive constructs that inform physical activity preferences and how they are influenced? These potential relationships are important when considering approaches to physical activity programming.

Tailoring physical activity interventions to an individual's needs and preferences may be more effective than taking "one-size-fits-all" generic approaches. Research with the general population (Thompson & Wankel, 1980; Booth et al., 1997; Salmon, Crawford, Owen, Bauman & Sallis, 2003), older adults (Mills et al., 1997; Wilcox et al., 1999; Cohen-Mansfield et al., 2004) and chronic disease groups such as heart disease (Ruland & Moore, 2001; Moore & Kramer, 1996), cancer (Denmark-Wahnefried,

Peterson, McBride, Lipkus & Clipp, 2000; Jones & Courneya, 2002; Vallance, Courneya, Jones & Reiman, 2006; Karvinen et al., 2006; Jones et al., 2007; Karvinen, Courneya, North & Venner, 2007; Courneya et al., 2008; Rogers, Courneya, Verhulst, Markwell & McAuley, in press) and type 2 diabetes (Wood, 2002; Wanko et al., 2004) have examined physical activity preferences. Only a few of these studies however, have examined physical activity preferences as their primary research question.

2.5.1 General Population

There have been a number of studies investigating general physical activity preferences with the general population. Thompson and Wankel (1980) performed a study which recruited 36 adult women who had recently joined a physical fitness club, had indicated a goal of at least 8 pounds weight loss, and were free of physical limitations. Participants were matched on the basis of their activity preferences and then one member of each pair was randomly assigned to the experimental group or the control group. The exercise programs were either based on preferences or standardized, depending on their group assignment. Attendance and weight changes were monitored over a 6 week period. The preference-matched group had a significantly higher average attendance rate then the no-choice group. The preference-matched group also indicated significantly higher intention scores with regards to future exercise.

Booth et al, (1997) conducted a study with a randomly selected sample of 2,298 Australian adults. Participants were administered a questionnaire including preferred sources of assistance or support to become physically active, preferred activities and barriers to regular participation. The results were analyzed in three different age groups (i.e., 18-39, 40-59, and 60-78 years of age). The findings indicated that the most

preferred activity was walking for all the age groups (38%, 67% and 68% respectively). More than 50 percent of the oldest group preferred to receive advice from a health professional whereas among the middle age group (40-59), 41 percent preferred advice from a health professional compared with the youngest age group (22%). The youngest age group indicated a preference for a group setting (more than 40%) as their source of support.

In another Australian study by Salmon et al, (2003) 1,332 adults were randomly selected to complete a mail survey focusing on individual and environmental-level factors associated with physical activity participation. These factors were examined using three constructs: *barriers* to physical activity; *enjoyment* of physically active and sedentary behaviours; and, *preference* for physically active and sedentary behaviours. Participants that reported high enjoyment and preference (i.e., engaging in physical activity because they liked it, not because they had to) for physical activity were more likely to report high levels of moderate and/or vigorous physical activity.

2.5.2 Older Adults

There have been several studies regarding general physical activity preferences conducted with older adults. In general, the studies examined specific types of preferences for activities and the satisfaction participants received from interventions. A study in northern California included 113 participants from two senior congregate housing facilities. These participants were asked if they preferred to engage in physical activity in a group setting or on their own. Activity logs were collected at the end of each month over a period of six months. Results indicated that 28% preferred group exercise,

34% preferred to be physically active on their own and 39% had no preference (Mills et al., 1997).

A study by Cohen-Mansfield and colleagues (2004) included 320 older adults (age range 74-85 years) who reported the level of importance of various physical activity characteristics. Specifically, participants answered questions about their exercise preferences and the importance of different physical activity attributes (e.g., social opportunities, cost, setting, location). Among the most important characteristics identified regarding exercise classes were quality of instructor, a close location and type of physical activity (35.3%, 30.0%, and 27.8% rated as 'very important' respectively). With regards to authority involvement, a physicians' advice, an evaluation by a health professional to determine physical changes, and an evaluation by a health professional to ensure proper technique were also among the more important qualities (31.2%, 27.3% and 24.5% respectively were also rated as 'very important'). Further, the researchers found that women generally rated most attributes as more important than men. Type of exercise, location, participants being the same age, music with exercise and activity being evaluated by a professional were all significantly more important for women than men.

A study by Wilcox et al, (1999) examined adults' preference for engaging in physical activity in a class setting or on their own with some instruction. A sample of 1,820 middle-aged and 1,485 older adults were recruited through a random-digit dialling protocol and completed a 20 minute phone survey on health and health behaviours. Overall it was found that 69% of middle-aged and 67% of older adults preferred to engage in physical activity on their own with some instruction. This finding however, does not necessarily mean that social support is unimportant. Indeed, people may prefer

to engage in activities with family or friends -- just not in group exercise classes. Eleven unique subgroups among middle-aged and older adults were identified based on physical activity preferences of doing activities on their own with some instruction or in a class setting. These various subgroup dimensions support the need to tailor programs to an individual's specific needs.

2.5.3 Exercise preferences in chronic disease groups

Cardiovascular Disease

Limited research has been conducted on physical activity preferences on the cardiac population and has been primarily focused on cardiac rehabilitation. A study by Ruland and Moore (2001) with women in cardiac rehabilitation compared preferences between healthy, university-employed volunteers and women recovering from cardiac events. The main objective of this study was to determine the effectiveness of an instrument to assess patient preferences for components of a cardiac rehabilitation program. In this study, a convenience sample of 16 women was recruited; 8 women had attended a Phase II cardiac rehabilitation program during recovery from an acute cardiac event; and a further eight women were healthy volunteers that were employed at a university. The instrument included 20 descriptors of exercise features that women were asked to give an importance rating (1-10 scale). The researchers found there were differences between groups in the importance of values assigned to some questions. For example, those women in cardiac rehab stated having individualized attention from professionals during their physical activity was significantly more important than the control group.

A similar study by Moore and Kramer (1996) surveyed a convenience sample of 65 men and women who had participated in a cardiac rehabilitation program. The participants were asked to rate the importance of 17 features of the program and the extent of experience they had with each feature. It was found that men and women prefer to discuss their progress with professionals as well as be able to choose their own activities. The findings from these two studies suggest that physical activity preferences do vary among men and women and illustrate the need to determine patients' activity preferences on an individual basis and tailor individual exercise programs accordingly.

Cancer

Within clinical populations, physical activity preferences have been most thoroughly examined in the cancer domain. Denmark-Wahnefried et al, (2000) conducted a mail-out survey regarding health behaviours and health programs which was completed by 978 breast and prostate cancer survivors. The participants were asked about current health behaviours and their interest in pursuing healthy behaviours in diet and exercise. The majority (80%) of the sample indicated they were interested in health promoting programs with most (53%) respondents preferring to receive mailed literature as opposed to other media.

In another study, Jones and Courneya (2002) documented the exercise preferences of cancer survivors. The study consisted of a mailed survey which was completed by 307 prostate, breast, colorectal and lung cancer survivors. The survey asked questions regarding physical activity and program and counselling preferences. The majority (84%) of participants indicated that they would possibly be interested in receiving physical activity counselling at some point during their cancer experience. Eighty-five

percent of the participants preferred to receive counselling face-to-face, with 77% preferring to receive the counselling from an exercise specialist affiliated with a cancer centre. With respect to programming preferences, participants indicated preferences for recreational activities (98%), walking (81%), supervised activity (57%) and moderate intensity physical activity (56%). Additional information reported by the participants indicated that morning exercise (48%), exercising alone (44%), and exercising at home (40%) were preferable.

A further study by Vallance et al, (2006) examined physical activity preferences in a sample of non-Hodgkin's lymphoma (NHL) survivors. Similar to the methods of the above study, the mailed survey asked exercise and program preferences in a sample of 431 NHL survivors. The majority of participants (77%) 'preferred' or 'maybe preferred' to receive physical activity counselling at some point after their diagnosis. Walking was the most favoured activity (55%) and similar proportions indicated they would rather exercise alone (31%) or with others (35%). As in the other cancer studies above, the majority of participants preferred moderate intensity activity (62%); however, contrary to the previous study (Jones & Courneya, 2002) 59% of participants preferred unsupervised/self-paced physical activity.

Karvinen et al, (2006) surveyed the physical activity preferences of 386 endometrial cancer survivors. Similar to the above studies, it was found that most (76.9%) participants 'would be' or 'might be' interested in participating in a physical activity program. The majority (81.7%) of people surveyed also felt they would be capable of actually doing the program. Again, walking was found to be the preferred activity (68.6%), and moderate intensity was the preferred intensity (61.1%). This

sample also preferred to receive counselling face-to-face (82.8%) from an exercise specialist associated with a cancer centre (40.9%) at a cancer centre (41%). The study also found that the participants prefer to exercise at home (32.7%) but there was no significant difference between the desire to exercise alone (23.8%), with friends (22.6%) and having no preference (32.7%).

Jones et al, (2007) investigated similar constructs to the previously mentioned studies by Karvinen et al, (2006), Vallance et al, (2006) and Jones and Courneya (2002), but with brain cancer survivors. One hundred and six brain tumour patients completed a questionnaire that assessed physical activity preferences during and after treatment. Results showed that equal proportions of participants preferred to exercise at home or with family. Different from other studies (Jones & Courneya, 2002), a higher percent of people preferred receiving information by way of technologically-based approaches (48.1% via internet, 40.6% via computer program, 49.1% via email) rather than face-to-face (29.3%). Again, walking was found to be the most preferred activity (53%) followed by resistance training (36%) and cycling (19%). There was a significant difference for perceived ability in participating in physical activity between 'during treatment' and the 'post treatment,' but no significant difference was reported between the actual preferences between the during- and post-treatment periods.

In a study by Karvinen et al, (2007) 397 bladder cancer survivors completed a mailed survey to determine optimal physical activity programs for this population. Participants answered similar questions as the other above mentioned cancer studies with similar findings. Most participants indicated they would be interested (81.1%) and able to participate (84.3%) in a physical activity program specifically designed for bladder

cancer survivors. It was found that participants were strongly interested in participating in physical activity programs at home (53.7%) and doing walking (81.1%). Moderate intensity (61.7%), schedule flexibility (56.9%) and unsupervised (70.6%) activities were most preferred among the group.

Courneya et al, (2008) conducted a study with 242 women with breast cancer to determine the key factors associated with a patient's preference for resistance exercise training (RET) versus aerobic exercise training (AET) in a randomized controlled trial. The researchers found participants that preferred AET had more favourable beliefs about AET whereas those that preferred RET had more favourable beliefs about RET. Patient preferences for RET versus AET was explained by the difference in motivation for RET versus AET, smoking status (i.e., smokers preferred RET), and aerobic fitness (i.e., aerobically fitter participants preferred RET). Motivational difference in turn was explained by differences in instrumental attitude, affective attitude and perceived behavioural control. One interesting finding was that participants who preferred RET had a less negative view of AET than AET preferers of RET. This study lends support for the utility of the Theory of Planned Behaviour (TPB) as a conceptual model for understanding patient preference effects.

Finally, Rogers and colleagues (in press) surveyed 192 breast cancer survivors to assess differences in exercise counselling preferences, program preferences and telephone/internet access to investigate potential mode of delivery. Individuals preferred to receive counselling at home (36%), face-to-face (61%) with an exercise specialist (51%). Moderate intensity (64%), unsupervised (49%) physical activity was preferred. Similar to other research, walking was the most preferred type of activity for winter

(46%) and summer (65%). All participants reported telephone access in their home and only 19% did not have internet access at work or at home.

Factors associated with preferences were also explored in this study. Participants preferring to exercise alone or at home reported lower social support. Lower task self-efficacy and lower physical activity enjoyment were associated with preferring to participate in lower intensity activity. An important conclusion in this study was that self-efficacy was not the only variable associated with physical activity preferences. Exercise enjoyment, perceived barriers, social support, fatigue and co-morbidities were found to be important in this population as well. To our knowledge this is only the second (the first being Courneya et al., 2008) study to report on potential influences of social-cognitive variables on physical activity counselling and program preferences in any chronic disease population (Rogers et al., in press).

Type 2 Diabetes

To date, there has been very little research on physical activity preferences within the type 2 diabetes population. There appear to be only two studies that have reported any data on physical activity preferences in this population (and physical activity preferences were not the primary focus of these studies). Wood (2002) presented the physical activity practices and preferences of different ethnic groups. The researchers examined physical activity preferences across ethnicity, gender and age in a secondary analysis of type 2 diabetes individuals in the Third National Health and Nutrition Examination Survey. It was found that some of the physical activity preferences were different between various ethnic groups. The researchers also reported that preferences differed by age and gender. Preferences were not specifically solicited in this study but

inferred from the choices participants made about the activities they engaged in. The most practiced activities were walking and gardening among all age groups and for both sexes. The youngest age group was more likely to engage in jogging, swimming or dancing and the middle age group was more likely to jog, dance, perform calisthenics and lift weights than those over 65 years of age.

Wanko et al, (2004) surveyed 605 individuals at a diabetes clinic with predominately African American patients. The questionnaires consisted of multiple choice questions concerning the patients' exercise preferences. Among those individuals engaging in physical activity, frequently selected activities were walking outdoors, gardening/yard work, bicycling, sports and athletics, and swimming. Overall, the participants reported walking as the number one preferred activity. Among the next most popular activities, there were differences according to demographic characteristics. The researchers found that among younger participants, the second choice activities were sports and athletics whereas with the older participants, the second choice was gardening and yardwork. Apart from these two limited studies there appears to be no other research on physical activity preferences in this population. See Table 2-1 for a summary table of physical activity preference literature.

Among all the studies that measured and reported actual exercise and program preferences in the general and chronic disease populations, walking was found to be the most preferred type of activity. Walking is also the most prevalent type of physical activity in adult Canadians at 70% (CFLRI, 2007). Gardening, home exercise, swimming and bicycling complete the top five activities (CFLRI, 2007). The ACSM (2000) suggests programmers should emphasize more traditional exercises, such as walking,

because of the many health benefits associated with regular walking and because this behaviour can easily be performed. The ACSM's recommendation, along with many of the reviewed studies' findings, provide a strong rationale for developing physical activity programs that include walking as the main form of aerobic activity in order to achieve the aerobic activity guidelines.

2.6 Study Rationale

Type 2 diabetes is a serious health issue in Canada and worldwide. This disease adds economic strain to the health care system and can cause premature death. Engaging in regular aerobic and resistance training has been shown to be successful in helping to prevent and manage this disease. However, only about 30% of people with type 2 diabetes adhere to the Canadian Diabetes Association's guidelines for aerobic activity and less meet the resistance training guidelines. Adherence to physical activity programs is imperative. There has been research regarding the demographic and social-cognitive correlates of physical activity among people with type 2 diabetes. There has been some research with the general population and other chronic disease groups regarding the importance of addressing the physical activity preferences but very little attention has been given to the diabetic population. Further, there appears to be only two studies on the social-cognitive and behaviour relationships with physical activity preferences; these were conducted in the cancer domain. Work in the type 2 diabetes population has been atheoretical to date.

The overall purpose of this thesis is to examine physical activity preferences amongst a sample of adults with type 2 diabetes. The specific objectives of this study are

to determine: (1) physical activity preferences, (2) whether there are any relationships between physical activity-related, (i) social-cognitive and, (ii) behaviour constructs with physical activity preferences, and, (3) whether the results of the above two objectives are influenced by age and/or sex. Such information is required to help guide practitioners and researchers plan more effective physical activity programs for those with type 2 diabetes.

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1. Table 2-1: Physical activity preferences: Literature review summary

Authors	Objective	Sample	Methods	Main Results	Conclusion
Thompson & Wankel, 1980	Investigate the effect of perceived activity choice on the frequency of exercise behaviour in adult women	36 adults females who had recently joined a fitness club Age range 18-55 (M=28)	Asked preferences for activities before starting a fitness program. Matched people by preferences and split into two groups (perceived choice met or not; both groups actually had choices met)	• 'Choice' group had significantly higher average attendance than the 'no choice' group over a 6-week period	• Perceived activity choice results in higher attendance in the final weeks.
Booth et al, 1997	Examine the activity preferences, the preferred sources of support, and the barriers to regular participation in physical activity reported by insufficiently active respondents	1232 participants from Pilot Survey of the Fitness of Australians, who were categorized as insufficiently active	Two-stage systematic random sampling procedure. The questionnaire was administered in the respondents' homes by trained interviewers	• Walking was most preferred activity overall. Preferred sources of counselling were doctors and other health professionals. Most frequent barriers were lack of time and lack of motivation	• Comprehensive, community-wide exercise promotion strategies are likely to have a greater impact if they are tailored to the attributes of key target groups
Salmon et al, 2003	Examine associations of physical activity and sedentary behaviour with barriers, enjoyment, and preferences were examined	1,332 participants 55% women; mean age 45.4 years	Mailed survey	• Barriers, enjoyment, and preferences each had predictive power in explaining self-reported time in leisure-time physical activity and in sedentary behaviour • Barriers, enjoyment, and preferences each had predictive power in explaining	• An important finding is that the association between enjoyment, preference, and physical activity is particularly strong and that participation in sedentary behaviours appears to be related to physical activity barriers • These constructs can be used

Authors	Objective	Sample	Methods	Main Results	Conclusion
				self-reported time in leisure-time physical activity and in sedentary behaviour.	to examine individual and environmental influences on physical activity and sedentary behaviour in specific populations and could inform the development of interventions that target important determinants of these behaviours.
Mills et al, 1997	To describe PA format preferences of adults and explore how preferences are related to PA adoption and maintenance.	98 adults enrolled in an exercise program offered by the community 57-91 (mean 76±8) 81% female	Community Healthy Activities Model Program for Seniors: 6-month program Class-based activities Survey to assess this program, participation was measured using activity logs	• No preference for group or individual was most common (38%) • There was a trend for preference group to be associated with class adoption and maintenance.	• Results suggest that a significant proportion of older adults prefer engaging in individual activities outside of a formal class setting, and encouraging older adults to take part in physical activities that correspond with their preferences may results in increased effectiveness
Wilcox et al, 1999	Examine preferences for exercising on one's own vs. in a class	1820 middle aged adults 1485 older adults	20 minute telephone survey	• 69% and 67% (middle-aged and older adults respectively) preferred to exercise on their own with some instruction rather than in an exercise class • Subgroups were identified whose preference for exercising on their own with some instruction ranged from 33-85%	• Identification of subgroups potentially sets the stage for beginning to tailor exercise recommendations and interventions to the preferences of individuals
Cohen-Mansfield et al, 2004	To examine preferences concerning social and environmental aspects of	N=324, aged 74-85	Completed a health questionnaire	• Exercise setting characteristics including the quality of the instructor, close location, and type of exercise were the most important aspects of an	• Programs that take the varying preferences of this population into account and explore their meaning for program design may increase their chances of

Authors	Objective	Sample	Methods	Main Results	Conclusion
	exercise in the elderly population			exercise class • Doctor's advice to exercise, an evaluation by a health professional to monitor the physical effects of exercise, and an exercise evaluation by a professional to demonstrate proper exercises were also rated as very important • Walking for half an hour was the method acceptable to the largest number of participants • Women rated most exercise attributes as more important than did the men	recruiting elderly persons at risk
Ruland & Moore, 2001	Evaluate the applicability of the preference elicitation technique of 'CHOICE' (Creating better Health Orientation by Improving Communication about Exercise experiences)	Convenience sample of 16 women, 8 from CV rehab, 8 healthy university volunteers	Exercise preference elicitation interviews were conducted to determine features of exercise that are important to make exercise enjoyable for them.	• Variations were found between groups for the importance of certain aspects • Most important features overall included: setting own goals, see progress right away, variety of exercises, not be boring, flexible, easy to learn, encouragement from friends / family	• Differences in preferences between the groups suggests that preferences for exercise features do vary among women by characteristics of health or life • Need to elicit preferences for exercise features on an individual basis and to tailor individual exercise programs
Moore & Kramer, 1996	Purpose of this study was to identify and compare women's and men's preferences for specific cardiac rehabilitation	Convenience sample of 65 individuals participating in cardiac rehabilitation	Self-administered, descriptive survey design	• Convenience factors (drive time, transportation, non-interference with other life activities, and ease of learning the exercises) were well-met preferences for both women and men	• Findings suggest that a cardiac rehabilitation program that is responsive to client preferences should emphasize joint goal setting with participants and discussion of progress, offer frequent

Authors	Objective	Sample	Methods	Main Results	Conclusion
	program features.			• Men's and women's preferences were not well met for being able to discuss their progress with professionals and the ability to choose their own exercises	encouragement from professionals, and provide a range of exercise choices
Denmark-Wahnefried et al, 2000;	Cancer survivors' behaviours and their interest in pursuing healthier diets, exercise, and smoking cessation.	978 breast and prostate cancer survivors	65-item survey was mailed	• Majority of respondents (58%) reported routine exercise • 80% of participants were interested in health promotion programs • Most indicated they would prefer to receive mailed literature	• Among cancer survivors, receptivity is high for health promotion programs, especially those that can be delivered by mail and soon after diagnosis.
Jones & Courneya, 2002a	Purpose of this study was to provide a comprehensive assessment of the exercise preferences of cancer survivors.	307 survivors of prostate, breast, colorectal, or lung cancer	Mailed, self-administered survey	• 84% of participants said they preferred or maybe preferred to receive exercise counselling at some point during their cancer experience. 85% preferred to receive exercise counselling face to face, and 77% preferred to receive it from an exercise specialist affiliated with a cancer center. 98% preferred recreational exercises, 81% preferred walking, 57% preferred unsupervised exercise, and 56% preferred moderate-intensity exercise. • In addition, 48% preferred to exercise in the morning, 44% preferred to exercise alone, 40% preferred to exercise at	• The results of this study indicate that cancer survivors have unique and varied exercise counselling and programming preferences.

Authors	Objective	Sample	Methods	Main Results	Conclusion
				home, and 32% preferred to start their exercise program before treatment	
Vallance et al, 2006	Examine the exercise preferences of a population-based sample of non-Hodgkin's lymphoma (NHL) survivors.	431 NHL survivors residing in Alberta, Canada	Retrospective survey design	• Overall, 77% of participants preferred or maybe preferred to receive exercise counselling at some point after their NHL diagnosis. An overwhelming majority indicated that they would possibly be interested (81%) and able (85%) to participate in an exercise programme designed for NHL survivors. The majority of participants (55%) listed walking as their preferred choice of exercise • NHL survivors' exercise preferences were influenced by gender	• Eliciting exercise preferences from the population in question yields important information for cancer care professionals designing exercise programmes for NHL survivors. • Furthermore, tailoring exercise programmes to the preferences of NHL survivors may be one method to potentially enhance exercise adherence in this population both inside and outside of clinical trials
Karvinen et al, 2006	Examine the exercise preferences of cancer survivors.	386 endometrial cancer survivors.	Mailed questionnaire	• 76.9% of participants said they were interested or might be interested in doing an exercise program and 81.7% felt they were able or likely able to actually do an exercise program • Participants also indicated that walking was their preferred activity (68.6%) and moderate exercise was their preferred intensity (61.1%)	• Results suggest that endometrial cancer survivors have unique exercise preferences that are moderated by a number of demographic and medical variables
Jones et al, 2007	The purpose was to examine the	106 brain tumour patients	Completed a questionnaire that	• Approximately equal proportions of brain tumour	• Brain tumour patients may have unique and varied

Authors	Objective	Sample	Methods	Main Results	Conclusion
	interest and exercise preferences of an institution-based sample of brain tumour patients		assessed self-reported exercise behaviour, exercise interest and preferences during active and off-treatment periods	patients preferred to exercise at home with their spouse or other family members. • For exercise information preferences, a higher proportion of respondents preferred receiving information via technologically based approaches a small number of exercise program and information preferences were modified by exercise, medical, and demographic variables	preferences compared with other cancer populations • Incorporating patient's preferences into rehabilitation programs and clinical exercise investigations may optimize the potential benefits
Karvinen et al, 2007	Primary purpose of the present study was to solicit the exercise programming and counselling preferences of bladder cancer survivors	397 bladder cancer survivors in the province of Alberta, Canada	Mailed questionnaire	• The majority of survivors indicated they would be interested (81.1%) and able (84.3%) to participate in an exercise program designed for bladder cancer survivors. • Also found that bladder cancer survivors were particularly interested in home-based exercise programming (53.7%) and walking (81.1%). • Logistic regression analyses showed that current exercise, body mass index, age, adjuvant therapy, marital status, income and education all influenced various exercise preferences	• Findings suggest that bladder cancer survivors are interested in receiving exercise programming and have some consistent preferences such as for home exercise and for walking
Courneya et al, 2008	To identify the key factors	242 women with breast cancer	Prospective, three-armed, randomized	• 40.9% preferred RET, 36.4% preferred AET, 22.7% had no	• Preferences for AET versus RET during chemotherapy was

Authors	Objective	Sample	Methods	Main Results	Conclusion
	associated with a patient preference for RET versus AET in the START trial	undergoing adjuvant chemotherapy	controlled trial	preference • Participants that preferred AET had more favourable TPB beliefs about AET whereas those that preferred RET had more favourable beliefs about RET • Patient preferences for RET vs. AET was explained by the difference in motivation for RET vs. AET, smoking status, and aerobic fitness. • Motivational difference in turn was explained by differences in instrumental attitude, affective attitude and perceived behavioural control	strongly associated with differences in their motivation for each type of exercise • Motivational differences were largely based on differences in instrumental attitude (how beneficial exercise would be during chemo), affective attitude (how enjoyable each type of activity would be during chemo), PBC (how difficult each type of exercise would be during chemo), and subjective norm (how supportive others would be if they did each type of training during chemo) • Participants that preferred RET did not have as negative a view of AET as did AET preferers of RET • Supports the utility of TPB as a conceptual model for understanding patient preference effects
Rogers et al, in press	To assess differences in exercise counselling preferences, program preferences, and telephone/internet access among breast cancer	192 breast cancer survivors.	Self-administered survey	• Those preferring an exercise specialist were more likely to report current treatment, higher self-efficacy, greater perceived barriers, and residential environment conducive to physical activity • Participants preferring face–to-face counselling and	• Demographic, medical, social cognitive, and environmental factors may influence exercise preferences and internet access

Authors	Objective	Sample	Methods	Main Results	Conclusion
	survivors based on exercise behaviour, demographic, medical, social cognitive, and environmental factors			exercising outdoors were younger with those preferring to exercise alone and at home reporting lower social support • Low intensity exercise was preferred by participants who were sedentary, obese, less self-efficacious, enjoyed exercise less, perceived greater barriers, and reported lower social support. Participants with internet access were more apt to be younger with higher income and greater social support	
Wood, 2002	To describe and compare exercise practices and preferences of adult Caucasians, African Americans, and Mexican Americans with diabetes	1,614 adults who were 17 years old or older and who reported having diabetes	Secondary analysis self-identified respondents with diabetes to the third NHANES	• Two exercises most commonly performed by these diabetics during the past month were gardening (34.8%) and walking (31.3%) • Ethnic preferences for types of exercises were relatively similar. All ethnic groups engaged in walking and gardening more frequently than other types of exercises	• Data indicated a preference for low-impact exercises such as walking and gardening rather than the more aerobic activities of jogging and aerobic exercise routines. • Encouragement of these low-impact activities is feasible for several reasons. Because they have fewer negative effects on the musculoskeletal system, discomfort and injury should be rare. No special equipment or memberships are required, and many people choosing to walk or garden can engage in these exercises close to home
Wanko et al, 2004	Purpose of this study was to determine	605 patients attending the diabetes clinic for	Self-administered questionnaire	• Walking outdoors was preferred, but 52% reported an	• Recognition of patient exercise preferences and barriers

Authors	Objective	Sample	Methods	Main Results	Conclusion
	physical activity preferences and barriers to exercise in an urban diabetes clinic population	the first time.		exercise barrier (predominantly pain) • Increasing age, body mass index, college education, and being a smoker increased the odds of reporting a barrier; being male decreased the chances • Men reported more leisure-time physical activity than women. Exercise preferences and types of barriers changed with age	should help in developing exercise strategies for improving glycemic control

Chapter Three – Study One

3.0 Overview of the Chapter

This chapter includes a brief introduction, study rationale, study objectives and research questions. This is followed by the study methods, results, discussion, limitations and suggestions for future directions.

3.1 Introduction

In Canada, approximately 5-7% of the population over age 12 have diabetes. When examining only people over the age of 64, this prevalence increases to 17%. Of all the cases of diabetes mellitus, about 90-95% are type 2 diabetes (formally termed adult-onset diabetes) (Centers for Disease Control, 2003; Hux & Tang, 2003). This chronic disease also creates a significant economic burden on the health care system (Health Canada, 2002). The total cost of diabetes and the chronic complications that arise from having this disease is estimated to be $3.7 billion (US) per annum (Dawson, Gomes, Gerstein, Blanchard, & Kahler, 2002).

Lifestyle is an important part of the prevention and management of type 2 diabetes. Maintaining lifestyle habits such as healthy eating, not smoking and participating in regular physical activity can help prevent and manage chronic diseases such as type 2 diabetes (Pan et al., 1997; Spelsburg & Manson, 1995). Physical activity has been shown to play a lead role in managing type 2 diabetes, especially glycemic control [Canadian Diabetes Association (CDA) Clinical Guidelines Expert Committee, 2003; Zinman, Ruderman, Campaigne, Devlin, & Schneider, 2004; Boulé, Haddad,

Kenny, Well, & Sigal, 2001; Ronnemaa, Mattila, Lehtonen, & Kallio, 1986] and improving other cardiovascular risk factors (Lehmann, Kaplan, Bingisser, Bloch, & Spinas, 1997; Schneider, Khachadurian, Amorosa, Clemow, & Ruderman, 1992). Engaging regularly in moderate intensity physical activity and having good cardiopulmonary fitness has been shown to decrease mortality rates of those persons with type 2 diabetes by about 45 to 70% (Wei, Gibbons, Kampert, Nichaman, & Blair, 2000). In spite of this evidence, many people are not achieving sufficient physical activity for health benefits. Sixty-five percent of those with type 2 diabetes are not achieving diabetes-related aerobic physical activity guidelines (Plotnikoff, 2006; Health Canada, 2002) and only 12% report performing any resistance training activities (Plotnikoff, 2006).

The American College of Sports Medicine (ACSM) states that exercise prescription guidelines *"cannot be implemented in an overly rigid fashion by simply applying mathematical calculations to test data"* and *"individual preferences for exercise must be considered to improve the likelihood that the individual will adhere to the exercise program"* (ACSM, 2000). Literature suggests that it is important to gain a better understanding of an individual's exercise and program preferences as well as any barriers or negative factors in order to facilitate an increase in physical activity (Cohen-Mansfield, Marx, Biddison & Guralnik, 2004).

Research with the general population (Thompson & Wankel, 1980; Booth, Bauman, Owen & Gore, 1997; Salmon, Crawford, Owen, Bauman & Sallis, 2003), older adults (Mills, Stewart, Sepsis & King, 1997; Wilcox, King, Brassington & Ahn, 1999; Cohen-Mansfield et al., 2004) and chronic disease groups such as those with heart

disease (Ruland & Moore, 2001; Moore & Kramer, 1996), cancer (Denmark-Wahnefried, Peterson, McBride, Lipkus & Clipp, 2000; Jones & Courneya, 2002; Vallance, Courneya, Jones & Reiman, 2006; Karvinen et al., 2006; Jones et al., 2007; Karvinen, Courneya, North & Venner, 2007; Courneya et al., 2008; Rogers, Courneya, Verhulst, Markwell & McAuley, in press) and type 2 diabetes (Wood, 2002; Wanko et al., 2004) have examined physical activity preferences. However, there does not appear to be any examination of demographic, cognitive and behaviour variables with preferences in the diabetes population.

Only two studies have reported any data on physical activity preferences in this population (and physical activity preferences were not the primary focus of these studies). Wood (2002) presented the physical activity practices and preferences of different ethnic groups. Wanko and colleagues (2004) surveyed individuals at a diabetes clinic with predominately African American patients. Both studies employed multiple choice questionnaires to assess the participants' physical activity preferences.

Research in this area to date, has been atheoretical. There have been two studies that examined physical activity-related, social cognitive constructs with physical activity preferences in any population. Courneya et al, (2008) investigated the key factors (including social-cognitive constructs from the Theory of Planned Behaviour) associated with patients' preference for resistance exercise training (RET) versus aerobic exercise training (AET) in a randomized controlled trial, where Rogers et al, (in press) examined potential influences of social-cognitive variables on physical activity counselling and program preferences in the cancer domain.

3.2 Rationale of the Study

Type 2 diabetes is a serious health issue in Canada and worldwide. This disease adds economic burden to the health care system and can cause premature death. Engaging in regular aerobic and resistance training has been shown to be successful in helping to prevent and manage this disease. However, only about 35% of people with type 2 diabetes adhere to the Canadian Diabetes Association's guidelines for aerobic activity and less meet the resistance training guidelines.

Adherence to physical activity programs is imperative to mitigate the negative effects of this disease. There has been some research with the general population and other chronic disease groups investigating the physical activity preferences and related demographics differences (i.e., age and sex) but very little research has been conducted on the diabetic population. Further, there appears to be only two research studies (Courneya et al., 2008; Rogers et al., in press) on the social-cognitive and behaviour relationships with physical activity preferences for any population. Moreover, apart from one study (Courneya et al., 2008) research examining demographic differences (i.e., age and sex) within relationships of (i) social-cognitive and (ii) behaviour constructs, with physical activity preferences has been silent.

3.3 Study Purpose, Objectives and Questions

This is a descriptive study. The overall purpose of this study is to examine physical activity preferences amongst a sample of Canadian adults with type 2 diabetes. Specifically, the objectives are to determine: (1) physical activity preferences, (2)

whether there are any relationships between physical activity-related, (i) social-cognitive and, (ii) behaviour constructs with physical activity preferences, and, (3) whether the results of the above two objectives are influenced by age and/or sex. There is a need to obtain such information to help practitioners and researchers to more effectively plan physical activity interventions for the diabetic population to achieve and maintain regular physical activity. The research questions are as follows:

1a) What are the physical activity preferences (e.g., preferred type of activity, preferred mode of delivery of counselling, preferred location to engage in physical activity) of a sample of Canadians with type 2 diabetes?;

1b) Do these preferences differ by demographic characteristics [i.e., age (64 years and younger vs. 65 years and older), and/or sex (men vs. women)]?

2a) What are the relationships of physical activity-related, (i) social-cognitive and (ii) behaviour constructs with physical activity preferences?;

2b) Do any of these relationships differ by demographic characteristics [i.e., age (64 years and younger vs. 65 years and older), and/or sex (men vs. women)]?

3.3.1 Subsidiary component

A subsidiary component examined the following hypotheses which were based on intuitive speculation and findings from Courneya et al, (2008): (1) High self-efficacy (confidence in actions) will be associated with: (i) preferring higher intensity activity, (ii) engaging in activities alone, (iii) at home, and (iv) having unsupervised sessions; (2)

Social support will be associated with preference for engaging in physical activity: (i) with others, (ii) at a community or diabetes centre, (iii) or having supervised/instructed sessions; (3) Subjective norm (social support) will be associated with preferring to receive face-to-face counselling from (i) a doctor or (ii) exercise specialist.

3.4 Methods

3.4.1 Background

This study is a secondary analysis of the Canadian Aerobic and Resistance Exercise in Diabetes (CARED) study described elsewhere (Plotnikoff, Trinh, Courneya, Karunamuni, & Sigal, 2008; Plotnikoff, Courneya, Trinh, Karunamuni, & Sigal, 2008). The CARED study was a national Canadian survey to examine aerobic and resistance training attitudes and behaviours of adults 18 and older living with type 2 diabetes.

3.4.2 Recruitment and Procedure

In brief, a random digit dialling protocol was employed to recruit a geographically proportionate sample of individuals with type 2 diabetes. A random national sample was created by generating a random list of household phone numbers (a national diabetes registry does not exist in Canada). The list was proportionate to the actual number of household telephone numbers for each Canadian province (with the exception of Quebec which had a lesser proportion of phone numbers as predominately Francophone speaking communities were excluded from the sampling frame).

A pretest (n=7) was conducted to refine the questionnaire and to check the interview length, question wording and interview instructions. The baseline (time 1) questionnaires were mailed in March 2006. The time 2 follow-up questionnaires were

mailed in June 2006 employing a rolling mailout pattern to ensure three months had passed between time 1 and time 2. This research was reviewed and approved by a university-based research ethics board, and all subjects provided informed consent.

Calls were made to 35,452 generated numbers, which identified 1,796 eligible study participants (eligibility criteria included a diagnosis of type 2 diabetes, being over the age of 18 years, and ability to complete a questionnaire in English). From this number (1,796), 744 were excluded (e.g., away for duration of study) leaving 1,052 individuals. 558 individuals with type 2 diabetes indicated they would be interested in receiving an information package (a priori quota of 558 individuals was established). The recruitment breakdown was as follows: British Columbia, n=86; Prairie Provinces, n=107; Central Canada, n=317; and Atlantic Provinces, n=48. 287 out of the 1,052 (27.3%) known eligible individuals with type 2 diabetes completed and returned the package. 244 out of 1,052 (23.2%) individuals who completed the baseline questionnaires also completed and returned the time 2 questionnaires, yielding a response rate of 43.7% (244/558) of those initially recruited into the study and a follow-up retention rate of 85.0% (244/287).

3.4.3 Sample

The participants for this study consisted of 244 individuals who had completed the follow-up questionnaire at three months. Participants were an average age of 61 (SD 11.2) years of age and had an average diagnosis age of 52 (SD 11.9) years of age. The majority of the participants were male (53.9%) and married (70.1%), and 21.7% had completed college or university. See Table 3-1 for the detailed demographic characteristics.

In terms of physical activity behaviour, 76.5% of participants were not meeting the CDA guidelines of 150 minutes of moderate aerobic activity per week. Average MET scores were 438.47 MET minutes per week for combined strenuous and moderate activity and 703.33 MET minutes per week when mild intensity activity was included. Approximately 17% were meeting the guidelines for participating in resistance training of at least three times per week. See Table 3-2 for the detailed physical activity behaviour characteristics (Plotnikoff, Trinh, Courneya, Karunamuni, & Sigal, 2008; Plotnikoff, Courneya, Trinh, Karunamuni, & Sigal, 2008).

3.4.4 Instrumentation

Demographic and health-related characteristics were collected using measures reported elsewhere. Participants were asked questions about age, sex, marital status, ethnic affiliation, education, income levels, diagnosed health conditions (self-reported diagnosis of angina, heart attack, stroke, cancer, high cholesterol, and high blood pressure) smoking status and the age they were diagnosed with type 2 diabetes (Plotnikoff, Brez, & Hotz, 2000). Participants were also asked whether they had access to email or the internet from home (Statistics Canada, 2003). Appendix II presents the items for the above measures.

Parallel items to measure social-cognitive constructs for aerobic and resistance activity were adapted from major behavioural theories and models which included the Transtheoretical Model (Prochaska & DiClemente, 1983), Theory of Planned Behaviour (Ajzen, 1991), Social Cognitive Theory (Bandura, 2004) and Protection Motivation Theory (Rogers, 1983). All aerobic activity measures used the definition of regular moderate activity. *Self-efficacy* (11 items) was measured using 5-point Likert-type scales

ranging from "not at all confident" = 1 to "extremely confident" = 5 to assess the participants' confidence in participating in regular physical activity under different circumstances (e.g. when the weather is bad, when having diabetes complications, when having to get up early on weekends) (Marcus, Selby, Niaura, & Rossi, 1992). *Social Support* (3 items) was assessed using 5-point Likert scales ranging from "strongly disagree" = 1 to "strongly agree" = 5 to measure the amount of physical activity-related social support participants felt they were receiving from their doctor, friends and family (Courneya, Plotnikoff, Hotz, & Birkett, 2000; Courneya, Plotnikoff, Hotz, & Birkett, 2001). *Descriptive norms* (3 items) were comprised of 7-point Likert scales ranging from "strongly disagree" = 1 to "strongly agree" = 7 to assess the actions of the individuals social circle (e.g. whether their friends/family participate in physical activity) (Courneya et al., 2000; Courneya et al., 2001). *Injunctive norms* (4 items) were measured using a 7 point Likert scale ranging from "strongly disagree" = 1 to "strongly agree" = 7 to determine whether participants felt their social circle approved of them engaging in physical activity (Courneya et al., 2000; Courneya et al., 2001). *Pro's* (7 items) and *con's* (7 items) were assessed using 5-point Likert-type scales ranging from "not at all" = 1 to "very much" = 5 to measure the perceived positive (e.g. reduce stress, weight control) and negative influences (e.g., cost too much money, take too much time) when making decisions about regular physical activity (Marcus, Rakowski, & Rossi, 1992). *Attitude* (2 items) was measured using a 7-point Likert-type scale response option of whether they found physical activity enjoyable and beneficial (Courneya et al., 2000; Courneya et al., 2001). *Response efficacy* was assessed using a 5-point Likert-type scale ranging from "definitely not" = 1 to "definitely yes" = 5 (Plotnikoff & Higginbotham,

1998; Plotnikoff & Higginbotham, 2002). *Perceived behavioural control* (1 item) of engaging in physical activity was comprised of 5-point Likert scales ranging from "strongly disagree" = 1 to "strongly agree" = 5 (Courneya et al., 2000; Courneya et al., 2001). *Intention* (4 items) to meet the CDA activity guidelines was measured using a 7-point Likert-type scale ranging from "extremely un-" (1) to "extremely"(7) with questions asking how committed and motivated the participants are to meeting guidelines over specific periods of time (i.e., 3 months) (Courneya et al., 2000; Courneya et al., 2001).

Physical activity behaviour was assessed by: 1) leisure-time activity for both aerobic and resistance training; and 2) whether participants met the Canadian Diabetes Association guidelines of achieving 150 minutes per week of moderate physical activity for aerobic activity or a frequency of three times per week for resistance training (CDA, 2003). In the CARED study, the validated Godin Leisure Time Exercise Questionnaire (GLTEQ) (Godin & Shephard, 1985) was used to assess the amount of leisure time aerobic activity participants engaged in during an average week within the past month. Occupational and household activities were not included. Participants were asked to report the frequency (number of times per week) and duration (number of minutes per session) for each category of activity (strenuous, moderate, and mild).

For analysis, three distinct outcomes for aerobic physical activity were used: (1) strenuous plus moderate weekly minutes of physical activity (Measure 1), and, (2) total weekly minutes of physical activity (i.e., strenuous plus moderate plus mild weekly minutes) (Measure 2). Participant responses in each of these three activity categories were converted into a MET score (Measure 3) by multiplying the weekly frequency of

mild activity by 2.5 METs (Spangler & Konen, 1993), moderate activity by 4.0 METs (Brown & Bauman, 2000) and vigorous activity by 7.5 METs (Brown & Bauman, 2000). These recommended MET values for moderate and vigorous physical activity are based on population data (Brown & Bauman, 2000). Measure 3 was the total weekly METs for the sum of the weighted scores for mild, moderate and vigorous activity.

Two measures were employed for resistance training. Based on a modified measure of the GLTEQ, participants were asked to report the frequency (times per week) and duration (minutes per session) for resistance training. First, adherence to resistance training guidelines was measured by comparing the reported number of times per week in the last month to the CDA guidelines (i.e., 3 times per week) (CDA, 2003). Second, total weekly resistance training minutes was also calculated (i.e., frequency of RT multiplied by minutes per session).

Modified questions from Karvinen et al, (2007) were used to assess the physical activity counselling and program preferences. Participants were asked to check one category from each question based on what they would like to do (and not what they actually did). Questions were solicited in two sections. The first comprised physical activity-related counselling preference items (e.g., preferred source, location and method of counselling). The second investigated physical activity-related program preferences. The specific items pertained to preferred: company (e.g., alone, with other people who have type 2 diabetes, with friends, with family, or no preference); the commencement of a physical activity program (e.g., at diagnosis, 3–6 months after diagnosis, or at least 1 year after diagnosis); the activity location (e.g., at home, at a community fitness center, at a diabetes center, no preference); the time of day for physical activity (e.g., morning,

afternoon, evening, or no preference); and, the activity intensity (e.g., low, moderate, or high). Items were also included asking about the preferred structure of a physical activity program: supervised/instructed versus unsupervised/self-paced; competitive versus recreational; spontaneous/flexible versus scheduled; and engaging in the same activity versus a range of different activities. Finally, participants were asked in an open-ended question to identify the three activities in which they would be most interested to participate in.

3.5 Analysis

For Research Question 1a (i.e., physical activity preferences) descriptive statistics (e.g., frequencies and proportions) were conducted. To examine whether physical activity preferences differ by select demographic factors [i.e., sex (men vs. women) and age (64 and under vs. 65 and older)] (Research Question 1b), Chi-square analyses were performed. Research Question 2a (i.e., relationships between preferences and the physical activity-related, social-cognitive and behaviour constructs) were examined using one-way ANOVAs and t-tests. To determine whether any relationships found in Research Question 2a differed by demographical characteristics (i.e., age and sex), factorial ANOVAs were conducted (Research Question 2b). All analyses were completed using SPSS version 15.0 software.

Due to numerous tests in Research Questions 2a and 2b, it is possible that some significant results may be due to chance (Tabachnick & Fidell, 2001). Three hundred eighty-four tests for Research Question 2a and 768 tests for Research Question 2b were conducted and therefore, a more conservative p-value may be necessary. However, given

that a Bonferroni correction (Bonferroni, 1935; Bonferroni, 1936) has been criticized as being too conservative (Shaffer, 1995; Perneger, 1998) and the exploratory nature of this study, actual p-values for all tests are included in Appendix I and p-values < 0.05 will be presented and discussed later in this chapter.

3.6 Results

Results for the subsidiary hypotheses are imbedded throughout the following sections and within the tables at the end of the chapter.

3.6.1 Research Question 1a

Physical Activity Counselling Preferences

Overall, 91.7% of the participants 'preferred' or 'maybe preferred' to receive PA counselling. The majority of people indicated they preferred to receive counselling face-to-face (79.9%), at a diabetes centre (51.9%), and from an exercise specialist affiliated with a diabetes centre (47.9%). (See Table 3-3 for detailed results.)

Physical Activity Programming Preferences

The majority of participants specified they would prefer to start a PA program upon being diagnosed with type 2 diabetes (66.4%). Only 29.5% indicated preferring to engage in aerobic activity alone compared to 37.4% preferring to engage in strength training alone. Preferences were relatively similar between preferred place to participate in aerobic activity (at home 44.4%; community fitness centre 36.9%; and diabetes fitness centre 34.4%). Comparable results were found for strength training (at home 43.0%; community fitness centre 40.0%; diabetes fitness centre 30.4%). Participants stated they had 'no preference' for the time of day they preferred to engage in either strength training

(38.7%) or aerobic training (37.8%). Following this, was a preference for engaging in these activities in the morning (strength 32.2%; aerobic 33.6%).

More than half the participants indicated they would prefer a physical activity program (combined aerobic and resistance activity) of moderate intensity (58.6%). It was found that participants preferred physical activity programs to include different activities each session (64.9%), be supervised or instructed (55.9%) and be recreational in nature (96.9%). There was an approximately equal preference for spontaneous or flexible sessions (50.9%) and scheduled sessions (49.1%). In an open-ended question regarding preferred type of activity, participants indicated walking most often (59.8%) followed by swimming (29.5%), resistance/weight training (25.4%) and cycling (17.2%). Details of the PA programming preferences are given in Table 3-4.

3.6.2 Research Question 1b

Differences in preferences by age/sex

Chi-square analyses were performed to determine any demographic differences (i.e., age and sex) in reported preferences; the following reports the statistically significant findings. Of all the questions with regards to sex, it was found that a greater proportion of women preferred to engage in activities with others (χ^2=10.39, df=2, p=.006) and be supervised or instructed (χ^2=4.93, df=1, p=.026) than men. With regards to program intensity it was found that more men than women preferred moderate or vigorous intensity activity (χ^2=7.04, df=2, p=.030). Results showed that more women preferred to have scheduled physical activity sessions whereas men preferred more spontaneous or flexible sessions (χ^2=3.88, df=1, p=.049) (See Table 3-5a).

With regards to age it was found that a greater proportion of those 64 years and younger would prefer to receive physical activity counselling from an exercise specialist than those 65 years and older (χ^2=4.60, df=1, p=.032). It was also revealed that more participants 64 years and younger preferred to engage in aerobic (χ^2=21.65, df=3, p<.001) and resistance (χ^2=15.68, df=3, p=.001) activity in the evening than those 65 years and older. Results also showed that more participants 64 years and younger preferred activities that were of moderate or vigorous intensity than those 65 years and older (χ^2=13.90, df=2, p=.001) (See Table 3-5b).

3.6.3 Research Question 2a

Relationships of physical activity-related, social-cognitive and behaviour measures with physical activity preferences

ANOVAs and t-tests were performed to analyse relationships of physical activity-related, social-cognitive and behaviour measures with physical activity preferences. Three hundred eighty-four tests were conducted for this analysis with 43 being significant (11.1% of tests). The following reports results that were statistically significant (p<0.05). See Tables 3-6a through 3-6m for a detailed account of the significant results. Appendix I provides detailed results for all 384 tests.

General physical activity preferences and relationships with social-cognitive and behaviour measures

Aerobic and resistance intentions were significantly higher for those preferring to receive PA counselling at some point than individuals not wanting PA counselling (Table 3-6h). Aerobic intention was significantly higher for preferring to receive PA counselling from an exercise specialist than other sources of counselling (Table 3-6i).

Resistance intention and self-efficacy were significantly higher for receiving PA counselling at a community fitness centre than at a diabetes centre or at home (Table 3-6a). Resistance descriptive norm was significantly lower for those preferring to receive PA counselling at a diabetes centre than at home or at a community fitness centre (Table 3-6a). Resistance frequency and total weekly resistance minutes were significantly higher for individuals preferring to start a PA program at diagnosis than those preferring to start a PA program after diagnosis (Table 3-6j).

Intensity of PA had the most significant outcomes than the other preference variables (Table 3-6k). Intention, self-efficacy, pros, injunctive norm, social support, attitude, and expectations for both aerobic and resistance training, as well, aerobic descriptive norms, strenuous plus moderate weekly minutes, total weekly minutes, total weekly METs, and total weekly resistance training minutes were found to be significantly higher for those preferring moderate or strenuous activity than mild intensity activity (Table 3-6k). Aerobic social support was significantly higher for those preferring supervised or instructed sessions than unsupervised or self-paced sessions (Table 3-6l). Aerobic social support, strenuous plus moderate weekly minutes, and total weekly METs were significantly higher for preferring competitive than recreational activities (Table 3-6m).

Specific aerobic and resistance training preferences and relationships with social-cognitive and behavioural measures

Aerobic social support was significantly higher for those preferring to engage in aerobic activity with others than alone (Table 3-6b). Strenuous plus moderate weekly minutes of aerobic activity and resistance training frequency were both significantly

higher for those having no preference for social support during aerobic activity than alone or with others (Table 3-6b). The weekly MET minutes were significantly higher for individuals having no preference for social support than those preferring to engage in aerobic activity with others (Table 3-6b). Resistance injunctive norm was significantly higher for those having no preference for place to engage in aerobic activity than a specific location (Table 3-6c). Environment was significantly higher for preferring to engage in aerobic activity away from home than at home and 'no preference' (Table 3-6d).

Frequency of resistance training was significantly higher for preferring to engage in resistance activity alone than with others and 'no preference' (Table 3-6d). Aerobic social support was significantly higher for preferring to engage in resistance training away from home than at home (Table 3-6e). Aerobic attitude was significantly higher for not having a preference for resistance training location than at home or not at home (Table 3-6e). Aerobic attitude was significantly lower for preferring to engage in both resistance and aerobic activity in the evening than other times of day (Tables 3-6f and 3-6g).

3.6.4 Research Question 2b

Demographic differences (i.e., age and sex) of physical activity-related, social-cognitive and behaviour measures' relationships with physical activity preferences

Factorial ANOVAs were conducted to determine significant age and sex differences of physical activity-related, social-cognitive and behavioural measures' relationships with physical activity preferences. The following reports results that were statistically significant ($p<0.05$). See Tables 3-7a through 3-7g and 3-8a through 3-8k for

a detailed account of the significant results. Appendix I provides detailed results for all 768 tests.

General physical activity preferences: Relationships with physical activity-related social-cognitive and behaviour measures --- Age differences

The total weekly MET score was significantly higher for those participants 64 years and under preferring to receive PA counselling from other sources than from a PA specialist (Table 3-7a). Resistance training frequency was significantly higher for participants 65 and older preferring to receive PA counselling from a PA specialist than from other sources (Table 3-7a). Resistance training cons were significantly lower for older participants preferring other methods of PA counselling than face-to-face (Table 3-7b). Total strenuous and moderate minutes of PA per week were significantly higher for older participants preferring to receive other methods of counselling than face-to-face (Table 3-7b). Aerobic intention and total weekly minutes of activity were significantly higher for older participants preferring moderate or strenuous intensity activities than low intensity activities (Table 3-7e). Strenuous and moderate weekly minutes of activity was significantly higher for those 65 and older having no intensity preference than moderate or strenuous intensity which was also significantly higher than preferring low intensity activity (Table 3-7e). Total weekly resistance training minutes was significantly higher for older participants preferring moderate or strenuous intensity activity than low intensity or no preference (Table 3-7e). Aerobic pros, resistance pros and resistance response efficacy were significantly higher for older participants preferring different activities each session than having the same activities each session (Table 3-7f). Resistance training social support was significantly higher for younger participants

preferring a spontaneous or flexible structure than a scheduled structure whereas it was significantly higher for older participants preferring scheduled sessions (Table 3-7g).

Specific aerobic and resistance preferences: Relationships with physical activity-related, social-cognitive and behaviour measures --- Age differences

Environment was significantly lower for younger participants having 'no preference' for location than performing resistance training at home (Table 3-7c). Aerobic attitude was significantly lower for older participants having 'no preference' than preferring to engage in resistance activity in the evening (Table 3-7d).

General physical activity preferences: Relationships with physical activity-related, social-cognitive and behaviour measures --- Sex differences

Aerobic social support, aerobic attitude, and environment were significantly lower for men than women preferring not to have received PA counselling than preferring to receive counselling (Table 3-8a). Total weekly resistance training minutes were significantly higher for men than women preferring not to have received PA counselling than preferring to receive counselling (Table 3-8a). Strenuous and moderate weekly activity minutes and total weekly METs were significantly higher for men than women preferring other sources of PA counselling than a PA specialist (Table 3-8b). Total weekly activity minutes were significantly higher for women than men preferring to receive PA counselling at a fitness centre than a diabetes centre (Table 3-8c). Environment was significantly lower for men than women preferring to start a PA program sometime after diagnosis (Table 3-8d). Aerobic intention was significantly lower in men than women preferring to engage in low intensity activity than moderate or strenuous activity (Table 3-8i). Aerobic and resistance descriptive norms were

significantly higher for men than women preferring to engage in different activities each session than the same activities (Table 3-8j). Resistance response efficacy was significantly higher for women than men preferring supervised or instructed activities than unsupervised or self-paced activities (Table 3-8k).

Specific aerobic and resistance preferences: Relationships with physical activity-related, social-cognitive and behavioural measures --- Sex differences

Aerobic and resistance descriptive norms were significantly higher for men than women preferring to engage in aerobic activity with others than alone (Table 3-8e). Resistance training frequency was significantly higher for men than women not having a preference for social support during aerobic activity than for preferring to engage in activities with others or alone (Table 3-8e). Aerobic descriptive norm was significantly higher for men than women preferring to perform aerobic activity away from home than at home (Table 3-8f). Resistance response efficacy was significantly higher for men than women not having a preference for location of resistance training than at home (Table 3-8g). Aerobic and resistance descriptive norms were significantly lower for women than men preferring to engage in resistance training in the afternoon than other times of the day (Table 3-8h).

For detailed result tables of Study One, see Appendix I. Tables 3-9 and 3-10 present the significant findings for Research Questions 2a and 2b.

3.7 Discussion

This study set out to examine the physical activity preferences in a national sample of adults with type 2 diabetes and whether these preferences differed by age

and/or sex. In addition, the study explored the relationships between physical activity preferences and physical activity-related, social-cognitions and behaviour. Age and sex differences within these relationships were also examined.

This study found that only 23.5% of the sample was meeting the Canadian Diabetes Association's guidelines for physical activity which is lower than another national assessment of 34.9% which included both type 1 and type 2 diabetes in the calculation (Health Canada, 2002). Only 16.9% of the current sample were meeting guidelines for resistance training, which is consistent with the literature (Plotnikoff, 2006) which reported 12% were doing resistance training.

With regards to the various study hypotheses (subsidiary investigation) the following statements were supported. Resistance training self-efficacy was lower for preferring to receive counselling at a diabetes centre. This finding is intuitive because resistance training may be more intimidating to begin then aerobic training and therefore would require counselling from an experienced exercise specialist affiliated with a diabetes centre. Aerobic training social support was higher for preferring to engage in aerobic training with others. This finding is also intuitive as those who would prefer to engage in activities with other would be more likely to place higher value in having others approve of their activities. Higher intention scores for aerobic training and resistance training was associated with preferring to receive physical activity counselling. These results indicate that those who have high intentions for activity are willing to receive the necessary counselling to help them get started.

Higher aerobic training and resistance training self-efficacy, aerobic training and resistance training pros, aerobic training and resistance training social support, aerobic

training and resistance training attitude scores were all associated with preferring higher intensity activities. These results are not unexpected because having greater confidence in aerobic and resistance activity indicates a perceived ability for higher intensity activity. Believing that aerobic and resistance training are beneficial and enjoyable may lead people to engage more frequently and therefore they would be able to accomplish higher intensity workouts. Aerobic training social support was associated with preferring supervised or instructed sessions. This result is intuitive because those that feel social support is more important would benefit from having supervision and feedback from a group leader or trainer. Limited research in this area makes direct comparison difficult however, Rogers et al, (in press) found similar results with breast cancer survivors. Additional discussion of various results and their implication with regards to the specific research questions follows.

With regards to Research Question 1a, results show that the vast majority of participants 'preferred' or 'maybe preferred' to receive physical activity counselling. This is consistent with other physical activity preference studies focusing on cancer survivors (Jones & Courneya, 2002; Karvinen et al., 2006; Vallance et al., 2006; Karvinen et al., 2007). These researchers reported that the preferred method of receiving counselling was 'face-to-face' from an exercise specialist affiliated with a diabetes centre. This is also consistent with literature focused on those with cancer (Jones & Courneya, 2002; Karvinen et al., 2006). This finding needs to be researched further to determine the reason for preferring face-to-face counselling. The implications of providing every person diagnosed with type 2 diabetes with face-to-face counselling is immense when considering cost, feasibility and effectiveness. Research to determine the

effectiveness of various methods of counselling (e.g., face-to-face versus internet/email-based) should also be performed.

The majority of participants also indicated they would prefer to begin a physical activity program upon being diagnosed with type 2 diabetes. Recent research with cancer survivors indicates that most participants would prefer to begin a physical activity program immediately after or 3 to 6 months after treatment (Karvinen et al., 2006; Vallance et al., 2006). This difference is not unexpected because upon being diagnosed with cancer, most patients are facing up to six months of treatment which could include chemotherapy, surgery and radiation therapy. When diagnosed with type 2 diabetes, patients are faced with much less invasive treatments and therefore it is more feasible for them to want to start physical activity right away. With regards to social support, it was found that more people preferred to be alone when engaging in resistance activity than aerobic activity. Evidence has been inconsistent (Marcus & Forsyth, 1998; White, Ransdell, Vener & Flohr, 2005) regarding the importance of social support and physical activity adherence.

Consistent with other preference literature, the majority of study participants preferred to: engage in moderate intensity activity (Karvinen et al., 2006; Karvinen et al., 2007; Vallance et al., 2006); have different activities each session (Karvinen et al., 2006); be supervised or instructed (Karvinen et al., 2006); and, take part in activities that are recreational in nature (Jones & Courneya, 2002). There may be demand for programs tailored to the type 2 diabetes population that are led by instructors, such as personal training sessions or group classes. This also creates accountability for an individual as the other group members and/or the trainer are relying on them to show up and

participate in the class/training session. Feasibility issues are present with this approach because of the cost of personal training sessions and availability of personal training facilities or group classes. It is not reasonable to expect everyone to have access to training facilities or the means to participate.

As was found in the studies with type 2 diabetes populations (Wood, 2002; Wanko et al., 2004), as well as other preference studies in other clinical groups (Ruland & Moore, 2001; Jones & Courneya, 2002, Karvinen et al., 2006; Karvinen et al., 2007; Vallance et al., 2006; Rogers et al., in press), walking was the most preferred activity. The relative ease and inexpensive nature of walking makes this mode of activity a good choice for adults with type 2 diabetes to do, as well as for practitioners to recommend. Following walking preference, swimming, resistance training and cycling were three types of activity that most interested the participants. Non-weight bearing activities, such as swimming and cycling, are good choices for people with type 2 diabetes. Circulation and foot complications can make weight bearing activities difficult therefore, engaging in swimming or cycling reduces stress on joints, and reduces the effect of secondary complications while still providing activity (Eves & Plotnikoff, 2006; Plotnikoff, 2006). A significant proportion of respondents were interested in resistance training behaviour which is also consistent with the findings of Vallance et al, (2006) who also reported 11% of their sample of non-Hodgkins lymphoma cancer survivors were interested in resistance training activity. Collectively, these findings support the potential for having physical activity programming services available for adults living with type 2 diabetes.

Some preferences were found to differ among sex and age (Research Question 1b). When examining the differences between men and women, it was found that a

greater proportion of women preferred to engage in physical activity with companions. Evidence suggests social support is more consistently related to physical activity adherence for women than men, especially if the source is family (King et al., 1992; Marcus & Forsyth, 1998). Also consistent with the literature in the general population, more men than women preferred moderate or vigorous intensity activities to mild (King et al., 1992; Marcus & Forsyth, 1998). Women, more so than men, were also found to prefer structured or scheduled sessions that were supervised or instructed. Some studies indicate structured workplace physical activity programs are effective for increasing physical activity rates for women (White & Ransdell, 2003), whereas other studies report women's adherence rates are better when participating in activity near their home on their own with some instruction (Oman & King, 1998; Wilbur, Miller, Chandler & McDewitt, 2003; White et al., 2005). Regardless of location, the notion that women prefer scheduled, instructed (in some manner) physical activity is supported.

With regards to age differences among physical activity preferences, it was found that participants 64 years and under were more likely to prefer to receive physical activity counselling from an exercise specialist than their older counterparts. In a study with older adults by Cohen-Mansfield et al, (2004) results indicated that physician's advice, monitoring by a health professional, evaluation of the exercise program by a professional, and quality of the instructor, were all rated as important or very important by at least 70% of the sample. In accordance with literature in the general population (Booth et al., 1997), younger participants in our study were also found to prefer more moderate or vigorous intensity activities than older participants.

When examining Research Question 2a, intention to perform aerobic and resistance activity was associated with wanting to receive physical activity counselling as well as preferring to receive counselling from an exercise specialist. Intention to perform resistance training and confidence to perform resistance training was associated with wanting to receive counselling at a community fitness centre. This is intuitive, as resistance training tends to generally need more instruction at the outset than aerobic activity. There are trained individuals at a community fitness centre who can address issues and concerns people may have when starting a resistance training program.

Preferred intensity of physical activity had the most associations with the social-cognitive and behaviour measures of all the preference measures. This suggests that an individual's preferred intensity of activity may be influenced by many different cognitive factors such as intentions and self-efficacy. It is not surprising that those who have more confidence in their ability to perform activities would prefer higher intensity activities. This indicates that soliciting intention towards regular physical activity and building self-efficacy in achieving regular, moderate intensity physical activity is important when deciding on the intensity of a physical activity program.

Social support was found to be important when considering the preference for supervised or unsupervised sessions. This is intuitive because those that preferred supervised or instructed sessions had higher overall aerobic social support scores. It is reasonable to expect people that have higher social support needs to prefer supervision or instruction. According to the Self-Determination Theory core component relatedness, people are social creatures and engage in activities to be around people (Deci & Ryan, 1985). It may be that by engaging in physical activity in a group setting or with friends, a

person is filling an inherent need to be around others. Individuals from a study with older adults participating in group exercise classes indicated that those persons that preferred to exercise in this type of setting were less likely to drop out (Mills et al., 1997). The current study also reported those engaging in higher amounts of activity were more likely to have no preference for social support. It may be that social support is important when beginning a physical activity program but becomes less so when activity levels increase and are maintained (Courneya & McAuley, 1995).

To date, research in physical activity preferences has been largely atheoretical. Only two studies in the cancer domain have examined the association of individual social-cognitive constructs, with physical activity preferences (Courneya et al., 2008; Rogers et al., in press). Courneya et al, (2008) reported preferences for aerobic exercise training (AET) versus resistance exercise training (RET) during chemotherapy was strongly associated with differences in their motivation for each type of exercise. Rogers and colleagues (in press) reported that some constructs (i.e., self-efficacy, social support, barriers and attitude) were significantly associated with preferences for aerobic activity. Preferences may develop from a combination of influences. Understandably, the physical environment, and financial situation of some places restrict the types of activity available and therefore preference may develop for what is available. Other influences may be positive support from friends, family or health professionals. Having a positive experience with a specific activity will likely increase a person's confidence to perform the activity as well as their attitude toward the activity. In sum, all these influences may increase motivation to perform a preferred activity (Courneya et al., 2008).

When examining Research Question 2b, it is noteworthy there were not many significant differences reported regarding age and/or sex differences for the social-cognitive constructs associated with physical activity preferences. Therefore, age and sex may not be worth considering in examining relationships between social-cognitive and behaviour measures with physical activity preferences. Of the numerous tests conducted, a small percent (4.3%) were significant, and due to the sheer number of tests it is possible that some of these significant results are due to chance (Tabachnick & Fidell, 2001). There is no research regarding the physical activity-related, social-cognitive and behaviour measures with physical activity preferences in the type 2 diabetes population. The current research implies that a single approach may not be useful for the type 2 diabetes population either and that multiple approaches and strategies are required.

This study employed three specific aerobic activity measures and two distinct resistance training measures. Upon examination of the various findings, no patterns emerged between the results of the three aerobic outcomes or between the two resistance training outcomes. Using objective physical activity assessments would also be recommended when developing research projects and physical activity programs. Both forms (self-report and objective) of measurement should be used to expand the research in this field.

3.8 Strengths, Limitations & Future Directions

There are a number of study strengths that should be acknowledged. First, this study appears to be the most detailed exploration of physical activity counselling and program preferences in the limited literature on this topic. This appears to be only the

third study (along with Courneya et al., 2008 and Rogers et al., in press) to examine the physical activity-related, social-cognitive and behaviour measures' relationships with physical activity preferences, and the second (along with Courneya et al., 2008) to include a thorough examination of a host of relationships between demographical (i.e., age and sex), social-cognitive and behaviour constructs with physical activity preferences across any population. It is hopeful this detailed information will help researchers and practitioners be aware of the variety of preferences that may differ among people with type 2 diabetes. Second, this study included a relatively large, random national sample. This aids in the representativeness of the study findings to the actual type 2 diabetes population.

There are however, a number of study limitations. First, self-report measures were used to assess physical activity levels. Although self-report measures are cost-effective for large samples, individuals tend to over-report their behaviour. There is a need to include both self-report measures as well as other more direct assessments (e.g., accelerometry). Second, the referents for the employed social-cognitive measure were related to 'physical activity behaviour' rather than 'physical activity preferences'. Finally, the cross-sectional nature of this study restricts any causal inference of the findings. Future studies should incorporate longitudinal (non-experimental) and experimental approaches which will allow speculation on the causes of relationships between physical activity preferences and social-cognitive and behaviour constructs.

One important consideration with regards to using physical activity preferences when developing a program is that a patient's preferences may not be the best choice. Some people may not have the knowledge or experience to make the best choices when

considering health benefits of physical activity. Others may actually prefer not to engage in activity despite knowing health benefits. Researchers should focus on the more sedentary population in order to determine any differences between sedentary and non-sedentary program preferences.

3.9 Conclusion

Physical activity is an important part of effectively managing type 2 diabetes. This study suggests that physical activity preferences may vary among different demographic groups. As well, differences in physical activity-related, social-cognitive and behaviour measures among physical activity preferences were observed. Some of the relationships reported also varied by age and/or sex. This study highlights the various differences in physical activity counselling and programming preferences among a sample of people with type 2 diabetes. Further exploration of demographic, social-cognitive and behaviour differences among physical activity preferences should be a next step in research.

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2. Table 3-1 Participant Characteristics

Variable	N	%
Sex (n=244)		
Male	131	53.9
Female	112	46.1
Marital status (n=244)		
Never married	10	4.1
Married	171	70.1
Common Law	11	4.5
Widowed	22	9.0
Separated/Divorced	30	12.3
Ethnic Origin (n=244)		
Canadian	183	75.3
European	32	13.2
Aboriginal	1	0.4
Arab	2	0.8
Asian	15	6.2
African	1	0.4
Other	9	3.7
Education (n=244)		
Some grade school	13	5.3
Some high school	37	15.2
Completed high school	41	16.8
Some college/university	38	15.6
Completed college/university	53	21.7
Some graduate school	4	1.6
Completed graduate school	21	8.6
Some technical training	14	5.7
Completed technical training	23	9.4
Income (n=238)*		
<20,000	42	17.6
20,000-39,999	73	30.7
40,000-59,999	56	23.5
60,000-79,999	30	12.6
80,000-99,999	15	6.3
Over 100,000	22	9.2
Smoking Habits (n=241)*		
Regular smoker	32	13.3
Occasional smoker	7	2.9
Ex-smoker	105	43.6
Non-smoker	97	40.2

*Note: some variables do not total 244 because of missing data

3. Table 3-2 Physical activity behaviour (N=243)

		Duration M(SD)	
PA variable	*Sessions/week M(SD)*	*Minutes/session*	*Minutes/week*
Mild intensity	2.27 (2.87)	33.03 (66.39)	105.94 (241.99)
Moderate intensity	1.95 (3.31)	17.29 (27.14)	61.47 (117.38)
Strenuous intensity	0.58 (1.29)	8.69 (21.38)	25.68 (79.22)
Resistance training	0.86 (1.91)	5.75 (15.27)	19.71 (54.33)

MET Values	*Average minutes per week (SD)*
Strenuous + Moderate	438.47 (890.03)
Strenuous + Moderate + Mild	703.33 (1055.72)

4. Table 3-3 Physical activity counselling preferences

Variable	N	%
Would you prefer to receive PA counselling? (n=229)*		
Yes	136	59.4
No	19	8.3
Maybe	74	32.3
Who would you prefer to receive PA counselling from? (n=234)*		
Doctor/specialist	32	13.7
Someone who has diabetes	16	6.8
Nurse	3	1.3
Diabetes education instructor	47	20.1
Exercise specialist with a diabetes centre	112	47.9
Exercise specialist with a community fitness centre	24	10.3
Where would you prefer to receive PA counselling? (n=241)*		
At home	51	21.2
At a community fitness centre	65	27.0
At a diabetes centre	125	51.9
What method of PA counselling would you most prefer? (n=244)		
Face to face	195	79.9
By audiotape	2	0.8
By telephone	3	1.2
By pamphlet/brochure	12	4.9
By videotape	27	11.1
Over the internet	5	2.0

*Note: some variables do not total 244 because of missing data

5. Table 3-4 Physical activity programming preferences

Variable	N	%
When would you prefer to start a PA program? (n=235)*		
At your diagnosis	156	66.4
3-6 months after diagnosis	59	25.1
At least 1 year after diagnosis	20	8.5
Who would you prefer to engage in aerobic activity with? (n=241)*		
Alone	71	29.5
With others who have diabetes	108	44.8
With friends	70	29.0
With family	39	16.2
Where would you prefer to engage in aerobic activity? (n=241)*		
At home	107	44.4
At a community fitness centre	89	36.9
At a diabetes fitness centre	83	34.4
What time of day would you prefer to engage in aerobic activity? (n=241)*		
Morning	81	33.6
Afternoon	37	15.4
Evening	53	22.0
No preference	91	37.8
Who would you prefer to engage in strength activity with? (n=230)*		
Alone	86	37.4
With others who have diabetes	90	39.1
With friends	55	23.9
With family	29	12.6
Where would you prefer to engage in strength activity? (n=230)*		
At home	99	43.0
At a community fitness centre	92	40.0
At a diabetes fitness centre	70	30.4
What time of day would you prefer to engage in strength activity? (n=230)*		
Morning	74	32.2
Afternoon	34	14.8
Evening	46	19.9
No preference	89	38.7
What intensity would you prefer your PA program to be? (n=239)*		
Low	79	33.1
Moderate	140	58.6
High	10	4.2
No preference	10	4.2
What type of activities would you like to perform? (n=225)*		
Same each time	79	35.1
Different each time	146	64.9

Variable	N	%

Table 3-4 cont'd

How would you like to perform these activities? (n=229)*		
Supervised/instructed	128	55.9
Unsupervised/self-paced	101	44.1
What structure would you prefer your PA program to be? (n=228)*		
Spontaneous/flexible	116	50.9
Scheduled (specific times/days)	112	49.1
What type of PA would you prefer? (n=229)*		
Competitive	7	3.1
Recreational	222	96.9

*Note: some variables do not total 244 because of missing data

6. Tables 3-5a: Differences between sex (p<.05)

Preference	Sex: Women N(%)	Sex: Men N(%)	χ^2	df	p
Social preference for aerobic activity (n=240)*					
Alone	15 (13.5)	36 (27.9)			
With others	86 (77.5)	75 (58.1)	10.393	2	.006
No preference	10 (9.0)	18 (14.0)			
Total	111 (100)	129 (100)			
Preferred intensity (n=238)*					
Mild intensity	45 (41.3)	33 (25.6)			
Moderate/vigorous intensity	59 (54.1)	91 (70.5)	7.042	2	.030
No preference	5 (4.6)	5 (3.9)			
Total	109 (100)	129 (100)			
Supervision preference (n=229)*					
Supervised/instructed	67 (63.8)	61 (49.2)	4.927	1	.026
Unsupervised/self-paced	38 (36.2)	63 (50.8)			
Total	105 (100)	124 (100)			
Structure preference (n=228)*					
Spontaneous/flexible	45 (43.7)	71 (56.8)	3.884	1	.049
Scheduled	58 (56.3)	54 (43.2)			
Total	103 (100)	125 (100)			

*Note: some variables do not total 244 because of missing data

7. Table 3-5b: Differences between age (p<.05)

Preference	Age 64 and under	Age 65 and older	χ^2	df	P
Preferred source of counselling (n=234)*					
Exercise specialist	91 (63.6)	45 (49.5)	4.598	1	.032
Other	52 (36.4)	46 (50.5)			
Total	143 (100)	91 (100)			
Preferred time of day for aerobic activity (n=239)*					
Morning	33 (22.0)	31 (34.8)	21.645	3	<.001
Afternoon	12 (8.0)	14 (15.7)			
Evening	37 (24.7)	3 (3.4)			
No preference	68 (45.3)	41 (46.1)			
Total	150 (100)	89 (100)			
Preferred time of day for strength activity (n=228)*					
Morning	31 (21.2)	30 (36.6)	15.679	3	.001
Afternoon	15 (10.3)	10 (12.2)			
Evening	31 (21.2)	3 (3.7)			
No preference	69 (47.3)	39 (47.6)			
Total	146 (100)	82 (100)			
Preferred intensity (n=237)*					
Mild intensity	36 (24.2)	41 (46.6)	13.092	2	.001
Moderate/vigorous intensity	105 (70.5)	45 (51.1)			
No preference	8 (5.4)	2 (2.3)			
Total	149 (100)	88 (100)			

*Note: some variables do not total 244 because of missing data

8. Tables 3-6a - 3-6m: Significant Oneway-ANOVAs and t-test values (all p's <.05)

Table 3-6a: Preferred place for PA counselling [M(SD)]

Social-Cognitive/Behaviour variable	At home	At a community fitness centre	At a diabetes centre	Do	F	p
Resistance intention (n=240)	3.70 (1.783)	4.33 (1.535)	3.66 (1.573)	2, 237	4.071	.018[a]
Resistance Self Efficacy (n=236)	2.10 (0.992)	2.33 (1.015)	1.87 (1.001)	2, 233	4.445	.013[b]
Resistance Descriptive Norm (n=238)	2.42 (1.066)	2.43 (0.968)	2.10 (0.932)	2, 235	3.354	.037[c]

[a] community centre vs. diabetes centre (p=.018) [b] community centre vs. diabetes centre (p=.010) [c] diabetes vs. community centres (LSD p=.026)

Table 3-6b: Preferred social support for aerobic activity [M(SD)]

Social-Cognitive/Behaviour variable	Alone	With others	No preference	Do	F	p
Aerobic SS (n=237)	2.82 (0.95)	3.25 (1.00)	3.17 (1.05)	2, 234	3.451	.033[a]
Strenuous + Moderate mins/wk (n=240)	70.30 (92.33)	79.70 (181.07)	169.80 (162.86)	2, 237	3.847	.023[b]
Total Weekly METs (n=240)	18.13 (16.00)	16.34 (19.80)	27.85 (17.35)	2, 237	4.341	.014[c]
Resistance frequency (n=240)	0.92 (1.89)	0.63 (1.45)	2.00 (3.32)	2, 237	6.481	.002[d]

[a] alone vs. with others (p=.025) [b] no preference vs. alone(p=.031) and with others (p=.024) [c] no preference vs. with others (p=.010) [d] no preference vs. alone(p=.038) and with others (p=.001)

Table 3-6c: Preferred place to engage in aerobic activity [M(SD)]

Social-Cognitive/Behaviour variable	At home	Not at home	No preference	df	F	p
Resistance Injunctive Norm (n=238)	3.23 (0.97)	3.18 (1.08)	3.67 (0.94)	2, 235	3.133	.045[a]
Environment (n=239)	3.13 (1.02)	3.48 (0.97)	3.01 (1.08)	2, 236	4.548	.012[b]

[a] no preference vs. not at home (p=.037) [b] not at home vs. at home (p=.044) and no preference (p=.043)

Table 3-6d: Preferred social support for resistance activity [M(SD)]

Social-Cognitive/Behaviour variable	Alone	With others	No preference	df	F	p
Resistance frequency (n=230)	1.49 (2.729)	0.63 (1.348)	0.44 (1.013)	2, 227	5.786	.004[a]

[a] alone vs. with others (p=.005) and no preference (p=.036)

Table 3-6e: Preferred place to engage in resistance activity [M(SD)]

Social-Cognitive/Behaviour variable	At home	Not at home	No preference	df	F	p
Aerobic Social Support (n=226)	2.89 (0.973)	3.27 (1.039)	3.27 (0.948)	2, 223	3.652	.028[a]
Aerobic attitude (n=227)	5.06 (1.238)	5.11 (1.142)	5.77 (0.852)	2, 224	4.842	.009[b]

[a] at home vs. not at home (p=.027) [b] no preference vs. at home (p=.010) and not at home (p=.012)

Table 3-6f: Preferred time of day to engage in aerobic activity [M(SD)]

Social-Cognitive/Behaviour variable	Morning	Afternoon	Evening	No preference	df	F	p
Aerobic attitude (n=238)	5.31 (1.097)	4.82 (1.413)	4.75 (1.311)	5.31 (1.130)	3, 234	3.231	.023[a]

[a] evening vs. morning (LSD p=.019) and no preference (LSD p=.011)

Table 3-6g: Preferred time of day to engage in resistance activity [M(SD)]

Social-Cognitive/Behaviour variable	Morning	Afternoon	Evening	No preference	df	F	P
Aerobic attitude (n=227)	5.30 (1.066)	5.00 (1.437)	4.69 (1.183)	5.33 (1.099)	3, 223	3.206	.024 [a]

[a] evening vs. no preference (p=.022)

Table 3-6h: Would have preferred to receive PA counselling [M(SD)]

Social-Cognitive/ Behaviour variable	Yes/Maybe	No	t	df	P
Aerobic intention (n=238)	4.67 (1.307)	4.01 (1.508)	2.071	226	.039
Resistance intention (n=238)	3.87 (1.602)	2.99 (1.636)	2.293	226	.023

Table 3-6i: Preferred source of PA counselling [M(SD)]

Social-Cognitive/ Behaviour variable	Exercise specialist	Other	t	df	p
Aerobic intention (n=233)	4.75 (1.35)	4.40 (1.26)	1.977	231	.049

Table 3-6j: Preferred time to start PA program [M(SD)]

Social-Cognitive/ Behaviour variable	At diagnosis	After diagnosis	t	df	P
Resistance frequency (n=234)	1.05 (2.12)	0.56 (1.46)	2.051	209	.042
Total weekly resistance minutes (n=234)	25.2 (63.04)	10.3 (32.65)	2.371	232	.019

Table 3-6k: Preferred intensity [M(SD)]

Social-Cognitive/ Behaviour variable	Mild		Moderate/ strenuous		t	df	p
Aerobic intention (n=228)	3.93	(1.44)	4.98	(1.14)	-5.595	129	<.001
Resistance intention (n=228)	3.13	(1.58)	4.22	(1.52)	-5.049	226	<.001
Aerobic Self Efficacy (n=225)	2.04	(0.95)	2.76	(0.94)	-5.429	223	<.001
Resistance Self Efficacy (n=225)	1.61	(0.81)	2.25	(1.04)	-5.049	188	<.001
Aerobic pros (n=226)	3.23	(1.09)	4.00	(0.84)	-5.425	122	<.001
Resistance pros (n=226)	2.72	(1.25)	3.35	(1.18)	-3.720	224	<.001
Aerobic Injunctive Norm	3.37	(0.93)	3.81	(0.89)	-3.455	224	.001

Table 3-6k cont'd

Social-Cognitive/ Behaviour variable	Mild	Moderate/ strenuous	t	df	p
(n=226)					
Aerobic Descriptive Norm (n=226)	2.30 (0.94)	2.61 (1.02)	-2.188	224	.030
Aerobic Social Support (n=225)	2.90 (1.05)	3.24 (1.00)	-2.424	223	.016
Resistance Injunctive Norm (n=226)	2.97 (1.01)	3.83 (1.03)	-2.903	224	.004
Resistance Social Support (n=226)	2.48 (1.05)	2.82 (1.10)	-2.256	224	.025
Aerobic attitude (n=226)	4.57 (1.21)	5.47 (1.09)	-5.683	224	<.001
Resistance attitude (n=227)	3.76 (1.39)	4.79 (1.38)	-5.290	225	<.001
Aerobic Response Efficacy (n=225)	4.09 (0.78)	4.49 (0.60)	-4.270	223	<.001
Resistance Response Efficacy (n=226)	3.59 (1.02)	3.92 (1.01)	-2.300	224	.022
Strenuous + Moderate mins/wk (n=229)	32.30 (121.30)	103.00 (120.63)	-4.201	158	<.001
Total weekly minutes (n=229)	109.10 (189.55)	231.30 (302.70)	-3.742	227	.001
Total Weekly METs (n=229)	11.02 (20.58)	20.70 (16.24)	-3.904	227	<.001
Total weekly resistance minutes (n=229)	4.87 (16.62)	25.30 (60.24)	-3.888	188	<.001

Table 3-6l: Supervision preference [M(SD)]

Social-Cognitive/ Behaviour variable	Supervised/ instructed	Unsupervised/ self-paced	t	df	p
Aerobic Social Support (n=226)	3.26 (1.047)	2.94 (0.991)	2.355	224	.019

Table 3-6m: Organizational preference [M(SD)]

Social-Cognitive/ Behaviour variable	Competitive	Recreational	t	df	P
Aerobic Social Support (n=226)	3.90 (0.79)	3.11 (1.01)	2.064	224	.040
Environment (n=227)	3.97 (0.41)	3.27 (1.03)	4.075	9	.003
Strenuous + Moderate mins/wk (n=229)	262.10 (230.72)	74.50 (123.75)	3.828	227	<.001
Total Weekly METs (n=229)	35.79 (25.93)	17.13 (18.41)	2.606	227	.010

9. Tables 3-7a - 3-7g: Factorial ANOVAs by age (all p's <.05)

Table 3-7a: Preferred source of physical activity counselling [M(SD)]

Social-Cognitive/Behaviour variable	64 and under		65 and over		F	df	p
	Exercise specialist	Other	Exercise specialist	Other			
Total Weekly METs (n=233)	15.27 (13.61)	24.15 (27.04)	18.08 (21.12)	16.16 (14.17)	4.341	1	.038
Resistance frequency (n=233)	0.65 (1.39)	0.67 (1.61)	1.76 (2.90)	0.64 (1.76)	4.868	1	.028

Table 3-7b: Preferred method for physical activity counselling [M(SD)]

Social-Cognitive/Behaviour variable	64 and under		65 and over		F	df	p
	Face to face	Other	Face to face	Other			
Resistance cons (n=240)	1.96 (0.79)	2.15 (0.76)	1.91 (0.75)	1.58 (0.56)	4.373	1	.038
Strenuous + Moderate weekly minutes (n=241)	90.80 (143.34)	67.20 (102.93)	66.0 (104.49)	181.0 (396.72)	6.447	1	.012

Table 3-7c: Preferred place to perform resistance activity [M(SD)]

Social-Cognitive/Behaviour variable	64 and Under			65 and over			F	df	p
	At home	Not at home	No preference	At home	Not at home	No Preference			
Environment (n=226)	3.13 (0.98)	3.48 (0.92)	2.87 (1.06)	3.48 (1.01)	3.10 (1.16)	3.27 (1.18)	3.488	2	.034[a]

[a] no preference vs. not at home (LSD p=.052)

Table 3-7d: Preferred time of day to engage in resistance activity [M(SD)]

Social-Cognitive/ Behaviour variable	64 and under				65 and over				F	df	p
	Morn	Aft	Eve	No pref	Morn	Aft	Eve	No pref			
Aerobic attitude (n=225)	5.63 (1.02)	5.47 (0.99)	4.81 (1.14)	5.32 (1.13)	5.02 (0.99)	4.22 (1.77)	3.67 (1.44)	5.34 (1.05)	2.835	3	.039[a]

[a] evening vs morning (p= .046) and no preference (p= .026)

Table 3-7e: Preferred intensity of physical activity [M(SD)]

Social-Cognitive/ Behaviour variable	64 and Under			65 and over			F	df	p
	Low intensity	Moderate/ vigorous	No preference	Low intensity	Moderate/ vigorous	No Preference			
Aerobic intention (n=236)	4.42 (1.18)	4.94 (1.22)	4.78 (1.25)	3.49 (1.55)	5.09 (0.92)	4.63 (0.53)	4.577	2	.011[a]
Strenuous + Moderate min/wk (n=237)	47.1 (171.50)	95.9 (109.73)	136.8 (244.40)	20.8 (50.73)	119.6 (142.89)	840.0 (1187.9)	17.767	2	<.001[b]
Total weekly minutes (n=237)	129.7 (234.00)	222.7 (323.10)	158.6 (252.41)	94.7 (145.67)	251.3 (250.87)	840.0 (1187.9)	4.803	2	.009[a]
Total weekly resistance minutes (n=237)	5.97 (20.24)	17.2 (43.76)	71.1 (123.73)	4.15 (13.32)	44.3 (85.06)	17.5 (3.54)	3.138	2	.045[c]

[a] low sig different from mod/vig [b] all sig different from each other [c] low vs. mod/vig and no preference

Table 3-7f: Preferred type of activities for a physical activity program [M(SD)]

Social-Cognitive/Behaviour variable	64 and under		65 and over		F	df	p
	Same activity each session	Different activities each session	Same activity each session	Different activities each session			
Aerobic pros (n=223)	3.72 (0.97)	3.96 (0.85)	3.68 (1.10)	3.30 (1.16)	4.692	1	.031
Resistance pros (n=223)	2.82 (1.26)	3.47 (1.08)	3.38 (1.26)	2.65 (1.25)	15.985	1	<.001
Resistance Response Efficacy (n=222)	3.62 (1.21)	3.94 (0.92)	3.89 (1.01)	3.57 (1.01)	4.447	1	.036

Table 3-7g: Structure preference for a physical activity program [M(SD)]

Social-Cognitive/Behaviour variable	64 and under		65 and over		F	df	p
	Spontaneous /flexible	Scheduled	Spontaneous /flexible	Scheduled			
Resistance Social Support (n=225)	2.82 (1.09)	2.57 (1.15)	2.57 (0.85)	2.94 (1.21)	3.927	1	.049

10. Tables 3-8a - 3-8k: Factorial ANOVAs by sex (all p's <.05)

Table 3-8a: Would have preferred to receive PA counselling [M(SD)]

Social-Cognitive/Behaviour variable	Women		Men		F	df	p
	Yes/ Maybe	No	Yes/ maybe	No			
Aerobic Social Support (n=226)	2.96 (1.13)	3.46 (0.64)	3.24 (0.89)	2.73 (1.28)	4.255	1	.040
Aerobic attitude (n=226)	5.08 (1.32)	5.31 (0.92)	5.28 (1.02)	4.18 (1.71)	5.322	1	.022
Environment (n=227)	3.20 (1.06)	3.93 (0.76)	3.31 (1.01)	2.99 (0.98)	4.513	1	.035
Total weekly resistance minutes (n=227)	13.90 (35.07)	0 (0)	24.20 (62.03)	63.20 (117.18)	3.923	1	.049

Table 3-8b: Preferred source of physical activity counselling [M(SD)]

Social-Cognitive/Behaviour variable	Women		Men		F	df	p
	Exercise specialist	Other	Exercise specialist	Other			
Strenuous + Moderate weekly minutes (n=233)	85.40 (211.95)	45.60 (70.98)	77.90 (111.51)	138.40 (203.56)	5.089	1	.025
Total Weekly METs (n=233)	15.81 (16.63)	13.70 (11.63)	16.58 (16.38)	25.38 (26.64)	4.694	1	.031

Table 3-8c: Preferred place for physical activity counselling [M(SD)]

Social-Cognitive/Behaviour variable	Women			Men			F	df	p
	At home	At fitness centre	At diabetes centre	At home	At fitness centre	At diabetes centre			
Total weekly minutes (n=239)	103.3 (116.23)	312.4 (537.04)	157.7 (258.55)	254.5 (281.18)	195.1 (248.02)	179.1 (198.05)	3.040	2	.050

Table 3-8d: Preferred start time for a physical activity program [M(SD)]

Social-Cognitive/Behaviour variable	Women		Men		F	df	p
	At diagnosis	Sometime after diagnosis	At diagnosis	Sometime after diagnosis			
Environment (n=233)	3.19 (1.10)	3.48 (0.96)	3.46 (0.99)	2.93 (0.97)	8.415	1	.004

Table 3-8e: Preferred social support during aerobic activity [M(SD)]

Social-Cognitive/Behaviour variable	Women			Men			F	df	p
	Alone	With others	No preference	Alone	With others	No Preference			
Aerobic Descriptive Norm (n=236)	2.47 (0.81)	2.31 (0.99)	2.43 (0.54)	2.25 (0.85)	2.86 (1.06)	2.43 (1.03)	3.057	2	.049
Resistance Descriptive Norm (n=237)	2.27 (0.68)	2.07 (0.98)	2.43 (0.54)	2.05 (0.80)	2.54 (1.06)	2.17 (0.98)	3.268	2	.040[a]
Resistance frequency (n=239)	1.07 (2.46)	0.66 (1.50)	0.33 (1.00)	0.86 (1.62)	0.60 (1.40)	2.83 (3.76)	5.532	2	.004[b]

[a] alone vs. with others (LSD p=.262) [b] no preference vs. alone (p=.035) and with others (p=.001)

Table 3-8f: Preferred place to perform aerobic activity [M(SD)]

Social-Cognitive/Behaviour variable	Women			Men			F	df	p
	At home	Not at home	No preference	At home	Not at home	No Preference			
Aerobic Descriptive Norm (n=238)	2.50 (0.77)	2.31 (1.03)	2.14 (0.77)	2.31 (1.05)	2.83 (0.99)	2.78 (1.02)	3.601	2	.029[a]

[a] at home vs. not at home (LSD p=.232)

Table 3-8g: Preferred place to perform resistance activity [M(SD)]

Social-Cognitive/Behaviour variable	Women			Men			F	df	p
	At home	Not at home	No preference	At home	Not at home	No Preference			
Resistance Response Efficacy (n=226)	3.53 (1.19)	4.04 (0.96)	3.81 (1.10)	3.88 (0.84)	3.64 (1.07)	4.10 (0.74)	3.769	2	.025[a]

[a] at home vs. no preference (LSD p=.206)

Table 3-8h: Preferred time of day to engage in resistance activity [M(SD)]

Social-Cognitive/Behaviour variable	Women				Men				F	df	p
	Morn	Aft	Eve	No pref	Morn	Aft	Eve	No pref			
Aerobic Descriptive Norm (n=227)	2.48 (0.95)	1.53 (1.15)	2.44 (0.70)	2.44 (0.84)	2.49 (0.94)	3.12 (1.13)	2.62 (1.05)	2.58 (1.05)	4.169	3	.007[a]
Resistance Descriptive Norm (n=227)	2.22 (0.95)	1.27 (0.84)	2.36 (0.60)	2.21 (0.89)	2.20 (0.82)	2.71 (1.10)	2.48 (1.02)	2.30 (1.04)	3.879	3	.010[b]

[a] most significant LSD is between afternoon and evening (p=.742) [b] afternoon vs. evening (LSD p=.201)

Table 3-8i: Preferred intensity of physical activity [M(SD)]

Social-Cognitive/Behaviour variable	Women			Men			F	df	p
	Low intensity	Moderate/ vigorous	No preference	Low intensity	Moderate/ vigorous	No Preference			
Aerobic intention (n=237)	4.23 (1.35)	4.89 (1.17)	5.10 (1.10)	3.53 (1.48)	5.04 (1.12)	4.40 (1.14)	3.185	2	.043[a]

[a] low intensity sig different from moderate/vigorous

Table 3-8j: Preferred type of activities for a physical activity program [M(SD)]

Social-Cognitive/Behaviour variable	Women		Men		F	df	p
	Same activity each session	Different activities each session	Same activity each session	Different activities each session			
Aerobic Descriptive Norm (n=224)	2.39 (0.77)	2.31 (0.96)	2.28 (1.08)	2.79 (0.97)	4.372	1	.031
Resistance Descriptive Norm (n=224)	2.20 (0.74)	2.11 (0.95)	2.01 (0.98)	2.49 (0.95)	4.819	1	.029

Table 3-8k: Supervision preference for a physical activity program [M(SD)]

Social-Cognitive/Behaviour variable	Women		Men		F	df	p
	Supervised /instructed	Un-supervised /self-paced	Supervised /instructed	Un-supervised /self-paced			
Resistance Response Efficacy (n=226)	3.96 (1.025)	3.65 (1.063)	3.61 (1.110)	3.84 (0.876)	3.868	1	.050

11. Table 3-9: Summary of Question 2a significant results

	PA counsel	C. Source	C. Place	C. Method	PA start time	AT SS	AT Place	AT time	RT SS	RT place	RT time	Intens-ity	PA type	Super-vision	Struc-ture	Organiz-ational
Aerobic intention	√	√										√				
Strength intention	√		√				√					√				
Aerobic SE												√				
Strength SE			√									√				
Aerobic pros												√				
Aerobic cons																
Strength pros												√				
Strength cons																
Aerobic inj norm												√				
Aerobic des norm			√									√				
Aerobic SS						√				√		√		√		√
Strength inj norm												√				
Strength des norm																
Strength SS												√				

Aerobic attitude					√		√	√	√			
Strength attitude									√			
Aerobic RE									√			
Strength RE									√			
Environment				√								√
S+M mins/wk			√						√			√
Total mins/wk									√			
Weighted Godin			√						√			√
Strength freq		√	√		√							
Total RT mins/wk		√							√			

Legend
√= p<.05
PA=Physical activity
C=Counselling
AT=Aerobic Training
RT=Resistance Training
SE=Self-efficacy
SS=Social Support
RE=Response Efficacy
S+M=Strenuous + Moderate

12. Table 3-10 Summary of Question 2b significant results

	PA counsel		C. Source		C. Place		C. Method		PA start time		AT SS		AT Place		AT time		RT SS		RT place		RT time		Intens-ity		PA type		Super-vision		Struc-ture		Organ iz-ational	
	Age	M/F	Age	M/F	Age	M/F	Age	M/F	Age	M/F	Age	M/F	Age	M/F	Age	M/F	Age	M/F	Age	M/F	Age	M/F	Age	M/F	Age	M/F	Age	M/F	Age	M/F	Age	M/F
Aerobic intention																							√	√								
Strength intention																																
Aerobic SE																																
Strength SE																																
Aerobic pros																									√							
Aerobic cons																																
Strength pros																									√							
Strength cons							√																									
Aerobic inj norm																																
Aerobic des norm											√		√								√					√						
Aerobic SS		√																														
Strength inj norm																																
Strength des norm											√										√					√						
Strength																													√			

SS													
Aerobic attitude	√									√			
Strength attitude													
Aerobic RE													
Strength RE									√			√	√
Environment	√					√		√					
S+M mins/wk			√		√						√		
Total mins/wk				√							√		
Total Weekly METs		√	√										
Strength freq		√					√						
Total RT mins/wk	√										√		

Legend
√= $p<.05$
PA=Physical activity
C=Counselling
AT=Aerobic Training
RT=Resistance Training
SE=Self-efficacy
SS=Social Support
RE=Response Efficacy
S+M=Strenuous + Moderate

Chapter Four – Study Two

4.0 Overview of the Chapter

This chapter begins by providing a brief overview of type 2 diabetes and physical activity's role in helping the management of the disease. The study's rationale, objectives and research questions will also be stated. The methods, results, discussion, limitations and future directions will follow.

4.1 Introduction

Diabetes mellitus is a serious health concern in Canada and across the globe [Canadian Diabetes Association (CDA) Clinical Practice Guidelines Expert Committee, 2008]. In Canada, approximately 5-7% of the population over age 12 has diabetes. According to a statement from the World Health Organization (WHO), nearly 180 million people worldwide currently live with diabetes, and this is expected to almost double by the year 2030 (WHO, 2006). The increase in prevalence in Canada is related to the aging population, a significant rise in obesity rates and an increase in sedentary lifestyles (CDA, 2003; Wing et al., 2001; Zinman, Ruderman, Campaigne, Devlin & Schneider, 2004). Poor quality of life and long-term complications may result from type 2 diabetes (Jette et al., 1998). Diabetes also increases the risk for other chronic diseases (e.g., heart disease and stroke) and premature death [American Diabetes Association (ADA) & National Institute for Diabetes, Digestive and Kidney Diseases (NIDDKD), 2002]. This chronic disease also creates a significant economic burden on the health care

system (Health Canada, 2002) costing the Canadian government approximately $5.0 billion (US) annually (Dawson, Gomes, Gerstein, Blanchard & Kahler, 2002).

Maintaining lifestyle habits such as healthy eating, not smoking and participating in regular physical activity can help prevent and manage type 2 diabetes (Pan et al., 1997; Spelsburg & Manson, 1995). Physical activity plays a lead role in management of type 2 diabetes, especially glycemic control (CDA, 2003; Zinman et al., 2004; Boulé, Haddad, Kenny, Well, & Sigal, 2001; Ronnemaa, Mattila, Lehtonen, & Kallio, 1986) and improvement in other cardiovascular risk factors such as hyperinsulinemia, increased insulin sensitivity, reduced body fat percent, lower blood pressure and better lipid profiles (Lehmann, Kaplan, Bingisser, Bloch, & Spinas, 1997; Schneider, Khachadurian, Amorosa, Clemow, & Ruderman, 1992). Regular moderate intensity physical activity has also been associated with a decrease in glycosolated haemoglobin (A1C) to a level that reduces the risk of complications linked with type 2 diabetes (Boulé et al., 2001).

Organizations such as the CDA have developed physical activity recommendations based on large population-based physical activity studies and other related evidence. The CDA Clinical Practice guidelines established in 2003 recommend that people with type 2 diabetes engage in moderate intensity physical activity for at least 150 minutes every week over at least three non-consecutive days (CDA, 2003). The guidelines also recommend participating in resistance training at least three times per week to help management of type 2 diabetes (CDA, 2003).

Despite the encouraging evidence of the health benefits for both aerobic and resistance training, the majority of people with type 2 diabetes do not engage in these activities (Plotnikoff, 2006; Health Canada, 2002). The *Diabetes in Canada Report*

issued by Health Canada (2002) states that 65% of those with type 2 diabetes are physically inactive which is higher than the general population at 56% (Craig & Cameron, 2004).

Why is it that so few people with diabetes engage in physical activity when the benefits are widely known? Some barriers to regular exercise identified by this population include lack of time, pain/health issues, no one to participate with, and fear of complications (Plotnikoff, 2006). A significant proportion of adults with diabetes report that physical activity is a difficult part of self-care (Nelson, Reiber, & Boyko, 2002; Plotnikoff, Brez, & Hotz, 2000). In light of the observed difficulties people with type 2 diabetes have engaging in, and maintaining regular physical activity there has been a recent effort to research the demographic and psychosocial determinants of this behaviour (Plotnikoff, 2006; Plotnikoff et al., 2006). However, research on this population regarding the preferences for tailored physical activity programs delivery has been very limited, despite the American College of Sports Medicine (ACSM, 2000) statement that exercise prescription guidelines *"cannot be implemented in an overly rigid fashion by simply applying mathematical calculations to test data"* and *"individual preferences for exercise must be considered to improve the likelihood that the individual will adhere to the exercise program."* There is also consensus in the literature (Cohen-Mansfield, Marx, Biddison & Guralnik, 2004; Karvinen, Courneya, North & Venner, 2007; Jones et al., 2007) that it is important to gain a better understanding of individuals' exercise and program preferences (as well as any barriers or negative factors) in order to facilitate physical activity.

Tailoring physical activity interventions to an individual's needs and preferences has been shown to be more effective than taking "one-size fits all" generic approaches. Research with the general population (Thompson & Wankel, 1980; Booth, Bauman, Owen & Gore, 1997; Salmon, Crawford, Owen, Bauman & Sallis, 2003), older adults (Mills, Stewart, Sepsis & King, 1997; Wilcox, king, Brassington & Ahn, 1999; Cohen-Mansfield et al., 2004) and chronic disease groups such as heart disease (Ruland & Moore, 2001; Moore & Kramer, 1996), cancer (Denmark-Wahnefried, Peterson, McBride, Lipkus & Clipp, 2000; Jones & Courneya, 2002; Vallance, Courneya, Jones & Reiman, 2006; Karvinen et al., 2006; Jones et al., 2007; Karvinen et al., 2007; Courneya et al., 2008; Rogers, Courneya, Verhulst, Markwell & McAuley, in press) and type 2 diabetes (Wood, 2002; Wanko et al., 2004) have examined tailoring approaches for physical activity. Only a few of these studies however, have examined physical activity preferences as their primary research question.

There has been very little research on physical activity preferences within the type 2 diabetes population. It appears that only two studies have focused on physical activity preferences in this population. The tools for both studies (Wood, 2002; Wanko et al., 2004) consisted of multiple choice questions regarding patients' exercise preferences. Wood (2002) examined the physical activity practices and preferences of different ethnic groups. It was found that some of the physical activity preferences were different between various ethnic groups. The researchers also reported that preferences differed by age. Wanko et al, (2004) surveyed individuals at a diabetes clinic with predominately African American patients. Overall, the participants reported walking as the number one preferred activity and there were no differences based on demographic characteristics for

walking behaviour, however, demographics differences were found among the subsequent activities participants' reported as preferences. Apart from these two studies, there appears to be no other research on physical activity preferences in this population.

4.2 Rationale of the study

There is a limited amount of research regarding the physical activity counselling and programming preferences of individuals with type 2 diabetes. As well, the potential differences in preferences between men and women, and older and younger individuals should be explored to ensure that physical activity interventions can be specifically tailored to meet the diverse needs of this population.

4.3 Study Objectives

This study is exploratory and descriptive in nature. It follows a qualitative approach. The objectives of this study are to: (1) explore in detail physical activity preferences; (2) examine participants' understanding of the Canadian Diabetes Association's physical activity guidelines; and, (3) explore the meaning of physical, aerobic and resistance activity. The hope is that this study will provide a deeper understanding of the quantitative data from Study One. The main research questions are as follows:

1. What are the physical activity counselling and programming preferences of older and younger men and women with type 2 diabetes?

2. What is this population's understanding of the Canadian Diabetes Association's physical activity guidelines?
3. What do the phrases 'physical activity', 'aerobic activity' and 'resistance activity' mean to younger and older men and women with type 2 diabetes?

4.4 Methods

4.4.1 Background

The participants for this study were selected from the Canadian Aerobic and Resistance Exercise and Diabetes (CARED) Study. The study surveyed a sample of Canadians, aged 18 and older with type 2 diabetes. The Population Research Laboratory (PRL) at the University of Alberta was contracted to recruit a geographically proportionate sample through a random digit dialling protocol. Of the eligible people that the PRL contacted, 558 agreed to receive the study's recruitment package. These individuals were sent the baseline package. Of this sample, 287 returned the completed questionnaire for a recruitment rate of 51.4% (287/558). A total of 244 completed the 3-month questionnaire for a follow-up retention rate of 85.0% (244/287) and a total study response rate of 43.7% (244/558).

Participants in the CARED study completed self-report questionnaires at two time periods: baseline (ranged from March – May 2006) and 3 months (ranged from June – August 2006). The questionnaires contained biomedical, social-cognitive, behavioural and preference measures related to physical activity. See Plotnikoff, Trinh, Courneya, Karunamuni, and Sigal (2008) and Plotnikoff, Courneya, Trinh, Karunamuni and Sigal (2008) for further details.

4.4.2 Recruitment and Response Rates

A convenience sample from the CARED study who completed the entire study (baseline and time 2 questionnaires) and indicated they were willing to be contacted for further studies from the CARED study was selected for interviews. An information letter describing the study and expectations of the interview and consent form was sent to potential subjects. Those interested in taking part were asked to complete the consent form and return it in the included postage-paid envelope. Confirmation of intent to participate was confirmed by a telephone call from the researcher. At this point any questions from the participants were addressed and a date and time for the interview was scheduled.

A random, stratified (by age and sex) sample of 32 people were initially selected and contacted from the 150 people who agreed to be approached for future studies. Of these 32 individuals (8 per stratified group), 20 responses were received. Fourteen indicated they were interested in participating and six indicated they were not interested in this particular study. Reminder letters were mailed to those who did not respond. When no further responses were received after four weeks, recruitment letters were mailed to a further 16 participants to replace missing cases and to meet cell quotas. Of these, five people returned the consent forms (4 yes, 1 no) for a total study sample of 18 participants. Due to scheduling conflicts only 14 interviews were completed. The overall response rate was therefore 29.2% (14/48).

4.4.3 Sample

Participants (n=14) were an average age of 63 (9.1) years of age and had an average type 2 diabetes diagnosis age of 57 (10.6) years of age. There was an even split

for sex with seven men and seven women. Participants were stratified by age and sex (to examine the differences in the specific groups) with the following compositions: three women 64 years of age and under, four women 65 years of age and older, four men 64 years of age and under, and three men 65 years of age and older. The majority (57.1%) of the participants were married or common law partners while 42.9% had completed a college/university degree. There was no significant difference between Study One and Study Two samples on sex and age characteristics. See Table 4-1 for the detailed demographic characteristics.

The average amount of leisure-time moderate and/or vigorous physical activity for the participants was 62.9 (SD= 89.7) minutes per week. Only 28.6% of participants were meeting physical activity guidelines at the CARED 3 month follow up. This is slightly lower than the Canadian average of 35% for those 20 years and older with diabetes (Health Canada, 2002).

Overall, men had a higher average number of moderate and/or vigorous weekly aerobic activity minutes then women (M=85.7, SD=108.8 vs. M=40.0, SD=66.3) but when mild activity was added, women had a higher weekly average (M=184.3, SD=171.8 vs. M=195.7, SD=200.0). With regards to resistance training, men performed RT more times per week (M=1.86, SD=2.48) than women (M=0.29, SD=0.76).

In general, participants 65 years and older had a higher average number of moderate and/or vigorous weekly aerobic activity minutes (M=74.3, SD=97.1) than those 64 years and younger (M=51.4, SD=87.3). When examining resistance activity, participants 64 years and younger had a slightly higher average weekly frequency (M=1.14, SD=2.27) than those 65 years and older (M=1.00, SD=1.73).

4.4.4 Data collection

This study was approved by the Research Ethics Board of the Faculty of Physical Education and Recreation at the University of Alberta (see Appendix V). Telephone interviews were conducted by the researcher over a 10-month period starting in May 2007. Participants were informed that the purpose of the study was to explore physical activity counselling and program preferences among those with type 2 diabetes. Each telephone interview took approximately 15 to 20 minutes to complete.

During the interviews, a guide was followed which included semi-structured questions with occasional probes. The researcher used probes when applicable to: (1) further understanding if something was unclear; (2) prompt participants to deepen thoughts and elaborate; and, (3) clarify statements and keep on topic (Morgan & Krueger, 1998). Questions were developed from the quantitative results of Study One to ensure relevance and applicability. All interviews were recorded with permission from the participants. The participants were asked if they would be willing to be contacted for further verification and clarification purposes.

4.4.5 Instrumentation

The interview guide was composed of semi-structured questions with elaboration probes (see Appendix IV). The interview consisted of a series of questions intended to elaborate on physical activity counselling and program preferences.

Overall, nine primary questions were asked in order to explore physical activity behaviour and preferences. Participants were asked to provide information on current physical activity levels and indicate what activities they most preferred. Questions regarding whom they engaged in activity with and what activities they would like to

engage in given the opportunity were solicited. This served to inform the researcher on barriers and restrictions the participant may have felt held them back from regularly engaging in physical activity. Preference between recreational and competitive activities was also examined.

Participants were asked whether they had received physical activity counselling when they were first diagnosed with type 2 diabetes. Elaboration was requested on the type of information received and how helpful it was if they indicated they had received counselling. If they had indicated 'no', then suggestions of what they would have liked to learn were solicited.

Participants were asked whether they were familiar with the current physical activity guidelines for those with type 2 diabetes. In addition, the meaning of physical activity was also examined. Participants were asked "what does the phrase physical activity mean to you?" and were also asked to specifically give meaning to the terms 'aerobic' and 'resistance activity'.

Participants were asked if they engaged or were interested in resistance training. Further, individuals were asked what they believed the benefits (if any) of resistance training were. If not already answered in the previous prompts, participants were requested to give their thoughts were about resistance training in general. Finally, participants described what their optimal physical activity program would be if there were no restrictions or barriers whatsoever.

4.5 Data Analysis

The researcher used a content analysis (Morse, 1991) approach which progressed through the following stages: (1) audiotapes were transcribed word-for-word; (2) transcriptions were read to examine overall themes and similarities (Rothe, 2000); (3) transcriptions were broken into units of analysis in order to code the data (Miles & Huberman, 1994; Trochim, 2001; Glaser & Strauss, 1967); and, (4) comparisons within and between transcripts were made to assess themes and commonalities (Trochim, 2001). Coding took place until the researcher could not identify anymore codes (i.e., until saturation was reached). A count of themes among codes was recorded.

4.6 Data verification & Interpretation

To clarify and confirm any unclear answers given by participants, elaboration probes were used. Participants' responses were also reiterated to ensure understanding and credibility. Themes were explored for the entire sample then re-examined across sex and age for differences and/or similarities. Comparisons and generalizations were also made to previous research.

4.7 Results

4.7.1 Research Question One: Physical activity counselling and programming preferences

Overall Themes for the sample

To begin answering Research Question One, most participants indicated that they participated in some degree of walking. Nine of the fourteen participants were meeting the Canadian Diabetes Association's physical activity guidelines of 150 minutes of activity per week. However, some participants did not indicate whether the walking they participated in was mild or moderate therefore those meeting guidelines may be less. Other activities mentioned were cycling, swimming, gardening, working-out in the gym, resistance training, yoga/pilates, and sports such as squash, golf and skating.

The majority of participants indicated that walking was one of their favourite activities. Other favourite activities included gardening, working out in the gym, cycling, dancing, swimming, resistance training and sports like golf and squash. Of those that participated in some kind of physical activity, some performed alone while others engaged in that activity with a spouse or a family member. Some participants that engaged in solo activities indicated this was their preference while others preferred to be active with someone. Those that preferred to be alone tended to be the people who were 'working-out' in the gym.

Reported Barriers

Although not specifically asked, many participants indicated one or more barriers to physical activity. The most cited barrier was some kind of health issue. Some participants mentioned having joint problems such as arthritis or frozen shoulder. A few indicated they had had surgeries on various joints (shoulders, hips and knees). Two people indicated that weather, namely icy sidewalks, was also a barrier as well. Other restrictions mentioned were fear of dogs, no instruction in resistance activity, poorly

maintained facilities, family obligations, lack of funds, work, motivation and not liking the gym because of insecurities.

> "Participant: And it would also be nice if there was a program set up like with exercise machines or whatever. You know, like a gym atmosphere. A place that was geared to people my age and size. Or not even necessarily my size cause there are some really, really overweight. But it would have been nice to have people my own age and with the same problems that I have or some of the same problems.
> Interviewer: OK, so like in a diabetes centre, a gym set up or something like that?
> Participant: Yes, or a handicapped or rather than go to the gym with all you beautiful skinny girls. You know it's just discouraging." – *Younger Woman*

> "But there really isn't a person in the facility right because we, like in the country it's just a small place so there's nobody there to teach you how to do that. And I am thinking they say with weights you have to, certainly there's a way to do it right, so that you do it properly." - *Younger Woman*

> "Cycling, cycling and swimming both I used to do a lot of, like and they made a swimming pool here but they haven't put any water in it so I am unable to swim." – *Older Man*

Recreational preference

The majority of participants chose recreational activities as their preferred type of activity. The main reason for preferring recreational activities for the sample was age. The participants seemed to feel that sports are not advisable or appropriate for their age groups. A few of those interviewed said they used to prefer competitive activities but now prefer recreational activities due to advancing age. Some participants commented they would like to participate in recreational sports if there were informal leagues set up for people in their age group.

> "I used to like competitive when I was young but now after I sort of retired from competitiveness and we were just playing for fun, I found it was a lot more fun playing just for fun. It doesn't matter who wins after the game, you are all a bunch of chum that have a beer together and that's it. And I would have more fun like that than when I was playing competitive. Where they were keeping score and at the end of the year we had finished first place, second place and stuff like that. But when I did it, competition, I was liking it. I was loving it as a matter of fact but after I seen the difference then I was preferring the other one." - *Younger Man*

"Probably I would say I don't need to compete, like you know, you're 56. It's just if I can go in there and do my 35 minutes I'm happy with that..." – *Younger Woman*

"I don't feel like competing and I don't want to be at the bottom end. And more so that you can do it [recreational activity] when you want to do it. When you feel like doing it and you don't feel like you have to when you're not ready to do it." - *Older Woman*

"I enjoy being, you know, I mean, if you're playing squash or that you know, I don't like getting beat too badly. Like to be, compete you know, at least a little. Yeah, I don't think I'm overly competitive but I do like competitive stuff. I like doing activities rather than, you know, doing something rather than not doing any- just working out I find fairly difficult actually to get motivated. That's why I have a trainer cause then I, I pay in advance and if I don't go I lose my money. So it's a motivator to go." - *Younger Man*

Importance of physical activity counselling

Overall, six participants had received physical activity counselling and six had not. Two participants did not receive counselling at first but did after a short while. Those that did receive counselling said they learned about nutrition and ways to control their disease with diet. Some also learned about the importance of physical activity. A few participants commented on the excellent diabetes education courses that they had attended in their various hometowns. All the participants that received counselling said they found it helpful for the most part.

"They have a very good program at the hospital in Antigonish. You go in for three separate sessions. They do one on nutrition, they do one on... they just go through the different things and they do a social one. So you do that on three different occasions and then you go to your diabetic sessions. It could be at the beginning, maybe once a month and then you go three or four months in between." - *Younger Woman*

"Well I learned a lot about diet. I learned a lot about, you know, what to look for in packaging. I learned, you know, all the signs to look for for diabetes. I learned about how good exercise is for you and learned about alcohol and diabetes. You know, it was very thorough and very good. The people are great here about that." -*Younger Man*

"I went to after I was diagnosed, Ontario has a very good, I guess, group of diabetic centres with a three day course teaching you how to control your diabetes and what to work with, etcetera. And they do talk about nutrition and exercise and all of those things but they really, I guess most people are not like me, I just

> get in there and do it, so to speak. Uh so, they really omitted giving me any sort of counselling with, really, doing weight training. Although I'd been exercising and was fairly active, I got a personal trainer and what they didn't tell me was that if you go about doing heavy exercise, I controlled my diabetes by diet and I guess the, maybe the second day I was with my trainer I fainted." - *Older Man*

Of those that did not receive counselling, four of the six people indicated they would have liked to have received counselling. They indicated that they would like to have learned about the risks of inactivity and receive some guidance about which activities would be the best. Learning about the disease type 2 diabetes itself (i.e., how it develops, what is happening inside the body) was also mentioned. Some participants also said they would have liked to learn some motivational tactics to keeping on track with diet and physical activity.

> "I would liked to have learned that the fact it was so important and that it could have been one of the reasons for getting it, for developing it sooner, like it did. I think that that's really important to know. You know, nobody explained why I got it or why it comes, or like what would have to happen for it not to come. And I think that's important." - *Younger Woman*

> "And the doctor asked me, 'Are you diabetic?' Not that I know of, I didn't even know what diabetic meant. And they explained to me. And they finally, to make a long story short, they operated on me and when I got home I had a message on my phone that I had to go to the drug store because my family doctor had found that out. And I had to go there to get a kit to check my sugar and that's about all." - *Younger Man*

Resistance training behaviour

Half of the sample was currently engaged in resistance training at the time of the interviews. Of the seven participants who were not, four indicated when asked, that they would be interested in resistance training. When asked about the health benefits of resistance activity, participants gave a variety of answers. Many mentioned toning up the body and strengthening muscles. Three participants mentioned that it was good for the

heart and other organs and useful for building functional strength to remain mobile. Only two participants mentioned that it may help regulate blood pressure and blood sugars.

> "Well I mean, that's why, that's one of the reasons I do the push ups there. I got a bad back too, my lower back, my disc are all squashed there. I am in line for an operation sooner or later and I was trying to strengthen up the upper body for when you get operated on your back sometimes you gotta help yourself to move around which your arms. That's the main purpose of that keeps your muscle tight and stronger so when you get older you can keep mobile longer and you can be, I mean you can, I see people and after seven days they can hardly walk. There is no problem within their muscle but they don't have the strength, they're, they never done nothing." – *Younger Man*

> "Well, just to help you, you know, firm up and lose a little bit of weight and just feel a little better generally I think." – *Younger Man*

The final question that was asked of participants during the interview was to describe their optimal physical activity program. Most of the people who were currently active in some way indicated they were happy with their current programs. Some said that a general increase in activity would be preferable. A few participants said that they would like to go to the gym or play organized sports for seniors.

> "Getting out for my walk and my treadmill and being dedicated to it." - *Older Woman*

> "Well I would like to go to the gym like I was when I was- in '90, I did it up until '94. I used to go every day except Sunday." - *Younger Man*

> "If there was no restraints I would probably do three times a week on my, with my trainer and still try to keep one, at least one squash game a week and probably one golf game a week. But other than that I'm pretty, right now I'm pretty happy with my program." - *Younger Man*

Patterns of counselling and programming preferences across gender groups

When asked about their activities, men mentioned walking, cycling, gardening, going to the gym, squash, golf, swimming, and resistance training. Women mentioned walking, gardening, going to the gym, and dance. In general women said they were

happy with their current levels and type of physical activity but also cited a larger variety of potential changes they would like to make.

Patterns of counselling and programming preferences across age groups

Participants 65 years and older often cited health issues as a restriction to regular physical activity. Participants 65 years and older also cited weather and family obligations as physical activity restrictions. It was also found that those participants 65 years and older tended to engage in activities alone.

Patterns across age groups and gender groups

When examining patterns between age groups within women, older women engaged in walking and solo-based activities. Older women also tended to cite health issues as a restriction to physical activity. There were no apparent patterns for men. See Table 4-2 for a detailed numerical table of the results for Research Question One.

4.7.2 Research Question Two: Understanding of CDA physical activity guidelines

In terms of understanding the physical activity guidelines, most of the participants couldn't recall specific criteria or hadn't heard of them at all. One participant who was a retired doctor also didn't know the recommendations. The remaining participants provided criteria for what they remembered the guidelines to be. Only one person knew the exact criteria that the CDA has established for the guidelines.

> "That's an interesting question cause I work with somebody who knows where to take me. OK, so I think it imperative that somebody you know, doesn't just start out there and say get into an aerobic fitness class without having consulted their doctor and knowing what their own physical limitations are... I can't tell you that, no. Other than you know, you should exercise. I don't know what limitations are there." - *Younger Woman*

> "I should know but, you're supposed to get something like 30 minutes a day, 5 days a week?" – *Older Woman*

"I don't think I know them in specific terms. In general I would say, you know, just getting regular exercise, you know, walking whatever is always good for you." – *Younger Man*

"I'm not a great one for guidelines. I couldn't tell you 1, 2, 3, 4, 5. Cause they just don't fit into my schedule. I find the same with most people too." – *Older Man*

4.7.3 Research Question Three: Meaning of physical activity terminology

When asked what the phrase 'physical activity' meant, most participants made reference to some form of exercise and a few mentioned 'working up a sweat' or increasing their heart rate. Some participants also mentioned specific activities like running, jogging, going to the gym and weight training.

"Just that getting physically out there and walking. It means, you know, moving those legs." – *Younger Woman*

"Being active, I mean doing something. It's not like a couch potato, is that what they call it? Sitting down, watching TV all the time." - *Younger Man*

"Well, basically exercise. You know, walking, jogging, weights, just general kind of exercise. Nothing specific or competitive you know. Just being more conscious of my body and put some heart and soul to it, you know." – *Younger Man*

When asked about aerobic activity specifically, six participants mentioned traditional aerobics and two participants did not know what aerobic activity was at all. This suggests the meaning of aerobic activity may not be clearly illustrated to this population.

"I don't really know what aerobic exercising is all about. You see those girls on TV but that, all that entails I don't really know." – *Younger Woman*

"I'm not even sure what that means. I always pictured it as these babes in these tight suits that don't need any exercise at all bouncing around with their little ponytails. Not an image I like." – *Older Woman*

"Breathing hard. You know, stuff on the bike, squash, aerobic activity, yeah getting your heart rate up." – *Younger Man*

"I don't think of aerobics so much. I have taken aerobic classes. I tend to do more yoga/pilates and occasionally in the gym I will do water aerobics because I took a water aerobics class here at the YMCA in Toronto." – *Older Man*

When asked what resistance activity meant to them, nine of the fourteen participants mentioned weight lifting. A few participants also spoke of building muscle or strengthening joints. Only one participant wasn't sure what resistance training was.

"That's what I don't do. That's what I would like to do. You mean lifting weights and stuff like that?" – *Younger Man*

"I'm not sure what it means. You mean like weight lifting?" – *Older Man*

See Table 4-3 for a detailed numerical table of the results for Research Questions Two and Three.

4.8 Discussion

4.8.1 General observations

The first objective of this study was to qualitatively explore physical activity counselling and program preferences. This is important to guide the development of the most effective physical activity programs for this population. The second objective was to examine this sample's understanding of CDA's physical activity guidelines and the third objective was to explore the meaning of the phrases 'physical activity', 'aerobic activity' and 'resistance activity'. Such information will be helpful when considering further education regarding physical activity for this population.

Overall, it was found that 64% of participants were meeting the Canadian Diabetes Association's guidelines for aerobic physical activity. An explanation for these

high levels relative to other studies (Health Canada, 2002; Plotnikoff, 2006) may be that intensity of current physical activity was not specified in all cases and therefore may be artificially inflated. A second reason may be that the sample was recruited from a prior physical activity-related study and these participants may have been previously motivated to participate in regular physical activity.

In regards to Research Question One, results show that most people indicated that walking was the most preferable activity. This finding is similar to other studies that have examined the physical activity preferences of people with type 2 diabetes (Wood, 2002; Wanko et al., 2004) and with other clinical populations (Ruland & Moore, 2001; Moore & Kramer, 1996; Karvinen et al., 2006; Jones & Courneya, 2002; Vallance et al., 2006; Courneya et al., 2008; Rogers et al., in press) and the general population (Wilcox et al., 1999; Booth et al., 1997; Salmon et al., 2003; Cohen-Mansfield et al., 2004). Most participants that preferred walking said it was relatively easy for them as well as relatively inexpensive. They also preferred to walk outdoors when the weather was fine rather than on a treadmill or track because it was more interesting.

Contrary to other studies (Plotnikoff et al., 2006; Plotnikoff, 2006), a higher than average proportion of the participants were also engaging in resistance training. However, because the guidelines do not include intensity or duration, it is difficult determine whether health benefits are being derived from this activity. Nonetheless, it is encouraging to see that a high proportion of participants in this study are engaging in some kind of resistance training. Of those that were not currently engaging in RT, most indicated they would be interested in this behaviour. This is similar to the findings of Vallance et al, (2006) which found that non-Hodgkin Lymphoma cancer survivors listed

resistance training as the second most preferred activity after walking. One participant in particular indicated that they engaged in resistance activity because that is what he was able to do. Complications from arthritis and diabetes prevented them from engaging in aerobic type activities.

All participants made positive comments about physical activity in general, regardless of their physical activity level. This is encouraging as it shows that the benefits of physical activity are known among this population. However, when asked about their understanding of the CDA's physical activity guidelines (this study's second Research Question), only one person knew the exact recommendations. Some participants over-estimated while some under-estimated the amount of physical activity specified in these guidelines. For those underestimating, this may mean that people may perceive the duration or intensity of physical activity as being lower than the recommendations actually suggest. This is important because incorrect information about the specific guidelines means people may be engaging in less activity than is recommended and therefore not receiving health benefits.

When asked specifically about aerobic activity (Research Question 3), a number of participants assumed this was a reference to traditional aerobics (i.e., step aerobics, aerobic dance). This may indicate that the terminology typically used to describe types of physical activity may be confusing to some people, causing them to make incorrect conclusions about what types of physical activity to pursue. A qualitative study with focus groups comprised of women also found a misunderstanding of the terms used and the CDC/ASCM guidelines for physical activity (Eyler et al., 1998). There may be a

need to put extra emphasis on the intensity and duration of recommended activity when recommending activity to participants.

Most participants also had positive things to say about resistance training. Of the participants that were not currently engaging in resistance activity, more than half indicated they were interested in this behaviour. It is encouraging that most participants view resistance training positively, whether they are currently engaging in this behaviour or not. Many participants stated they felt some type of weight or strength training was important to remain functionally independent. Incorporating functional training could be a useful focus when developing resistance activity programs.

Some participants had health issues that prevented them from engaging in regular, sustained aerobic activity and therefore resistance training was the only readily available method of physical activity for them. One participant in particular was in a scooter most of the time and could only walk one or two blocks at a time. This person stated that they engaged in resistance training because it was "something that I can do, as opposed to something I would like to do." Others with type 2 diabetes also may not be able to easily engage in aerobic activity (Eves & Plotnikoff, 2006; Plotnikoff, 2006). For those with secondary diabetes complications, arthritis or severe obesity, aerobic activity may be uncomfortable or painful to perform. In these cases, resistance training may be the most effective alternative with results similar to aerobic training regarding physiological benefits (Eves & Plotnikoff, 2006; Plotnikoff, 2006).

Though not formally solicited, many participants expressed there are environmental and situational barriers to regular physical activity. The most commonly mentioned barrier was related to a health condition or injury which is consistent with the

literature on the general population (Marcus, 1995; Salmon et al., 2003; Trost, Owen, Bauman, Sallis & Brown, 2002). This was not unexpected, due to the average age of participants in this study (63 years), and that secondary complications can often result from diabetes (CDA, 2008; Health Canada, 2002).

Many participants mentioned that their diagnosis of type 2 diabetes was a motivator for them to engage in physical activity as was also reported by Barrett, Plotnikoff, Courneya, and Raine (2007) in a qualitative study of 20 individuals with this disease. As in Barrett's study, upon being diagnosed, some participants in the current study increased the current amount of activity they were engaging in, whereas others began a new physical activity program. This finding has both negative and positive aspects. This suggests that it takes an actual diagnosis for some people to become motivated to engage in regular activity, whereas if they were physically active earlier in life, individuals could have potentially avoided or ceased progression of the disease. However, this result may also be positive, as it shows that some people perceive their disease as a serious issue and are willing to engage in necessary self-care behaviours.

4.8.2 Patterns across gender

Overall, the type of activities favoured by women were less varied than those expressed by men. Women mentioned walking, the gym, cycling and gardening among their top activities, whereas men mentioned sports, swimming and resistance training in addition to those activities listed by women. Further, there is literature to suggest that women are more likely to incorporate physical activity into their everyday life by accumulating activity throughout the day rather then one long session (White, Ransdell, Vener & Flohr, 2005). Consistent with the literature on the general population (Eyler et

al., 1998; Hooker et al., 2005), walking for errands, active commuting and necessary housework are often mentioned by women when asked about their daily activity.

Results showed that more men were currently engaging in resistance training then women. Some women mentioned that they didn't want to get too big, or that they didn't think they would be strong enough for resistance training. Many assumed that they would need weights or would have to go to the gym to accomplish resistance training. This may indicate that more education about the various forms of resistance training may be warranted.

4.8.3 Patterns across age

The main difference between the age groups was that those 65 years and older were more likely to cite health issues as a limitation to physical activity. This is not surprising as there are generally more health issues with advancing age (Hardmen & Stensel, 2003; Kruger, Ham & Sanker, 2008) and diabetes complications normally become more prevalent with advancing age (CDA, 2008).

Results also showed that participants 65 years and older tend to engage in physical activity alone. However, when asked if this was their preference, some indicated that this was not necessarily their choice. There is evidence showing that older adults prefer to exercise with persons their own age rather than with individuals significantly older or younger then themselves (Wilcox et al., 1999). Therefore, when faced with a choice of whether to be active with a group or alone, the age range of the group may be the defining factor for participation.

In summary, there were many differences between gender and age groups regarding physical activity preferences. Educating people on specific types of activity

related to resistance training and aerobic activity is necessary to better inform decisions and ultimately increase the amount of physical activity people with this disease engage in. It is also evident that health professionals should also solicit the physical activity preferences and individual barriers to physical activity when counselling people with type 2 diabetes.

4.9 Strengths, Limitations & Future Directions

A strength of the study was the qualitative, exploratory nature of the methodology. Participants were free to express themselves in their own words and voice issues that may not be feasible in a survey protocol. The qualitative methodological approach helps add valuable information that may have gone overlooked in a quantitative methodology. Qualitative data is rich and in-depth, and therefore information gathered in this study will be useful for informing practitioners and researchers on physical activity program and counselling preferences.

There are several limitations that the reader should be cognizant of when reviewing the results of this study. First, the sample may have over-represented active individuals (64.3%) when compared to Health Canada's (2002) reported prevalence of 35% of active Canadian adults with type 2 diabetes (although type 1 diabetes was included in the sample). This may be due to self-selection of participants. Those who were more active and interested in physical activity may have been more likely to participate in the study. As well, the sample was recruited from a previous study focusing on physical activity. The participants may have been motivated to start engaging in activity because of participation in the original CARED study and

subsequently were more active during this study. Second, the description and comparisons between each gender/age group were based on a small sample and may have limited generalizability. Larger scale, qualitative studies that focus on physical activity preferences in the population of people with type 2 diabetes would be an important avenue for further research. Third, due to logistic constraints, Study Two interview questions did not build specifically on the results of Study One. Fourth, there was no reliability check between answers given during the interviews and the previous answers from Study One. Finally, only the primary researcher was involved in coding and analysing the interview data. Additional researchers involved in the coding and interpretation of transcripts could increase confirmability of the results.

4.10 Conclusion

This study adds to the limited research regarding physical activity preferences for people with type 2 diabetes. The differences between gender and age groups regarding physical activity preferences illustrate a variety of differences in preferences for physical activity programming. Also apparent, is the need to further distinguish the difference between 'physical activity,' 'aerobic activity,' and 'resistance' activity. Evidence in this study showed a lack of understanding of these terms as well as to the Canadian Diabetes Association's physical activity guidelines. More research needs to be conducted to determine the best method of knowledge dissemination and the most effective way to implement tailored, physical activity promotion programming.

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13. Table 4-1 Participant Characteristics (n=14)

Variable	N	%
Sex		
Male	7	50.0
Female	7	50.0
Marital status		
Married	7	50.0
Common Law	1	7.1
Widowed	3	21.4
Separated/Divorced	3	21.4
Ethnic Origin		
Canadian	11	78.6
European	2	14.3
Other	1	7.1
Education		
Some grade school	1	7.1
Some high school	2	14.3
Completed high school	1	7.1
Some college/university	2	14.3
Completed college/university	4	28.6
Some graduate school	1	7.1
Completed graduate school	2	14.3
Completed technical training	1	7.1
Income		
<20,000	4	28.6
20,000-39,999	2	14.3
40,000-59,999	5	35.7
60,000-79,999	1	7.1
Over 100,000	2	14.3
Smoking Habits		
Regular smoker	1	7.1
Occasional smoker	1	7.1
Ex-smoker	9	64.3
Non-smoker	3	21.4

14. Table 4-2: Summary of Research Question One results

	Women		Men	
	64 and under	65 and older	64 and under	65 and older
Current Physical Activities				
Walking	1	4	2	1
Cycling	-	2	-	-
Swimming	-	-	-	1
Gardening	-	1	-	1
Gym	2	-	1	1
Resistance training	-	1	1	1
Skating	-	1	-	-
Yoga/pilates	-	-	-	1
Housework	1	-	-	-
Squash	-	-	1	-
Golf	-	-	1	-
Meeting CDA guidelines (150 mins/wk)	2	4	2	1
Favourite type of activities				
Walking	2	3	2	1
Gardening	-	1	-	-
Cycling	-	-	-	1
Gym	1	-	1	1
Dance	-	1	-	-
Squash	-	-	1	-
Golf	-	-	1	-
Swimming	-	-	-	2
Resistance training	-	-	-	1
Social Preferences				
With parents	1	-	-	-
Mostly alone, sometimes not	2	-	1	-
With spouse	-	1	1	1
Alone	-	3	1	2
With dog	-	-	1	-
With opponent	-	-	1	-
Activities they would like to do				
Walking	2	-	1	1
Swimming/Water aerobics	2	1	-	-
Organized sports for seniors	-	1	-	-
Curling	-	1	-	-
Go to gym	-	-	1	-
Cycling	-	-	-	1
Recreational/ Competitive				
Recreational	2	4	2	2
Competitive	-	-	1	-
Competitive then recreational	1	-	1	1
Reason for choice				
Age	2	3	3	2

Competing not fun	1	1	-	-
More spontaneous	-	1	-	-
Doesn't like to be last	-	1	-	-
Not interested in competition	-	1	-	2
Received PA counselling				
Yes	1	1	3	1
No	2	2	-	2
Not at first	-	1	1	-
If yes, what did you learn?				
Nutrition and PA	1	-	1	1
Importance of PA	-	2	3	-
Different ways to control it	-	1	-	-
More for diet	-	1	-	-
Blood sugars and pressures	-	-	2	-
Was it helpful				
Yes	1	2	4	1
If no, would have liked to				
Yes	2	1	-	1
No	-	1	-	1
Would have liked to learn				
Risks of inactivity	1	-	-	-
Importance of PA	2	-	-	-
Guidance on what activities are good	-	1	-	1
About disease itself	1	-	-	-
Motivation	-	1	-	-
Help with heavy exercise	-	-	-	1
Diet restrictions	-	-	-	1
Currently doing RT				
Yes	1	1	2	3
No	-	3	2	-
Has tried before, not current	2	-	-	-
Interested in RT				
Yes	2	1	1	-
No	-	2	1	-
Health benefits of RT				
Tone body	2	-	1	1
Regulate weight	2	-	1	1
More functional strength	1	-	1	1
Conditioning	1	-	-	-
Helps blood pressure/sugars	1	-	1	-
Good for heart and organs	-	1	2	-
Strengthens muscle	-	1	2	-
Helps circulation	-	1	-	-
Feel better	-	-	1	-
Fountain of youth	-	-	-	1
Optimal program				
Happy with current program	2	3	1	1
More walking	1	-	2	-

Swimming/aquatics	1	1	-	1
Cycling	-	-	-	1
Gym program for seniors/diabetics	1	-	-	-
Walk every day	1	1	-	-
Badminton	1	-	-	-
Overall increase	1	-	1	-
Would like to skate more	-	1	-	-
Like to start RT	1	-	-	-
Gym 6 days a week	-	-	1	-
Barriers				
Afraid of dogs	1	-	-	-
Doesn't have instruction in RT	1	-	-	-
Facilities – not well maintained	1	-	-	-
Doesn't like gym because of skinny girls	1	-	-	-
Health	1	4	1	2
Weather	-	2	-	-
Family	-	1	-	-
Money	-	-	1	-
Work	-	-	1	-
Motivation	-	-	1	-

15. Table 4-3: Summary of Research Questions Two and Three results

	Women		Men	
	64 and under	65 and older	64 and under	65 and older
What do you think of when you hear the phrase 'physical activity'?				
Gets heart rate up	1	1	-	-
Makes you sweat	1	-	-	-
Running/jogging	1	-	1	-
Sports	1	-	1	-
Getting out and walking/moving	1	1	1	1
Exercising in some form	-	1	2	-
Not stressful/enjoyable	-	1	-	-
Commitment	-	1	-	-
Working out in the gym	-	-	2	1
Weight lifting	-	-	-	1
And 'aerobic activity'?				
Did not know	1	-	-	1
Traditional aerobics	2	2	1	1
Running	-	1	1	-
Exercise in some form	-	1	-	-
Inline dancing	-	-	1	-
Breathing hard/heart rate up	-	-	1	-
Activity in everyday life	-	-	-	1
And resistance activity?				
Pulling on bars	1	-	-	-
Weight lifting	2	2	3	2
Build muscle	-	1	-	-
Strengthens around the joint	-	1	-	-
Hard work	-	1	-	-
Wasn't sure	-	-	1	-
What is your understanding of PA guidelines?				
30mins x 7 days/week	1	-	-	-
30mins x 5 days/week	-	1	-	-
20mins x 7 days/week	-	-	1	-
30mins x 3 days/week	-	-	-	1
An hour a day	-	1	-	-
Didn't know	2	2	3	2
Heard of it after prompts	-	1	-	-

Chapter Five – Conclusions

5.0 Overview of Chapter

This chapter summarizes the major findings of Study One and Study Two. Recommendations for research, practice, policy and future directions are then provided.

5.1 Summary

5.1.1 Summary and synthesis of Study One and Study Two

Study One examined national survey results of 244 adults with type 2 diabetes to explore: (1) physical activity preferences, and whether these differed by age and/or sex; and, (2) relationships of physical activity-related, social-cognitive and behaviour measures with physical activity preferences, and whether these relationships differed by age and/or sex.

Results showed that walking was the most preferred activity by all participants. Women preferred scheduled, supervised sessions more than men. Women also preferred mild intensity activities, whereas men preferred moderate intensity activities. Those participants 64 years and younger preferred to receive physical activity counselling from an exercise specialist and moderate intensity activities more than participants 65 years and older.

The overwhelming majority of participants indicated they 'maybe preferred' or 'preferred' to receive physical activity counselling (91.7%). Also, similar to most of the physical activity research [Rogers, Courneya, Verhulst, Markwell & McAuley, in press; Wood, 2002; Wanko et al., 2004; Canadian Fitness and Lifestyle Research Institute

(CFLRI), 2007], participants indicated they were most interested in engaging in walking (59.8%). This is a lower proportion compared to other studies which may have been due to the open-ended format of the question. This study also found that approximately 25 percent of the participants were interested in resistance training. There has been some recent evidence in other clinical populations (i.e., cancer domain; Karvinen, Courneya, North & Venner, 2007; Jones et al., 2007) that people are becoming interested in engaging in this behaviour.

There were some differences between age and sex with regards to physical activity preferences. Regarding sex, the results showed that women were more likely to prefer to engage in physical activity with others as well as have structured or instructed sessions than men. Women may benefit more from a structured group-class atmosphere than men based on these results. However, evidence on the importance of social support has been varied (Marcus & Forsyth, 1998; White, Ransdell, Vener & Flohr, 2005). As with other research (Marcus & Forsyth, 1998), preference for higher intensity activities in the current study was found to be more common among men.

With regards to differences between age groups, younger participants indicated a preference for higher intensity activity which is also consistent with other preference literature in this area (Booth, Bauman, Owen & Gore, 1997; Karvinen et al., 2007). The results of this study are important because because determining the influences of physical activity preferences of persons with type 2 diabetes may be beneficial to increasing physical activity rates and adherence. This in turn could have a positive effect on the health care system in the long run.

To date, there appears to be no literature on the relationships of physical activity-related social-cognitive and behavioural measures with physical activity preferences for type 2 diabetes adults and only two studies on this topic outside of this population. There were limited significant findings when examining these relationships presented in Study One. Further, age and sex overall, did not differentiate between many of the significant relationships between social-cognitive and behavioural constructs with physical activity counselling and programming preferences.

Study Two was a qualitative study, utilizing semi-structured telephone interviews (n=14) to: (1) determine in detail physical activity preferences; (2) examine participants' understanding of the Canadian Diabetes Association's physical activity guidelines; and, (3) explore the meaning of physical, aerobic and resistance activity. Responses were examined to compare differences and similarities in age and/or sex. As in Study One, walking was cited by participants as their most preferred activity. Also consistent with Study One, the majority of participants indicated that some kind of physical activity counselling was or would be helpful and felt that physical activity was very important. Despite this, only one person could specify the Canadian Diabetes Association's physical activity guidelines. This suggests there may still be a need to educate people on specific terms and guidelines and expand educational material to include definitions for physical activity terminology.

Overall, participants viewed physical activity positively. There was a tendency towards misunderstanding the terminology traditionally used in the physical activity field (e.g., 'physical activity', 'aerobic activity' and 'resistance activity') and with the physical activity guidelines for people with type 2 diabetes. This study's information is useful

because a deeper understanding of program and counselling preferences may help researchers and practitioners provide the best service possible to this population. Specifically, in communication between adults with type 2 diabetes and their counsellors, there may be a discrepancy between levels of activity people think they are participating in, and what they may actually be doing.

Both Study One and Study Two examined physical activity preferences and whether differences between age and/or sex exist. Even though demographic differences and physical activity preferences was not a specific research question in Study Two, these results provide useful information that could be used to complement the findings from Study One.

Both studies showed common preferences for types of activity as well as some importance for social support. Preferences for social support in different situations and contexts may be important to operationalize with this population. Physical activity intensity also had many significant results in Study One and was often mentioned as a determining factor in Study Two. Suitable intensity for physical activity to remain achievable, interesting, and challenging may be important when deciding to engage in physical activity.

Overall, this research identifies a need for considering participant preferences when developing physical activity counselling and programming for people with type 2 diabetes. The number of significant differences indicate that people with type 2 diabetes have a wide range of preferences for activity. Based on this research and the limited physical activity preference literature that deals with social-cognitive constructs, it appears that confidence in ability (self-efficacy), attitude, and social support may be

important when beginning or maintaining a physical activity program. Chances of success therefore, may be increased by soliciting physical activity preferences and considering the social-cognitive influences of preferences of individuals before prescribing a program.

5.1.2 Strengths of Present Research

This research adds to limited studies on the physical activity preferences of adults living with type 2 diabetes beyond the current two studies. This also appears to be the first study to examine demographic differences in the relationships between physical activity-related, social-cognitive and behaviour measures with physical activity counselling and programming preference in this population. This research could contribute to a better understanding of physical activity adherence in this population. The mixed-methods of this research also helps strengthen and validate the results between the two studies. The large national sample in Study One allowed a broad perspective when examining the research questions whereas the qualitative methods of Study Two provided a deeper understanding of some of the information (i.e., physical activity preferences, barriers to activity, age and sex differences) in Study One. Due to the exploratory nature of this research, a wide variety of differences between demographic groups and the importance of social-cognitive and behaviour constructs with physical activity preferences are highlighted.

5.1.3 Limitations of the research

First, it is recognized that more quantitative and qualitative work is needed in this area with larger samples. Second, self-report measures were used in both studies to determine current physical activity levels which may mean that these measures are less

accurate than ones assessed by more objective assessments. Third, the referents for the employed social-cognitive measure were related to 'physical activity behaviour' rather than 'physical activity preferences'. Fourth, the lack of theoretical basis in both studies may also be seen as a limitation, however, using an exploratory method allowed analysis of many different social-cognitive variables which could be perceived as a study strength. Fifth, the sample in Study Two may have been over-represented by active individuals since they were recruited from a previous study that focused on physical activity. Sixth, due to logistic constraints, Study Two interview questions did not build specifically on the results of Study One. Seventh, there was no reliability check between answers given during the interviews and the previous answers from Study One. Eighth, there is a need to align social-cognitive constructs with preferences in terms corresponding to action, context, target and time according to Ajzen's Theory of Planned Behaviour. Finally, specific to Study Two, the primary researcher was the only coder when analysing the data. Additional coders could increase confirmability of these findings.

5.2 Recommendations and Future Directions

Research has shown that soliciting patients' physical activity preferences prior to admistering a program may help increase motivation to engage in physical activity. However, the literature appears to be silent regarding physical activity counselling and programming for people with type 2 diabetes and more research needs to be conducted on the topic.

Findings from Study One indicate some differences between men and women and older and younger groups regarding physical activity preferences. These differences

should to be taken into consideration when developing physical activity programs. Participants in Study Two also listed many barriers (e.g., health issues, weather conditions, facility access) to physical activity; researchers and practitioners need to gain a better understanding of these barriers in order to effectively tailor physical activity programs for this population.

It is important for researchers and practitioners to use valid measures when using self-report for physical activity. The employment of objective physical activity assessments would also be recommended when developing research projects and physical activity programs. Both forms of measurement should be used to expand the research in this field.

Walking was reported as the most preferred activity in both studies. As such, practitioners and researchers may focus on developing and promoting walking programs for those preferring this activity. Further, professionals could also educate this mode of activity for those not aware of walking activity's suitability and potential, along with finding other modes of activity for those not wanting to/unable to perform this form of activity. As well, the use of motivational aides such as a pedometer or a walking journal may help reinforce social-cognitive strategies (i.e., goal setting, building self-efficacy, self-monitoring). The development and evaluation of community walking groups may also be beneficial for those with type 2 diabetes.

Resistance training was cited as being of interest to a significant portion of the participants in both studies. With this in mind, more research on specific resistance training preferences and perceived and actual barriers regarding this behaviour is

necessary. Researchers and practitioners should work towards developing resistance programs that meet the specific needs and health requirements of this population.

Research in this thesis implies that enjoyment of an activity appears to be a more important preference than the specific intensity of an activity. In other words, a physical activity program may include more intense types of activity without adherence declining, if the participant finds the activity enjoyable. Enjoyment is a key factor in some social-cognitve theories such as the Theory of Planned Behaviour (TPB) (Ajzen, 1991) and Self-Determination Theory (SDT) (Deci & Ryan, 1985). TPB states that enjoyment influences motivation through affective attitude (Ajzen, 1991). Indeed, Courneya et al, (2008) demonstrated that the enjoyment belief within TPB's attitude construct, along with the theory's subject norms and perceieved behavioural control constructs were associated with physical activity preferences in cancer patients. SDT also incorporates interest and enjoyment through a person's motivation to engage in activity. To increase adherence to an activity program, SDT implies that it is ideal for a person to be intrinsically motivated. According to SDT, those who are intrinsically motivated tend to choose activities that are interesting and enjoyable rather than engaging in an activity because of external influences (Deci & Ryan, 1985). Appendix II provides a detailed rationale for employing SDT towards the understanding of physical activity preferences. The TPB and SDT therefore, may both provide a good theoretical basis for further research with physical activity preferences.

Tailoring programs, rather than using a generic 'one-size-fits-all' approach should be implemented given some of the observed differences within demographic groups, social-cognitive and behaviour constructs with physical activity counselling and

programming preferences. Meeting the needs, interests, motivation and level of behaviour may help to increase physical activity adherence over time. This means developing specific programs for a variety of settings, intensities, structures and types of activity. Research using longitudinal (non-interventional) and experimental designs is also important. This type of research may help identify causal inferences between behaviours and physical activity preferences.

One important consideration with regards to using physical activity preferences when developing a program is that a patient's preferences may not be the best choice. Some people may not have the knowledge or experience to make the best choices when considering health benefits of physical activity. Others may actually prefer not to engage in activity despite knowing health benefits. Researchers should focus on the more sedentary population in order to determine any differences between sedentary and non-sedentary program preferences.

Results from these studies indicate potential policy changes could be made to encourage more physically active behaviour for this population. Some participants in Study Two indicated that they were unable to afford gym memberships or that facilities were lacking up-keep. Policies that enforce improvement and maintenance of facilities or existing infrastructure (e.g., walking trails, sidewalks) should be prioritized. Improving accessibility and availability to physical activity counselling and programming and facilities would also be useful. Workplace policies could incorporate flexible hours and establish or increase wellness accounts designed to assist people in beginning or maintaining physical activity behaviour.

For health professionals, there is a need to engage in discussions with patients about the potential role of physical activity with regards to diabetes prevention and management. The lack of understanding of the Canadian Diabetes Association's guidelines for physical activity indicates that some patients may not be receiving enough information from their health care providers. Policies that ensure promotion of physical activity tailored to individuals' preferences in the health care setting may help develop more comprehensive and consistent treatment for those with type 2 diabetes.

In summary, physical activity is a very important part of diabetes management. It is important to have a comprehensive understanding of the barriers, motives and influences individuals face when engaging in, or contemplating physical activity. Tailoring interventions and physical activity programs to the specific needs and interests of individuals is an important component for health professionals and researchers in facilitating this behaviour.

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Appendix I

Study One Detailed Results Tables

PA counselling preferences

Table 1

Variable	N	%
Would you prefer to receive PA counselling? (n=229)		
Yes	136	59.4
No	19	8.3
Maybe	74	32.3
Who would you prefer to receive PA counselling from? (n=234)		
Doctor/specialist	32	13.7
Someone who has diabetes	16	6.8
Nurse	3	1.3
Diabetes education instructor	47	20.1
Exercise specialist with a diabetes centre	112	47.9
Exercise specialist with a community fitness centre	24	10.3
Where would you prefer to receive PA counselling? (n=241)		
At home	51	21.2
At a community fitness centre	65	27.0
At a diabetes centre	125	51.9
What method of PA counselling would you most prefer? (n=244)		
Face to face	195	79.9
By audiotape	2	0.8
By telephone	3	1.2
By pamphlet/brochure	12	4.9
By videotape	27	11.1
Over the internet	5	2.0

Exercise programming preferences

Table 2

Variable	N	%
When would you prefer to start a PA program? (n=235)		
At your diagnosis	156	66.4
3-6 months after diagnosis	59	25.1
At least 1 year after diagnosis	20	8.5
Who would you prefer to engage in aerobic activity with? (n=241)		

Alone	71	29.5
With others who have diabetes	108	44.8
With friends	70	29.0
With family	39	16.2
Where would you prefer to engage in aerobic activity? (n=241)		
At home	107	44.4
At a community fitness centre	89	36.9
At a diabetes fitness centre	83	34.4
What time of day would you prefer to engage in aerobic activity? (n=241)		
Morning	81	33.6
Afternoon	37	15.4
Evening	53	22.0
No preference	91	37.8
Who would you prefer to engage in strength activity with? (n=230)		
Alone	86	37.4
With others who have diabetes	90	39.1
With friends	55	23.9
With family	29	12.6
Where would you prefer to engage in strength activity? (n=230)		
At home	99	43.0
At a community fitness centre	92	40.0
At a diabetes fitness centre	70	30.4
What time of day would you prefer to engage in strength activity? (n=230)		
Morning	74	32.2
Afternoon	34	14.8
Evening	46	19.9
No preference	89	38.7
What intensity would you prefer your PA program to be? (n=239)		
Low	79	33.1
Moderate	140	58.6
High	10	4.2
No preference	10	4.2
What type of activities would you like to perform? (n=225)		
Same each time	79	35.1

Different each time	146	64.9
How would you like to perform these activities? (n=229)		
Supervised/instructed	128	55.9
Unsupervised/self-paced	101	44.1
What structure would you prefer your PA program to be? (n=228)		
Spontaneous/flexible	116	50.9
Scheduled (specific times/days)	112	49.1
What type of PA would you prefer? (n=229)		
Competitive	7	3.1
Recreational	222	96.9

Chi Square Tests by Sex

Table 3

	Sex				
Preference	Women N(%)	Men N (%)	F	df	p
Would have preferred to receive PA counselling at some point					
• Yes/maybe	99 (47.4)	110 (52.6)	.194	1	.660
• No	8 (42.1)	11 (57.9)			
Preferred source of counselling					
• Exercise specialist	68 (50.0)	68 (50.0)	1.167	1	.280
• Other	42 (42.9)	56 (57.1)			
Preferred place of counselling					
• At home	21 (41.2)	30 (58.8)	.689	2	.709
• At community fitness centre	29 (45.3)	35 (54.7)			
• At diabetes centre	60 (48.0)	65 (52.0)			
Preferred method of counselling					
• Face to face	92 (47.4)	102 (52.6)	.687	1	.407
• Other	20 (40.8)	29 (59.2)			
Interested in a PA program for T2D					
• Yes	79 (48.5)	84 (51.5)	3.013	2	.222
• No	1 (16.7)	5 (83.3)			
• Maybe	30 (41.7)	42 (58.3)			
Preferred time to start PA program					
• At diagnosis	73 (46.8)	83 (53.2)	.000	1	.995

• Sometime after diagnosis	37 (46.8)	42 (53.2)			
Social preference for aerobic activity					
• Alone	15 (29.4)	36 (70.6)	10.393	2	.006*
• With others	86 (53.4)	75 (46.6)			
• No preference	10 (35.7)	18 (64.3)			
Preferred place for aerobic activity					
• At home	33 (41.3)	47 (58.8)	3.773	2	.152
• Not at home	66 (52.0)	61 (48.0)			
• No preference	12 (36.4)	21 (63.6)			
Preferred time of day for aerobic activity					
• Morning	30 (46.9)	34 (53.1)	.244	3	.970
• Afternoon	11 (42.3)	15 (57.7)			
• Evening	18 (45.0)	22 (55.0)			
• No preference	52 (47.3)	58 (52.7)			
Social preference for strength activity					
• Alone	28 (38.4)	45 (61.6)	2.742	2	.254
• With others	65 (50.4)	64 (49.5)			
• No preference	12 (44.4)	15 (55.6)			
Preferred place for strength activity					
• At home	36 (46.8)	41 (53.2)	1.056	2	.590
• Not at home	57 (47.5)	63 (52.5)			
• No preference	12 (37.5)	20 (62.5)			
Preferred time of day for strength activity					
• Morning	27 (44.3)	34 (55.7)	.452	3	.929
• Afternoon	11 (44.0)	14 (56.0)			
• Evening	15 (42.9)	20 (57.1)			
• No preference	52 (48.1)	56 (51.9)			
Preferred intensity					
• Mild intensity	45 (57.7)	33 (42.3)	7.042	2	.030*
• Moderate/vigorous intensity	59 (39.3)	91 (60.7)			
• No preference	5 (50.0)	5 (50.0)			
Preferred activity type					
• Same activities each session	36 (45.6)	43 (54.4)	.023	1	.880
• Different activities each session	65 (44.5)	81 (55.5)			

Supervision preference					
• Supervised/instructed	67 (52.3)	61 (47.7)	4.927	1	.026*
• Unsupervised/self-paced	38 (37.6)	63 (62.4)			
Structure preference					
• Spontaneous/flexible	45 (38.8)	71 (61.2)	3.884	1	.049*
• Scheduled	58 (51.8)	54 (48.2)			
Organization preference					
• Competitive	0 (0)	7 (100)	5.903	1	.015*
• Recreational	103 (46.4)	119 (53.6)			

Chi Square Tests by Age

Table 4

	Age				
Preference	64 and under	65 and older	F	df	p
Would have preferred to receive PA counselling at some point					
• Yes/maybe	132 (63.2)	77 (36.8)	.088	1	.767
• No	12 (66.7)	6 (33.3)			
Preferred source of counselling					
• Exercise specialist	91 (66.9)	45 (33.1)	4.598	1	.032*
• Other	52 (53.1)	46 (46.9)			
Preferred place of counselling					
• At home	31 (60.8)	20 (39.2)	2.312	2	.315
• At community fitness centre	45 (70.3)	19 (29.7)			
• At diabetes centre	74 (59.2)	51 (40.8)			
Preferred method of counselling					
• Face to face	123 (63.4)	71 (36.6)	.421	1	.516
• Other	28 (58.3)	20 (41.7)			
Interested in a PA program for T2D					
• Yes	106 (65.0)	57 (35.0)	2.731	2	.255
• No	2 (33.3)	4 (66.7)			
• Maybe	43 (60.6)	28 (39.4)			
Preferred time to start PA program					
• At diagnosis	100(64.1)	56 (35.9)	.583	1	.445
• Sometime after diagnosis	46 (59.0)	32 (41.0)			

Social preference for aerobic activity					
• Alone	30 (60.0)	20 (40.0)	.474	2	.789
• With others	101(62.7)	60 (37.3)			
• No preference	19 (67.9)	9 (32.1)			
Preferred place for aerobic activity					
• At home	45 (57.0)	34 (43.0)	4.780	2	.092
• Not at home	79 (62.2)	48 (37.8)			
• No preference	26 (78.8)	7 (21.2)			
Preferred time of day for aerobic activity					
• Morning	33 (51.6)	31 (48.4)	21.645	3	.000*
• Afternoon	12 (46.2)	14 (53.8)			
• Evening	37 (82.5)	3 (7.5)			
• No preference	68 (62.4)	41 (37.6)			
Social preference for strength activity					
• Alone	42 (58.3)	30 (41.7)	1.485	2	.476
• With others	86 (66.7)	43 (33.3)			
• No preference	18 (66.7)	9 (33.3)			
Preferred place for strength activity					
• At home	41 (53.9)	35 (46.1)	5.654	2	.059
• Not at home	81 (67.5)	39 (32.5)			
• No preference	24 (75.0)	8 (25.0)			
Preferred time of day for strength activity					
• Morning	31 (50.8)	30 (49.2)	15.679	3	.001*
• Afternoon	15 (60.0)	10 (40.0)			
• Evening	31 (91.2)	3 (8.8)			
• No preference	69 (63.9)	39 (36.1)			
Preferred intensity					
• Mild intensity	36 (46.8)	41 (53.2)	13.092	2	.001*
• Moderate/vigorous intensity	105(70.0)	45 (30.0)			
• No preference	8 (80.0)	2 (20.0)			
Preferred activity type					
• Same activities each session	46 (59.0)	32 (41.0)	1.738	1	.187
• Different activities each session	99 (67.8)	47 (32.2)			
Supervision preference					

• Supervised/instructed	84 (66.1)	43 (33.9)	.802	1	.370
• Unsupervised/self-paced	61 (60.4)	40 (39.6)			
Structure preference					
• Spontaneous/flexible	76 (66.1)	39 (33.9)	.706	1	.401
• Scheduled	68 (60.7)	44 (39.3)			
Organization preference					
• Competitive	6 (85.7)	1 (14.3)	1.422	1	.233
• Recreational	141 (63.8)	80 (36.2)			

Oneway ANOVA and T-test tables (RQ2a social-cognitive, behaviour and preferences)

Table 5

Social Cognitive variable	Preferred place for PA counselling M(SD)			df	F	p
	At home	At a community fitness centre	At a diabetes centre			
Aerobic intention	4.38 (1.411)	4.82 (1.372)	4.60 (1.268)	2, 237	1.546	.215
Resistance intention	3.70 (1.783)	4.33 (1.535)	3.66 (1.573)	2, 237	4.071	.018*
Aerobic Self-efficacy	2.50 (0.941)	2.69 (0.986)	2.44 (1.038)	2, 234	1.350	.261
Resistance self-efficacy	2.10 (0.992)	2.33 (1.015)	1.87 (1.001)	2, 233	4.445	.013*
Aerobic pros	3.69 (1.092)	3.77 (1.018)	3.71 (0.999)	2, 235	.093	.911
Aerobic cons	1.85 (0.671)	1.76 (0.618)	1.89 (0.724)	2, 235	.701	.497
Resistance pros	3.31 (1.271)	3.29 (1.190)	3.00 (1.241)	2, 235	1.740	.178
Resistance cons	1.93 (0.679)	1.85 (0.704)	1.99 (0.827)	2, 235	0.783	.458
Aerobic injunctive norm	3.63 (0.894)	3.71 (1.003)	3.65 (0.887)	2, 235	0.144	.866
Aerobic descriptive norm	2.67 (1.017)	2.67 (1.031)	2.38 (0.979)	2, 235	2.531	.082
Aerobic social support	3.04 (0.920)	3.22 (1.137)	3.10 (0.998)	2, 234	0.461	.631
Resistance injunctive norm	3.32 (0.987)	3.44 (1.046)	3.13 (1.050)	2, 235	2.102	.124
Resistance descriptive norm	2.42 (1.066)	2.43 (0.968)	2.10 (0.932)	2, 235	3.354	.037*
Resistance social support	2.74 (1.010)	2.86 (1.212)	2.65 (1.074)	2, 235	0.766	.466
Aerobic attitude	5.13 (1.278)	5.20 (1.343)	5.16 (1.098)	2, 235	0.045	.956
Resistance attitude	4.44 (1.590)	4.74 (1.314)	4.31 (1.438)	2, 236	1.883	.154
Aerobic response efficacy	4.28 (0.815)	4.33 (0.791)	4.36 (0.614)	2, 234	0.248	.780
Resistance response efficacy	3.81 (1.076)	4.04 (0.883)	3.68 (1.070)	2, 235	2.690	.070

Environment	3.11 (0.955)	3.25 (1.095)	3.39 (1.005)	2, 236	1.372	.256
Behavioural Variables						
Strenuous + Moderate weekly minutes	88.8 (157.37)	76.1 (95.88)	93.0 (196.37)	2, 237	0.220	.802
Total weekly minutes	194.0 (240.06)	244.4 (404.00)	168.8 (228.40)	2, 237	1.467	.233
Total Weekly METs	15.95 (15.626)	17.48 (16.466)	18.92 (21.533)	2, 237	0.455	.636
Resistance frequency	1.06 (2.132)	0.95 (1.841)	0.76 (1.881)	2, 237	0.508	.602
Total weekly resistance minutes	19.7 (56.49)	20.4 (50.86)	19.8 (56.17)	2, 237	0.004	.996

Table 6

Social Cognitive variable	Preferred social support for aerobic activity			df	F	p
	Alone	With others	No preference			
Aerobic intention	4.52 (1.452)	4.65 (1.286)	4.77 (1.217)	2, 237	0.341	.711
Resistance intention	3.75 (1.758)	3.88 (1.551)	4.13 (1.601)	2, 237	0.508	.602
Aerobic Self-efficacy	2.53 (1.066)	2.49 (0.965)	2.73 (1.071)	2, 234	0.645	.526
Resistance self-efficacy	2.12 (0.984)	1.98 (0.980)	2.29 (1.236)	2, 233	1.292	.277
Aerobic pros	3.62 (1.161)	3.77 (0.944)	3.83 (1.055)	2, 235	0.546	.580
Aerobic cons	1.73 (0.642)	1.88 (0.680)	1.72 (0.568)	2, 235	1.513	.222
Resistance pros	3.08 (1.283)	3.14 (1.206)	3.45 (1.255)	2, 235		.407
Resistance cons	1.77 (0.651)	2.00 (0.787)	1.76 (0.570)	2, 235		
Aerobic injunctive norm	3.71 (0.774)	3.67 (0.949)	3.66 (0.882)	2, 235	0.033	.967
Aerobic descriptive norm	2.31 (0.840)	2.57 (1.059)	2.43 (0.874)	2, 235	1.364	.258
Aerobic social support	2.82 (0.953)	3.25 (1.002)	3.17 (1.052)	2, 234	3.451	.033*
Resistance injunctive norm	3.37 (0.808)	3.19 (1.105)	3.51 (0.954)	2, 235	1.412	.246
Resistance descriptive norm	2.11 (0.770)	2.29 (1.043)	2.26 (0.853)	2, 235	0.616	.541
Resistance social support	2.49 (0.907)	2.76 (1.127)	3.07 (1.109)	2, 235		.068
Aerobic attitude	5.20 (1.212)	5.11 (1.230)	5.39 (1.012)	2, 235	0.667	
Resistance attitude	4.52 (1.436)	4.36 (1.462)	4.96 (1.146)	2, 236	2.194	.114
Aerobic response efficacy	4.29 (0.615)	4.36 (0.723)	4.32 (0.734)	2, 234	0.164	.849
Resistance response efficacy	3.78 (0.939)	3.79 (1.079)	3.99 (0.824)	2, 235	0.483	.617
Environment	3.19 (1.098)	3.39 (0.972)	2.95 (1.054)	2, 236	2.613	.075
Behavioural Variables						

Strenuous + Moderate weekly minutes	70.3 (92.33)	79.7 (181.07)	169.8 (162.86)	2, 237	3.847	.023*
Total weekly minutes	204.2 (359.15)	176.8 (270.05)	288.3 (237.49)	2, 237	1.767	.173
Total Weekly METs	18.13 (16.004)	16.34 (19.795)	27.85 (17.348)	2, 237	4.341	.014*
Resistance frequency	0.92 (1.885)	0.63 (1.448)	2.00 (3.317)	2, 237	6.481	.002*
Total weekly resistance minutes	27.3 (63.50)	14.5 (43.80)	37.8 (84.73)	2, 237	2.747	.066

Table 7

Social Cognitive variable	Preferred place to engage in aerobic activity			df	F	p
	At home	Not at home	No preference			
Aerobic intention	4.55 (1.421)	4.60 (1.301)	4.97 (1.032)	2, 237	1.299	.275
Resistance intention	3.72 (1.754)	3.91 (1.564)	4.16 (1.321)	2, 237	0.923	.399
Aerobic Self-efficacy	2.60 (1.073)	2.44 (0.963)	2.69 (0.939)	2, 234	1.115	.330
Resistance self-efficacy	2.02 (1.051)	2.03 (1.002)	2.16 (1.005)	2, 233	0.232	.793
Aerobic pros	3.67 (1.075)	3.76 (0.993)	3.86 (0.877)	2, 235	0.463	.630
Aerobic cons	1.76 (0.659)	1.83 (0.633)	1.99 (0.763)	2, 235	1.471	.232
Resistance pros	2.98 (1.299)	3.22 (1.247)	3.39 (0.908)	2, 235	1.608	.202
Resistance cons	1.86 (0.715)	1.89 (0.738)	2.18 (0.793)	2, 235	2.390	.094
Aerobic injunctive norm	3.72 (0.848)	3.60 (0.955)	3.86 (0.822)	2, 235	1.182	.308
Aerobic descriptive norm	2.39 (0.942)	2.56 (1.039)	2.55 (0.978)	2, 235	0.728	.484
Aerobic social support	3.00 (0.991)	3.26 (0.986)	3.11 (1.111)	2, 234	1.584	.207
Resistance injunctive norm	3.23 (0.966)	3.18 (1.082)	3.67 (0.936)	2, 235	3.133	.045*
Resistance descriptive norm	2.16 (0.924)	2.28 (0.981)	2.35 (1.041)	2, 235	0.580	.561
Resistance social support	2.57 (1.018)	2.82 (1.112)	2.84 (1.161)	2, 235	1.400	.249
Aerobic attitude	5.27 (1.207)	5.03 (1.197)	5.45 (1.168)	2, 235	2.042	.132
Resistance attitude	4.33 (1.528)	4.44 (1.428)	4.86 (1.148)	2, 236	1.636	.197
Aerobic response efficacy	4.36 (0.682)	4.36 (0.700)	4.22 (0.758)	2, 234	0.530	.589
Resistance response efficacy	3.70 (1.100)	3.84 (1.028)	3.94 (0.788)	2, 235	0.758	.470
Environment	3.13 (1.016)	3.48 (0.973)	3.01 (1.075)	2, 236	4.548	.012*
Behavioural Variables						
Strenuous + Moderate weekly minutes	103.8 (218.41)	76.5 (139.56)	93.7 (107.47)	2, 237	0.678	.508

Total weekly minutes	191.1 (260.49)	183.5 (265.12)	250.0 (418.79)	2, 237	0.706	0495
Total Weekly METs	18.38 (14.445)	17.17 (20.646)	20.42 (16.414)	2, 237	0.401	0670
Resistance frequency	1.09 (2.456)	0.72 (1.557)	0.85 (1.881)	2, 237	0.987	.374
Total weekly resistance minutes	23.7 (65.61)	18.5 (51.23)	15.3 (36.32)	2, 237	0.349	.705

Table 8

Social Cognitive variable	Preferred social support for resistance activity			df	F	p
	Alone	With others	No preference			
Aerobic intention	4.58 (1.332)	4.62 (1.357)	4.88 (1.220)	2, 226	0.519	.596
Resistance intention	3.65 (1.757)	3.97 (1.519)	4.26 (1.622)	2, 226	1.709	.183
Aerobic Self-efficacy	2.52 (1.018)	2.47 (0.999)	2.93 (0.898)	2, 223	2.332	.099
Resistance self-efficacy	2.12 (1.044)	2.03 (1.000)	2.30 (1.061)	2, 222	0.810	.446
Aerobic pros	3.68 (1.104)	3.76 (0.974)	4.07 (0.677)	2, 224	1.567	.211
Aerobic cons	1.80 (0.756)	1.86 (0.652)	1.77 (0.561)	2, 224	0.319	.727
Resistance pros	3.01 (1.308)	3.20 (1.204)	3.63 (0.962)	2, 224	2.538	.081
Resistance cons	1.81 (0.788)	1.97 (0.719)	1.80 (0.581)	2, 224	1.417	.245
Aerobic injunctive norm	3.68 (0.813)	3.69 (0.945)	3.68 (0.987)	2, 224	0.002	.998
Aerobic descriptive norm	2.42 (0.850)	2.51 (1.095)	2.70 (0.765)	2, 224	0.769	.465
Aerobic social support	2.91 (0.945)	3.25 (1.073)	3.29 (0.837)	2, 223	2.959	.054
Resistance injunctive norm	3.29 (0.975)	3.28 (1.065)	3.31 (1.084)	2, 224	0.009	.991
Resistance descriptive norm	2.18 (0.813)	2.25 (1.032)	2.48 (0.912)	2, 224	1.010	.366
Resistance social support	2.56 (1.039)	2.82 (1.135)	2.88 (0.996)	2, 224	1.476	.231
Aerobic attitude	5.20 (1.244)	5.11 (1.151)	5.50 (0.930)	2, 224	1.251	.288
Resistance attitude	4.44 (1.588)	4.45 (1.345)	4.85 (1.090)	2, 225	0.993	.372
Aerobic response efficacy	4.36 (0.637)	4.30 (0.756)	4.52 (0.572)	2, 223	1.088	.339
Resistance response efficacy	3.74 (1.007)	3.82 (1.020)	4.06 (0.987)	2, 224	0.990	.373
Environment	3.19 (1.069)	3.34 (0.975)	3.26 (1.126)	2, 225	0.517	.597*
Behavioural Variables						
Strenuous + Moderate weekly minutes	93.4 (118.93)	84.5 (197.70)	103.5 (135.33)	2, 227	0.168	.646
Total weekly minutes	231.9 (337.90)	176.2 (275.07)	213.1 (249.77)	2, 227	0.879	.416
Total Weekly METs	19.55 (15.785)	16.96 (21.962)	20.09 (13.602)	2, 227	0.573	.565

Resistance frequency	1.49 (2.729)	0.63 (1.348)	0.44 (1.013)	2, 227	5.786	.004
Total weekly resistance minutes	30.3 (70.96)	16.6 (48.70)	12.5 (32.68)	2, 227	1.743	.177

Table 9

Social Cognitive variable	Preferred place to engage in resistance activity			df	F	P
	At home	Not at home	No preference			
Aerobic intention	4.35 (1.478)	4.69 (1.282)	5.17 (0.936)	2, 226	4.579	.011
Resistance intention	3.65 (1.790)	4.01 (1.508)	4.09 (1.550)	2, 226	1.428	.242
Aerobic Self-efficacy	2.45 (1.051)	2.52 (0.979)	2.85 (0.924)	2, 223	1.899	.152
Resistance self-efficacy	2.04 (1.030)	2.09 (1.019)	2.19 (1.027)	2, 222	0.220	.803
Aerobic pros	3.57 (1.078)	3.82 (0.986)	4.04 (0.685)	2, 224	2.967	.053
Aerobic cons	1.89 (0.743)	1.81 (0.641)	1.73 (0.637)	2, 224	0.732	.482
Resistance pros	2.98 (1.289)	3.26 (1.227)	3.45 (0.970)	2, 224	2.034	.133
Resistance cons	1.93 (0.778)	1.89 (0.710)	1.87 (0.697)	2, 224	0.108	.897
Aerobic injunctive norm	3.56 (0.854)	3.72 (0.952)	3.84 (0.839)	2, 224	1.252	.288
Aerobic descriptive norm	2.34 (0.971)	2.58 (1.034)	2.58 (0.812)	2, 224	1.463	.234
Aerobic social support	2.89 (0.973)	3.27 (1.039)	3.27 (0.948)	2, 223	3.652	.028*
Resistance injunctive norm	3.16 (1.041)	3.31 (1.034)	3.50 (1.012)	2, 224	1.296	.276
Resistance descriptive norm	2.16 (0.967)	2.30 (0.962)	2.30 (0.905)	2, 224	0.492	.612
Resistance social support	2.57 (1.049)	2.82 (1.115)	2.85 (1.091)	2, 224	1.402	.248
Aerobic attitude	5.06 (1.238)	5.11 (1.142)	5.77 (0.852)	2, 224	4.842	.009*
Resistance attitude	4.28 (1.590)	4.50 (1.306)	5.00 (1.164)	2, 225	3.015	.051
Aerobic response efficacy	4.27 (0.707)	4.38 (0.706)	4.43 (0.673)	2, 223	0.800	.450
Resistance response efficacy	3.27 (1.022)	3.84 (1.037)	3.99 (0.890)	2, 224	0.827	.439
Environment	3.28 (0.995)	3.36 (1.012)	2.97 (1.088)	2, 225	1.948	.145
Behavioural Variables						
Strenuous + Moderate weekly minutes	99.1 (220.78)	78.7 (143.42)	107.3 (105.04)	2, 227	0.544	.581
Total weekly minutes	195.2 (277.79)	187.6 (263.86)	245.8 (419.25)	2, 227	0.502	.606
Total Weekly METs	16.67 (16.506)	18.16 (21.810)	21.70 (15.071)	2, 227	0.763	.467
Resistance frequency	1.14 (2.512)	0.69 (1.466)	1.00 (1.704)	2, 227	1.408	.244
Total weekly resistance	20.3 (61.06)	20.0 (55.31)	23.0 (42.61)	2, 227	0.037	.964

minutes						

Table 10

Social Cognitive variable	Preferred time of day to engage in aerobic activity				df	F	P
	Morning	Afternoon	Evening	No preference			
Aerobic intention	4.72 (1.221)	4.10 (1.434)	4.68 (1.427)	4.69 (1.281)	3, 236	1.568	.198
Resistance intention	4.06 (1.582)	3.53 (1.764)	3.92 (1.518)	3.84 (1.605)	3, 236	0.711	.546
Aerobic Self-efficacy	2.46 (1.017)	2.15 (0.987)	2.59 (0.854)	2.63 (1.027)	3, 233	1.802	.147
Resistance self-efficacy	2.00 (0.982)	1.89 (0.926)	2.04 (0.958)	2.12 (1.079)	3, 232	0.414	.743
Aerobic pros	3.73 (0.949)	3.35 (1.174)	3.78 (0.910)	3.83 (1.018)	3, 234	1.617	.186
Aerobic cons	1.81 (0.609)	1.86 (0.681)	1.84 (0.726)	1.83 (0.671)	3, 234	0.049	.986
Resistance pros	3.09 (1.216)	2.86 (1.319)	3.20 (1.180)	3.26 (1.232)	3, 234	0.834	.477
Resistance cons	1.81 (0.620)	2.01 (0.845)	2.04 (0.886)	1.92 (0.728)	3, 234	0.909	.437
Aerobic injunctive norm	3.59 (0.994)	3.33 (1.145)	3.92 (0.703)	3.72 (0.831)	3, 234	2.525	.058
Aerobic descriptive norm	2.45 (0.992)	2.31 (1.174)	2.56 (1.028)	2.55 (0.955)	3, 234	0.511	.675
Aerobic social support	3.05 (1.115)	3.12 (0.957)	3.16 (0.975)	3.22 (0.974)	3, 233	0.409	.747
Resistance injunctive norm	3.15 (1.135)	2.98 (1.078)	3.52 (0.869)	3.31 (1.008)	3, 234	1.775	.153
Resistance descriptive norm	2.17 (0.885)	1.99 (1.047)	2.42 (1.020)	2.29 (0.977)	3, 234	1.213	.306
Resistance social support	2.63 (1.172)	2.62 (0.981)	2.92 (1.088)	2.77 (1.069)	3, 234	0.720	.541
Aerobic attitude	5.31 (1.097)	4.82 (1.413)	4.75 (1.311)	5.31 (1.130)	3, 234	3.231	.023*
Resistance attitude	4.61 (1.404)	4.00 (1.702)	4.30 (1.390)	4.55 (1.387)	3, 235	1.395	.245
Aerobic response efficacy	4.30 (0.716)	4.04 (0.846)	4.49 (0.590)	4.38 (0.681)	3, 233	2.369	.071
Resistance response efficacy	3.81 (0.954)	3.45 (1.049)	4.04 (0.925)	3.80 (1.077)	3, 234	1.716	.164
Environment	3.23 (1.110)	3.44 (0.937)	3.31 (0.799)	3.31 (1.054)	3, 235	0.272	.845
Behavioural Variables							
Strenuous + Moderate	69.3 (92.32)	59.8 (114.62)	73.4 (102.90)	110.5 (218.87)	3, 236	1.291	.278

weekly minutes							
Total weekly minutes	151.4 (169.13)	185.4 (293.02)	166.1 (162.17)	233.7 (367.35)	3, 236	1.299	.275
Total Weekly METs	15.93 (13.648)	13.80 (20.451)	16.43 (17.253)	20.79 (21.746)	3, 236	1.547	.203
Resistance frequency	0.80 (1.906)	0.76 (1.739)	0.70 (1.488)	0.95 (2.036)	3, 236	0.211	.889
Total weekly resistance minutes	17.6 (50.96)	18.2 (49.56)	13.8 (31.27)	23.7 (64.01)	3, 236	0.387	.763

Table 11

Social Cognitive variable	Preferred time of day to engage in resistance activity				df	F	P
	Morning	Afternoon	Evening	No preference			
Aerobic intention	4.75 (1.310)	4.20 (1.555)	4.55 (1.481)	4.70 (1.233)	3, 225	1.164	.324
Resistance intention	4.10 (1.654)	3.66 (1.895)	4.04 ()	(1.605)	3, 225	0.725	.538
Aerobic Self-efficacy	2.45 (1.037)	2.23 (1.086)	2.58 (0.857)	2.66 (0.995)	3, 222	1.424	.237
Resistance self-efficacy	2.00 (0.994)	2.06 (1.097)	2.16 (0.917)	2.12 (1.059)	3, 221	0.272	.845
Aerobic pros	3.76 (1.033)	3.63 (1.113)	3.65 (0.966)	3.85 (0.952)	3, 223	0.540	.656
Aerobic cons	1.79 (0.664)	1.88 (0.744)	1.88 (0.731)	1.82 (0.655)	3, 223	0.169	.917
Resistance pros	3.11 (1.293)	3.21 (1.316)	3.13 (1.087)	3.26 (1.212)	3, 223	0.237	.871
Resistance cons	1.82 (0.682)	1.99 (0.861)	1.97 (0.766)	1.90 (0.715)	3, 223	0.484	.694
Aerobic injunctive norm	3.69 (1.011)	3.46 (1.183)	3.79 (0.725)	3.76 (0.821)	3, 223	1.126	.339
Aerobic descriptive norm	2.48 (0.940)	2.46 (1.368)	2.54 (0.908)	2.51 (0.952)	3, 223	0.043	.988
Aerobic social support	3.03 (1.098)	3.26 (1.059)	3.04 (0.996)	3.22 (0.971)	3, 222	0.673	.570
Resistance injunctive norm	3.14 (1.194)	3.19 (1.185)	3.49 (0.787)	3.32 (0.972)	3, 223	0.957	.414
Resistance descriptive norm	2.21 (0.870)	2.11 (1.222)	2.43 (0.854)	2.26 (0.969)	3, 223	0.615	.606
Resistance social support	2.64 (1.166)	2.73 (1.115)	2.87 (1.070)	2.77 (1.060)	3, 223	0.352	.788
Aerobic attitude	5.30 (1.066)	5.00 (1.437)	4.69 (1.183)	5.33 (1.099)	3, 223	3.206	.024*
Resistance attitude	4.52 (1.431)	4.29 (1.750)	4.37 (1.184)	4.57 (1.374)	3, 224	0.363	.779
Aerobic response efficacy	4.27 (0.733)	4.15 (0.885)	4.37 (0.635)	4.43 (0.652)	3, 222	1.360	.256

Resistance response efficacy	3.74 (1.023)	3.74 (1.116)	3.97 (0.785)	3.84 (1.054)	3, 223	0.441	.724
Environment	3.13 (1.106)	3.46 (0.955)	3.31 (0.853)	3.32 (1.037)	3, 224	0.790	.501
Behavioural Variables							
Strenuous + Moderate weekly minutes	66.9 (94.11)	63.4 (119.85)	83.5 (109.29)	110.5 (219.55)	3, 226	1.139	.334
Total weekly minutes	164.4 (210.84)	188.0 (291.65)	180.3 (169.01)	225.9 (359.96)	3, 226	0.643	.588
Total Weekly METs	15.27 (13.650)	14.88 (21.783)	18.50 (18.012)	20.45 (21.672)	3, 226	1.216	.305
Resistance frequency	0.92 (2.035)	0.72 (1.671)	0.91 (1.579)	0.89 (2.011)	3, 226	0.071	.976
Total weekly resistance minutes	15.6 (40.31)	21.2 (54.24)	17.0 (33.09)	24.3 (68.12)	3, 226	0.372	.773

Table 12

Social Cognitive variable	Would have preferred to receive PA counselling		t	df	P
	Yes/Maybe	No			
Aerobic intention	4.67 (1.307)	4.01 (1.508)	2.071	226	.039*
Resistance intention	3.87 (1.602)	2.99 (1.636)	2.293	226	.023
Aerobic Self-efficacy	2.54 (1.001)	2.33 (1.065)	0.840	224	.402
Resistance self-efficacy	2.05 (1.020)	1.75 (1.013)	1.250	223	.213
Aerobic pros	3.74 (1.003)	3.44 (1.194)	1.214	225	.226
Aerobic cons	1.86 (0.691)	1.86 (0.785)	-0.050	225	.960
Resistance pros	3.13 (1.251)	3.07 (1.168)	0.218	225	.828
Resistance cons	1.93 (0.767)	1.99 (0.817)	-0.314	225	.754
Aerobic injunctive norm	3.68 (0.885)	3.49 (1.194)	0.687	20	.500
Aerobic descriptive norm	2.49 (0.993)	2.60 (1.210)	-0.427	225	.669
Aerobic social support	3.10 (1.018)	3.04 (1.099)	0.287	224	.775
Resistance injunctive norm	3.26 (1.046)	3.16 (1.084)	0.390	225	.697
Resistance descriptive norm	2.24 (0.975)	2.25 (1.121)	-0.036	225	.972
Resistance social support	2.67 (1.093)	2.82 (1.145)	-0.537	225	.592
Aerobic attitude	5.18 (1.174)	4.66 (1.510)	1.793	225	.074
Resistance attitude	4.46 (1.452)	4.05 (1.461)	1.161	226	.247
Aerobic response efficacy	4.34 (0.686)	4.23 (0.975)	0.681	224	.496
Resistance response efficacy	3.79 (1.020)	3.91 (1.165)	-0.507	225	.613
Environment	3.26 (1.031)	3.38 (0.993)	-0.488	226	.626

Behavioural Variables					
Strenuous + Moderate weekly minutes	87.5 (166.90)	113.2 (199.14)	-0.632	226	.528
Total weekly minutes	195.1(299.62)	208.4 (243.35)	-0.187	226	.852
Total Weekly METs	17.90 (19.152)	18.92 (22.700)	-0.219	226	.827
Resistance frequency	0.88 (1.927)	1.16 (2.141)	-0.606	226	.545
Total weekly resistance minutes	19.2 (51.17)	36.6 (93.34)	-0.802	19	.433

Table 13

Social Cognitive variable	Preferred source of PA counselling		t	df	P
	Exercise specialist	Other			
Aerobic intention	4.75 (1.354)	4.40 (1.256)	1.977	231	.049*
Resistance intention	3.90 (1.609)	3.70 (1.659)	0.908	231	.365
Aerobic Self-efficacy	2.58 (0.992)	2.45 (0.999)	0.972	229	.332
Resistance self-efficacy	2.10 (1.032)	1.92 (0.978)	1.338	228	.182
Aerobic pros	3.76 (1.010)	3.66 (1.034)	0.751	230	.453
Aerobic cons	1.83 (0.702)	1.85 (0.661)	-0.219	230	.827
Resistance pros	3.08 (1.234)	3.17 (1.253)	-0.527	230	.599
Resistance cons	1.92 (0.762)	1.96 (0.780)	-0.342	230	.733
Aerobic injunctive norm	3.69 (0.945)	3.62 (0.896)	0.544	230	.587
Aerobic descriptive norm	2.50 (1.020)	2.52 (0.980)	-0.132	230	.895
Aerobic social support	3.15 (1.088)	3.10 (0.953)	0.381	229	.703
Resistance injunctive norm	3.22 (1.094)	3.26 (0.986)	-0.303	230	.762
Resistance descriptive norm	2.21 (0.954)	2.29 (0.999)	-0.597	230	.551
Resistance social support	2.64 (1.147)	2.79 (1.042)	-1.044	230	.298
Aerobic attitude	5.30 (1.138)	5.04 (1.222)	1.649	229	.101
Resistance attitude	4.56 (1.415)	4.30 (1.450)	1.328	230	.186
Aerobic response efficacy	4.40 (0.690)	4.25 (0.648)	1.625	210	.106
Resistance response efficacy	3.83 (1.013)	3.68 (1.046)	1.076	229	.283
Environment	3.26 (1.035)	3.34 (1.008)	-0.602	230	.548
Behavioural Variables					
Strenuous + Moderate weekly minutes	81.6 (168.76)	99.2 (167.22)	-0.787	231	.432
Total weekly minutes	177.6 (292.14)	224.6 (292.13)	-1.212	231	.227
Total Weekly METs	16.20 (16.447)	20.44 (22.281)	-1.674	231	.096
Resistance frequency	1.01 (2.076)	0.66 (1.670)	1.443	228	.150

Total weekly resistance minutes	25.1 (60.25)	11.9 (44.64)	1.917	230	.056

Table 14

Social Cognitive variable	Preferred method of PA counselling		t	df	P
	Face-to-face	Other			
Aerobic intention	4.69 (1.306)	4.34 (1.367)	1.639	241	.102
Resistance intention	3.91 (1.566)	3.59 (1.817)	1.115	67	.269
Aerobic Self-efficacy	2.53 (0.976)	2.47 (1.106)	0.355	238	.723
Resistance self-efficacy	2.03 (0.984)	2.05 (1.143)	-0.088	237	.930
Aerobic pros	3.75 (1.014)	3.62 (1.041)	0.798	239	.425
Aerobic cons	1.82 (0.680)	1.94 (0.705)	-1.052	239	.294
Resistance pros	3.14 (1.254)	3.13 (1.181)	0.044	239	.965
Resistance cons	1.94 (0.773)	1.93 (0.733)	0.152	239	.879
Aerobic injunctive norm	3.68 (0.954)	3.58 (0.766)	0.815	90	.417
Aerobic descriptive norm	2.54 (1.018)	2.39 (0.939)	0.964	239	.336
Aerobic social support	3.16 (1.066)	3.02 (0.840)	0.964	92	.337
Resistance injunctive norm	3.22 (1.097)	3.37 (0.792)	-1.084	100	.281
Resistance descriptive norm	2.26 (1.009)	2.24 (0.839)	0.109	239	.913
Resistance social support	2.72 (1.147)	2.71 (0.898)	0.058	92	.954
Aerobic attitude	5.20 (1.557)	4.98 (1.362)	1.150	239	.251
Resistance attitude	4.45 (1.439)	4.46 (1.446)	-0.036	240	.971
Aerobic response efficacy	4.36 (0.714)	4.24 (0.659)	1.018	238	.310
Resistance response efficacy	3.79 (1.081)	3.86 (0.784)	-0.555	100	.580
Environment	3.33 (1.006)	3.15 (1.079)	1.071	240	.285
Behavioural Variables					
Strenuous + Moderate weekly minutes	81.3 (130.53)	110.8 (264.10)	-0.752	53	.455
Total weekly minutes	187.1 (281.46)	217.6 (313.93)	-0.659	241	.511
Total Weekly METs	17.78 (19.143)	18.09 (18.662)	-0.100	241	.921
Resistance frequency	0.83 (1.699)	1.02 (2.621)	-0.633	241	.527
Total weekly resistance minutes	19.4 (49.98)	21.0 (69.89)	-0.187	241	.852

Table 15

Social Cognitive variable	Preferred time to start PA program		t	df	P
	At diagnosis	After diagnosis			

Aerobic intention	4.70 (1.359)	4.49 (1.269)	1.161	232	.247
Resistance intention	3.97 (1.583)	3.69 (1.657)	1.257	232	.210
Aerobic Self-efficacy	2.55 (1.019)	2.49 (0.975)	0.398	230	.691
Resistance self-efficacy	2.09 (1.070)	1.98 (0.931)	0.778	169	.459
Aerobic pros	3.83 (0.996)	3.57 (1.042)	1.840	231	.067
Aerobic cons	1.84 (0.696)	1.81 (0.643)	0.326	231	.745
Resistance pros	3.26 (1.250)	2.94 (1.199)	1.847	231	.066
Resistance cons	1.95 (0.780)	1.85 (0.719)	0.936	231	.350
Aerobic injunctive norm	3.72 (0.876)	3.57 (0.976)	1.221	231	.223
Aerobic descriptive norm	2.51 (0.963)	2.53 (1.066)	-0.143	231	.887
Aerobic social support	3.22 (1.060)	2.98 (0.926)	1.690	230	.092
Resistance injunctive norm	3.34 (1.043)	3.10 (1.018)	1.647	231	.101
Resistance descriptive norm	2.28 (0.944)	2.25 (1.015)	0.242	231	.809
Resistance social support	2.79 (1.139)	2.60 (0.998)	1.275	231	.203
Aerobic attitude	5.27 (1.088)	4.99 (1.370)	1.618	130	.108
Resistance attitude	4.56 (1.404)	4.30 (1.503)	1.311	231	.191
Aerobic response efficacy	4.42 (0.609)	4.23 (0.758)	1.916	132	.058
Resistance response efficacy	3.86 (1.018)	3.65 (1.027)	1.490	230	.137
Environment	3.33 (1.050)	3.19 (0.999)	1.022	231	.308
Behavioural Variables					
Strenuous + Moderate weekly minutes	98.3 (180.02)	65.6 (134.55)	1.420	232	.157
Total weekly minutes	218.2 (322.70)	148.2 (204.04)	1.747	232	.082
Total Weekly METs	18.79 (17.697)	16.63 (21.979)	0.807	232	.420
Resistance frequency	1.05 (2.124)	0.56 (1.465)	2.051	209	.042*
Total weekly resistance minutes	25.2 (63.04)	10.3 (32.65)	2.371	232	.019*

Table 16

Social Cognitive variable	Preferred intensity		t	df	P
	Mild	Moderate/ strenuous			
Aerobic intention	3.93 (1.436)	4.98 (1.139)	-5.595	129	.000*
Resistance intention	3.13 (1.577)	4.22 (1.523)	-5.049	226	.000*
Aerobic Self-efficacy	2.04 (0.953)	2.76 (0.936)	-5.429	223	.000*
Resistance self-efficacy	1.61 (0.808)	2.25 (1.045)	-5.049	188	.000*
Aerobic pros	3.23 (1.086)	4.00 (0.843)	-5.425	122	.000*

Aerobic cons	1.93 (0.704)	1.76 (0.642)	1.795	224	.074
Resistance pros	2.72 (1.246)	3.35 (1.181)	-3.720	224	.000*
Resistance cons	1.96 (0.731)	1.90 (0.762)	0.516	224	.606
Aerobic injunctive norm	3.37 (0.932)	3.81 (0.888)	-3.455	224	.001*
Aerobic descriptive norm	2.30 (0.938)	2.61 (1.021)	-2.188	224	.030*
Aerobic social support	2.90 (1.046)	3.24 (1.000)	-2.424	223	.016*
Resistance injunctive norm	2.97 (1.010)	3.83 (1.027)	-2.903	224	.004*
Resistance descriptive norm	2.11 (0.918)	2.31 (0.977)	-1.510	224	.132
Resistance social support	2.48 (1.050)	2.82 (1.100)	-2.256	224	.025*
Aerobic attitude	4.57 (1.213)	5.47 (1.086)	-5.683	224	.000*
Resistance attitude	3.76 (1.390)	4.79 (1.382)	-5.290	225	.000*
Aerobic response efficacy	4.09 (0.782)	4.49 (0.602)	-4.270	223	.000*
Resistance response efficacy	3.59 (1.018)	3.92 (1.009)	-2.300	224	.022*
Environment	3.29 (1.030)	3.28 (1.043)	0.069	225	.945
Behavioural Variables					
Strenuous + Moderate weekly minutes	32.3 (121.30)	103.0 (120.63)	-4.201	158	.000*
Total weekly minutes	109.1 (189.55)	231.3 (302.70)	-3.742	227	.001*
Total Weekly METs	11.02 (20.580)	20.70 (16.243)	-3.904	227	.000*
Resistance frequency	0.57 (1.802)	0.99 (1.997)	-1.603	173	.111
Total weekly resistance minutes	4.87 (16.62)	25.3 (60.24)	-3.888	188	.000*

Table 17

Social Cognitive variable	Preferred activity type		t	df	P
	Same activities each session	Different activities each session			
Aerobic intention	4.56 (1.367)	4.65 (1.349)	-0.503	222	.615
Resistance intention	3.72 (1.666)	3.92 (1.615)	-0.900	222	.369
Aerobic Self-efficacy	2.45 (0.982)	2.53 (0.991)	-0.592	222	.554
Strength self-efficacy	1.94 (0.975)	2.13 (1.021)	-1.383	219	.168
Aerobic pros	3.69 (1.017)	3.75 (1.008)	-0.418	222	.676
Aerobic cons	1.85 (0.709)	1.83 (0.664)	0.217	222	.828
Resistance pros	3.04 (1.277)	3.21 (1.199)	-0.987	222	.325
Resistance cons	1.98 (0.844)	1.91 (0.714)	0.678	222	.499
Aerobic injunctive norm	3.60 (0.980)	3.71 (0.879)	-0.872	222	.384

Aerobic descriptive norm	2.33 (0.944)	2.58 (0.994)	-1.833	222	.068
Aerobic social support	3.03 (1.079)	3.17 (0.998)	-0.926	221	.356
Resistance injunctive norm	3.15 (1.078)	3.33 (1.015)	-1.229	222	.220
Resistance descriptive norm	2.10 (0.882)	2.32 (0.963)	-1.736	222	.084
Resistance social support	2.55 (1.061)	2.79 (1.099)	-1.591	222	.113
Aerobic attitude	5.12 (1.185)	5.13 (1.219)	-0.075	221	.940
Resistance attitude	4.35 (1.461)	4.47 (1.429)	-0.569	222	.570
Aerobic response efficacy	4.32 (0.733)	4.34 (0.635)	-0.164	220	.870
Resistance response efficacy	3.74 (1.128)	3.82 (0.965)	-0.555	141	.580
Environment	3.25 (1.023)	3.30 (1.028)	-0.344	222	.731
Behavioural Variables					
Strenuous + Moderate weekly minutes	87.2 (210.27)	87.3 (142.17)	-0.003	223	.997
Total weekly minutes	181.4 (346.10)	202.5 (264.87)	-0.512	223	.609
Total Weekly METs	16.53 (17.821)	18.79 (20.276)	-0.834	223	.405
Resistance frequency	0.80 (2.204)	0.96 (1.830)	-0.587	223	.558
Total weekly resistance minutes	18.4 (59.78)	22.0 (54.24)	-0.466	223	.642

Table 18

Social Cognitive variable	Supervision preference		t	df	P
	Supervised/ instructed	Unsupervised/ self-paced			
Aerobic intention	4.63 (1.356)	4.60 (1.347)	0.129	226	.898
Resistance intention	3.73 (1.552)	3.93 (1.697)	-0.931	226	.353
Aerobic Self-efficacy	2.48 (0.984)	2.55 (1.000)	-0.599	224	.549
Resistance self-efficacy	1.96 (0.966)	2.13 (1.045)	-1.262	222	.208
Aerobic pros	3.76 (1.023)	3.70 (0.995)	0.453	225	.651
Aerobic cons	1.83 (0.642)	1.84 (0.718)	-0.125	225	.901
Resistance pros	3.12 (1.246)	3.15 (1.220)	-0.192	225	.848
Resistance cons	1.91 (0.744)	1.96 (0.778)	-0.576	225	.565
Aerobic injunctive norm	3.71 (0.936)	3.60 (0.913)	0.891	225	.374
Aerobic descriptive norm	2.51 (1.039)	2.47 (0.955)	0.249	225	.804
Aerobic social support	3.26 (1.047)	2.94 (0.991)	2.355	224	.019*
Resistance injunctive norm	3.19 (1.090)	3.31 (0.970)	-0.898	225	.370
Resistance descriptive norm	2.22 (1.004)	2.24 (0.896)	-0.167	225	.868
Resistance social support	2.74 (1.151)	2.64 (1.033)	0.711	225	.478

Aerobic attitude	5.15 (1.233)	5.12 (1.159)	0.191	224	.848
Resistance attitude	4.40 (1.485)	4.45 (1.415)	-0.256	225	.798
Aerobic response efficacy	4.41 (0.660)	4.25 (0.674)	1.761	223	.080
Resistance response efficacy	3.80 (1.077)	3.77 (0.948)	0.192	224	.848
Environment	3.36 (1.026)	3.18 (1.024)	1.314	225	.190
Behavioural Variables					
Strenuous + Moderate weekly minutes	77.3 (142.47)	87.3 (116.70)	-0.573	227	.567
Total weekly minutes	166.7 (247.87)	220.0 (310.10)	-1.445	227	.150
Total Weekly METs	16.80 (21.451)	19.05 (15.260)	-0.891	227	.374
Resistance frequency	0.74 (1.584)	1.10 (2.335)	-1.316	168	.171
Total weekly resistance minutes	18.1 (50.46)	23.9 (61.93)	-0.783	227	.434

Table 19

Social Cognitive variable	Structure preference		t	df	P
	Spontaneous/ flexible	Scheduled			
Aerobic intention	4.67 (1.351)	4.57 (1.356)	0.518	225	.605
Resistance intention	3.89 (1.643)	3.81 (1.595)	0.349	225	.728
Aerobic Self-efficacy	2.50 (0.973)	2.51 (0.984)	-0.004	223	.997
Resistance self-efficacy	2.09 (1.005)	2.02 (0.998)	0.571	221	.549
Aerobic pros	3.78 (0.960)	3.47 (1.064)	0.816	224	.415
Aerobic cons	1.90 (0.762)	1.79 (0.591)	1.255	216	.211
Resistance pros	3.26 (1.220)	3.04 (1.220)	1.321	224	.188
Resistance cons	2.00 (0.791)	1.88 (0.740)	1.188	224	.236
Aerobic injunctive norm	3.71 (0.895)	3.64 (0.953)	0.601	224	.549
Aerobic descriptive norm	2.49 (0.948)	2.49 (1.045)	0.048	224	.962
Aerobic social support	3.10 (0.975)	3.18 (1.081)	-0.583	223	.561
Resistance injunctive norm	3.31 (1.009)	3.22 (1.078)	0.691	224	.490
Resistance descriptive norm	2.32 (0.922)	2.23 (1.007)	-0.004	224	.996
Resistance social support	2.74 (1.015)	2.71 (1.183)	0.170	215	.865
Aerobic attitude	5.11 (1.172)	5.17 (1.224)	-0.417	223	.677
Resistance attitude	4.48 (1.416)	4.42 (1.495)	0.333	224	.739
Aerobic response efficacy	4.35 (0.632)	4.36 (0.685)	-0.115	222	.908
Resistance response efficacy	3.83 (0.949)	3.89 (1.058)	0.324	223	.746
Environment	3.18 (1.076)	3.40 (0.952)	-1.660	224	.098

Behavioural Variables					
Strenuous + Moderate weekly minutes	86.2 (124.78)	89.9 (205.65)	-0.164	226	.870
Total weekly minutes	205.5 (273.87)	189.5 (316.49)	0.409	226	.683
Total Weekly METs	17.72 (15.475)	18.56 (22.862)	-0.323	226	.747
Resistance frequency	1.02 (1.925)	0.73 (1.903)	1.124	226	.262
Total weekly resistance minutes	22.7 (50.91)	18.2 (60.54)	0.607	226	.544

Table 20

Social Cognitive variable	Organizational preference		t	df	P
	Competitive	Recreational			
Aerobic intention	4.89 (1.376)	4.63 (1.333)	0.515	226	.607
Resistance intention	4.61 (1.117)	3.84 (1.615)	1.245	226	.214
Aerobic Self-efficacy	3.09 (1.255)	2.49 (0.972)	1.590	224	.113
Resistance self-efficacy	2.39 (1.183)	2.04 (0.993)	0.991	222	.363
Aerobic pros	4.33 (0.533)	3.72 (0.995)	1.608	225	.109
Aerobic cons	1.82 (0.925)	1.83 (0.654)	-0.060	225	.952
Resistance pros	3.63 (1.253)	3.14 (1.106)	1.066	225	.288
Resistance cons	1.76 (0.954)	1.94 (0.741)	-0.651	225	.516
Aerobic injunctive norm	3.93 (0.898)	3.68 (0.907)	0.726	225	.468
Aerobic descriptive norm	3.10 (1.371)	2.49 (0.990)	1.583	225	.115
Aerobic social support	3.90 (0.787)	3.11 (1.011)	2.064	224	.040*
Resistance injunctive norm	3.36 (1.290)	3.27 (1.023)	0.226	225	.822
Resistance descriptive norm	2.62 (1.446)	2.23 (0.949)	0.707	6	.506
Resistance social support	3.33 (1.202)	2.70 (1.081)	1.531	225	.127
Aerobic attitude	5.29 (0.994)	5.15 (1.200)	0.304	224	.761
Resistance attitude	4.64 (1.029)	4.45 (1.451)	0.357	225	.722
Aerobic response efficacy	4.29 (0.705)	4.36 (0.667)	-0.281	223	.779
Resistance response efficacy	3.71 (1.380)	3.81 (1.013)	-0.247	224	.805
Environment	3.97 (0.414)	3.27 (1.026)	4.075	9	.003*
Behavioural Variables					
Strenuous + Moderate weekly minutes	262.1 (230.72)	74.5 (123.75)	3.828	227	.000*
Total weekly minutes	306.3 (240.76)	187.3 (278.35)	1.118	227	.265
Total Weekly METs	35.79 (25.928)	17.13 (18.414)	2.606	227	.010*
Resistance frequency	1.14 (1.464)	0.83 (1.883)	0.437	227	.663

Total weekly resistance minutes	76.4 (134.50)	18.4 (51.04)	1.139	6	.298

Factorial ANOVA tables (RQ2b age differences in social-cognitive and behaviour with preferences)

Table 21

	Would have preferred to receive PA counselling						
	64 and under		65 and over				
Social Cognitive variable	Yes/ Maybe	No	Yes/ maybe	No	F	df	P
Aerobic intention	4.84 (1.240)	4.21 (1.117)	4.38 (1.382)	3.58 (2.262)	0.059	1	.808
Resistance intention	3.95 (1.630)	2.98 (1.436)	3.73 (1.564)	2.83 (2.206)	0.007	1	.933
Aerobic Self-efficacy	2.64 (0.938)	2.41 (1.048)	2.36 (1.087)	2.29 (1.255)	0.092	1	.761
Resistance self-efficacy	2.19 (1.030)	1.63 (0.921)	1.82 (0.972)	1.98 (1.314)	1.882	1	.171
Aerobic pros	3.89 (0.896)	3.74 (1.086)	3.48 (1.125)	2.98 (1.401)	0.454	1	.501
Aerobic cons	1.87 (0.686)	2.07 (0.802)	1.83 (0.703)	1.36 (0.570)	3.402	1	.066
Resistance pros	3.26 (1.203)	3.42 (0.949)	2.91 (1.309)	2.45 (1.461)	0.915	1	.340
Resistance cons	1.97 (0.785)	2.18 (0.761)	1.87 (0.735)	1.55 (0.878)	1.760	1	.186
Aerobic injunctive norm	3.89 (0.791)	3.79 (1.091)	3.32 (0.930)	3.00 (1.378)	0.249	1	.619
Aerobic descriptive norm	2.64 (0.936)	2.81 (1.226)	2.24 (1.045)	2.33 (1.265)	0.023	1	.879
Aerobic social support	3.13 (1.058)	3.28 (0.973)	3.06 (0.949)	2.67 (1.366)	1.020	1	.314
Resistance injunctive norm	3.43 (1.031)	3.35 (0.980)	2.95 (1.005)	2.83 (1.366)	0.004	1	.949
Resistance descriptive norm	2.33 (0.931)	2.50 (1.202)	2.07 (1.032)	1.83 (0.960)	0.645	1	.423
Resistance social support	2.67 (1.143)	2.99 (1.046)	2.68 (1.006)	2.56 (1.456)	0.603	1	.438
Aerobic attitude	5.30 (1.112)	5.08 (1.240)	4.98 (1.251)	3.92 (1.908)	1.873	1	.173
Resistance attitude	4.54 (1.416)	4.25 (1.138)	4.32 (1.521)	3.67 (2.137)	0.221	1	.638
Aerobic response efficacy	4.41 (0.651)	4.47 (0.674)	4.27 (0.631)	3.72 (1.405)	2.951	1	.087
Resistance response efficacy	3.84 (1.013)	4.25 (0.976)	3.68 (1.028)	3.17 (1.346)	3.050	1	.082
Environment	3.28 (0.975)	3.73 (1.009)	3.23 (1.129)	2.79 (0.738)	2.819	1	.095
Behavioural Variables							
Strenuous + Moderate weekly minutes	85.4 (131.18)	104.2 (211.12)	92.3 (216.94)	150.0 (200.80)	0.192	1	.662
Total weekly minutes	198.8 (313.21)	172.4 (221.70)	191.4 (277.62)	303.3 (295.48)	0.801	1	.372
Total Weekly METs	18.46 (19.898)	17.46 (23.232)	17.16 (17.898)	22.08 (25.498)	0.338	1	.561
Resistance frequency	0.69 (1.504)	0.50 (1.168)	1.21 (2.484)	2.67 (3.077)	2.704	1	.102
Total weekly resistance	16.1 (41.28)	32.5 (103.50)	24.9 (65.04)	50.8 (83.93)	0.106	1	.744

minutes							

Table 22

Social Cognitive variable	Preferred source of physical activity counselling				F	df	P
	64 and under		65 and over				
	Exercise specialist	Other	Exercise specialist	Other			
Aerobic intention	4.91 (1.235)	4.52 (1.141)	4.42 (1.531)	4.26 (1.377)	0.402	1	.527
Resistance intention	3.88 (1.593)	3.82 (1.700)	3.92 (1.659)	3.56 (1.619)	0.416	1	.519
Aerobic Self-efficacy	2.65 (0.906)	2.60 (0.967)	2.43 (1.146)	2.28 (1.021)	0.124	1	.725
Resistance self-efficacy	2.15 (1.026)	2.11 (1.018)	2.00 (1.048)	1.69 (0.887)	0.964	1	.327
Aerobic pros	3.92 (0.830)	3.81 (1.004)	3.45 (1.254)	3.48 (1.053)	0.261	1	.610
Aerobic cons	1.84 (0.681)	1.95 (0.695)	1.81 (0.750)	1.74 (0.608)	0.889	1	.347
Resistance pros	3.14 (1.160)	3.42 (1.199)	2.96 (1.378)	2.87 (1.263)	1.229	1	.269
Resistance cons	1.94 (0.773)	2.09 (0.822)	1.88 (0.747)	1.80 (0.703)	1.271	1	.261
Aerobic injunctive norm	3.87 (0.892)	3.88 (0.706)	3.31 (0.949)	3.31 (1.002)	0.002	1	.963
Aerobic descriptive norm	2.62 (0.921)	2.74 (1.034)	2.27 (1.171)	2.27 (0.856)	0.171	1	.679
Aerobic social support	3.16 (1.098)	3.12 (1.008)	3.12 (1.079)	3.06 (0.894)	0.004	1	.951
Resistance injunctive norm	3.33 (1.100)	3.53 (0.922)	2.99 (1.060)	2.95 (0.976)	0.733	1	.393
Resistance descriptive norm	2.25 (0.870)	2.50 (1.057)	2.13 (1.111)	2.04 (0.872)	1.608	1	.206
Resistance social support	2.60 (1.139)	2.84 (1.140)	2.73 (1.171)	2.73 (0.922)	0.608	1	.436
Aerobic attitude	5.46 (0.998)	5.18 (1.155)	4.97 (1.336)	4.88 (1.290)	0.346	1	.557
Resistance attitude	4.57 (1.339)	4.48 (1.438)	4.52 (1.574)	4.09 (1.452)	0.755	1	.386
Aerobic response efficacy	4.46 (0.670)	4.31 (0.608)	4.27 (0.721)	4.19 (0.695)	0.163	1	.687
Resistance response efficacy	3.84 (1.015)	3.79 (1.056)	3.80 (1.021)	3.55 (1.031)	0.478	1	.490
Environment	3.24 (0.965)	3.41 (0.986)	3.29 (1.176)	3.26 (1.040)	0.498	1	.481
Behavioural Variables							
Strenuous + Moderate weekly minutes	69.3 (94.63)	121.1 (190.79)	106.6 (261.00)	73.9 (132.66)	3.397	1	.067
Total weekly minutes	165.6 (277.73)	264.2 (346.73)	201.8 (321.24)	178.8 (206.98)	2.328	1	.128
Total Weekly METs	15.27 (13.607)	24.15 (27.037)	18.08 (21.115)	16.16 (14.174)	4.341	1	.038*
Resistance frequency	0.65 (1.393)	0.67 (1.605)	1.76 (2.901)	0.64 (1.760)	4.868	1	.028*
Total weekly resistance minutes	18.2 (45.75)	13.6 (51.87)	39.0 (81.00)	9.89 (34.94)	2.769	1	.097

Table 23

Social Cognitive variable	Preferred place for physical activity counselling						F	df	P
	64 and Under			65 and over					
	At home	At fitness centre	At diabetes centre	At home	At fitness centre	At diabetes centre			
Aerobic intention	4.81 (1.185)	4.86 (1.446)	4.73 (1.110)	3.68 (1.493)	4.76 (1.240)	4.42 (1.461)	2.293	2	.103
Resistance intention	3.97 (1.800)	4.17 (1.604)	3.72 (1.563)	3.25 (1.708)	4.74 (1.358)	3.57 (1.599)	2.026	2	.134
Aerobic Self-efficacy	2.68 (0.826)	2.70 (1.022)	2.53 (0.952)	2.18 (1.073)	2.66 (0.921)	2.30 (1.147)	0.618	2	.540
Resistance self-efficacy	2.31 (1.020)	2.31 (1.075)	1.99 (0.994)	1.74 (0.850)	2.39 (0.903)	1.70 (0.997)	1.330	2	.267
Aerobic pros	4.04 (0.782)	3.90 (1.006)	3.81 (0.886)	3.09 (1.298)	3.46 (1.004)	3.57 (1.137)	2.123	2	.122
Aerobic cons	1.90 (0.681)	1.82 (0.651)	1.91 (0.716)	1.75 (0.660)	1.63 (0.526)	1.85 (0.742)	0.164	2	.848
Resistance pros	3.65 (1.104)	3.28 (1.249)	3.14 (1.142)	2.73 (1.362)	3.31 (1.067)	2.80 (1.358)	1.868	2	.157
Resistance cons	2.04 (0.685)	1.89 (0.748)	2.04 (0.851)	1.74 (0.643)	1.75 (0.596)	1.92 (0.795)	0.221	2	.802
Aerobic injunctive norm	3.93 (0.693)	3.84 (0.946)	3.85 (0.794)	3.11 (0.982)	3.39 (1.088)	3.35 (0.939)	0.656	2	.520
Aerobic descriptive norm	2.98 (0.950)	2.77 (0.987)	2.46 (0.933)	2.13 (0.916)	2.44 (1.122)	2.25 (1.039)	1.748	2	.176
Aerobic social support	3.20 (0.768)	3.16 (1.190)	3.11 (1.056)	2.76 (1.101)	3.37 (1.012)	3.09 (0.917)	1.301	2	.274
Resistance injunctive norm	3.56 (0.880)	3.48 (1.063)	3.30 (1.057)	2.90 (1.044)	3.34 (1.028)	2.87 (0.994)	0.820	2	.441
Resistance descriptive norm	2.62 (1.078)	2.47 (0.874)	2.18 (0.927)	2.06 (0.972)	2.35 (1.184)	1.99 (0.938)	0.807	2	.447
Resistance social support	2.84 (0.950)	2.71 (1.236)	2.70 (1.142)	2.57 (1.113)	3.23 (1.100)	2.59 (0.974)	1.981	2	.140
Aerobic attitude	5.42 (1.025)	5.43 (1.121)	5.22 (1.132)	4.64 (1.532)	4.74 (1.678)	5.08 (1.052)	1.739	2	.178
Resistance attitude	4.66 (1.502)	4.72 (1.209)	4.40 (1.455)	4.06 (1.705)	4.82 (1.592)	4.19 (1.418)	0.724	2	.486
Aerobic response efficacy	4.38 (0.708)	4.47 (0.683)	4.41 (0.601)	4.11 (0.970)	4.18 (0.622)	4.29 (0.633)	0.416	2	.660
Resistance response efficacy	3.88 (0.998)	3.99 (0.979)	3.80 (1.070)	3.69 (1.218)	4.12 (0.601)	3.50 (1.057)	0.838	2	.434
Environment	2.93 (0.897)	3.30 (1.014)	3.47 (0.950)	3.42 (0.997)	3.09 (1.292)	3.27 (1.077)	2.139	2	.120
Behavioural Variables									
Strenuous + Moderate weekly minutes	101.9 (163.40)	78.9 (95.76)	85.7 (147.28)	67.5 (148.80)	73.5 (99.59)	103.5 (252.54)	0.423	2	.655

Total weekly minutes	215.1 (265.85)	246.6 (448.72)	161.6 (177.96)	159.6 (192.55)	251.9 (291.13)	179.3 (288.01)	0.273	2	.761
Total Weekly METs	17.56 (17.284)	16.98 (13.968)	19.85 (23.514)	13.30 (12.446)	19.58 (21.560)	17.58 (18.426)	0.449	2	.639
Resistance frequency	0.90 (1.921)	0.73 (1.558)	0.55 (1.240)	1.32 (2.473)	1.53 (2.366)	1.06 (2.525)	0.145	2	.865
Total weekly resistance minutes	25.2 (69.48)	18.4 (50.03)	13.2 (35.24)	10.8 (22.50)	26.3 (54.87)	29.3 (76.52)	1.304	2	.273

Table 24

	Preferred method for physical activity counselling						
	64 and under		65 and over				
Social Cognitive variable	Face to face	Other	Face to face	Other	F	df	P
Aerobic intention	4.85 (1.225)	4.52 (1.200)	4.41 (1.408)	4.10 (1.603)	0.002	1	.963
Resistance intention	3.98 (1.568)	3.57 (1.838)	3.78 (1.578)	3.60 (1.879)	0.184	1	.669
Aerobic Self-efficacy	2.59 (0.937)	2.70 (0.988)	2.41 (1.039)	2.18 (1.229)	1.024	1	.313
Resistance self-efficacy	2.14 (1.010)	2.16 (1.136)	1.83 (0.917)	1.89 (1.945)	0.014	1	.905
Aerobic pros	3.90 (0.900)	3.79 (0.910)	3.48 (1.148)	3.43 (1.199)	0.037	1	.848
Aerobic cons	1.84 (0.669)	2.10 (0.731)	1.80 (0.702)	1.69 (0.612)	2.833	1	.094
Resistance pros	3.29 (1.198)	3.23 (1.094)	2.89 (1.318)	3.03 (1.335)	0.246	1	.621
Resistance cons	1.96 (0.788)	2.15 (0.762)	1.91 (0.750)	1.58 (0.563)	4.373	1	.038*
Aerobic injunctive norm	3.91 (0.833)	3.68 (0.754)	3.27 (1.018)	3.48 (0.782)	2.360	1	.126
Aerobic descriptive norm	2.67 (0.960)	2.61 (1.010)	2.31 (1.084)	2.12 (0.774)	0.159	1	.690
Aerobic social support	3.21 (1.065)	2.93 (0.962)	3.07 (1.069)	3.18 (0.635)	1.380	1	.241
Resistance injunctive norm	3.40 (1.085)	3.51 (0.744)	2.90 (1.051)	3.21 (0.852)	0.366	1	.546
Resistance descriptive norm	2.35 (0.970)	2.38 (0.892)	2.09 (1.060)	2.07 (0.754)	0.026	1	.872
Resistance social support	2.75 (1.161)	2.57 (1.010)	2.67 (1.127)	2.93 (0.706)	1.481	1	.225
Aerobic attitude	5.36 (1.023)	5.11 (1.442)	4.94 (1.323)	4.85 (1.278)	0.166	1	.684
Resistance attitude	4.54 (1.412)	4.57 (1.331)	4.30 (1.496)	4.33 (1.649)	0.001	1	.976
Aerobic response efficacy	4.45 (0.634)	4.31 (0.685)	4.25 (0.726)	4.15 (0.644)	0.031	1	.860
Resistance response efficacy	3.87 (1.065)	3.83 (0.839)	3.62 (1.096)	3.88 (0.736)	0.812	1	.369
Environment	3.37 (0.965)	3.02 (0.998)	3.25 (1.081)	3.35 (1.206)	1.709	1	.192
Behavioural Variables							
Strenuous + Moderate weekly minutes	90.8 (143.34)	67.2 (102.93)	66.0 (104.49)	181.0 (396.72)	6.447	1	.012*

Total weekly minutes	200.0 (313.19)	183.1 (241.21)	167.3 (217.74)	276.2 (404.20)	1.713	1	.192
Total Weekly METs	18.92 (20.601)	16.09 (15.584)	16.06 (16.315)	21.07 (23.011)	1.520	1	.219
Resistance frequency	0.67 (1.434)	0.68 (1.744)	1.10 (2.071)	1.58 (3.580)	0.563	1	.454
Total weekly resistance minutes	18.7 (51.46)	10.5 (30.11)	20.9 (47.95)	37.6 (104.43)	1.882	1	.171

Table 25

	Preferred start time for a physical activity program						
	64 and under		65 and over				
Social Cognitive variable	At diagnosis	Sometime after diagnosis	At diagnosis	Sometime after diagnosis	F	df	P
Aerobic intention	4.84 (1.302)	4.68 (1.082)	4.45 (1.435)	4.27 (1.492)	0.027	1	.870
Resistance intention	4.01 (1.614)	3.77 (1.598)	3.91 (1.538)	3.57 (1.783)	0.057	1	.811
Aerobic Self-efficacy	2.59 (0.963)	2.68 (0.910)	2.46 (1.120)	2.23 (1.026)	1.238	1	.267
Resistance self-efficacy	2.18 (1.068)	2.13 (0.982)	1.93 (1.063)	1.76 (0.831)	0.161	1	.689
Aerobic pros	3.94 (0.872)	3.80 (0.947)	3.63 (1.174)	3.27 (1.110)	0.660	1	.417
Aerobic cons	1.87 (0.699)	1.90 (0.655)	1.79 (0.700)	1.66 (0.610)	0.690	1	.407
Resistance pros	3.34 (1.236)	3.13 (1.062)	3.12 (1.275)	2.69 (1.362)	0.416	1	.520
Resistance cons	1.99 (0.815)	1.98 (0.732)	1.87 (0.713)	1.65 (0.669)	1.081	1	.300
Aerobic injunctive norm	3.86 (0.860)	3.87 (0.778)	3.47 (0.857)	3.16 (1.091)	1.654	1	.200
Aerobic descriptive norm	2.60 (0.966)	2.80 (0.962)	2.35 (0.945)	2.17 (1.114)	1.900	1	.169
Aerobic social support	3.19 (1.106)	3.09 (0.898)	3.28 (0.974)	2.85 (0.969)	1.224	1	.270
Resistance injunctive norm	3.44 (1.072)	3.32 (0.961)	3.14 (0.964)	2.80 (1.051)	0.514	1	.474
Resistance descriptive norm	2.34 (0.949)	2.43 (0.937)	2.18 (0.933)	2.01 (1.096)	0.888	1	.347
Resistance social support	2.77 (1.193)	2.58 (0.961)	2.82 (1.042)	2.64 (1.079)	0.001	1	.970
Aerobic attitude	5.38 (1.033)	5.11 (1.307)	5.08 (1.172)	4.80 (1.464)	0.026	1	.873
Resistance attitude	4.64 (1.409)	4.29 (1.409)	4.42 (1.397)	4.31 (1.674)	0.331	1	.566
Aerobic response efficacy	4.47 (0.620)	4.28 (0.693)	4.31 (0.579)	4.16 (0.859)	0.060	1	.807
Resistance response efficacy	3.92 (1.026)	3.65 (1.013)	3.75 (1.005)	3.64 (1.072)	0.268	1	.605
Environment	3.28 (1.012)	3.30 (0.937)	3.43 (1.121)	3.04 (1.092)	1.935	1	.166
Behavioural Variables							
Strenuous + Moderate weekly minutes	88.2 (124.82)	78.2 (159.02)	116.4 (250.54)	48.9 (88.64)	1.453	1	.229
Total weekly minutes	222.3 (344.69)	137.6 (164.55)	210.7 (282.00)	166.5 (255.97)	0.237	1	.627

Total Weekly METs	18.55 (17.337)	18.32 (24.873)	19.22 (18.475)	14.11 (17.347)	0.779	1	.378
Resistance frequency	0.88 (1.695)	0.26 (0.855)	1.36 (2.720)	1.03 (2.008)	0.287	1	.593
Total weekly resistance minutes	23.3 (57.16)	4.24 (15.70)	28.4 (72.82)	19.7 (47.06)	0.436	1	.510

Table 26

Social Cognitive variable	Preferred social support during aerobic activity						F	df	P
	64 and Under			65 and over					
	Alone	With others	No preference	Alone	With others	No Preference			
Aerobic intention	4.80 (1.269)	4.77 (1.230)	4.92 (1.184)	4.12 (1.672)	4.45 (1.371)	4.44 (1.292)	0.355	2	.702
Resistance intention	3.97 (1.752)	3.86 (1.559)	4.20 (1.705)	3.40 (1.802)	3.91 (1.562)	3.97 (1.439)	0.684	2	.506
Aerobic Self-efficacy	2.58 (1.005)	2.58 (0.923)	2.93 (0.895)	2.48 (1.193)	2.35 (1.025)	2.29 (1.324)	0.597	2	.551
Resistance self-efficacy	2.32 (1.009)	2.05 (1.008)	2.43 (1.147)	1.82 (0.906)	1.86 (0.935)	2.01 (1.438)	0.461	2	.631
Aerobic pros	3.69 (1.211)	3.93 (0.804)	4.05 (0.721)	3.56 (1.120)	3.50 (1.100)	3.35 (1.487)	0.731	2	.482
Aerobic cons	1.89 (0.633)	1.91 (0.719)	1.68 (0.505)	1.44 (0.564)	1.83 (0.610)	1.79 (0.711)	1.903	2	.151
Resistance pros	3.14 (1.307)	3.28 (1.154)	3.56 (1.094)	3.01 (1.305)	2.91 (1.266)	3.22 (1.593)	0.160	2	.852
Resistance cons	1.90 (0.666)	2.05 (0.846)	1.79 (0.522)	1.52 (0.566)	1.90 (0.670)	1.70 (0.690)	0.499	2	.608
Aerobic injunctive norm	3.80 (0.729)	3.89 (0.856)	3.91 (0.826)	3.61 (0.835)	3.30 (0.993)	3.14 (0.801)	1.165	2	.314
Aerobic descriptive norm	2.46 (0.669)	2.73 (1.043)	2.54 (0.869)	2.12 (1.049)	2.31 (1.044)	2.19 (0.884)	0.038	2	.963
Aerobic social support	2.68 (0.961)	3.30 (1.016)	3.28 (1.084)	3.09 (0.927)	3.17 (0.980)	2.93 (0.997)	1.603	2	.204
Resistance injunctive norm	3.36 (0.848)	3.38 (1.099)	3.71 (0.921)	3.41 (0.774)	2.86 (1.047)	3.08 (0.927)	1.548	2	.215
Resistance descriptive norm	2.19 (0.665)	2.40 (1.026)	2.30 (0.860)	2.02 (0.933)	2.10 (1.055)	2.19 (0.884)	0.138	2	.871
Resistance social support	2.32 (0.912)	2.77 (1.144)	3.18 (1.204)	2.75 (0.881)	2.76 (1.109)	2.85 (0.899)	1.138	2	.322
Aerobic attitude	5.23 (1.165)	5.26 (1.130)	5.68 (0.916)	5.22 (1.320)	4.89 (1.355)	4.78 (0.972)	1.128	2	.325
Resistance attitude	4.58 (1.480)	4.39 (1.400)	5.26 (1.005)	4.45 (1.433)	4.32 (1.586)	4.33 (1.225)	0.967	2	.382
Aerobic response efficacy	4.26 (0.682)	4.47 (0.619)	4.40 (0.708)	4.35 (0.517)	4.22 (0.740)	4.15 (0.801)	1.211	2	.300
Resistance response efficacy	3.76 (0.951)	3.85 (1.080)	4.04 (0.831)	3.79 (0.964)	3.65 (1.071)	3.89 (0.850)	0.239	2	.787

Environment	3.11 (1.124)	3.42 (0.880)	2.92 (1.113)	3.34 (1.099)	3.33 (1.121)	3.03 (0.976)	0.476	2	.622
Behavioural Variables									
Strenuous + Moderate weekly minutes	91.2 (101.79)	70.1 (140.81)	170.4 (140.08)	42.5 (69.67)	97.3 (235.11)	168.3 (219.21)	0.972	2	.380
Total weekly minutes	243.9 (440.37)	167.6 (253.38)	288.3 (252.70)	151.3 (192.50)	195.1 (298.62)	288.3 (212.82)	0.782	2	.459
Total Weekly METs	21.18 (17.439)	16.11 (20.518)	27.12 (16.750)	13.58 (13.163)	17.01 (18.727)	29.59 (19.786)	1.018	2	.363
Resistance frequency	0.70 (1.557)	0.52 (1.188)	1.47 (2.435)	1.30 (2.319)	0.82 (1.809)	3.25 (4.803)	1.634	2	.197
Total weekly resistance minutes	22.7 (57.96)	14.3 (46.95)	24.5 (39.58)	35.5 (73.07)	15.0 (38.68)	69.4 (144.97)	1.690	2	.187

Table 27

Social Cognitive variable	Preferred place to perform aerobic activity						F	df	P
	64 and Under			65 and over					
	At home	Not at home	No preference	At home	Not at home	No Preference			
Aerobic intention	4.86 (1.144)	4.68 (1.342)	5.04 (0.953)	4.13 (1.676)	4.49 (1.247)	4.71 (1.342)	0.981	2	.377
Resistance intention	3.89 (1.732)	3.88 (1.618)	4.10 (1.405)	3.47 (1.808)	3.94 (1.505)	4.39 (0.999)	0.698	2	.498
Aerobic Self-efficacy	2.63 (0.937)	2.59 (0.977)	2.72 (0.842)	2.58 (1.260)	2.20 (0.899)	2.57 (1.316)	0.681	2	.507
Resistance self-efficacy	2.13 (1.007)	2.13 (1.055)	2.26 (1.024)	1.90 (1.125)	1.86 (0.900)	1.78 (0.897)	0.126	2	.882
Aerobic pros	3.81 (0.919)	3.92 (0.913)	3.97 (0.792)	3.50 (1.259)	3.50 (1.072)	3.47 (1.124)	0.106	2	.899
Aerobic cons	1.88 (0.664)	1.83 (0.678)	2.02 (0.715)	1.56 (0.614)	1.84 (0.557)	1.88 (0.981)	1.455	2	.236
Resistance pros	3.07 (1.240)	3.35 (1.208)	3.47 (0.925)	2.86 (1.405)	3.01 (1.294)	3.10 (0.840)	0.068	2	.935
Resistance cons	1.98 (0.710)	1.92 (0.818)	2.20 (0.769)	1.67 (0.697)	1.84 (0.588)	2.08 (0.936)	0.570	2	.566
Aerobic injunctive norm	3.89 (0.783)	3.84 (0.871)	3.95 (0.771)	3.52 (0.896)	3.22 (0.971)	3.50 (0.968)	0.471	2	.625
Aerobic descriptive norm	2.63 (0.842)	2.63 (1.054)	2.73 (0.879)	2.07 (0.997)	2.43 (1.013)	1.86 (1.086)	1.501	2	.225
Aerobic social support	2.99 (1.016)	3.29 (1.007)	3.13 (1.155)	3.03 (0.979)	3.20 (0.960)	3.05 (1.008)	0.087	2	.917
Resistance injunctive norm	3.33 (0.962)	3.35 (1.103)	3.79 (0.868)	3.11 (0.971)	2.90 (0.995)	3.26 (1.131)	0.369	2	.692
Resistance descriptive norm	2.34 (0.886)	2.29 (0.969)	2.51 (0.972)	1.92 (0.943)	2.26 (1.011)	1.76 (1.150)	1.822	2	.164
Resistance social	2.56 (1.075)	2.79 (1.136)	2.85 (1.208)	2.59 (0.964)	2.88 (1.080)	2.81 (1.052)	0.037	2	.963

support									
Aerobic attitude	5.38 (1.067)	5.17 (1.171)	5.62 (0.983)	5.15 (1.392)	4.83 (1.213)	4.86 (1.651)	0.416	2	.660
Resistance attitude	4.47 (1.539)	4.43 (1.382)	4.98 (1.109)	4.16 (1.542)	4.47 (1.528)	4.43 (1.272)	0.588	2	.556
Aerobic response efficacy	4.36 (0.627)	4.48 (0.631)	4.32 (0.715)	4.36 (0.778)	4.22 (0.616)	3.86 (0.858)	1.307	2	.273
Resistance response efficacy	3.72 (1.020)	3.90 (1.087)	3.97 (0.822)	3.66 (1.234)	3.72 (0.921)	3.81 (0.690)	0.072	2	.930
Environment	2.99 (1.004)	3.55 (0.843)	3.04 (1.114)	3.33 (1.029)	3.34 (1.158)	2.88 (0.981)	1.799	2	.168
Behavioural Variables									
Strenuous + Moderate weekly minutes	82.9 (111.40)	83.9 (158.01)	103.5 (108.80)	135.4 (311.83)	66.0 (104.25)	57.0 (101.45)	1.310	2	.272
Total weekly minutes	165.8 (201.53)	197.8 (283.60)	255.3 (460.98)	229.2 (326.65)	163.8 (234.52)	230.6 (222.30)	0.674	2	.511
Total Weekly METs	17.57 (16.470)	18.01 (22.559)	21.70 (15.772)	19.52 (19.145)	16.15 (17.284)	15.64 (19.148)	0.446	2	.641
Resistance frequency	0.82 (1.813)	0.68 (1.446)	0.42 (0.945)	1.48 (3.144)	0.79 (1.750)	2.00 (2.000)	1.618	2	.201
Total weekly resistance minutes	13.9 (30.71)	21.9 (60.23)	9.00 (28.54)	37.9 (93.99)	13.4 (31.91)	38.6 (53.28)	2.587	2	.077

Table 28

Social Cognitive variable	Preferred time of day to engage in aerobic activity								F	Do	P
	64 and under				65 and over						
	Morn	Aft	Eve	No pref	Morn	Aft	Eve	No pref			
Aerobic intention	4.94 (1.189)	4.10 (1.412)	4.68 (1.432)	4.91 (1.056)	4.51 (1.247)	4.10 (1.512)	4.58 (1.665)	4.34 (1.548)	0.368	3	.776
Resistance intention	4.12 (1.649)	3.38 (1.756)	3.91 (1.530)	3.93 (1.622)	4.00 (1.560)	3.67 (1.830)	4.08 (1.665)	3.67 (1.604)	0.236	3	.871
Aerobic Self-efficacy	2.61 (0.980)	2.02 (0.917)	2.62 (0.844)	2.74 (0.948)	2.30 (1.048)	2.02 (1.072)	2.15 (1.034)	2.48 (1.148)	0.554	3	.646
Resistance self-efficacy	2.18 (1.014)	1.76 (0.738)	2.08 (0.964)	2.25 (1.114)	1.80 (0.937)	2.02 (1.102)	1.48 (0.840)	1.90 (1.005)	0.739	3	.530
Aerobic pros	3.89 (0.838)	3.85 (0.800)	3.81 (0.935)	3.95 (0.922)	3.56 (1.041)	2.89 (1.302)	3.33 (0.297)	3.66 (1.150)	0.798	3	.496
Aerobic cons	1.80 (0.553)	2.07 (0.745)	1.87 (0.740)	1.88 (0.696)	1.81 (0.672)	1.66 (0.576)	1.52 (0.502)	1.73 (0.625)	0.707	3	.549

Resistance pros	3.18 (1.171)	3.27 (1.219)	3.23 (1.195)	3.37 (1.181)	2.99 (1.275)	2.48 (1.340)	2.86 (1.116)	3.10 (1.322)	0.386	3	.763
Resistance cons	1.79 (0.549)	2.23 (0.896)	2.05 (0.903)	2.01 (0.779)	1.83 (0.697)	1.80 (0.773)	1.81 (0.733)	1.76 (0.618)	0.779	3	.507
Aerobic injunctive norm	3.73 (1.024)	3.58 (0.979)	3.92 (0.731)	3.97 (0.728)	3.44 (0.957)	3.09 (1.271)	3.92 (0.144)	3.32 (0.842)	0.864	3	.460
Aerobic descriptive norm	2.55 (0.908)	2.44 (1.131)	2.59 (1.019)	2.76 (0.927)	2.35 (1.080)	2.18 (1.244)	2.11 (1.262)	2.22 (0.914)	0.458	3	.712
Aerobic social support	2.87 (1.178)	3.17 (0.948)	3.14 (1.005)	3.33 (0.984)	3.24 (1.026)	3.08 (1.001)	3.33 (0.577)	3.05 (0.944)	1.395	3	.245
Resistance injunctive norm	3.14 (1.225)	3.40 (0.907)	3.51 (0.888)	3.51 (1.021)	3.16 (1.052)	2.59 (1.110)	3.58 (0.722)	2.98 (0.912)	1.535	3	.206
Resistance descriptive norm	2.14 (0.829)	1.94 (0.919)	2.48 (0.999)	2.44 (0.952)	2.20 (0.953)	2.03 (1.190)	1.67 (1.202)	2.06 (0.993)	1.226	3	.301
Resistance social support	2.35 (1.158)	2.63 (0.975)	2.94 (1.105)	2.82 (1.131)	2.91 (1.135)	2.62 (1.026)	2.67 (1.000)	2.71 (0.979)	1.383	3	.249
Aerobic attitude	5.55 (1.056)	5.38 (1.047)	4.84 (1.280)	5.44 (1.002)	5.12 (1.080)	4.31 (1.548)	3.67 (1.443)	5.13 (1.305)	1.036	3	.377
Resistance attitude	4.76 (1.387)	4.04 (1.544)	4.39 (1.375)	4.60 (1.386)	4.47 (1.449)	3.96 (1.898)	3.17 (1.258)	4.48 (1.419)	0.525	3	.666
Aerobic response efficacy	4.47 (0.613)	4.14 (0.703)	4.54 (0.585)	4.37 (0.673)	4.21 (0.523)	3.95 (0.980)	3.89 (0.192)	4.38 (0.710)	1.198	3	.311
Resistance response efficacy	3.81 (1.034)	3.75 (0.878)	4.06 (0.955)	3.79 (1.082)	3.78 (0.864)	3.18 (1.152)	3.78 (0.385)	3.82 (1.091)	0.621	3	.602
Environment	3.14 (1.119)	3.75 (0.799)	3.32 (0.757)	3.28 (1.027)	3.29 (1.119)	3.15 (0.992)	3.24 (1.459)	3.36 (1.120)	0.884	3	.450
Behavioural Variables											
Strenuous + Moderate weekly minutes	76.4 (91.50)	22.1 (46.29)	72.8 (101.98)	111.3 (174.07)	64.0 (94.91)	94.6 (146.89)	80.0 (138.56)	111.7 (281.92)	0.403	3	.751
Total weekly minutes	171.2 (196.02)	125.4 (175.21)	143.9 (128.91)	253.6 (403.97)	135.3 (136.30)	240.8 (369.67)	440.0 (303.48)	204.7 (303.61)	1.626	3	.184
Total Weekly METs	15.73 (12.400)	9.38 (9.509)	15.76 (16.837)	22.99 (24.175)	16.65 (14.978)	17.88 (26.758)	24.67 (24.322)	17.22 (16.978)	1.359	3	.256
Resistance	0.67	0.17	0.65	0.79	0.97	1.31	1.33	1.22	0.318	3	.812

frequency	(1.614)	(0.577)	(1.438)	(1.579)	(2.213)	(2.250)	(2.309)	(2.641)			
Total weekly resistance minutes	18.8 (55.57)	1.67 (5.77)	13.8 (32.09)	21.2 (55.73)	16.9 (47.27)	33.5 (66.00)	13.3 (23.09)	28.4 (76.90)	0.573	3	.633

Table 29

Social Cognitive variable	Preferred social support during resistance activity						F	df	P
	64 and Under			65 and over					
	Alone	With others	No preference	Alone	With others	No Preference			
Aerobic intention	4.79 (1.173)	4.76 (1.266)	4.92 (1.269)	4.30 (1.521)	4.36 (1.517)	4.81 (1.184)	0.175	2	.840
Resistance intention	3.70 (1.734)	4.03 (1.497)	4.25 (1.772)	3.56 (1.844)	3.87 (1.595)	4.28 (1.372)	0.033	2	.968
Aerobic Self-efficacy	2.58 (0.927)	2.54 (0.973)	3.02 (0.784)	2.45 (1.160)	2.34 (1.050)	2.73 (1.119)	0.065	2	.937
Resistance self-efficacy	2.23 (0.984)	2.10 (1.034)	2.48 (1.078)	1.96 (1.140)	1.89 (0.934)	1.91 (0.973)	0.275	2	.760
Aerobic pros	3.81 (1.130)	3.89 (0.823)	4.06 (0.596)	3.52 (1.067)	3.49 (1.193)	4.10 (0.857)	0.509	2	.602
Aerobic cons	1.85 (0.736)	1.92 (0.688)	1.79 (0.503)	1.69 (0.792)	1.73 (0.558)	1.73 (0.694)	0.089	2	.915
Resistance pros	3.09 (1.278)	3.31 (1.169)	3.68 (0.704)	2.92 (1.386)	2.99 (1.262)	3.52 (1.391)	0.089	2	.915
Resistance cons	1.95 (0.789)	2.00 (0.764)	1.84 (0.541)	1.58 (0.751)	1.90 (0.618)	1.71 (0.681)	0.785	2	.457
Aerobic injunctive norm	3.89 (0.743)	3.82 (0.880)	4.01 (0.825)	3.41 (0.833)	3.42 (1.028)	3.00 (0.976)	1.231	2	.294
Aerobic descriptive norm	2.60 (0.716)	2.66 (1.090)	2.76 (0.831)	2.20 (0.982)	2.18 (1.044)	2.57 (0.641)	0.232	2	.793
Aerobic social support	2.87 (0.920)	3.24 (1.120)	3.39 (0.810)	2.99 (1.002)	3.26 (0.982)	3.09 (0.902)	0.380	2	.684
Resistance injunctive norm	3.40 (0.974)	3.38 (1.071)	3.74 (0.885)	3.15 (0.985)	3.07 (1.033)	2.44 (0.950)	2.580	2	.078
Resistance descriptive norm	2.26 (0.681)	2.36 (1.047)	2.56 (0.907)	2.07 (0.981)	2.02 (0.971)	2.33 (0.957)	0.156	2	.856
Resistance social support	2.43 (1.029)	2.81 (1.161)	3.07 (1.000)	2.77 (1.054)	2.84 (1.095)	2.48 (0.915)	1.563	2	.194
Aerobic attitude	5.38 (1.224)	5.20 (1.102)	5.53 (0.977)	4.98 (1.257)	4.98 (1.235)	5.44 (0.882)	0.207	2	.813
Resistance attitude	4.50 (1.566)	4.48 (1.322)	5.11 (1.051)	4.36 (1.668)	4.42 (1.422)	4.33 (1.031)	0.648	2	.524
Aerobic response efficacy	4.41 (0.662)	4.40 (0.648)	4.54 (0.550)	4.29 (0.615)	4.18 (0.788)	4.48 (0.648)	0.179	2	.836
Resistance response efficacy	3.72 (1.038)	3.86 (1.013)	4.28 (0.669)	3.75 (0.991)	3.70 (1.035)	3.63 (1.379)	0.983	2	.376
Environment	3.01 (1.085)	3.41 (0.883)	3.31 (1.110)	3.45 (1.025)	3.17 (1.139)	3.16 (1.217)	2.434	2	.090

Behavioural Variables									
Strenuous + Moderate weekly minutes	101.9 (97.37)	75.5 (152.99)	108.6 (147.35)	84.6 (145.70)	104.3 (268.21)	93.2 (114.94)	0.460	2	.632
Total weekly minutes	250.5 (394.04)	178.9 (272.14)	182.8 (184.09)	211.4 (249.22)	174.9 (285.95)	273.8 (352.89)	0.431	2	.650
Total Weekly METs	21.82 (15.544)	17.15 (22.821)	18.11 (12.670)	16.46 (16.111)	16.99 (20.507)	24.06 (15.286)	0.846	2	.431
Resistance frequency	1.02 (2.066)	0.58 (1.241)	0.50 (1.043)	2.20 (3.398)	0.74 (1.560)	0.33 (1.000)	2.000	2	.138
Total weekly resistance minutes	22.0 (51.56)	16.4 (50.52)	13.9 (34.71)	43.0 (91.90)	17.4 (45.97)	10.0 (30.00)	0.833	2	.436

Table 30

Social 0ognitive 0variable	Preferred place to perform resistance activity						F	df	P
	64 and Under			65 and over					
	At home	Not at home	No preference	At home	Not at home	No Preference			
Aerobic intention	4.72 (1.216)	4.70 (1.306)	5.19 (0.936)	3.90 (1.700)	4.67 (1.258)	5.10 (0.999)	2.102	2	.125
Resistance intention	3.85 (1.806)	3.98 (1.517)	4.07 (1.565)	3.40 (1.793)	4.07 (1.526)	4.16 (1.609)	0.624	2	.537
Aerobic Self-efficacy	2.60 (0.915)	2.57 (0.987)	2.76 (0.875)	2.28 (1.201)	2.40 (0.963)	3.14 (1.068)	1.134	2	.324
Resistance self-efficacy	2.20 (0.970)	2.15 (1.054)	2.31 (1.053)	1.86 (1.100)	1.98 (0.957)	1.83 (0.912)	0.296	2	.744
Aerobic pros	3.75 (0.952)	3.91 (0.911)	4.02 (0.748)	3.36 (1.201)	3.64 (1.116)	4.09 (0.483)	0.510	2	.601
Aerobic cons	1.94 (0.689)	1.88 (0.697)	1.77 (0.619)	1.81 (0.815)	1.67 (0.483)	1.59 (0.714)	0.089	2	.915
Resistance pros	3.16 (1.213)	3.30 (1.191)	3.49 (0.973)	2.77 (1.383)	3.17 (1.309)	3.32 (1.012)	0.245	2	.783
Resistance cons	2.06 (0.751)	1.94 (0.766)	1.91 (0.679)	1.76 (0.797)	1.78 (0.570)	1.73 (0.780)	0.196	2	.822
Aerobic injunctive norm	3.87 (0.655)	3.86 (0.894)	3.86 (0.924)	3.20 (0.936)	3.43 (1.015)	3.78 (0.558)	1.070	2	.345
Aerobic descriptive norm	2.62 (0.930)	2.68 (1.028)	2.64 (0.804)	2.02 (0.939)	2.37 (1.028)	2.42 (0.868)	0.599	2	.550
Aerobic social support	2.96 (0.904)	3.23 (1.123)	3.24 (0.975)	2.82 (1.071)	3.37 (0.838)	3.38 (0.916)	0.465	2	.628
Resistance injunctive norm	3.40 (0.983)	3.40 (1.063)	3.58 (0.977)	2.87 (1.066)	3.11 (0.956)	3.25 (1.142)	0.286	2	.752
Resistance descriptive norm	2.36 (0.996)	2.34 (0.959)	2.42 (0.782)	1.94 (0.903)	2.21 (0.975)	1.96 (1.201)	0.597	2	.552
Resistance social support	2.61 (1.030)	2.75 (1.175)	2.89 (1.089)	2.54 (1.102)	2.98 (0.973)	2.75 (1.165)	0.567	2	.568

Aerobic attitude	5.35 (1.050)	5.14 (1.202)	5.71 (0.859)	4.73 (1.381)	5.12 (1.001)	5.94 (0.863)	2.018	2	.135
Resistance attitude	4.51 (1.502)	4.44 (1.333)	5.06 (1.219)	4.00 (1.696)	4.63 (1.271)	4.81 (1.033)	1.400	2	.249
Aerobic response efficacy	4.34 (0.643)	4.46 (0.629)	4.40 (0.674)	4.17 (0.790)	4.28 (0.642)	4.50 (0.713)	0.450	2	.638
Resistance response efficacy	3.77 (0.926)	3.87 (1.082)	4.04 (0.776)	3.64 (1.153)	3.74 (0.941)	3.83 (1.222)	0.015	2	.985
Environment	3.13 (0.978)	3.48 (0.918)	2.87 (1.063)	3.48 (1.010)	3.10 (1.158)	3.27 (1.179)	3.488	2	.034*
Behavioural Variables									
Strenuous + Moderate weekly minutes	77.9 (113.52)	83.1 (157.39)	117.0 (104.83)	126.9 (303.58)	71.7 (112.03)	78.0 (107.01)	0.950	2	.388
Total weekly minutes	157.6 (206.22)	202.4 (280.59)	264.3 (476.14)	242.8 (343.44)	161.7 (228.12)	190.5 (169.84)	1.220	2	.297
Total Weekly METs	15.60 (14.367)	18.86 (23.386)	22.91 (14.286)	17.91 (19.057)	17.17 (18.441)	18.06 (17.751)	0.395	2	.674
Resistance frequency	0.66 (1.575)	0.64 (1.399)	0.96 (1.781)	1.74 (3.239)	0.79 (1.625)	1.13 (1.553)	1.422	2	.243
Total weekly resistance minutes	11.8 (29.64)	20.1 (58.53)	20.0 (39.75)	30.9 (84.19)	20.4 (49.37)	31.9 (52.23)	0.625	2	.536

Table 31

Social Cognitive variable	Preferred time of day to engage in resistance activity								F	df	p
	64 and under				65 and over						
	Morn	Aft	Eve	No pref	Morn	Aft	Eve	No pref			
Aerobic intention	5.05 (1.164)	4.38 (1.466)	4.56 (1.516)	4.86 (1.044)	4.46 (1.418)	3.89 (1.737)	4.58 (1.665)	4.43 (1.486)	0.169	3	.917
Resistance intention	4.20 (1.697)	3.57 (1.914)	4.04 (1.397)	3.90 (1.585)	4.00 (1.660)	3.81 (1.968)	4.08 (1.665)	3.62 (1.645)	0.172	3	.915
Aerobic self-efficacy	2.63 (0.999)	2.16 (1.082)	2.65 (0.845)	2.69 (0.927)	2.26 (1.058)	2.35 (1.148)	2.15 (1.034)	2.60 (1.122)	0.598	3	.617
Resistance self-efficacy	2.16 (1.019)	1.95 (1.058)	2.24 (0.920)	2.22 (1.080)	1.82 (0.969)	2.28 (1.207)	1.48 (0.840)	1.95 (1.010)	0.844	3	.471
Aerobic pros	3.93 (0.876)	3.99 (0.794)	3.71 (1.004)	3.92 (0.886)	3.58 (1.161)	3.02 (1.337)	3.33 (0.297)	3.71 (1.061)	0.926	3	.429
Aerobic cons	1.76 (0.551)	2.07 (0.761)	1.89 (0.752)	1.89 (0.684)	1.83 (0.771)	1.57 (0.645)	1.52 (0.502)	1.68 (0.581)	1.230	3	.300
Resistance pros	3.19	3.43	3.18	3.36	3.03	2.84	2.86	3.08	0.165	3	.920

	(1.242)	(1.266)	(1.112)	(1.142)	(1.360)	(1.390)	(1.116)	(1.326)			
Resistance cons	1.79 (0.601)	2.24 (0.903)	1.97 (0.787)	1.99 (0.743)	1.85 (0.767)	1.59 (0.637)	1.81 (0.733)	1.74 (0.638)	1.385	3	.248
Aerobic injunctive norm	3.81 (1.021)	3.77 (0.966)	3.81 (0.746)	3.93 (0.757)	3.35 (0.962)	2.94 (1.385)	3.92 (0.144)	3.45 (0.851)	0.694	3	.556
Aerobic descriptive norm	2.61 (0.919)	2.78 (1.307)	2.61 (0.882)	2.67 (0.948)	2.35 (0.957)	1.93 (1.372)	2.11 (1.262)	2.22 (0.901)	0.503	3	.681
Aerobic social support	2.96 (1.141)	3.36 (0.980)	3.03 (1.038)	3.25 (1.014)	3.11 (1.064)	3.11 (1.225)	3.33 (0.577)	3.16 (0.900)	0.360	3	.782
Resistance injunctive norm	3.26 (1.261)	3.57 (0.923)	3.51 (0.805)	3.44 (1.023)	3.03 (1.130)	2.56 (1.351)	3.58 (0.722)	3.09 (0.837)	1.000	3	.394
Resistance descriptive norm	2.23 (0.912)	2.27 (1.197)	2.53 (0.802)	2.36 (0.951)	2.23 (0.838)	1.85 (1.292)	1.67 (1.202)	2.06 (0.983)	0.704	3	.551
Resistance social support	2.49 (1.145)	2.79 (1.088)	2.90 (1.103)	2.75 (1.127)	2.79 (1.189)	2.63 (1.218)	2.67 (1.000)	2.81 (0.942)	0.355	3	.785
Aerobic attitude	5.63 (1.024)	5.47 (0.990)	4.81 (1.145)	5.32 (1.131)	5.02 (0.995)	4.22 (1.770)	3.67 (1.443)	5.34 (1.053)	2.835	3	.039*[a]
Resistance attitude	4.79 (1.395)	4.27 (1.522)	4.50 (1.147)	4.55 (1.438)	4.25 (1.461)	4.33 (2.179)	3.17 (1.258)	4.61 (1.269)	1.217	3	.304
Aerobic response efficacy	4.44 (0.617)	4.31 (0.718)	4.42 (0.655)	4.43 (0.634)	4.19 (0.562)	3.89 (1.106)	3.89 (0.192)	4.42 (0.692)	1.093	3	.353
Resistance response efficacy	3.83 (1.036)	3.98 (0.913)	3.98 (0.825)	3.82 (1.070)	3.61 (1.004)	3.33 (1.354)	3.78 (0.385)	3.87 (1.038)	0.767	3	.514
Environment	3.02 (1.044)	3.59 (0.952)	3.33 (0.821)	3.31 (1.019)	3.20 (1.179)	3.25 (0.979)	3.24 (1.459)	3.33 (1.083)	0.367	3	.777
Behavioural Variables											
Strenuous + Moderate weekly minutes	69.8 (92.49)	35.7 (77.11)	86.6 (109.61)	106.5 (171.55)	66.2 (98.06)	105.0 (160.78)	80.0 (138.56)	117.6 (288.07)	0.279	3	.841
Total weekly minutes	180.4 (227.61)	134.7 (161.43)	158.7 (136.38)	241.5 (395.98)	153.4 (196.43)	268.0 (417.66)	440.0 (303.48)	198.1 (288.11)	1.458	3	.227
Total Weekly METs	15.63 (12.869)	11.93 (13.830)	17.94 (18.003)	21.70 (23.805)	15.42 (14.575)	19.30 (30.522)	24.67 (24.322)	18.24 (17.338)	0.649	3	.585
Resistance frequency	0.74 (1.788)	0.33 (0.900)	0.90 (1.557)	0.67 (1.472)	1.13 (2.300)	1.30 (2.359)	1.33 (2.309)	1.28 (2.695)	0.137	3	.938

Total weekly resistance minutes	13.5 (33.05)	10.3 (34.87)	17.9 (34.55)	21.6 (61.81)	18.3 (47.59)	37.5 (73.91)	13.3 (23.09)	30.0 (78.62)	0.290	3	.833

[a] evening vs morning (p= .046) and no preference (p= .026)

Table 32

Social Cognitive variable	Preferred intensity of physical activity						F	df	p
	64 and Under			65 and over					
	Low intensity	Moderate/vigorous	No preference	Low intensity	Moderate/vigorous	No Preference			
Aerobic intention	4.42 (1.182)	4.94 (1.222)	4.78 (1.250)	3.49 (1.547)	5.09 (0.922)	4.63 (0.530)	4.577	2	.011*[a]
Resistance intention	3.31 (1.578)	4.13 (1.564)	4.31 (1.684)	2.93 (1.601)	4.33 (1.417)	4.75 (0.354)	1.243	2	.290
Aerobic Self-efficacy	2.26 (0.901)	2.74 (0.935)	2.76 (0.891)	1.84 (0.976)	2.81 (0.948)	3.07 (0.101)	1.817	2	.165
Resistance self-efficacy	1.74 (0.866)	2.27 (1.055)	2.60 (0.891)	1.47 (0.756)	2.18 (1.032)	3.00 (0.000)	0.444	2	.642
Aerobic pros	3.56 (0.887)	4.01 (0.845)	3.71 (1.181)	2.94 (1.185)	3.98 (0.850)	3.57 (0.202)	2.462	2	.087
Aerobic cons	1.93 (0.645)	1.82 (0.669)	2.25 (0.876)	1.92 (0.767)	1.62 (0.558)	2.07 (0.101)	0.429	2	.651
Resistance pros	2.92 (1.116)	3.37 (1.188)	3.63 (1.027)	2.55 (1.360)	3.32 (1.178)	3.36 (0.101)	0.435	2	.648
Resistance cons	2.01 (0.686)	1.95 (0.800)	2.27 (0.961)	1.90 (0.782)	1.78 (0.661)	1.86 (0.404)	0.132	2	.877
Aerobic injunctive norm	3.76 (0.792)	3.91 (0.843)	3.75 (0.768)	3.02 (0.929)	3.56 (0.947)	4.13 (0.530)	1.879	2	.155
Aerobic descriptive norm	2.49 (0.860)	2.70 (0.991)	2.63 (1.076)	2.14 (0.992)	2.38 (1.065)	2.50 (0.236)	0.038	2	.962
Aerobic social support	3.07 (1.024)	3.20 (1.056)	3.04 (0.916)	2.75 (1.064)	3.34 (0.855)	3.83 (0.236)	1.750	2	.176
Resistance injunctive norm	3.18 (1.031)	3.47 (1.041)	3.66 (0.823)	2.77 (0.975)	3.17 (0.971)	4.13 (0.530)	0.565	2	.569
Resistance descriptive norm	2.14 (0.863)	2.40 (0.953)	2.63 (1.133)	2.09 (0.984)	2.10 (1.012)	2.50 (0.236)	0.370	2	.691

Resistance social support	2.47 (1.083)	2.79 (1.137)	2.83 (0.943)	2.50 (1.045)	2.90 (1.017)	4.00 (0.000)	0.814	2	.444
Aerobic attitude	4.82 (1.226)	5.50 (1.044)	4.88 (0.835)	4.38 (1.195)	5.40 (1.189)	5.50 (0.707)	0.951	2	.388
Resistance attitude	3.72 (1.451)	4.80 (1.320)	4.69 (0.704)	3.78 (1.385)	4.76 (1.532)	5.75 (0.354)	0.499	2	.608
Aerobic response efficacy	4.23 (0.666)	4.52 (0.596)	3.88 (0.796)	4.03 (0.733)	4.42 (0.620)	4.33 (0.471)	0.839	2	.433
Resistance response efficacy	3.53 (1.099)	3.96 (0.990)	3.83 (0.891)	3.59 (0.941)	3.81 (1.058)	4.33 (0.471)	0.515	2	.598
Environment	3.21 (0.975)	3.30 (1.000)	3.64 (0.691)	3.35 (1.101)	3.23 (1.149)	3.43 (1.212)	0.288	2	.750
Behavioural Variables									
Strenuous + Moderate weekly minutes	47.1 (171.50)	95.9 (109.73)	136.8 (244.40)	20.8 (50.73)	119.6 (142.89)	840.0 (1187.94)	17.767	2	<.001*[b]
Total weekly minutes	129.7 (234.00)	222.7 (323.10)	158.6 (252.41)	94.7 (145.67)	251.3 (250.87)	840.0 (1187.94)	4.803	2	.009*[a]
Total Weekly METs	12.56 (27.516)	19.82 (15.469)	26.44 (25.722)	9.77 (12.475)	22.76 (17.934)	40.25 (56.922)	0.947	2	.390
Resistance frequency	0.44 (1.611)	0.69 (1.430)	1.75 (1.581)	0.71 (2.003)	1.69 (2.819)	1.50 (0.707)	1.111	2	.331
Total weekly resistance minutes	5.97 (20.24)	17.2 (43.76)	71.1 (123.73)	4.15 (13.32)	44.3 (85.06)	17.5 (3.54)	3.138	2	.045*[c]

[a] low sig different from mod/vig [b] all sig different from each other [c] low vs. mod/vig and no preference

Table 33

	Preferred type of activities for a physical activity program						
	64 and under		65 and over				
Social Cognitive variable	Same activity each session	Different activities each session	Same activity each session	Different activities each session	F	df	P
Aerobic intention	4.74 (1.129)	4.83 (1.288)	4.30 (1.653)	4.27 (1.413)	0.085	1	.771
Resistance intention	3.66 (1.512)	4.04 (1.618)	3.78 (1.912)	3.66 (1.595)	1.080	1	.300
Aerobic Self-efficacy	2.56 (0.915)	2.61 (0.940)	2.31 (1.076)	2.37 (1.086)	0.001	1	.969

Resistance self-efficacy	1.91 (0.937)	2.25 (1.030)	1.98 (1.055)	1.86 (0.956)	2.430	1	.120
Aerobic pros	3.72 (0.968)	3.96 (0.854)	3.68 (1.101)	3.30 (1.164)	4.692	1	.031*
Aerobic cons	1.89 (0.705)	1.86 (0.681)	1.76 (0.723)	1.75 (0.626)	0.013	1	.910
Resistance pros	2.82 (1.260)	3.47 (1.085)	3.38 (1.264)	2.65 (1.252)	15.985	1	<.001*
Resistance cons	2.04 (0.881)	1.96 (0.747)	1.88 (0.802)	1.79 (0.628)	0.003	1	.958
Aerobic injunctive norm	3.84 (0.901)	3.87 (0.804)	3.28 (1.014)	3.36 (0.942)	0.033	1	.856
Aerobic descriptive norm	2.51 (0.932)	2.70 (0.973)	2.10 (0.930)	2.32 (0.999)	0.007	1	.934
Aerobic social support	3.08 (1.147)	3.19 (1.001)	2.98 (0.998)	3.12 (1.000)	0.013	1	.911
Resistance injunctive norm	3.18 (1.167)	3.50 (0.962)	3.11 (0.969)	2.96 (1.039)	2.399	1	.123
Resistance descriptive norm	2.19 (0.913)	2.41 (0.937)	1.98 (0.846)	2.14 (1.003)	0.038	1	.845
Resistance social support	2.39 (1.103)	2.84 (1.110)	2.79 (0.983)	2.69 (1.078)	3.090	1	.080
Aerobic attitude	5.37 (1.013)	5.24 (1.170)	4.79 (1.346)	4.90 (1.302)	0.466	1	.495
Resistance attitude	4.32 (1.435)	4.58 (1.375)	4.42 (1.540)	4.23 (1.526)	1.193	1	.276
Aerobic response efficacy	4.41 (0.713)	4.41 (0.619)	4.20 (0.768)	4.18 (0.646)	0.032	1	.859
Resistance response efficacy	3.62 (1.208)	3.94 (0.925)	3.89 (1.015)	3.57 (1.012)	4.447	1	.036*
Environment	3.26 (0.984)	3.31 (0.972)	3.25 (1.106)	3.27 (1.149)	0.011	1	.918
Behavioural Variables							
Strenuous + Moderate weekly minutes	61.7 (87.61)	94.1 (152.04)	126.6 (311.92)	72.9 (118.95)	3.083	1	.081
Total weekly minutes	180.6 (365.71)	200.4 (271.03)	186.0 (326.86)	207.1 (254.22)	0.000	1	.987
Total Weekly METs	15.82 (17.533)	19.43 (21.061)	17.52 (18.737)	17.44 (18.660)	0.424	1	.516
Resistance frequency	0.46 (1.328)	0.77 (1.570)	1.31 (3.031)	1.36 (2.250)	0.213	1	.645
Total weekly resistance minutes	11.1 (32.93)	19.9 (54.78)	29.4 (84.88)	26.4 (53.40)	0.525	1	.470

Table 34

	Supervision preference for a physical activity program						
	64 and under		65 and over				
Social Cognitive variable	Supervised /instructed	Un-supervised /self-paced	Supervised /instructed	Un-supervised /self-paced	F	df	P
Aerobic intention	4.82 (1.261)	4.79 (1.207)	4.26 (1.490)	4.34 (1.514)	0.095	1	.758
Resistance intention	3.78 (1.543)	4.07 (1.642)	3.64 (1.602)	3.73 (1.780)	0.186	1	.667
Aerobic Self-efficacy	2.62 (0.932)	2.58 (0.943)	2.18 (1.039)	2.52 (1.094)	1.975	1	.161
Resistance self-efficacy	2.03 (1.005)	2.29 (1.009)	1.81 (0.884)	1.88 (1.065)	0.413	1	.521

Aerobic pros	3.93 (0.885)	3.81 (0.915)	3.42 (1.199)	3.53 (1.098)	0.709	1	.401
Aerobic cons	1.84 (0.692)	1.93 (0.676)	1.80 (0.532)	1.70 (0.766)	1.105	1	.294
Resistance pros	3.21 (1.211)	3.31 (1.140)	2.93 (1.323)	2.90 (1.309)	0.144	1	.705
Resistance cons	1.94 (0.827)	2.06 (0.734)	1.83 (0.545)	1.82 (0.828)	0.454	1	.501
Aerobic injunctive norm	3.92 (0.794)	3.77 (0.880)	3.30 (1.068)	3.34 (0.910)	0.558	1	.456
Aerobic descriptive norm	2.62 (1.004)	2.68 (0.903)	2.29 (1.091)	2.16 (0.958)	0.493	1	.483
Aerobic social support	3.29 (1.040)	2.96 (1.031)	3.23 (1.076)	2.90 (0.937)	0.000	1	.983
Resistance injunctive norm	3.33 (1.073)	3.48 (0.980)	2.91 (1.095)	3.06 (0.912)	0.000	1	.989
Resistance descriptive norm	2.27 (0.980)	2.43 (0.868)	2.14 (1.067)	1.95 (0.869)	1.792	1	.182
Resistance social support	2.71 (1.141)	2.67 (1.102)	2.83 (1.193)	2.60 (0.931)	0.370	1	.544
Aerobic attitude	5.33 (1.093)	5.21 (1.160)	4.80 (1.4231	4.99 (1.161)	0.870	1	.352
Resistance attitude	4.39 (1.438)	4.65 (1.333)	4.43 (1.611)	4.15 (1.499)	1.719	1	.191
Aerobic response efficacy	4.50 (0.600)	4.27 (0.688)	4.22 (0.748)	4.23 (0.658)	1.726	1	.190
Resistance response efficacy	3.82 (1.114)	3.84 (0.898)	3.74 (1.018)	3.66 (1.025)	0.136	1	.713
Environment	3.39 (0.950)	3.18 (1.005)	3.30 (1.185)	3.17 (1.066)	0.090	1	.764
Behavioural Variables							
Strenuous + Moderate weekly minutes	86.6 (159.16)	85.7 (102.68)	61.0 (103.56)	89.8 (136.72)	0.660	1	.417
Total weekly minutes	184.9 (282.32)	216.9 (335.91)	133.4 (162.04)	224.7 (270.07)	0.594	1	.442
Total Weekly METs	17.68 (23.103)	19.43 (14.958)	15.06 (18.218)	18.48 (15.886)	0.101	1	.750
Resistance frequency	0.65 (1.460)	0.72 (1.572)	0.93 (1.818)	1.68 (3.100)	1.605	1	.207
Total weekly resistance minutes	20.1 (57.81)	14.1 (33.70)	14.7 (32.67)	38.9 (87.78)	3.863	1	.051

Table 35

	Structure preference for a physical activity program						
	64 and under		65 and over				
Social Cognitive variable	Spontaneous /flexible	Scheduled	Spontaneous /flexible	Scheduled	F	df	P
Aerobic intention	4.89 (1.197)	4.72 (1.287)	4.23 (1.546)	4.35 (1.445)	0.621	1	.431
Resistance intention	3.98 (1.631)	3.85 (1.569)	3.70 (1.694)	3.76 (1.653)	0.181	1	.671
Aerobic Self-efficacy	2.63 (0.957)	2.61 (0.896)	2.28 (1.007)	2.34 (1.106)	0.096	1	.756
Resistance self-efficacy	2.24 (1.039)	2.07 (0.967)	1.81 (0.893)	1.93 (1.053)	1.084	1	.299
Aerobic pros	3.96 (0.783)	3.81 (1.008)	3.45 (1.171)	3.45 (1.125)	0.296	1	.587

Aerobic cons	1.94 (0.767)	1.81 (0.584)	1.82 (0.759)	1.76 (0.605)	0.144	1	.705
Resistance pros	3.46 (1.156)	3.06 (1.176)	2.89 (1.280)	3.02 (1.302)	2.381	1	.124
Resistance cons	2.02 (0.779)	1.95 (0.809)	1.95 (0.829)	1.77 (0.606)	0.234	1	.629
Aerobic injunctive norm	3.92 (0.800)	3.82 (0.869)	3.34 (0.955)	3.36 (1.024)	0.213	1	.645
Aerobic descriptive norm	2.61 (0.985)	2.67 (0.944)	2.30 (0.914)	2.19 (1.141)	0.402	1	.527
Aerobic social support	3.18 (1.017)	3.14 (1.086)	2.96 (0.886)	3.24 (1.083)	1.308	1	.254
Resistance injunctive norm	3.51 (1.004)	3.28 (1.067)	2.93 (0.925)	3.11 (1.099)	1.989	1	.160
Resistance descriptive norm	2.31 (0.927)	2.35 (0.954)	2.10 (0.918)	2.05 (1.073)	0.129	1	.720
Resistance social support	2.82 (1.093)	2.57 (1.152)	2.57 (0.847)	2.94 (1.210)	3.927	1	.049*
Aerobic attitude	5.20 (1.203)	5.39 (1.018)	4.95 (1.105)	4.82 (1.448)	0.923	1	.338
Resistance attitude	4.59 (1.451)	4.40 (1.343)	4.28 (1.356)	4.45 (1.731)	0.809	1	.369
Aerobic response efficacy	4.40 (0.628)	4.46 (0.628)	4.25 (0.646)	4.20 (0.752)	0.345	1	.558
Resistance response efficacy	3.85 (0.991)	3.84 (1.070)	3.79 (0.975)	3.70 (1.043)	0.094	1	.759
Environment	3.23 (1.035)	3.40 (0.891)	3.08 (1.172)	3.41 (1.054)	0.343	1	.559
Behavioural Variables							
Strenuous + Moderate weekly minutes	91.9 (120.21)	80.0 (156.43)	77.4 (135.15)	105.1 (265.80)	0.708	1	.401
Total weekly minutes	211.2 (288.83)	185.8 (325.98)	197.9 (248.45)	195.1 (304.85)	0.075	1	.784
Total Weekly METs	18.49 (16.208)	18.61 (23.749)	16.24 (14.244)	18.47 (21.690)	0.152	1	.697
Resistance frequency	0.92 (1.795)	0.43 (1.055)	1.23 (2.182)	1.20 (2.690)	0.794	1	.374
Total weekly resistance minutes	20.6 (48.00)	14.3 (50.71)	27.3 (57.03)	24.2 (73.44)	0.043	1	.836

Table 36

	Organizational preference for a physical activity program						
	64 and under		65 and over				
Social Cognitive variable	Competitive	Recreational	Competitive	Recreational	F	df	P
Aerobic intention	5.29 (0.967)	4.78 (1.238)	2.50 (0.000)	4.37 (1.465)	2.745	1	.099
Resistance intention	4.63 (1.222)	3.87 (1.595)	4.50 (0.000)	3.78 (1.669)	0.000	1	.987
Aerobic Self-efficacy	3.39 (1.058)	2.57 (0.911)	1.27 (0.000)	2.33 (1.071)	3.243	1	.073
Resistance self-efficacy	2.58 (1.178)	2.12 (1.000)	1.27 (0.000)	1.90 (0.975)	1.003	1	.318
Aerobic pros	4.45 (0.456)	3.85 (0.898)	3.57 (0.000)	3.48 (1.117)	0.232	1	.631

Aerobic cons	1.64 (0.879)	1.88 (0.674)	2.86 (0.000)	1.73 (0.607)	3.645	1	.058
Resistance pros	3.67 (1.369)	3.24 (1.165)	3.43 (0.000)	2.96 (1.271)	0.001	1	.975
Resistance cons	1.57 (0.899)	2.01 (0.778)	2.86 (0.000)	1.82 (0.660)	3.300	1	.071
Aerobic injunctive norm	4.08 (0.876)	3.86 (0.829)	3.00 (0.000)	3.36 (0.958)	0.379	1	.539
Aerobic descriptive norm	3.11 (1.501)	2.61 (0.931)	3.00 (0.000)	2.27 (1.061)	0.046	1	.831
Aerobic social support	4.06 (0.743)	3.12 (1.037)	3.00 (0.000)	3.10 (0.970)	0.879	1	.349
Resistance injunctive norm	3.42 (1.402)	3.40 (1.023)	3.00 (0.000)	3.03 (0.991)	0.001	1	.971
Resistance descriptive norm	2.56 (1.573)	2.32 (0.904)	3.00 (0.000)	2.08 (1.018)	0.419	1	.518
Resistance social support	3.39 (1.307)	2.67 (1.107)	3.00 (0.000)	2.74 (1.044)	0.146	1	.703
Aerobic attitude	5.50 (0.894)	5.28 (1.125)	4.00 (0.000)	4.92 (1.301)	0.775	1	.380
Resistance attitude	4.92 (0.801)	4.49 (1.407)	3.00 (0.000)	4.37 (1.543)	1.306	1	.254
Aerobic response efficacy	4.33 (0.760)	4.42 (0.644)	4.00 (0.000)	4.25 (0.704)	0.053	1	.818
Resistance response efficacy	3.67 (1.506)	3.85 (1.007)	4.00 (0.000)	3.74 (1.031)	0.158	1	.691
Environment	3.94 (0.445)	3.28 (0.979)	4.14 (0.000)	3.26 (1.119)	0.042	1	.838
Behavioural Variables							
Strenuous + Moderate weekly minutes	270.8 (251.48)	77.7 (125.61)	210.0 (0)	69.8 (121.51)	0.143	1	.705
Total weekly minutes	307.3 (263.72)	192.1 (305.04)	300.00 (0)	180.3 (227.14)	0.000	1	.988
Total Weekly METs	36.92 (28.212)	17.59 (19.225)	29.00 (0)	16.31 (17.102)	0.105	1	.746
Resistance frequency	1.33 (1.506)	0.65 (1.493)	0 (0)	1.16 (2.405)	0.828	1	.364
Total weekly resistance minutes	89.2 (142.63)	14.2 (39.04)	0 (0)	26.0 (67.02)	2.871	1	.092

Factorial ANOVA tables (RQ2b sex differences in social-cognitive and behaviour with preferences)

Table 37

	Would have preferred to receive PA counselling						
	Women		Men				
Social Cognitive variable	Yes/ Maybe	No	Yes/ maybe	No	F	df	p
Aerobic intention	4.61 (1.296)	4.66 (0.981)	4.73 (1.323)	3.55 (1.688)	3.724	1	.055
Resistance intention	3.68 (1.571)	3.34 (1.322)	4.04 (1.625)	2.73 (1.849)	1.569	1	.212
Aerobic Self-efficacy	2.43 (0.969)	2.53 (1.034)	2.63 (1.024)	2.19 (1.112)	1.270	1	.261
Resistance self-efficacy	1.81 (0.929)	1.55 (0.745)	2.27 (1.059)	1.89 (1.184)	0.050	1	.823

Aerobic pros	3.80 (0.983)	3.79 (0.935)	3.69 (1.023)	3.19 (1.339)	0.968	1	.326
Aerobic cons	1.94 (0.697)	1.80 (0.483)	1.79 (0.681)	1.91 (0.969)	0.569	1	.451
Resistance pros	3.04 (1.257)	3.34 (0.775)	3.21 (1.246)	2.87 (1.390)	1.107	1	.294
Resistance cons	1.98 (0.707)	1.95 (0.458)	1.90 (0.819)	2.03 (1.026)	0.183	1	.669
Aerobic injunctive norm	3.53 (1.011)	3.81 (1.223)	3.82 (0.734)	3.25 (1.173)	3.758	1	.054
Aerobic descriptive norm	2.33 (0.932)	2.46 (1.053)	2.64 (1.027)	2.70 (1.354)	0.020	1	.887
Aerobic social support	2.96 (1.133)	3.46 (0.641)	3.24 (0.886)	2.73 (1.281)	4.255	1	.040*
Resistance injunctive norm	3.08 (1.168)	3.16 (0.999)	3.41 (0.900)	3.16 (1.190)	0.427	1	.514
Resistance descriptive norm	2.11 (0.934)	2.13 (0.775)	2.35 (1.001)	2.33 (1.350)	0.003	1	.953
Resistance social support	2.52 (1.174)	2.94 (0.654)	2.81 (1.001)	2.73 (1.428)	0.874	1	.351
Aerobic attitude	5.08 (1.317)	5.31 (0.923)	5.28 (1.019)	4.18 (1.707)	5.322	1	.022*
Resistance attitude	4.18 (1.562)	4.13 (1.094)	4.70 (1.312)	4.00 (1.732)	0.855	1	.356
Aerobic response efficacy	4.45 (0.635)	4.46 (0.711)	4.28 (0.649)	4.06 (1.134)	0.462	1	.497
Resistance response efficacy	3.78 (1.079)	4.25 (0.850)	3.78 (0.968)	3.67 (1.333)	1.365	1	.244
Environment	3.20 (1.061)	3.93 (0.764)	3.31 (1.006)	2.99 (0.978)	4.513	1	.035*
Behavioural Variables							
Strenuous + Moderate weekly minutes	75.0 (181.82)	11.3 (22.32)	99.4 (152.92)	187.3 (238.08)	3.477	1	.065
Total weekly minutes	194.1 (362.26)	80.6 (55.96)	197.9 (232.74)	301.3 (286.10)	2.289	1	.132
Total Weekly METs	15.47 (15.572)	10.00 (6.687)	20.23 (21.690)	25.41 (28.040)	1.297	1	.256
Resistance frequency	0.80 (1.764)	0 (0)	0.95 (2.074)	2.00 (2.530)	3.851	1	.051
Total weekly resistance minutes	13.9 (35.07)	0 (0)	24.2 (62.03)	63.2 (117.18)	3.923	1	.049*

Table 38

	Preferred source of physical activity counselling						
	Women		Men				
Social Cognitive variable	Exercise specialist	Other	Exercise specialist	Other	F	df	P
Aerobic intention	4.75 (1.385)	4.45 (1.062)	4.75 (1.333)	4.37 (1.389)	0.061	1	.805
Resistance intention	3.70 (1.641)	3.81 (1.519)	4.09 (1.563)	3.62 (1.764)	1.820	1	.179
Aerobic Self-efficacy	2.50 (0.942)	2.46 (0.993)	2.66 (1.039)	2.45 (1.013)	0.403	1	.526
Resistance self-efficacy	1.85 (0.913)	1.84 (0.989)	2.35 (1.089)	1.98 (0.974)	1.839	1	.176
Aerobic pros	3.84 (0.983)	3.81 (0.956)	3.69 (1.038)	3.55 (1.085)	0.145	1	.704

Aerobic cons	1.91 (0.717)	1.88 (0.570)	1.75 (0.683)	1.83 (0.727)	0.318	1	.573
Resistance pros	3.02 (1.266)	3.25 (1.184)	3.14 (1.207)	3.11 (1.309)	0.655	1	.419
Resistance cons	1.98 (0.725)	1.91 (0.587)	1.86 (0.799)	1.99 (0.902)	0.873	1	.351
Aerobic injunctive norm	3.56 (1.075)	3.52 (0.961)	3.82 (0.782)	3.69 (0.846)	0.131	1	.718
Aerobic descriptive norm	2.33 (0.993)	2.41 (0.816)	2.68 (1.023)	2.60 (1.087)	0.378	1	.539
Aerobic social support	3.01 (1.235)	3.10 (0.995)	3.29 (0.902)	3.09 (0.929)	1.035	1	.310
Resistance injunctive norm	3.08 (1.211)	3.11 (1.074)	3.36 (0.951)	3.38 (0.908)	0.001	1	.973
Resistance descriptive norm	2.12 (0.974)	2.17 (0.824)	2.30 (0.932)	2.38 (1.111)	0.012	1	.913
Resistance social support	2.53 (1.255)	2.75 (1.108)	2.75 (1.026)	2.82 (1.000)	0.218	1	.641
Aerobic attitude	5.28 (1.265)	5.02 (1.134)	5.32 (1.003)	5.05 (1.293)	0.001	1	.971
Resistance attitude	4.35 (1.544)	4.13 (1.432)	4.76 (1.250)	4.43 (1.464)	0.109	1	.742
Aerobic response efficacy	4.52 (0.647)	4.33 (0.604)	4.27 (0.714)	4.19 (0.678)	0.418	1	.519
Resistance response efficacy	3.87 (1.056)	3.73 (1.105)	3.79 (0.975)	3.64 (1.010)	0.002	1	.964
Environment	3.28 (1.082)	3.30 (1.034)	3.24 (0.994)	3.36 (0.997)	0.128	1	.721
Behavioural Variables							
Strenuous + Moderate weekly minutes	85.4 (211.95)	45.6 (70.98)	77.9 (111.51)	138.4 (203.56)	5.089	1	.025*
Total weekly minutes	192.8 (355.35)	182.3 (333.93)	162.4 (212.67)	255.6 (256.01)	1.757	1	.186
Total Weekly METs	15.81 (16.630)	13.70 (11.627)	16.58 (16.376)	25.38 (26.637)	4.694	1	.031*
Resistance frequency	0.93 (1.790)	0.49 (1.630)	1.10 (2.338)	0.79 (1.703)	0.056	1	.814
Total weekly resistance minutes	15.7 (33.24)	9.02 (35.25)	34.5 (77.65)	14.0 (50.63)	0.916	1	.339

Table 39

Social Cognitive variable	Preferred place for physical activity counselling						F	df	p
	Women			Men					
	At home	At fitness centre	At diabetes centre	At home	At fitness centre	At diabetes centre			
Aerobic intention	4.41 (1.288)	4.69 (1.559)	4.67 (1.131)	4.36 (1.508)	4.95 (1.220)	4.55 (1.390)	0.437	2	.646
Resistance intention	3.39 (1.787)	4.32 (1.567)	3.59 (1.485)	3.90 (1.781)	4.36 (1.552)	3.72 (1.659)	0.326	2	.722
Aerobic Self-efficacy	2.53 (1.090)	2.45 (0.943)	2.46 (0.955)	2.49 (0.849)	2.89 (0.990)	2.42 (1.115)	1.312	2	.271
Resistance self-efficacy	1.90 (1.037)	2.08 (0.921)	1.72 (0.904)	2.24 (0.952)	2.55 (1.068)	2.02 (1.071)	0.159	2	.853
Aerobic pros	3.63 (1.259)	3.74 (1.024)	3.94 (0.827)	3.73 (0.983)	3.79 (1.027)	3.51 (1.101)	1.738	2	.178

Aerobic cons	1.99 (0.751)	1.82 (0.459)	1.91 (0.731)	1.74 (0.602)	1.71 (0.727)	1.86 (0.722)	0.342	2	.711
Resistance pros	2.95 (1.471)	3.28 (1.101)	3.11 (1.228)	3.56 (1.071)	3.28 (1.275)	2.90 (1.254)	1.873	2	.156
Resistance cons	2.08 (0.719)	1.94 (0.543)	1.93 (0.732)	1.82 (0.642)	1.77 (0.813)	2.05 (0.909)	1.358	2	.259
Aerobic injunctive norm	3.64 (0.948)	3.58 (1.146)	3.48 (0.993)	3.62 (0.873)	3.82 (0.869)	3.79 (0.753)	0.553	2	.576
Aerobic descriptive norm	2.58 (0.930)	2.51 (1.068)	2.19 (0.855)	2.72 (1.084)	2.81 (0.994)	2.55 (1.060)	0.193	2	.824
Aerobic social support	3.02 (1.023)	2.97 (1.346)	3.06 (1.069)	3.06 (0.859)	3.43 (0.895)	3.15 (0.934)	0.832	2	.437
Resistance injunctive norm	3.11 (1.096)	3.43 (1.102)	2.91 (1.160)	3.47 (0.896)	3.45 (1.014)	3.33 (0.899)	0.835	2	.435
Resistance descriptive norm	2.37 (0.973)	2.34 (1.025)	1.94 (0.824)	2.45 (1.142)	2.51 (0.927)	2.24 (1.008)	0.248	2	.781
Resistance social support	2.62 (1.050)	2.74 (1.301)	2.59 (1.197)	2.83 (0.991)	2.96 (1.143)	2.71 (0.952)	0.052	2	.950
Aerobic attitude	5.08 (1.280)	5.28 (1.353)	5.13 (1.248)	5.17 (1.298)	5.19 (1.340)	5.19 (0.945)	0.102	2	.903
Resistance attitude	3.80 (1.584)	4.78 (1.461)	4.13 (1.498)	4.88 (1.462)	4.73 (1.215)	4.48 (1.371)	2.152	2	.119
Aerobic response efficacy	4.50 (0.617)	4.44 (0.685)	4.45 (0.627)	4.13 (0.906)	4.34 (0.674)	4.28 (0.595)	0.616	2	.541
Resistance response efficacy	3.67 (1.243)	4.18 (0.790)	3.72 (1.107)	3.91 (0.955)	3.90 (0.942)	3.64 (1.043)	0.906	2	.406
Environment	3.01 (1.067)	3.41 (1.312)	3.34 (1.012)	3.18 (0.883)	3.10 (1.064)	3.43 (1.004)	1.056	2	.350
Behavioural Variables									
Strenuous + Moderate weekly minutes	41.6 (72.40)	74.6 (83.81)	78.1 (223.04)	120.3 (189.32)	79.6 (106.46)	106.7 (168.69)	0.686	2	.504
Total weekly minutes	103.3 (116.23)	312.4 (537.04)	157.7 (258.55)	254.5 (281.18)	195.1 (248.02)	179.1 (198.05)	3.040	2	.050*
Total Weekly METs	13.39 (13.231)	18.62 (17.940)	13.82 (13.775)	17.65 (17.039)	17.04 (15.330)	23.63 (26.008)	1.953	2	.144
Resistance frequency	1.05 (2.212)	1.00 (2.000)	0.55 (1.395)	1.07 (2.116)	0.94 (1.748)	0.95 (2.232)	0.367	2	.693
Total weekly resistance minutes	11.8 (23.36)	18.4 (44.94)	11.1 (31.04)	25.0 (70.44)	22.7 (56.44)	27.8 (71.33)	0.275	2	.760

Table 40

Social Cognitive variable	Preferred method for physical activity counselling		F	df	p
	Women	Men			

	Face to face	Other	Face to face	Other			
Aerobic intention	4.72 (1.271)	4.20 (1.185)	4.67 (1.346)	4.44 (1.492)	0.469	1	.494
Resistance intention	3.76 (1.520)	3.53 (1.837)	4.01 (1.615)	3.64 (1.834)	0.036	1	.849
Aerobic Self-efficacy	2.52 (0.936)	2.22 (1.062)	2.54 (1.014)	2.64 (1.122)	1.452	1	.229
Resistance self-efficacy	1.85 (0.897)	1.82 (1.118)	2.20 (1.038)	2.19 (1.154)	0.002	1	.961
Aerobic pros	3.86 (0.951)	3.62 (1.035)	3.65 (1.062)	3.62 (1.064)	0.409	1	.523
Aerobic cons	1.87 (0.672)	2.10 (0.639)	1.78 (0.686)	1.83 (0.737)	0.631	1	.428
Resistance pros	3.10 (1.222)	3.17 (1.301)	3.18 (1.287)	3.11 (1.114)	0.134	1	.714
Resistance cons	1.96 (0.691)	2.01 (0.620)	1.93 (0.843)	1.87 (0.806)	0.215	1	.644
Aerobic injunctive norm	3.57 (1.050)	3.43 (0.907)	3.78 (0.850)	3.68 (0.647)	0.019	1	.891
Aerobic descriptive norm	2.37 (0.964)	2.23 (0.773)	2.70 (1.045)	2.49 (1.037)	0.053	1	.819
Aerobic social support	3.05 (1.173)	2.97 (0.991)	3.26 (0.954)	3.06 (0.735)	0.115	1	.735
Resistance injunctive norm	3.06 (1.186)	3.29 (0.971)	3.37 (0.992)	3.43 (0.654)	0.266	1	.607
Resistance descriptive norm	2.11 (0.956)	2.20 (0.721)	2.39 (1.041)	2.26 (0.923)	0.450	1	.503
Resistance social support	2.57 (1.221)	2.82 (1.051)	2.86 (1.064)	2.64 (0.786)	1.650	1	.200
Aerobic attitude	5.17 (1.228)	4.98 (1.498)	5.25 (1.086)	4.98 (1.285)	0.029	1	.864
Resistance attitude	4.20 (1.445)	4.38 (1.849)	4.68 (1.410)	4.52 (1.122)	0.511	1	.475
Aerobic response efficacy	4.48 (0.630)	4.35 (0.635)	4.29 (0.700)	4.17 (0.676)	0.004	1	.950
Resistance response efficacy	3.78 (1.109)	4.05 (0.833)	3.78 (1.060)	3.74 (0.737)	0.888	1	.347
Environment	3.28 (1.059)	3.29 (1.043)	3.36 (0.961)	3.06 (1.111)	0.894	1	.345
Behavioural Variables							
Strenuous + Moderate weekly minutes	59.0 (77.09)	118.4 (384.80)	102.2 (162.52)	105.9 (147.72)	1.059	1	.304
Total weekly minutes	189.0 (338.11)	171.8 (377.49)	187.1 (220.94)	247.6 (267.34)	0.669	1	.414
Total Weekly METs	15.01 (13.791)	14.38 (19.671)	20.46 (22.698)	20.52 (17.900)	0.012	1	.912
Resistance frequency	0.78 (1.734)	0.58 (1.710)	0.87 (1.681)	1.31 (3.072)	1.037	1	.309
Total weekly resistance minutes	12.7 (30.14)	14.2 (48.60)	25.6 (62.42)	25.5 (81.42)	0.009	1	.924

Table 41

	Preferred start time for a physical activity program						
	Women		Men				
Social Cognitive variable	At diagnosis	Sometime after diagnosis	At diagnosis	Sometime after diagnosis	F	df	P

Aerobic intention	4.70 (1.309)	4.56 (1.142)	4.70 (1.408)	4.43 (1.383)	0.124	1	.725
Resistance intention	3.84 (1.571)	3.59 (1.611)	4.08 (1.594)	3.78 (1.712)	0.015	1	.901
Aerobic Self-efficacy	2.48 (0.937)	2.49 (1.006)	2.60 (1.089)	2.50 (0.960)	0.165	1	.685
Resistance self-efficacy	1.84 (0.972)	1.86 (0.879)	2.31 (1.110)	2.09 (0.974)	0.685	1	.409
Aerobic pros	3.94 (0.957)	3.66 (0.927)	3.73 (1.024)	3.50 (1.140)	0.030	1	.863
Aerobic cons	1.91 (0.668)	1.88 (0.650)	1.78 (0.722)	1.75 (0.639)	0.000	1	.998
Resistance pros	3.21 (1.252)	2.96 (1.203)	3.30 (1.255)	2.93 (1.211)	0.121	1	.729
Resistance cons	1.96 (0.696)	1.93 (0.620)	1.94 (0.851)	1.79 (0.798)	0.331	1	.565
Aerobic injunctive norm	3.66 (1.002)	3.41 (1.009)	3.78 (0.749)	3.71 (0.934)	0.563	1	.454
Aerobic descriptive norm	2.38 (0.796)	2.34 (1.134)	2.63 (1.081)	2.70 (0.984)	0.153	1	.696
Aerobic social support	3.14 (1.196)	2.86 (1.029)	3.29 (0.924)	3.09 (0.823)	0.056	1	.812
Resistance injunctive norm	3.21 (1.192)	2.95 (1.034)	3.45 (0.885)	3.23 (0.999)	0.024	1	.877
Resistance descriptive norm	2.18 (0.832)	2.09 (1.056)	2.37 (1.028)	2.39 (0.968)	0.142	1	.707
Resistance social support	2.71 (1.255)	2.45 (1.082)	2.86 (1.029)	2.73 (0.911)	0.186	1	.667
Aerobic attitude	5.26 (1.160)	5.00 (1.414)	5.28 (1.028)	4.98 (1.348)	0.017	1	.895
Resistance attitude	4.33 (1.475)	4.12 (1.609)	4.76 (1.315)	4.45 (1.405)	0.054	1	.817
Aerobic response efficacy	4.56 (0.551)	4.32 (0.692)	4.29 (0.633)	4.14 (0.810)	0.218	1	.641
Resistance response efficacy	3.92 (1.073)	3.70 (1.068)	3.82 (0.973)	3.61 (1.001)	0.000	1	.992
Environment	3.19 (1.100)	3.48 (0.960)	3.46 (0.994)	2.93 (0.972)	8.415	1	.004*
Behavioural Variables							
Strenuous + Moderate weekly minutes	76.2 (204.37)	58.7 (82.34)	117.7 (154.17)	71.5 (167.74)	0.387	1	.534
Total weekly minutes	214.2 (409.21)	137.3 (144.22)	221.7 (223.12)	157.5 (245.44)	0.025	1	.875
Total Weekly METs	14.48 (13.845)	16.17 (17.153)	22.57 (19.817)	17.04 (25.606)	1.864	1	.174
Resistance frequency	0.79 (1.724)	0.69 (1.786)	1.28 (2.411)	0.45 (1.131)	1.828	1	.178
Total weekly resistance minutes	13.3 (31.28)	12.9 (39.43)	35.6 (80.11)	8.10 (25.76)	3.226	1	.074

Table 42

Social Cognitive variable	Preferred social support during aerobic activity						F	df	p
	Women			Men					
	Alone	With others	No preference	Alone	With others	No Preference			
Aerobic intention	4.77 (1.028)	4.69 (1.240)	4.20 (1.442)	4.42 (1.598)	4.61 (1.350)	5.08 (0.978)	1.893	2	.153

Resistance intention	3.45 (1.852)	3.83 (1.491)	3.83 (1.797)	3.87 (1.729)	3.94 (1.634)	4.32 (1.500)	0.303	2	.739
Aerobic Self-efficacy	2.73 (1.058)	2.45 (0.927)	2.31 (1.070)	2.44 (1.073)	2.54 (1.010)	2.96 (1.028)	1.759	2	.175
Resistance self-efficacy	1.92 (0.936)	1.83 (0.911)	1.88 (1.201)	2.20 (1.004)	2.15 (1.041)	2.53 (1.226)	0.327	2	.722
Aerobic pros	3.97 (0.840)	3.85 (0.886)	3.61 (1.418)	3.47 (1.255)	3.68 (1.003)	3.94 (0.814)	1.389	2	.251
Aerobic cons	1.86 (0.734)	1.91 (0.632)	1.80 (0.432)	1.67 (0.601)	1.85 (0.734)	1.67 (0.639)	0.171	2	.843
Resistance pros	3.01 (1.421)	3.13 (1.159)	3.36 (1.496)	3.08 (1.240)	3.16 (1.264)	3.50 (1.144)	0.032	2	.969
Resistance cons	1.97 (0.760)	1.97 (0.634)	1.74 (0.470)	1.68 (0.589)	2.03 (0.933)	1.77 (0.632)	0.982	2	.376
Aerobic injunctive norm	3.55 (0.780)	3.61 (1.022)	3.20 (1.104)	3.77 (0.773)	3.74 (0.862)	3.92 (0.630)	1.194	2	.305
Aerobic descriptive norm	2.47 (0.815)	2.31 (0.993)	2.43 (0.545)	2.25 (0.853)	2.86 (1.063)	2.43 (1.028)	3.057	2	.049*
Aerobic social support	2.33 (1.008)	3.19 (1.098)	3.00 (1.227)	3.04 (0.856)	3.32 (0.883)	3.26 (0.967)	1.375	2	.255
Resistance injunctive norm	3.28 (0.761)	3.09 (1.194)	3.13 (1.180)	3.40 (0.836)	3.31 (0.990)	3.72 (0.757)	0.463	2	.630
Resistance descriptive norm	2.27 (0.681)	2.07 (0.985)	2.43 (0.545)	2.05 (0.805)	2.54 (1.057)	2.17 (0.985)	3.268	2	.040*
Resistance social support	2.11 (0.870)	2.68 (1.213)	3.00 (1.227)	2.65 (0.885)	2.86 (1.021)	3.11 (1.073)	0.507	2	.603
Aerobic attitude	5.47 (1.288)	5.09 (1.301)	5.15 (1.001)	5.09 (1.177)	5.16 (1.145)	5.53 (1.021)	0.882	2	.415
Resistance attitude	4.07 (1.635)	4.23 (1.527)	4.60 (1.410)	4.71 (1.319)	4.51 (1.390)	5.17 (0.955)	0.332	2	.718
Aerobic response efficacy	4.47 (0.588)	4.47 (0.625)	4.47 (0.652)	4.22 (0.619)	4.28 (0.715)	4.24 (0.782)	0.034	2	.966
Resistance response efficacy	3.67 (1.016)	3.85 (1.113)	4.00 (0.755)	3.83 (0.916)	3.70 (1.039)	3.98 (0.882)	0.386	2	.680
Environment	3.12 (1.030)	3.39 (1.023)	2.84 (1.134)	3.22 (1.139)	3.39 (0.922)	3.02 (1.036)	0.103	2	.902
Behavioural Variables									
Strenuous + Moderate weekly minutes	48.7 (80.43)	71.5 (190.20)	88.6 (100.71)	79.3 (96.46)	90.2 (171.76)	210.4 (174.81)	1.030	2	.359
Total weekly minutes	298.0 (595.32)	171.0 (301.14)	164.2 (83.70)	165.1 (192.76)	185.7 (232.29)	350.4 (265.95)	2.438	2	.090
Total Weekly METs	14.53 (9.680)	14.36 (15.698)	22.36 (12.609)	19.63 (17.905)	18.83 (23.560)	30.60 (19.014)	0.105	2	.900
Resistance frequency	1.07 (2.463)	0.66 (1.500)	0.33 (1.000)	0.86 (1.624)	0.60 (1.405)	2.83 (3.761)	5.532	2	.004*[a]
Total weekly resistance minutes	22.7 (56.63)	11.8 (29.89)	5.00 (15.00)	29.2 (66.82)	17.7 (55.91)	54.2 (100.11)	1.708	2	.183

[a] no preference vs. alone (p=.035) and with others (p=.001)

Table 43

Social Cognitive variable	Preferred place to perform aerobic activity						F	df	p
	Women			Men					
	At home	Not at home	No preference	At home	Not at home	No Preference			
Aerobic intention	4.66 (1.006)	4.54 (1.356)	5.29 (0.878)	4.47 (1.652)	4.68 (1.256)	4.79 (1.088)	0.887	2	.413
Resistance intention	3.51 (1.645)	3.83 (1.566)	4.15 (1.286)	3.86 (1.828)	3.99 (1.583)	4.17 (1.372)	0.145	2	.865
Aerobic Self-efficacy	2368 (1.022)	2.33 (0.887)	2.73 (1.060)	2.54 (1.114)	2.56 (1.032)	2.67 (0.890)	0.872	2	.420
Resistance self-efficacy	1.80 (1.018)	1.88 (0.902)	1.84 (0.943)	2.18 (1.056)	2.21 (1.089)	2.34 (1.015)	0.089	2	.915
Aerobic pros	3.76 (0.993)	3.81 (0.885)	4.25 (1.001)	3.61 (1.135)	3.70 (1.103)	3.64 (0.733)	0.786	2	.457
Aerobic cons	1.91 (0.682)	1.87 (0.568)	1.95 (0.823)	1.65 (0.627)	1.79 (0.699)	2.01 (0.748)	0.780	2	.459
Resistance pros	2.76 (1.377)	3.27 (1.135)	3.33 (1.104)	3.12 (1.235)	3.16 (1.365)	3.42 (0.804)	0.868	2	.421
Resistance cons	1.96 (0.714)	1.88 (0.543)	2.26 (0.844)	1.79 (0.715)	1.90 (0.908)	2.13 (0.780)	0.414	2	.662
Aerobic injunctive norm	3.60 (0.856)	3.52 (1.056)	3.75 (1.082)	3.80 (0.841)	3.70 (0.830)	3.92 (0.654)	0.006	2	.994
Aerobic descriptive norm	2.50 (0.771)	2.31 (1.028)	2.14 (0.771)	2.31 (1.046)	2.83 (0.989)	2.78 (1.024)	3.601	2	.029*
Aerobic social support	2.90 (1.165)	3.14 (1.056)	3.00 (1.428)	3.07 (0.852)	3.38 (0.898)	3.17 (0.917)	0.027	2	.974
Resistance injunctive norm	2.95 (1.056)	3.13 (1.170)	3.49 (1.165)	3.42 (0.858)	3.24 (0.984)	3.79 (0.788)	0.758	2	.470
Resistance descriptive norm	2.20 (0.811)	2.12 (1.000)	2.00 (0.765)	2.13 (1.002)	2.45 (0.939)	2.56 (1.137)	1.510	2	.223
Resistance social support	2.34 (1.144)	2.77 (1.175)	2.64 (1.322)	2.73 (0.899)	2.87 (1.046)	2.95 (1.076)	0.433	2	.649
Aerobic attitude	5.34 (1.132)	4.98 (1.298)	5.54 (1.422)	5.21 (1.268)	5.11 (1.077)	5.40 (1.032)	0.326	2	.722
Resistance attitude	4.00 (1.476)	4.36 (1.537)	4.25 (1.406)	4.57 (1.537)	4.54 (1.269)	5.21 (0.815)	1.096	2	.336
Aerobic response efficacy	4.46 (0.619)	4.46 (0.604)	4.53 (0.731)	4.29 (0.720)	4.30 (0.663)	4.05 (0.732)	0.755	2	.471
Resistance response efficacy	3.48 (1.264)	3.96 (0.993)	4.08 (0.698)	3.85 (0.960)	3.69 (1.053)	3.86 (0.840)	2.353	2	.097
Environment	3.11 (0.981)	3.46 (1.011)	2.95 (1.243)	3.15 (1.050)	3.49 (0.942)	3.04 (0.997)	0.010	2	.990
Behavioural Variables									

Strenuous + Moderate weekly minutes	105.9 (298.74)	54.8 (74.98)	55.8 (77.40)	102.3 (144.01)	101.3 (184.13)	115.3 (117.63)	0.657	2	.519
Total weekly minutes	166.3 (293.29)	169.7 (281.64)	344.6 (659.44)	208.0 (237.43)	201.4 (248.50)	196.0 (181.71)	1.346	2	.262
Total Weekly METs	16.34 (15.947)	14.64 (14.919)	13.79 (12.142)	19.78 (18.433)	20.19 (25.296)	24.20 (17.567)	0.367	2	.693
Resistance frequency	0.66 (1.825)	0.79 (1.632)	0.25 (0.866)	1.38 (2.786)	0.66 (1.493)	1.05 (1.532)	1.590	2	.206
Total weekly resistance minutes	12.5 (40.10)	14.7 (33.41)	2.50 (8.66)	31.4 (77.89)	23.0 (65.60)	22.6 (43.77)	0.288	2	.750

Table 44

Social Cognitive variable	Preferred time of day to engage in aerobic activity								F	Df	p
	Women				Men						
	Morn	Aft	Eve	No pref	Morn	Aft	Eve	No pref			
Aerobic intention	4.70 (1.022)	3.80 (0.896)	4.50 (1.640)	4.85 (1.187)	4.76 (1.399)	4.30 (1.704)	4.82 (1.247)	4.55 (1.354)	0.975	3	.405
Resistance intention	3.74 (1.641)	3.35 (1.191)	3.90 (1.372)	3.82 (1.660)	4.35 (1.521)	3.65 (2.093)	3.93 (1.660)	3.85 (1.569)	0.484	3	.694
Aerobic Self-efficacy	2.47 (0.987)	1.73 (0.764)	2.47 (0.829)	2.63 (0.966)	2.44 (1.058)	2.42 (1.042)	2.69 (0.881)	2.64 (1.086)	0.922	3	.431
Resistance self-efficacy	1.68 (0.815)	1.71 (0.726)	1.75 (0.922)	2.00 (1.028)	2.27 (1.053)	2.01 (1.055)	2.27 (0.944)	2.22 (1.123)	0.538	3	.657
Aerobic pros	3.81 (0.776)	2.96 (1.236)	3.82 (0.830)	4.05 (0.905)	3.66 (1.085)	3.61 (1.094)	3.75 (0.989)	3.64 (1.083)	1.928	3	.126
Aerobic cons	1.84 (0.596)	2.03 (0.397)	1.93 (0.789)	1.88 (0.630)	1.78 (0.627)	1.74 (0.812)	1.77 (0.681)	1.79 (0.709)	0.185	3	.907
Resistance pros	2.88 (1.049)	2.86 (1.220)	3.21 (1.086)	3.30 (1.346)	3.27 (1.335)	2.87 (1.424)	3.19 (1.277)	3.23 (1.130)	0.505	3	.679
Resistance cons	1.91 (0.546)	2.06 (0.382)	1.98 (0.744)	1.93 (0.697)	1.72 (0.674)	1.97 (1.061)	2.08 (1.002)	1.91 (0.762)	0.361	3	.781
Aerobic injunctive norm	3.36 (1.159)	3.25 (1.041)	3.94 (0.793)	3.62 (0.932)	3.79 (0.784)	3.38 (1.242)	3.90 (0.639)	3.81 (0.723)	0.631	3	.596
Aerobic descriptive norm	2.39 (1.032)	1.57 (1.187)	2.39 (0.725)	2.46 (0.838)	2.50 (0.968)	2.80 (0.898)	2.70 (1.221)	2.64 (1.050)	2.094	3	.102
Aerobic social	2.86	2.83	3.07	3.21	3.22	3.31	3.23	3.23	0.545	3	.652

support	(1.234)	(1.021)	(1.045)	(1.115)	(0.983)	(0.895)	(0.934)	(0.836)			
Resistance injunctive norm	2.92 (1.193)	2.88 (1.162)	3.50 (0.907)	3.15 (1.163)	3.36 (1.056)	3.04 (1.055)	3.53 (0.857)	3.45 (0.826)	0.353	3	.787
Resistance descriptive norm	2.14 (0.985)	1.37 (0.987)	2.31 (0.641)	2.20 (0.903)	2.20 (0.800)	2.40 (0.893)	2.50 (1.259)	2.37 (1.041)	1.622	3	.185
Resistance social support	2.42 (1.277)	2.38 (1.006)	2.98 (1.038)	2.68 (1.208)	2.80 (1.058)	2.78 (0.965)	2.86 (1.149)	2.86 (0.928)	0.491	3	.689
Aerobic attitude	5.32 (1.185)	4.30 (1.229)	4.75 (1.437)	5.36 (1.202)	5.36 (0.994)	5.17 (1.460)	4.75 (1.232)	5.27 (1.069)	1.073	3	.361
Resistance attitude	4.13 (1.468)	4.10 (1.524)	4.28 (1.396)	4.32 (1.630)	5.04 (1.233)	3.93 (1.860)	4.32 (1.419)	4.75 (1.094)	1.220	3	.303
Aerobic response efficacy	4.43 (0.563)	3.90 (0.704)	4.67 (0.498)	4.53 (0.617)	4.28 (0.602)	4.13 (0.941)	4.35 (0.630)	4.23 (0.710)	1.229	3	.300
Resistance response efficacy	3.74 (0.915)	3.57 (1.134)	4.20 (0.785)	3.82 (1.205)	3.84 (0.989)	3.38 (1.023)	3.91 (1.024)	3.79 (0.955)	0.352	3	.788
Environment	3.04 (1.103)	3.86 (0.911)	3.60 (0.564)	3.25 (1.107)	3.37 (1.116)	3.16 (0.874)	3.09 (0.897)	3.36 (1.010)	2.429	3	.066
Behavioural Variables											
Strenuous + Moderate weekly minutes	61.9 (68.01)	30.0 (94.87)	54.2 (69.77)	87.5 (239.30)	78.0 (110.42)	79.7 (125.22)	89.1 (123.08)	131.1 (198.63)	0.108	3	.955
Total weekly minutes	130.2 (125.19)	186.0 (264.29)	118.6 (108.45)	245.3 (470.65)	174.6 (200.11)	185.0 (319.82)	205.0 (189.22)	223.4 (244.20)	0.407	3	.748
Total Weekly METs	14.58 (12.088)	13.75 (27.443)	10.86 (11.142)	17.00 (14.275)	17.59 (14.855)	13.83 (15.259)	20.98 (20.101)	24.18 (26.404)	0.521	3	.668
Resistance frequency	1.03 (2.297)	0.30 (0.949)	0.28 (0.826)	0.71 (1.446)	0.62 (1.518)	1.07 (2.086)	1.05 (1.812)	1.16 (2.441)	1.139	3	.334
Total weekly resistance minutes	10.3 (22.93)	3.00 (9.49)	5.83 (17.17)	18.4 (44.29)	24.6 (66.84)	28.3 (62.27)	20.2 (38.47)	28.4 (77.66)	0.130	3	.942

Table 45

Social Cognitive variable	Preferred social support during resistance activity						F	df	p
	Women			Men					
	Alone	With others	No preference	Alone	With others	No Preference			

Aerobic intention	4.78 (1.104)	4.64 (1.275)	4.52 (1.475)	4.46 (1.454)	4.62 (1.452)	5.17 (0.924)	1.255	2	.287
Resistance intention	3.39 (1.814)	3.98 (1.427)	3.42 (1.866)	3.81 (1.723)	3.96 (1.628)	4.93 (1.028)	2.610	2	.076
Aerobic Self-efficacy	2.58 (0.905)	2.42 (0.961)	2.75 (1.060)	2.48 (1.090)	2.53 (1.041)	3.07 (0.754)	0.448	2	.639
Resistance self-efficacy	1.85 (0.894)	1.93 (0.948)	1.75 (1.097)	2.28 (1.104)	2.14 (1.054)	2.78 (0.781)	1.847	2	.160
Aerobic pros	3.91 (0.995)	3.86 (0.859)	4.02 (0.915)	3.53 (1.154)	3.65 (1.074)	4.10 (0.437)	0.560	2	.572
Aerobic cons	1.90 (0.817)	1.91 (0.620)	1.95 (0.595)	1.73 (0.716)	1.81 (0.683)	1.62 (0.503)	0.359	2	.699
Resistance pros	2.87 (1.410)	3.25 (1.127)	3.37 (1.210)	3.11 (1.246)	3.16 (1.284)	3.84 (0.681)	0.807	2	.448
Resistance cons	1.91 (0.812)	1.97 (0.628)	2.02 (0.638)	1.74 (0.775)	1.97 (0.804)	1.62 (0.479)	0.947	2	.390
Aerobic injunctive norm	3.54 (0.969)	3.64 (1.014)	3.38 (1.053)	3.78 (0.691)	3.73 (0.878)	3.92 (0.895)	0.738	2	.479
Aerobic descriptive norm	2.44 (0.856)	2.28 (0.989)	2.64 (0.502)	2.41 (0.856)	2.73 (1.153)	2.74 (0.940)	1.495	2	.226
Aerobic social support	2.74 (1.142)	3.21 (1.140)	3.00 (1.073)	3.02 (0.791)	3.29 (1.008)	3.52 (0.515)	0.606	2	.547
Resistance injunctive norm	3.04 (1.186)	3.23 (1.152)	2.83 (1.110)	3.44 (0.788)	3.32 (0.977)	3.68 (0.933)	1.659	2	.193
Resistance descriptive norm	2.19 (0.848)	2.08 (0.961)	2.36 (0.688)	2.17 (0.799)	2.42 (1.079)	2.58 (1.073)	0.833	2	.436
Resistance social support	2.40 (1.245)	2.78 (1.204)	2.44 (1.104)	2.67 (0.883)	2.86 (1.070)	3.22 (0.773)	1.155	2	.317
Aerobic attitude	5.46 (1.178)	5.08 (1.193)	5.33 (1.094)	5.03 (1.269)	5.17 (1.104)	5.63 (0.790)	1.486	2	.229
Resistance attitude	3.96 (1.861)	4.37 (1.392)	4.50 (0.977)	4.74 (1.323)	4.55 (1.311)	5.13 (1.125)	1.111	2	.331
Aerobic response efficacy	4.54 (0.597)	4.44 (0.610)	4.69 (0.502)	4.25 (0.643)	4.22 (0.767)	4.38 (0.602)	0.087	2	.917
Resistance response efficacy	3.58 (1.160)	3.93 (1.017)	4.03 (1.150)	3.84 (0.896)	3.69 (1.015)	4.09 (0.877)	1.351	2	.261
Environment	3.26 (1.071)	3.29 (1.037)	3.42 (1.111)	3.14 (1.078)	3.37 (0.917)	3.14 (1.160)	0.445	2	.641
Behavioural Variables									
Strenuous + Moderate weekly minutes	66.9 (79.12)	72.6 (215.53)	71.7 (95.90)	109.9 (136.31)	97.9 (179.99)	128.9 (158.83)	0.128	2	.880
Total weekly minutes	240.1 (458.09)	179.5 (330.80)	144.6 (87.79)	226.9 (240.09)	175.7 (208.00)	267.9 (320.25)	0.578	2	.562
Total Weekly METs	16.21 (11.421)	14.49 (17.009)	16.04 (10.031)	21.64 (17.779)	19.74 (25.981)	23.33 (15.466)	0.032	2	.969
Resistance frequency	1.00 (2.244)	0.69 (1.457)	0.25 (0.866)	1.80 (2.974)	0.58 (1.245)	0.60 (1.121)	1.353	2	.261
Total weekly resistance	17.3 (44.69)	12.8 (31.57)	3.75 (12.99)	38.4 (82.70)	20.8 (61.71)	19.7 (41.60)	0.330	2	.719

minutes									

Table 46

Social Cognitive variable	Preferred place to perform resistance activity						F	df	p
	Women			Men					
	At home	Not at home	No preference	At home	Not at home	No Preference			
Aerobic intention	4.46 (1.219)	4.59 (1.273)	5.60 (0.757)	4.24 (1.676)	4.79 (1.300)	4.90 (0.951)	1.613	2	.202
Resistance intention	3.49 (1.809)	3.89 (1.408)	3.90 (1.854)	3.79 (1.785)	4.12 (1.608)	4.21 (1.375)	0.016	2	.984
Aerobic Self-efficacy	2.53 (0.999)	2.34 (0.907)	3.19 (0.791)	2.38 (1.101)	2.68 (1.021)	2.65 (0.956)	2.933	2	.055
Resistance self-efficacy	1.93 (1.002)	1.88 (0.930)	1.81 (0.922)	2.14 (1.057)	2.29 (1.070)	2.41 (1.042)	0.462	2	.631
Aerobic pros	3.71 (1.053)	3.91 (0.808)	4.37 (0.637)	3.44 (1.098)	3.75 (1.124)	3.84 (0.646)	0.447	2	.640
Aerobic cons	2.05 (0.793)	1.89 (0.618)	1.61 (0.391)	1.76 (0.678)	1.74 (0.659)	1.80 (0.748)	1.347	2	.262
Resistance pros	2.89 (1.363)	3.33 (1.120)	3.12 (1.189)	3.06 (1.232)	3.19 (1.321)	3.65 (0.778)	1.061	2	.348
Resistance cons	2.03 (0.799)	1.94 (0.599)	1.87 (0.682)	1.84 (0.758)	1.84 (0.799)	1.86 (0.723)	0.197	2	.822
Aerobic injunctive norm	3.38 (0.886)	3.66 (1.050)	3.83 (1.052)	3.73 (0.802)	3.77 (0.859)	3.85 (0.714)	0.513	2	.600
Aerobic descriptive norm	2.26 (0.817)	2.42 (0.993)	2.42 (0.818)	2.42 (1.093)	2.73 (1.056)	2.68 (0.813)	0.139	2	.870
Aerobic social support	2.80 (1.088)	3.20 (1.128)	3.14 (1.314)	2.97 (0.867)	3.34 (0.954)	3.35 (0.671)	0.014	2	.986
Resistance injunctive norm	2.79 (1.111)	3.32 (1.127)	3.23 (1.272)	3.48 (0.871)	3.29 (0.952)	3.66 (0.812)	2.966	2	.054
Resistance descriptive norm	2.03 (0.806)	2.24 (0.979)	2.00 (0.779)	2.28 (1.085)	2.35 (0.951)	2.48 (0.946)	0.494	2	.611
Resistance social support	2.40 (1.199)	2.85 (1.163)	2.33 (1.333)	2.73 (0.886)	2.80 (1.079)	3.17 (0.798)	2.216	2	.111
Aerobic attitude	5.23 (1.146)	5.08 (1.213)	5.79 (1.010)	4.91 (1.310)	5.17 (1.071)	5.75 (0.769)	0.729	2	.484
Resistance attitude	3.96 (1.704)	4.46 (1.385)	4.29 (1.287)	4.56 (1.446)	4.53 (1.250)	5.43 (0.863)	2.156	2	.118
Aerobic response efficacy	4.41 (0.592)	4.53 (0.597)	4.58 (0.622)	4.14 (0.777)	4.29 (0.654)	4.33 (0.701)	0.015	2	.985
Resistance response efficacy	3.53 (1.190)	4.04 (0.964)	3.81 (1.105)	3.88 (0.836)	3.64 (1.070)	4.10 (0.742)	3.769	2	.025*
Environment	3.31 (1.021)	3.34 (1.050)	3.06 (1.148)	3.26 (0.984)	3.37 (0.987)	2.91 (1.076)	0.111	2	.895
Behavioural Variables									

Strenuous + Moderate weekly minutes	96.9 (282.29)	50.6 (76.42)	90.0 (82.90)	101.1 (151.26)	105.5 (181.60)	117.6 (117.14)	0.529	2	.590
Total weekly minutes	166.3 (305.41)	171.9 (283.51)	361.3 (653.66)	220.5 (252.17)	204.8 (247.12)	176.6 (161.14)	1.948	2	.145
Total Weekly METs	14.92 (15.539)	14.50 (15.021)	18.71 (13.310)	18.21 (17.355)	21.76 (26.193)	23.49 (16.093)	0.257	2	.774
Resistance frequency	0.83 (2.035)	0.65 (1.445)	0.75 (1.422)	1.41 (2.863)	0.73 (1.505)	1.15 (1.872)	0.412	2	.663
Total weekly resistance minutes	12.6 (38.07)	13.0 (31.93)	14.2 (34.76)	27.0 (75.61)	26.7 (70.02)	28.3 (46.74)	0.001	2	.999

Table 47

Social Cognitive variable	Preferred time of day to engage in resistance activity								F	df	p
	Women				Men						
	Morn	Aft	Eve	No pref	Morn	Aft	Eve	No pref			
Aerobic intention	4.63 (1.208)	3.93 (0.972)	4.42 (1.747)	4.89 (1.099)	4.87 (1.408)	4.39 (1.878)	4.65 (1.286)	4.65 (1.286)	1.156	3	.327
Resistance intention	3.62 (1.693)	3.15 (1.324)	4.15 (1.249)	3.77 (1.542)	4.49 (1.568)	4.02 (2.191)	3.96 (1.485)	3.77 (1.542)	1.572	3	.197
Aerobic Self-efficacy	2.35 (1.043)	1.75 (0.740)	2.45 (0.832)	2.74 (0.905)	2.52 (1.040)	2.58 (1.185)	2.68 (0.885)	2.57 (1.074)	1.740	3	.160
Resistance self-efficacy	1.58 (0.814)	1.71 (0.726)	1.94 (0.922)	2.06 (1.024)	2.32 (1.026)	2.34 (1.275)	2.33 (0.899)	2.19 (1.097)	1.255	3	.291
Aerobic pros	3.81 (0.965)	3.26 (1.060)	3.66 (0.919)	4.12 (0.750)	3.71 (1.096)	3.89 (1.111)	3.65 (1.023)	3.58 (1.051)	2.637	3	.051
Aerobic cons	1.92 (0.797)	2.11 (0.300)	1.91 (0.797)	1.87 (0.618)	1.70 (0.528)	1.71 (0.919)	1.85 (0.698)	1.77 (0.690)	0.413	3	.744
Resistance pros	2.85 (1.207)	2.99 (1.059)	3.00 (1.101)	3.40 (1.268)	3.31 (1.340)	3.37 (1.491)	3.23 (1.094)	3.13 (1.153)	1.343	3	.261
Resistance cons	1.99 (0.737)	2.20 (0.324)	1.99 (0.747)	1.89 (0.679)	1.68 (0.612)	1.85 (1.087)	1.95 (0.799)	1.91 (0.754)	0.900	3	.442
Aerobic injunctive norm	3.31 (1.165)	3.35 (1.062)	3.73 (0.842)	3.73 (0.925)	3.81 (0.821)	3.54 (1.297)	3.83 (0.644)	3.79 (0.718)	0.834	3	.477
Aerobic descriptive norm	2.48 (0.953)	1.53 (1.146)	2.44 (0.698)	2.44 (0.839)	2.49 (0.943)	3.12 (1.129)	2.62 (1.050)	2.58 (1.051)	4.169	3	.007*
Aerobic social	2.85	2.93	2.96	3.22	3.18	3.50	3.10	3.22	0.656	3	.580

support	(1.231)	(1.086)	(1.140)	(1.112)	(0.970)	(1.011)	(0.899)	(0.827)			
Resistance injunctive norm	2.84 (1.273)	2.93 (1.179)	3.33 (0.948)	3.27 (1.134)	3.38 (1.088)	3.38 (1.196)	3.61 (0.641)	3.36 (0.796)	0.661	3	.577
Resistance descriptive norm	2.22 (0.947)	1.27 (0.843)	2.36 (0.597)	2.21 (0.888)	2.20 (0.817)	2.71 (1.101)	2.48 (1.017)	2.30 (1.045)	3.879	3	.010*
Resistance social support	2.43 (1.270)	2.28 (0.988)	2.89 (1.110)	2.74 (1.236)	2.80 (1.067)	3.05 (1.124)	2.85 (1.068)	2.79 (0.874)	0.941	3	.421
Aerobic attitude	5.22 (1.155)	4.50 (1.333)	4.77 (1.100)	5.47 (1.122)	5.42 (0.961)	5.36 (1.447)	4.63 (1.266)	5.19 (1.069)	1.852	3	.139
Resistance attitude	3.93 (1.466)	4.10 (1.524)	4.33 (1.175)	4.47 (1.586)	5.00 (1.249)	4.43 (1.940)	4.40 (1.220)	4.66 (1.147)	1.539	3	.205
Aerobic response efficacy	4.40 (0.618)	4.07 (0.750)	4.58 (0.527)	4.60 (0.540)	4.26 (0.588)	4.21 (0.992)	4.22 (0.678)	4.26 (0.708)	1.120	3	.342
Resistance response efficacy	3.63 (1.051)	3.70 (1.181)	4.04 (0.775)	3.92 (1.145)	3.79 (1.002)	3.76 (1.113)	3.92 (0.808)	3.76 (0.965)	0.373	3	.772
Environment	2.90 (1.181)	3.77 (1.097)	3.57 (0.625)	3.33 (1.013)	3.27 (1.033)	3.24 (0.811)	3.12 (0.959)	3.31 (1.069)	1.724	3	.163
Behavioural Variables											
Strenuous + Moderate weekly minutes	47.7 (66.56)	27.3 (90.45)	59.0 (75.05)	95.7 (238.40)	84.1 (110.18)	91.8 (135.10)	102.0 (128.03)	124.2 (201.68)	0.080	3	.971
Total weekly minutes	137.1 (196.01)	177.3 (252.39)	135.0 (109.12)	239.3 (460.27)	190.9 (223.05)	196.4 (328.42)	214.3 (198.76)	213.4 (235.14)	0.392	3	.759
Total Weekly METs	11.98 (11.158)	13.18 (26.103)	12.37 (11.344)	17.97 (14.362)	18.34 (14.857)	16.21 (18.642)	23.10 (20.827)	22.76 (26.669)	0.259	3	.855
Resistance frequency	1.15 (2.397)	0.27 (0.905)	0.33 (0.900)	0.71 (1.446)	0.76 (1.742)	1.07 (2.056)	1.35 (1.843)	1.05 (2.423)	1.172	3	.321
Total weekly resistance minutes	10.2 (21.46)	2.73 (9.05)	7.00 (18.69)	18.4 (44.29)	20.4 (50.85)	35.7 (69.67)	24.5 (39.56)	29.8 (84.53)	0.289	3	.834

Table 48

Social Cognitive variable	Preferred intensity of physical activity						F	df	P
	Women			Men					
	Low intensity	Moderate/vigorous	No preference	Low intensity	Moderate/vigorous	No Preference			

Aerobic intention	4.23 (1.354)	4.89 (1.166)	5.10 (1.098)	3.53 (1.485)	5.04 (1.124)	4.40 (1.140)	3.185	2	.043*[a]
Resistance intention	3.01 (1.685)	4.22 (1.326)	4.80 (1.242)	3.27 (1.452)	4.22 (1.646)	4.00 (1.768)	0.556	2	.574
Aerobic Self-efficacy	2.19 (0.988)	2.68 (0.862)	2.65 (0.943)	1.83 (0.875)	2.81 (0.982)	3.00 (0.680)	1.856	2	.159
Resistance self-efficacy	1.60 (0.846)	2.00 (0.949)	2.57 (0.972)	1.61 (0.778)	2.41 (1.079)	2.80 (0.688)	1.036	2	.357
Aerobic pros	3.44 (1.088)	4.17 (0.655)	3.86 (0.735)	2.95 (1.036)	3.90 (0.933)	3.51 (1.358)	0.320	2	.727
Aerobic cons	2.05 (0.671)	1.77 (0.602)	2.43 (0.827)	1.76 (0.724)	1.76 (0.670)	2.00 (0.749)	1.372	2	.256
Resistance pros	2.75 (1.297)	3.41 (1.085)	3.80 (0.773)	2.69 (1.192)	3.32 (1.243)	3.34 (1.072)	0.125	2	.882
Resistance cons	2.06 (0.671)	1.87 (0.631)	2.31 (0.911)	1.81 (0.795)	1.92 (0.840)	2.06 (0.924)	1.032	2	.358
Aerobic injunctive norm	3.43 (1.050)	3.64 (1.008)	3.75 (0.968)	3.29 (0.748)	3.91 (0.789)	3.90 (0.454)	1.267	2	.284
Aerobic descriptive norm	2.32 (0.945)	2.40 (0.934)	2.07 (0.760)	2.28 (0.941)	2.74 (1.057)	3.13 (0.869)	1.859	2	.158
Aerobic social support	2.87 (1.233)	3.14 (1.080)	3.00 (1.225)	2.93 (0.731)	3.31 (0.944)	3.40 (0.365)	0.153	2	.858
Resistance injunctive norm	2.86 (1.178)	3.28 (1.081)	3.75 (0.968)	3.11 (0.711)	3.45 (0.991)	3.75 (0.637)	0.080	2	.924
Resistance descriptive norm	2.04 (0.927)	2.23 (0.900)	2.07 (0.760)	2.20 (0.911)	2.36 (1.026)	3.13 (0.989)	1.132	2	.324
Resistance social support	2.30 (1.226)	2.84 (1.134)	3.00 (1.225)	2.73 (0.685)	2.82 (1.084)	3.13 (0.767)	1.058	2	.349
Aerobic attitude	4.63 (1.276)	5.54 (1.123)	5.20 (0.837)	4.53 (1.143)	5.43 (1.064)	4.80 (0.837)	0.083	2	.921
Resistance attitude	3.45 (1.380)	4.79 (1.418)	5.00 (1.000)	4.17 (1.336)	4.79 (1.367)	4.80 (0.570)	1.829	2	.163
Aerobic response efficacy	4.33 (0.632)	4.60 (0.572)	4.20 (0.606)	3.86 (0.708)	4.41 (0.613)	3.73 (0.863)	1.244	2	.290
Resistance response	3.55	4.07 (0.899)	4.20	3.59	3.81 (1.067)	3.67	0.723	2	.486

efficacy	(1.184)		(0.606)	(0.737)		(1.000)			
Environment	3.10 (1.042)	3.42 (1.083)	3.60 (0.779)	3.52 (0.984)	3.19 (1.012)	3.60 (0.785)	2.461	2	.088
Behavioural Variables									
Strenuous + Moderate weekly minutes	21.7 (53.37)	78.8 (82.76)	368.0 (735.06)	47.6 (177.54)	118.6 (138.02)	186.8 (307.10)	2.288	2	.104
Total weekly minutes	77.8 (95.76)	253.1 (403.23)	392.0 (726.86)	155.2 (265.52)	217.1 (215.39)	197.8 (313.23)	1.561	2	.212
Total Weekly METs	9.87 (12.437)	17.63 (13.518)	26.90 (32.986)	12.91 (28.467)	22.70 (17.573)	31.50 (30.706)	0.075	2	.927
Resistance frequency	0.53 (1.804)	0.86 (1.676)	1.60 (1.817)	0.64 (1.851)	1.07 (2.185)	1.80 (1.095)	0.017	2	.984
Total weekly resistance minutes	4.44 (15.12)	17.9 (40.96)	36.0 (50.42)	5.61 (18.91)	30.2 (69.77)	84.8 (154.65)	0.951	2	.388

[a] low intensity sig different from moderate/vigourous

Table 49

	Preferred type of activities for a physical activity program						
	Women		Men				
Social Cognitive variable	Same activity each session	Different activities each session	Same activity each session	Different activities each session	F	df	P
Aerobic intention	4.53 (1.194)	4.65 (1.373)	4.58 (1.511)	4.66 (1.339)	0.008	1	.930
Resistance intention	3.76 (1.423)	3.68 (1.706)	3.67 (1.862)	4.11 (1.521)	1.326	1	.251
Aerobic Self-efficacy	2.36 (0.794)	2.49 (0.994)	2.53 (1.118)	2.57 (0.993)	0.111	1	.740
Resistance self-efficacy	1.70 (0.702)	1.96 (0.980)	2.13 (1.127)	2.27 (1.038)	0.174	1	.677
Aerobic pros	3.81 (0.953)	3.84 (0.930)	3.59 (1.068)	3.68 (1.066)	0.065	1	.798
Aerobic cons	2.06 (0.707)	1.86 (0.653)	1.67 (0.670)	1.80 (0.676)	3.003	1	.085
Resistance pros	3.05 (1.265)	3.20 (1.150)	3.04 (1.301)	3.22 (1.243)	0.008	1	.929
Resistance cons	2.07 (0.737)	1.94 (0.641)	1.90 (0.926)	1.88 (0.769)	0.257	1	.613
Aerobic injunctive norm	3.39 (1.114)	3.67 (0.954)	3.77 (0.825)	3.74 (0.820)	1.456	1	.229
Aerobic descriptive norm	2.39 (0.766)	2.31 (0.963)	2.28 (1.077)	2.79 (0.973)	4.372	1	.031*
Aerobic social support	2.87 (1.268)	3.08 (1.093)	3.17 (0.879)	3.23 (0.917)	0.247	1	.620
Resistance injunctive norm	2.95 (1.196)	3.24 (1.114)	3.31 (0.951)	3.39 (0.931)	0.525	1	.470

Resistance descriptive norm	2.20 (0.744)	2.11 (0.951)	2.01 (0.983)	2.49 (0.946)	4.819	1	.029*
Resistance social support	2.40 (1.187)	2.71 (1.189)	2.68 (0.937)	2.86 (1.025)	0.195	1	.659
Aerobic attitude	5.18 (1.103)	5.05 (1.366)	5.07 (1.262)	5.20 (1.095)	0.544	1	.462
Resistance attitude	4.29 (1.344)	4.15 (1.588)	4.41 (1.567)	4.72 (1.242)	1.305	1	.255
Aerobic response efficacy	4.44 (0.637)	4.44 (0.610)	4.22 (0.799)	4.26 (0.647)	0.061	1	.805
Resistance response efficacy	3.88 (1.030)	3.84 (1.072)	3.62 (1.203)	3.81 (0.879)	0.604	1	.438
Environment	3.20 (0.981)	3.38 (1.097)	3.30 (1.067)	3.23 (0.972)	0.737	1	.391
Behavioural Variables							
Strenuous + Moderate weekly minutes	84.5 (279.37)	56.6 (80.74)	89.4 (130.62)	111.9 (173.32)	1.134	1	.288
Total weekly minutes	194.0 (468.21)	188.4 (284.86)	170.8 (198.81)	213.9 (248.91)	0.339	1	.561
Total Weekly METs	14.03 (16.386)	14.82 (14.458)	18.62 (18.874)	21.98 (23.556)	0.225	1	.636
Resistance frequency	0.61 (1.728)	0.86 (1.810)	0.95 (2.544)	1.04 (1.854)	0.091	1	.764
Total weekly resistance minutes	8.33 (21.68)	16.5 (40.46)	26.7 (78.03)	26.5 (63.06)	0.285	1	.594

Table 50

	Supervision preference for a physical activity program						
	Women		Men				
Social Cognitive variable	Supervised /instructed	Un-supervised /self-paced	Supervised /instructed	Un-supervised /self-paced	F	df	P
Aerobic intention	4.67 (1.348)	4.59 (1.216)	4.59 (1.375)	4.61 (1.430)	0.075	1	.785
Resistance intention	3.73 (1.561)	3.69 (1.658)	3.74 (1.555)	4.08 (1.717)	0.739	1	.391
Aerobic Self-efficacy	2.43 (0.949)	2.47 (0.897)	2.52 (1.027)	2.61 (1.062)	0.029	1	.865
Resistance self-efficacy	1.83 (0.901)	1.85 (0.884)	2.10 (1.021)	2.31 (1.104)	0.517	1	.473
Aerobic pros	3.86 (0.985)	3.80 (0.842)	3.64 (1.059)	3.63 (1.079)	0.048	1	.826
Aerobic cons	1.87 (0.634)	1.99 (0.735)	1.78 (0.654)	1.75 (0.698)	0.781	1	.378
Resistance pros	3.19 (1.185)	3.02 (1.257)	3.04 (1.315)	3.23 (1.200)	1.147	1	.285
Resistance cons	1.93 (0.617)	2.05 (0.766)	1.88 (0.868)	1.91 (0.787)	0.197	1	.657
Aerobic injunctive norm	3.67 (1.014)	3.34 (1.040)	3.75 (0.848)	3.75 (0.796)	1.668	1	.198
Aerobic descriptive norm	2.35 (1.013)	2.32 (0.798)	2.68 (1.047)	2.57 (1.033)	0.085	1	.771
Aerobic social support	3.23 (1.102)	2.62 (1.181)	3.29 (0.992)	3.13 (0.806)	2.649	1	.105
Resistance injunctive norm	3.15 (1.163)	3.03 (1.109)	3.23 (1.012)	3.48 (0.842)	1.684	1	.196
Resistance descriptive norm	2.14 (1.001)	2.11 (0.732)	2.31 (1.008)	2.32 (0.978)	0.027	1	.870

Resistance social support	2.72 (1.228)	2.38 (1.150)	2.77 (1.069)	2.80 (0.930)	1.532	1	.217
Aerobic attitude	5.11 (1.335)	5.14 (1.121)	5.20 (1.121)	5.10 (1.191)	0.166	1	.684
Resistance attitude	4.31 (1.561)	4.01 (1.445)	4.50 (1.402)	4.71 (1.340)	1.704	1	.193
Aerobic response efficacy	4.54 (0.587)	4.31 (0.645)	4.27 (0.710)	4.22 (0.693)	1.079	1	.300
Resistance response efficacy	3.96 (1.025)	3.65 (1.063)	3.61 (1.110)	3.84 (0.876)	3.868	1	.050*
Environment	3.30 (1.060)	3.30 (1.059)	3.42 (0.992)	3.10 (1.004)	1.292	1	.257
Behavioural Variables							
Strenuous + Moderate weekly minutes	53.5 (76.76)	49.9 (68.17)	103.4 (187.50)	109.9 (133.47)	0.084	1	.773
Total weekly minutes	158.5 (267.65)	201.8 (399.13)	175.7 (226.04)	230.9 (244.35)	0.025	1	.875
Total Weekly METs	14.04 (14.973)	14.28 (11.200)	19.84 (26.635)	21.93 (16.685)	0.132	1	.717
Resistance frequency	0.73 (1.591)	0.79 (2.029)	0.75 (1.588)	1.29 (2.498)	0.800	1	.372
Total weekly resistance minutes	12.7 (30.37)	14.2 (41.12)	24.3 (65.59)	29.7 (71.30)	0.061	1	.805

Table 51

	Structure preference for a physical activity program						
	Women		Men				
Social Cognitive variable	Spontaneous /flexible	Scheduled	Spontaneous /flexible	Scheduled	F	df	P
Aerobic intention	4.66 (1.325)	4.63 (1.294)	4.67 (1.376)	4.51 (1.42+)	0.142	1	.707
Resistance intention	3.72 (1.680)	3.77 (1.527)	3.99 (1.623)	3.85 (1.678)	0.184	1	.669
Aerobic Self-efficacy	2.37 (0.896)	2.50 (0.910)	2.59 (1.031)	2.51 (1.065)	0.595	1	.441
Resistance self-efficacy	1.93 (0.902)	1.83 (0.896)	2.20 (1.059)	2.22 (1.067)	0.188	1	.665
Aerobic pros	3.88 (0.992)	3.80 (0.897)	3.72 (0.941)	3.53 (1.211)	0.162	1	.687
Aerobic cons	2.07 (0.827)	1.82 (0.492)	1.79 (0.703)	1.75 (0.683)	1.258	1	.263
Resistance pros	3.33 (1.215)	3.03 (1.172)	3.21 (1.230)	3.06 (1.280)	0.232	1	.630
Resistance cons	2.17 (0.787)	1.84 (0.540)	1.90 (0.781)	1.92 (0.917)	2.778	1	.097
Aerobic injunctive norm	3.64 (1.086)	3.52 (0.995)	3.76 (0.755)	3.77 (0.896)	0.321	1	.571
Aerobic descriptive norm	2.30 (0.843)	2.34 (1.005)	2.62 (1.026)	2.65 (1.073)	0.000	1	.992
Aerobic social support	2.90 (1.091)	3.15 (1.213)	3.23 (0.880)	3.22 (0.924)	0.812	1	.368
Resistance injunctive norm	3.17 (1.227)	3.09 (1.101)	3.40 (0.840)	3.35 (1.046)	0.011	1	.918
Resistance descriptive norm	2.10 (0.828)	2.13 (0.973)	2.31 (0.974)	2.35 (1.040)	0.001	1	.980

Resistance social support	2.60 (1.100)	2.65 (1.305)	2.82 (0.956)	2.78 (1.044)	0.088	1	.767
Aerobic attitude	5.04 (1.210)	5.17 (1.286)	5.15 (1.154)	5.18 (1.163)	0.072	1	.788
Resistance attitude	4.20 (1.513)	4.29 (1.555)	4.66 (1.330)	4.56 (1.430)	0.248	1	.619
Aerobic response efficacy	4.45 (0.679)	4.48 (0.567)	4.29 (0.597)	4.23 (0.780)	0.207	1	.649
Resistance response efficacy	3.91 (1.112)	3.86 (0.996)	3.78 (0.891)	3.71 (1.125)	0.007	1	.931
Environment	3.30 (1.077)	3.34 (1.031)	3.10 (1.077)	3.47 (0.863)	1.442	1	.231
Behavioural Variables							
Strenuous + Moderate weekly minutes	45.9 (77.20)	83.6 (224.60)	111.8 (141.86)	96.7 (185.01)	1.362	1	.245
Total weekly minutes	154.5 (296.63)	220.1 (394.87)	237.8 (255.31)	156.6 (199.90)	3.446	1	.065
Total Weekly METs	13.09 (11.695)	16.19 (17.419)	20.66 (16.879)	21.10 (27.489)	0.263	1	.608
Resistance frequency	0.73 (1.724)	0.69 (1.614)	1.20 (2.033)	0.78 (2.186)	0.534	1	.466
Total weekly resistance minutes	18.1 (46.22)	8.71 (20.38)	25.6 (53.78)	28.4 (83.81)	0.669	1	.414

Appendix II

Rationale for using Self-Determination Theory

A potential study theory

Using the current study, Courneya et al, (2008) and Rogers et al, (in press), potential theories could be addressed. Self-determination theory states that people want to feel competent in the activities they perform (Deci & Ryan, 1985) which links to building self-efficacy. Increasing confidence in an action may lead to feelings of competence and potentially increase levels of participation (Deci & Ryan, 1985; Ryan & Deci, 2000). Motivational theories, such as Self-Determination Theory, have examined the nature of people and the factors that influence their actions. Self-Determination Theory is an organismic motivational theory is self-determination theory (Deci & Ryan, 1985).

According to the theory, social situations that satisfy the psychological needs for *autonomy*, *relatedness* and *competence* (core components) facilitate the development of self-determined regulations which affect both task persistence and psychological well-being (Deci & Ryan, 1985; Ryan & Deci, 2000). Autonomy refers to feeling free to choose your own behaviours and that this choice of behaviour comes from an internal locus of control (Deci & Ryan, 1985). Relatedness involves feeling meaningfully connected to others within a given social setting (Ryan & Deci, 2000). Finally, competence refers to effectively interacting with one's environment by mastering challenges (Deci & Ryan, 1985). The idea is that the rewards of an activity are derived from the activity itself and whether secondary gains are realised or not, the primary motivators are the spontaneous, internal experiences that go along with the specific behaviour. It is also important to note that self-determination theory assumes not all behaviours are drive-based or functions of external influences.

Deci and Ryan (1985) suggest that in the modern world, the nature of work requires an increased subordination of self-determination to economic and technological forces and a decrease in identification with the products of one's labours. This leads to an increase in pressure and alienation. This in turn leads people to leisure-time activities that are self-determining and allow creative expression. People need to feel competent and self-determining when dealing with their surroundings (Deci et al, 1981). Motivational approaches show that people seek activities that interest them and require creativity and resourcefulness. They seek challenges appropriate to their competencies (Deci & Ryan, 1985, Wilson & Rodgers, 2002).

Internal motivation is authentic motivation (i.e., self-endorsed actions) and people who are internally motivated tend to have more excitement, interest and confidence in activities which in turn can be evident as enhanced performance, persistence and creativity (Deci & Ryan, 1991, Ryan & Deci, 2000) and as heightened vitality (Nix, Ryan, Manly & Deci, 1999), self-esteem (Deci & Ryan, 1995) and general well-being (Ryan, Deci & Grolnick, 1995). From these results, we can surmise that to increase performance and persistence in an activity one must be excited and interested in that activity. Supporting the importance of internal motivation, Wilson and Rodgers (2002) found that people who feel compelled to engage in physical activity because of social pressures or constraints are less likely to develop motivational patterns that either sustain physical activity involvement or promote overall physical self-worth. Soliciting physical activity preferences when developing a physical activity program could help increase performance and persistence by ensuring the activities included in a program are ones that an individual would be keen and interested in engaging.

Overall, individuals seek activities to have fun, interact with others, to test and enhance their skills, and to feel they are being self-determining (doing something they want to do). This need to seek interesting activities that provide an appropriate challenge relates to tailoring physical activity programs to personal preferences. If physical activity programs are appropriately tailored then the intrinsic needs for self-determination and competency may be met and people should remain intrinsically motivated to continue physical activity programs. Self-determination theory may be applicable to physical activity preference research.

Appendix III

CARED Study Baseline Instrument

CARED Study Follow up Instrument

CARED: The Canadian Aerobic and Resistance Exercise Diabetes Study

Dear Participant:

Thank you very much for participating in this study. We will be using your opinions and thoughts collected from this questionnaire to help develop useful physical activity programs for people of all ages and abilities living with Type 2 Diabetes. **You do not have to be currently active to fill out this questionnaire**.

The purpose of this study is to find out about what people living with Type 2 Diabetes think, feel and do in terms of physical activity. While getting *any* activity is good for your health, this questionnaire is *only* measuring activities you do *outside* of work and daily living. For example, physical labor on the job, shoveling snow, cleaning house, grocery shopping, chores, etc., are *not* being assessed.

Please read the questions carefully and answer each to the best of your ability. There are no right or wrong answers. Also, try not to miss any questions or leave any blank.

If you would like assistance filling this questionnaire out over the telephone, or if you have any questions or concerns, please call Melissa Matthews, Project Coordinator, at (780) 492-6315. Please remember to call collect if calling long distance (dial 0+780-492-6315).

How to Record Your Answers

Here is an example of a question answered by checking a box:

1. *Do you exercise even when you feel tired?*

☑ Yes ☐ No

Checking the "yes" box means that the above statement is true for you.

Here is an example of a question answered by circling a number:

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
2. *I enjoy swimming.*	1	2	3	(4)	5

Circling the number 4 means you Agree that you enjoy swimming.

Centre for Health Promotion STUDIES

UNIVERSITY OF ALBERTA

Faculty of Physical Education & Recreation

Appendix

Definitions of words used in this Questionnaire

Use for your referral if you are unsure of the definition of words when answering the questions.

1. Aerobic Activity: Brisk physical activity that requires the heart and lungs to work harder to meet the body's need for oxygen. Aerobic activity promotes the circulation of oxygen through the blood.

Examples of aerobic activity include walking, swimming, cycling, dancing, jogging, recreational sports, aerobic dance classes, skiing, tennis, martial arts.

Moderate Intensity: *Aerobic activity* performed at a level where a person begins to lightly sweat, but can still carry out a conversation. This level is different for everyone.

2. Strength Training: Training designed to increase the body's strength, power, and muscular endurance. Also known as "weight training" and "resistance training".

Examples of strength training include lifting barbells/dumbbells, exercise machines, doing squats, sit-ups/crunches, pushups, leg lifts, using a theraband/large elastic band, exercise tubing.

Canadian Guidelines for Aerobic Activity and Strength Training Exercise: This questionnaire will ask whether you "meet the guidelines" for aerobic activity and strength training exercise. This is also known as "regular physical activity".

These guidelines are the most current recommendations for people with Type 2 Diabetes. These are *recommendations only* based on what the research says is most beneficial for health.

- **The Guidelines for *Aerobic Activity:*** 150 minutes per week *or more* at a *moderate intensity* (see above definition under "aerobic activity").

For example: walking briskly on the treadmill 5 times per week for 30 minutes each time = 150 min.
bicycling 3 times per week for 50 minutes each time= 150 minutes.
square dancing 2 times per week for 45 minutes each time plus brisk walking 2 times per week for 30 minutes each time=150 minutes.
tennis 3 times per week for 60 minutes each time= 180 minutes.

- **The Guidelines for *Strength Training:*** A resistance/strength training program done 3 times per week or more

For example: using the machines at the gym 3 times per week
doing a strength training and toning video at home 3 times per week
leg lifts and stomach crunches 3 times per week
exercise band training 3 times per week

Section A

This section asks you to identify obstacles that may make participating in regular physical activity more challenging

1. **Please write down what main obstacles, situations or circumstances *if any* prevent you from getting Aerobic activity?**

_____

_____

□ **Not Applicable, there are no obstacles preventing me**

2. **What main obstacles, situations or circumstances *if any* prevent you from doing Strength training?**

_____

_____

□ **Not Applicable, there are no obstacles preventing me**

3. **Is the amount of physical activity you did in the past month less, more, or about the same as your usual activity habits?**

I am now much less active	*I am now less active*	*I am now about the same*	*I am now more active*	*I am now much more active*
1	2	3	4	5

4. **In the past month, was your participation in physical activity limited by a health condition, injury, or disability?**

Not at All	*Slightly*	*A little*	*Somewhat*	*Quite a lot*	*Completely*
0	1	2	3	4	5

5. **Check the type(s) of health conditions that affect your ability to participate in Aerobic activity** (examples include walking, biking, swimming, dancing, etc.):

_____ *Not Applicable*
_____ Arthritis
_____ Knee problems
_____ Hip problems
_____ Asthma
_____ Foot problems
_____ Heart Condition
_____ Stroke
_____ Cancer
_____ Depression
_____ Other, specify:_____

6. **Check the type(s) of health conditions that affect your ability to participate in <u>Strength training exercise</u>:**

_____ *Not Applicable*	_____Heart Condition
_____ Arthritis	_____Stroke
_____ Knee problems	_____Cancer
_____ Hip problems	_____Depression
_____ Asthma	_____Other, specify:_____
_____ Foot problems	

By placing a check-mark in one box in each group below, please indicate which statements best describe your own state of health today.

7. **Mobility**

	check one
I have no problems in walking about	☐
I have some problems walking about	☐
I am confined to bed	☐

8. **Self-Care**

	check one
I have no problems with self-care	☐
I have some problems with washing or dressing myself	☐
I am unable to wash or dress myself	☐

9. **Usual Activities (e.g., work, study, housework, family or leisure activities)**

	check one
I have no problems with performing my usual activities	☐
I have some problems with performing my usual activities	☐
I am unable to perform my usual activities	☐

10. Pain/Discomfort

	check one
I have no pain or discomfort	☐
I have moderate pain or discomfort	☐
I have extreme pain or discomfort	☐

11. Anxiety/Depression

	check one
I am not anxious or depressed	☐
I am moderately anxious or depressed	☐
I am extremely anxious or depressed	☐

12. In general, would you say your health is:

Excellent	Very good	Good	Fair	Poor
☐	☐	☐	☐	☐

SECTION B

This next section asks you about your current physical activity habits

PLEASE READ CAREFULLY:

We would like you to recall your average weekly participation in Aerobic Activity over the *past month*.

When answering these questions, please:

- Only count activity sessions that lasted 10 minutes or longer in duration.
- Do not count activity that was done as part of your employment, yard work or household chores.
- Please write the average amount of times per week in the first column and the average length of time in the second column for each category of strenuous, moderate and mild physical activity.

** *Please fill in all 6 boxes below. Mark a "0" if a category does not apply to you.*

How many times per week on average did you do the following kinds of Aerobic Activity over the *last month*?

		Number of Times Per Week	Average Time Per Session (in minutes)
1.	**Strenuous activity** (heart beats rapidly, sweating) Examples: running, jogging, hockey, soccer, squash, cross country skiing, judo, roller skating, vigorous swimming, vigorous long distance bicycling, vigorous aerobic dance classes, vigorous tennis **Example Only: I did not do any strenuous activity in the past month**	_____ **0**	_____ **0**
2.	**Moderate activity** (not exhausting, light perspiration) Examples: fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, skiing, dancing, water aerobics, hiking **Example Only: I did Fast walking in the past month**	_____ **Average of 2x per week**	_____ **10 minutes per walk**
3.	**Mild activity** (minimal effort, no perspiration) Examples: easy walking, tai chi, yoga, archery, fishing, bowling, lawn bowling, shuffleboard, horseshoes, golf, snowmobiling) **Example Only: I did Yoga in the past month**	_____ **Average of 3x per week**	_____ **30 minutes per class**

Now think about Strength Training:

Examples of Strength training may include: Lifting or pushing dumbbells and/or barbells, using elastic exercise bands or therabands, using your own body weight as resistance (for example: pushups, squats, lunges, leg lifts, stomach crunches), weight machines

Again, considering your average over the past month, indicate how many times per week you engaged in strength training, if any. Next, indicate the average time per session (in minutes). Mark a '0' in each column if you did not do any strength training over the last month.

	Number of Times Per Week	Average Time Per Session (in minutes)
A. Strength training		

SECTION C

This section asks about your intentions to be physically active

Current Canadian Guidelines for Aerobic activity are:

150 minutes per week *or more* at a *moderate intensity* (performed at a level where a person begins to lightly sweat, but can still carry out a conversation).

For example: brisk walking outside 5 times per week for 30 minutes each time = 150 minutes.
stationary bicycling 3 times per week for 60 minutes each time= 180 minutes.
hiking 2 times per week for 30 minutes each time plus 3x30 minute water aerobic classes = 150 minutes.

**Please Remember: this study is not measuring household chores, yard work or physical labor on the job, so those activities are not included in the definition of the Guidelines*

1. **Based on the definition above, do you meet the Guidelines for *Aerobic activity*?**

No, and I do not intend to within the next 6 months	***No, but I intend to within the next 6 months***	***No, but I intend to within the next 30 days***	***Yes, and I have for less than 6 months***	***Yes, and I have for more than 6 months***
1	2	3	4	5

2. **Based on the definition above, how motivated are you to meet the Guidelines for *Aerobic activity* over the next *3 months*?**

Extremely Unmotivated	Very Unmotivated	Quite Unmotivated	Neutral	Slightly Motivated	Very Motivated	Extremely Motivated
1	2	3	4	5	6	7

3. **How committed are you to meeting the Guidelines for *Aerobic Activity* over the next *3 months?***

Extremely Uncommitted	Very Uncommitted	Quite Uncommitted	Neutral	Slightly Committed	Very Committed	Extremely committed
1	2	3	4	5	6	7

4. **How motivated are you to *increase* the amount of *Aerobic Activity* that you are *currently doing* over the next *3 months?***

Extremely Unmotivated	Very Unmotivated	Quite Unmotivated	Neutral	Slightly Motivated	Very Motivated	Extremely Motivated
1	2	3	4	5	6	7

5. **I strongly intend to do everything I can to meet the Guidelines for *Aerobic Activity* over the next *3 months*.**

Extremely Untrue	Very Untrue	Quite Untrue	Neutral	Slightly True	Very True	Extremely True
1	2	3	4	5	6	7

Current Guidelines for strength training are: Strength training 3 times per week or more

1. **Based on the definition above, do you meet the Guidelines for Strength Training?**

No, and I do not intend to within the next 6 months	*No, but I intend to within the next 6 months*	*No, but I intend to within the next 30 days*	*Yes, and I have for less than 6 months*	*Yes, and I have for more than 6 months*
1	2	3	4	5

2. **Based on the definition above, how motivated are you to meet the Guidelines for *Strength Training* over the next 3 months?**

Extremely Unmotivated	Very Unmotivated	Quite Unmotivated	Neutral	Slightly Motivated	Very Motivated	Extremely Motivated
1	2	3	4	5	6	7

3. **How committed are you to meeting the Guidelines for *Strength Training* over the next 3 months?**

Extremely Uncommitted	Very Uncommitted	Quite Uncommitted	Neutral	Slightly Committed	Very Committed	Extremely committed
1	2	3	4	5	6	7

4. **How motivated are you to *increase* the amount of *Strength Training* that you are *currently doing* over the next 3 months?**

Extremely Unmotivated	Very Unmotivated	Quite Unmotivated	Neutral	Slightly Motivated	Very Motivated	Extremely Motivated
1	2	3	4	5	6	7

5. **I strongly intend to do everything I can to meet the Guidelines for *Strength Training* over the next 3 months.**

Extremely Untrue	Very Untrue	Quite Untrue	Neutral	Slightly True	Very True	Extremely True
1	2	3	4	5	6	7

SECTION D

The next section asks you about how confident you are to meet the Guidelines for Physical Activity

---

Please rate how much the following circumstances affect your confidence to meet the Canadian Guidelines for Aerobic activity *and* Strength training (in the next 3 months).

***Note: If you do not plan on doing aerobic activity or strength training, mark a "1" for your answer (do not leave the question blank).**

	Not at all confident	***Not very confident***	***Moderately confident***	***Very confident***	***Extremely confident***
1. When I am a little tired:					
I could do Aerobic Activity	1	2	3	4	5
I could Strength Train	1	2	3	4	5
2. When I am in a bad mood or feeling depressed:					
I could do Aerobic Activity	1	2	3	4	5
I could Strength Train	1	2	3	4	5
3. When I have to do it by myself:					
I could do Aerobic Activity	1	2	3	4	5
I could Strength Train	1	2	3	4	5

		Not at all confident	*Not very confident*	*Moderately confident*	*Very confident*	*Extremely confident*
4.	**When it becomes boring:**					
	I could do Aerobic Activity	1	2	3	4	5
	I could Strength Train	1	2	3	4	5
5.	**When I can't notice any improvements in my fitness:**					
	I could do Aerobic Activity	1	2	3	4	5
	I could Strength Train	1	2	3	4	5
6.	**When I have many other demands on my time:**					
	I could do Aerobic Activity	1	2	3	4	5
	I could Strength Train	1	2	3	4	5
7.	**When I feel a little stiff or sore:**					
	I could do Aerobic Activity	1	2	3	4	5
	I could Strength Train	1	2	3	4	5
8.	**When the weather is bad:**					
	I could do Aerobic Activity	1	2	3	4	5
	I could Strength Train	1	2	3	4	5
9.	**When I have to get up early, even on weekends:**					
	I could do Aerobic Activity	1	2	3	4	5
	I could Strength Train	1	2	3	4	5
10.	**When I have to find different activities due to diabetes complications**:**					
	I could do Aerobic Activity	1	2	3	4	5
	I could Strength Train	1	2	3	4	5
11.	**When I feel a little ill:**					
	I could do Aerobic Activity	1	2	3	4	5
	I could Strength Train	1	2	3	4	5

***Diabetes complications means foot, eye, kidney or heart problems caused by long-term uncontrolled or unmanaged blood sugars.*

SECTION E

This section asks about factors that may influence your decision to activity

To what extent will the following ideas influence your decision to meet the Canadian Guidelines for aerobic activity *or* strength training over the next 3 months?

	Possible Positive Influences:	*Not at all*	*A little*	*Somewhat*	*Quite a lot*	*Very much*
1.	*Meeting the guidelines for Aerobic activity* will lead to better management of my diabetes.	1	2	3	4	5
	Meeting the guidelines for Strength training will lead to better management of my diabetes.	1	2	3	4	5
2.	*Meeting the guidelines for Aerobic activity* will lead to better control of my blood sugar.	1	2	3	4	5
	Meeting the guidelines for Strength training will lead to better control of my blood sugar.	1	2	3	4	5
3.	I would feel more confident about my health by *meeting the guidelines for Aerobic activity.*	1	2	3	4	5
	I would feel more confident about my health by *meeting the guidelines for* Strength *training.*	1	2	3	4	5
4.	*Meeting the guidelines for Aerobic activity* will delay and/or prevent long-term diabetes complications (problems related to eyes, kidneys, heart, or feet).	1	2	3	4	5
	Meeting the guidelines for Strength training will delay and/or prevent long-term diabetes complications	1	2	3	4	5
5.	*Meeting the Aerobic activity* guidelines would help me reduce tension or manage stress.	1	2	3	4	5
	Meeting the Strength training guidelines would help me reduce tension or manage stress.	1	2	3	4	5

	Possible Positive Influences:	*Not at all*	*A little*	*Somewhat*	*Quite a lot*	*Very much*
6.	I would sleep better if I met the *Aerobic activity guidelines.*	1	2	3	4	5
	I would sleep better if I met the *Strength training guidelines.*	1	2	3	4	5
7.	Getting the *Aerobic activity guidelines* will help me control my weight.	1	2	3	4	5
	Getting the Strength training guidelines will help me control my weight.	1	2	3	4	5
	Possible Negative Influences:					
8.	I would be concerned that *meeting the guidelines for Aerobic activity* would give me low blood sugar.	1	2	3	4	5
	I would be concerned that *meeting the guidelines for Strength training* would give me low blood sugar.	1	2	3	4	5
9.	*Meeting the Aerobic activity guidelines* would make me more prone to physical injury.	1	2	3	4	5
	Meeting the Strength training guidelines would make me more prone to physical injury.	1	2	3	4	5
10.	It would be a hassle if I had to check my blood sugar more often if getting *Aerobic activity.*	1	2	3	4	5
	It would be a hassle if I had to check my blood sugar more often if *Strength training.*	1	2	3	4	5
11.	I'd worry about looking awkward if others saw me doing *aerobic activity.*	1	2	3	4	5
	I'd worry about looking awkward if others saw me *Strength training.*	1	2	3	4	5
12.	*Aerobic activity* would cost too much money.	1	2	3	4	5
	Strength training would cost too much money.	1	2	3	4	5

Possible Negative Influences:		*Not at all*	*A little*	*Somewhat*	*Quite a lot*	*Very much*
13.	*Meeting the guidelines for Aerobic activity* would take too much of my time.	1	2	3	4	5
	Meeting the guidelines for Strength training would take too much of my time.	1	2	3	4	5
14.	I'd be too tired to *meet the guidelines for Aerobic activity* because of my other daily responsibilities.	1	2	3	4	5
	I'd be too tired to *meet the guidelines for Strength training* because of my other daily responsibilities.	1	2	3	4	5

SECTION F

This part of the questionnaire asks you what people in your social circle think and do about activity

Choose the number that matches your answer. ***If people in your social circle (i.e., family and friends) don't seem to care what you do for activity, mark a '1' for strongly disagree.***

		Strongly disagree	*Disagree*	*Neutral*	*Agree*	*Strongly agree*
1.	**In the next 3 months, most people in my social circle want me to:**					
	Meet the guidelines for Aerobic activity	1	2	3	4	5
	Meet the guidelines for Strength training	1	2	3	4	5
2.	**In the next 3 months, most people in my social circle would approve if I:**					
	Met the guidelines for Aerobic activity	1	2	3	4	5
	Met the guidelines for Strength training	1	2	3	4	5
3.	**In the next 3 months, my doctor or health care provider wants me to:**					
	Meet the guidelines for Aerobic activity	1	2	3	4	5

		Strongly disagree	*Disagree*	*Neutral*	*Agree*	*Strongly agree*	
	Meet the guidelines for Strength training	1	2	3	4	5	
4.	**In the next 3 months my doctor or health care provider would approve for me to:**						
	Meet the guidelines for Aerobic activity	1	2	3	4	5	
	Meet the guidelines for Strength training	1	2	3	4	5	
5.	**Most of my family members:**						
	Achieve the guidelines for Aerobic activity	1	2	3	4	5	
	Achieve the guidelines for Strength training	1	2	3	4	5	
6.	**Most of my friends:**						
	Do the Aerobic activity recommended in the guidelines	1	2	3	4	5	Not applicable
	Do the Strength training recommended in the guidelines	1	2	3	4	5	Not applicable
7.	**My spouse/partner:**						
	Does the Aerobic activity recommended in the guidelines	1	2	3	4	5	Not applicable
	Does the Strength training recommended in the guidelines	1	2	3	4	5	Not applicable
8.	**People in my social circle are likely to help me:**						
	Get regular Aerobic activity	1	2	3	4	5	
	Do regular Strength training	1	2	3	4	5	
9.	**There is at least one person in my social circle to turn to for assistance with:**						
	Aerobic activity	1	2	3	4	5	

		Strongly disagree	*Disagree*	*Neutral*	*Agree*	*Strongly agree*
	Strength training	1	2	3	4	5
10.	**I feel that someone in my social circle will support me in getting:**					
	Aerobic activity	1	2	3	4	5
	Strength training	1	2	3	4	5
11.	**Whether or not I participate in:**					
	Aerobic activity is mostly up to me	1	2	3	4	5
	Strength training is mostly up to me	1	2	3	4	5

SECTION G

This section is about your views and attitudes on activity

For each of the following statements, please circle the word that best represents how you feel about aerobic activity *or* strength training over the next 3 months. Read each question from left to right.

Example:

Extremely Unenjoyable	Quite Unenjoyable	Slightly Unenjoyable	Neutral	(Slightly Enjoyable)	Quite Enjoyable	Extremely Enjoyable

For me, meeting the *guidelines for Aerobic activity* would be/is:

→

1.	Extremely Unenjoyable	Quite unenjoyable	Slightly unenjoyable	Neutral	Slightly enjoyable	Quite enjoyable	Extremely enjoyable
2.	Extremely Harmful	Quite harmful	Slightly harmful	Neutral	Slightly beneficial	Quite beneficial	Extremely beneficial

For me *meeting the Guidelines for Strength training* would be/is:

1.	Extremely Unenjoyable	Quite unenjoyable	Slightly unenjoyable	Neutral	Slightly enjoyable	Quite enjoyable	Extremely enjoyable
2.	Extremely Harmful	Quite harmful	Slightly harmful	Neutral	Slightly beneficial	Quite beneficial	Extremely beneficial

SECTION H

The following questions ask for your thoughts about diabetes and activity

Please tell us how much the following statements represent your beliefs about activity and diabetes.

		Definitely not	*Probably not*	*Unsure*	*Probably yes*	*Definitely yes*
1.	Getting further diabetes complications would be a very bad thing to happen to me.	1	2	3	4	5
2.	I am frightened about the possibility of getting further diabetes complications.	1	2	3	4	5
3.	My chances of getting diabetes complications are likely.	1	2	3	4	5
4.	*Aerobic activity* will keep me healthy.	1	2	3	4	5
	Strength *training* will keep me healthy.	1	2	3	4	5
5.	For me, *Aerobic activity* will reduce my chances of getting serious health problems.	1	2	3	4	5
	For me, Strength *training* will reduce my chances of getting serious health problems.	1	2	3	4	5
6.	For me, *Aerobic* activity will help me either remain fit or get fit.	1	2	3	4	5
	For me, *Strength training* will help me either remain fit or get fit.	1	2	3	4	5

SECTION I

We would like to find out more information about your local area. **Please circle your answers.**
Your local area is a 10-15 minute walk from your home.

		Strongly disagree	Somewhat disagree	Unsure	Somewhat agree	Strongly agree
1.	There are many shops or other places to buy things I need within easy walking distance of my home.	1	2	3	4	5
2.	It is within a 15-minute walk to a public transit stop from my home.	1	2	3	4	5
3.	There are many four-way intersections in my local area.	1	2	3	4	5
4.	There are sidewalks on most of the streets in my local area.	1	2	3	4	5
5.	There are many interesting things to look at while walking in my local area.	1	2	3	4	5
6.	My local area has several free or low cost recreation facilities, such as parks, walking trails, bike paths, playgrounds, and recreation centres.	1	2	3	4	5
7.	The level of crime in my local area makes it unsafe to go on walks at night.	1	2	3	4	5

SECTION J
Demographics

This part of the questionnaire is important to help us understand the characteristics of the people participating in this study. Please do not skip any questions.

1. **Age** _____ (years)

2. **Male** ☐ **Female** ☐

3. **Marital Status**:

   Never Married _____ Married _____

   Common Law _____ Widowed _____ Separated or Divorced _____

4. **Ethnic Origin:**

   Canadian _____ European _____ Aboriginal _____

   Arab _____ Asian _____ Latin, South American _____

   African _____ Other (please specify) _____

5. **Education:**

Some Grade School	_____	Completed College / University	_____
Some High School	_____	Some Graduate School	_____
Completed High School	_____	Completed Graduate School	_____
Some College/University	_____	Some Technical Training	_____
		Completed Technical Training	_____

6. **Gross Annual Family Income. Please note: we ask about income to determine whether future exercise programs need to be cost-effective for the Diabetes population.**

<$20,000	_____	$60,000-79,999	_____
$20,000-39,999	_____	$80,000-99,999	_____
$40,000-59,999	_____	Over $100,000	_____

* **Gross Annual Family Income** is the *total amount of income made in a year by yourself and/or your partner before any deductions are taken off.* Do your best to estimate if you are uncertain.

7. Do you have access to email or internet at home? **Yes ☐** **No ☐**

Please tell us a little about your medical and health background:

1. Smoking Habits (includes tobacco, pipes, cigars): Are you a...

   ☐ Regular smoker (I smoke everyday)?

   ☐ Occasional smoker (I smoke once in a while, not everyday)?

   ☐ Ex-smoker (I don't smoke at all anymore, but I used to smoke)?

   ☐ Non-smoker (I don't smoke and I have never smoked)?

2. Has a doctor or nurse ever told you that you have had the following: *(please check all that apply)*

   Angina _____ High Cholesterol _____

   Heart Attack _____ High Blood Pressure _____

   Stroke _____ Type 2 Diabetes _____

   Cancer _____ None of the Above _____

3. At what age were you diagnosed with Type 2 Diabetes? _____

4. The next questions ask about your prescribed medication habits. Choose one response for each question.

   a) Are you currently on diabetes medication? **Yes ☐** **No ☐**

   b) Are you taking insulin everyday for your diabetes now? **Yes ☐** **No ☐**

   c) Are you taking diabetes pills everyday for your diabetes now? **Yes ☐** **No ☐**

   d) Are you currently taking medication for high cholesterol? **Yes ☐** **No ☐**

   e) Are you currently taking medication for high blood pressure? **Yes ☐** **No ☐**

SECTION K

The next section asks about where you may have received information on aerobic activity and strength training

1. **Since having been diagnosed with diabetes, from which *health care professional(s)* have you received information or recommendations regarding Aerobic Activity?**

Yes	No	
☐	☐	Nurse
☐	☐	Diabetes educator
☐	☐	Dietician / nutritionist
☐	☐	Physical activity / Fitness professional
☐	☐	Pharmacist
☐	☐	Doctors. If yes, specify by marking the box:

☐ General / family doctor
☐ Endocrinologist
☐ Cardiologist
☐ Ophthalmologist / Optometrist
☐ Podiatrist

Other(s)_____

2. **Were specific Aerobic Activity guidelines provided to you? For example, were you provided information concerning:**

a. What type of aerobic activity you should be performing?	Yes ☐	No ☐
b. For how long and how often these activities should be performed?	Yes ☐	No ☐
c. At what intensity should you perform these activities?	Yes ☐	No ☐

3. **Since having been diagnosed with diabetes, how often have you received information or recommendations regarding Aerobic Activity from *health care professionals*?**

Never or less than once per year	Once per year	Twice per year	Once per month	More than once per month
1	2	3	4	5

4. From which <u>other</u> sources have you learned about <u>Aerobic Activity</u>?

a.	Family	☐ Yes	☐ No	e.	Television	☐ Yes	☐ No
b.	Books	☐ Yes	☐ No	f.	Friends	☐ Yes	☐ No
c.	Internet	☐ Yes	☐ No	g.	Magazines	☐ Yes	☐ No
d.	School	☐ Yes	☐ No	h.	Recreational Facilities	☐ Yes	☐ No
				i.	Other _____		

Next, please complete the same questions for <u>Strength Training</u>:

1. Since having been diagnosed with diabetes, from which *health care professional(s)* have you received information or recommendations regarding <u>Strength Training</u>?

Yes	No	
☐	☐	Nurse
☐	☐	Diabetes educator
☐	☐	Dietician / nutritionist
☐	☐	Physical activity / Fitness professional
☐	☐	Pharmacist
☐	☐	Doctors. If yes, specify by marking the box:

☐ General / family doctor
☐ Endocrinologist
☐ Cardiologist
☐ Ophthalmologist / Optometrist
☐ Podiatrist

Other(s)_____

2. **Were specific Strength Training guidelines provided to you? For example, were you provided information concerning:**

a. What type of strength training activities you should be performing?	Yes ☐	No ☐
b. For how long and how often these activities should be performed?	Yes ☐	No ☐
c. At what intensity should you perform these activities?	Yes ☐	No ☐

3. **Since having been diagnosed with diabetes, how often have you received information or recommendations regarding Strength Training from *health care professionals*?**

Never or less than once per year	Once per year	Twice per year	Once per month	More than once per month
1	2	3	4	5

4. **From which other sources have you learned about Strength Training?**

a. Family	☐ Yes	☐ No	e. Television	☐ Yes	☐ No
b. Books	☐ Yes	☐ No	f. Friends	☐ Yes	☐ No
c. Internet	☐ Yes	☐ No	g. Magazines	☐ Yes	☐ No
d. School	☐ Yes	☐ No	h. Recreational Facilities	☐ Yes	☐ No
			i. Other _____		

Thank you for your time and participation today!

Please look over your answers for any missed pages or questions and then send this questionnaire back to us along with one of the consent forms, in the prepaid envelope provided.

For the final part of your participation,
we will be sending you your last questionnaire in *3 months time.*
This questionnaire will be *very short.*

Funding for this study has been provided by the:

CARED: The Canadian Aerobic and Resistance Exercise Diabetes Study

Dear Participant,

Thank you very much for participating in the final part of our study. This questionnaire is *very* short and will only take about 5-10 minutes to complete.

As with the first questionnaire, please read the questions carefully and answer each to the best of your ability. There are no right or wrong answers. Once again, we emphasize that *you do not have to be currently active to fill out this questionnaire.*

This questionnaire is *only* measuring physical activities you do *outside* of work and daily living. For example, physical labor on the job, shoveling snow, cleaning house, grocery shopping, chores, etc., are *not* being assessed.

If you would like assistance with completing this questionnaire, please contact Cindy Forbes, Project Coordinator at (780) 492-6315 (or call collect if calling long distance, 0+780+492-6315).

Please indicate by checking the response below, if you would like to receive a copy of the study results along with materials based on your personal results, available Fall, 2006.

_____ Yes, please send me a copy of the results

_____ No thank you, I do not wish to receive a copy of the results

In addition, indicate if you would like to be contacted for future studies with our Lab:

_____ Yes, I would be interested in being contacted for future studies

_____ No, I do not want to be contacted for future studies.

Funding for this study has been provided by The Canadian Diabetes Association

SECTION A

This next section asks you about your current physical activity habits

PLEASE READ CAREFULLY:

We would like you to recall your average <u>weekly</u> participation in Aerobic Activity <u>over the past month.</u>

When answering these questions, please:

- Only count activity sessions that lasted 10 minutes or longer in duration.
- <u>Do not</u> count activity that was done as part of your employment, yard work or household chores.
- Please write the average <u>amount of times per week</u> in the first column and the <u>average length of time</u> in the second column for each category of <u>strenuous</u>, <u>moderate</u> and <u>mild</u> physical activity.

** *Please fill in all 6 boxes below. Mark a "0" if a category does not apply to you.*

How many <u>times per week</u> on average did you do the following kinds of Aerobic Activity over the *last month*?

		Number of Times Per Week	Average Time Per Session (in minutes)
1.	**Strenuous activity** (heart beats rapidly, sweating) Examples: running, jogging, hockey, soccer, squash, cross country skiing, judo, roller skating, vigorous swimming, vigorous long distance bicycling, vigorous aerobic dance classes, vigorous tennis **Example Only: I did not do any strenuous activity in the past month**	_____ **0**	_____ **0**
2.	**Moderate activity** (not exhausting, light perspiration) Examples: fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, skiing, dancing, water aerobics, hiking **Example Only: I did <u>Fast walking in the past month</u>**	_____ **Average of 2x per week**	_____ **10 minutes per walk**
3.	**Mild activity** (minimal effort, no perspiration) Examples: easy walking, tai chi, yoga, archery, fishing, bowling, lawn bowling, shuffleboard, horseshoes, golf, snowmobiling) **Example Only: I did <u>Yoga</u> in the past month**	_____ **Average of 3x per week**	_____ **30 minutes per class**

✓ ***Reminder: The Guidelines for <u>Aerobic Activity</u> are 150 minutes or more of moderate-intensity aerobic activity per week.*** **This intensity is at a pace of brisk walking or faster. Activities must last for at least 10 minutes per session.**

4. How true is this statement for you? "I strongly intend to do everything I can to meet the Guidelines for *<u>Aerobic Activity</u>* over the next *3 months"* *(please circle a response)*:

Extremely Untrue	Very Untrue	Quite Untrue	Neutral	Slightly True	Very True	Extremely True
1	2	3	4	5	6	7

Now think about Strength Training:

<u>Examples of Strength Training may include:</u> Lifting or pushing dumbbells and/or barbells, using elastic exercise bands or therabands, using your own body weight as resistance (for example: pushups, squats, lunges, leg lifts, stomach crunches), weight machines

Again, considering your average over the past month, indicate in the first box how many times per week you engaged in strength training, if any. In the next box, indicate the average time per session (in minutes). **Mark a '0' in each box if you did not do any strength training over the last month.**

	Number of Times Per Week	Average Time Per Session (in minutes)
5. Strength training		

✓ ***Reminder: The Guidelines for <u>Strength Training</u> are 3 times per week***

6. How true is this statement for you? "I strongly intend to do everything I can to meet the Guidelines for *<u>Strength Training</u>* over the next *3 months"* (please circle a response):

Extremely Untrue	Very Untrue	Quite Untrue	Neutral	Slightly True	Very True	Extremely True
1	2	3	4	5	6	7

SECTION B

This last set of questions asks about your physical activity programming preferences. This will give us information on what programs will be of use and of interest to you. Choose only one response for each question unless otherwise indicated.

1a) I received physical activity counseling or instruction after my Diabetes diagnosis:

yes _____ no_____

b) I would have preferred to be counseled about physical activity at some point after my Diabetes diagnosis:

yes _____ no_____ maybe_____

c) <u>Even if you answered "no" to the above question,</u> who would be your preferred source for physical activity counseling? *(check one response)*

____ doctor/specialist	____ nurse	____ exercise specialist affiliated with a diabetes center
____ someone who also has Diabetes	____ Diabetes education program instructor	____ exercise specialist affiliated wth a community fitness center

d) Where would you prefer this counseling to take place? (Choose one answer):

____ at home ____ at a community fitness center ____ at a Diabetes Center

e) What method of physical activity counseling would you *most* prefer? (Choose one answer):

____ face to face	____ by telephone	____ by videotape
____ by audiotape	____ pamphlet/brochure	____ over the internet

2a) Do you think you would be able to participate in a physical activity program designed specifically for individuals with Type 2 Diabetes?

yes _____ no_____ maybe_____

b) Would you be interested in a physical activity program designed specifically for individuals with Type 2 Diabetes?

yes _____ no_____ maybe_____

c) What types of physical activities would you be most interested in doing?

a. _____ b. _____ c. _____

d) If you were to begin a physical activity program, when would you prefer this program to start? Please circle one response option:

at your diagnosis	3-6 months after your diagnosis	at least 1 year after your diagnosis
1	2	3

3a) If/when you were to/do participate in *Aerobic Activity* regularly, would you prefer to be active (check any that apply):

i. ___ alone ___ with others who have Diabetes ___ with friends ___ with family

ii. ___ at home ___ at a community fitness center ___ at a Diabetes fitness center

iii. ___ morning ___ afternoon ___ evening ___ no preference

b) If/when you were to/do participate in *Strength Training*, would you prefer to be active (check any that apply):

i. ___ alone ___ with others who have Diabetes ___ with friends ___ with family

ii. ___ at home ___ at a community fitness center ___ at a Diabetes fitness center

iii. ___ morning ___ afternoon ___ evening ___ no preference

4. If you were to participate in physical activity regularly, would you prefer the physical activity to be (check one for each row):

i. ___ low intensity ___ moderate intensity ___ high intensity ___ no preference

ii. ___ the same activity each activity session ___ different activities each activity session

iii. ___ supervised/instructed ___ unsupervised/self-paced

v. ___ spontaneous/flexible ___ scheduled (i.e., specific days/times)

iv.___ competitive ___ recreational

5. How much has this study influenced your decision to participate in more physical activity? Please circle a response:

Not at All	A Little	Somewhat	Quite a Lot	Very Much
1	2	3	4	5

6. Check the answer(s) that best applies to you – You may check more than one option.

Since participating in this study, have the questionnaires/information provided encouraged you to:

____ Increase your levels of aerobic activity, but not to the level recommended by the physical activity guidelines

____ Increase your levels of strength training, but not to the level recommended by the physical activity guidelines

____ Meet or continue to meet the guidelines for aerobic activity

____ Meet or continue to meet the guidelines for strength training

____ Join a club or recreational facility

____ Try a new activity

____ Learn about physical activity

____ Check with your doctor or health care provider to see what activities are appropriate for you

Thank you for your time and participation today!

Please look over your answers for any missed pages or questions.

Send this questionnaire back to us in the prepaid envelope provided.

We will be sending you the study results in a few months time.

Appendix IV

Qualitative Study Interview Guide

Interview Guide and Script

Hi, may I speak to _____. This is Cindy Forbes from the University of Alberta. We talked before about the study you agreed to participate in and set up this time for an interview. Is this still a good time to talk? (If no, arrange another time more convenient).

I am going to ask you some questions about your physical activity preferences. If at any time you feel uncomfortable with any question you may skip it or stop the interview.

Is it alright if I record this conversion?
[If no] That's fine.

[If yes] Thank you. If at any point you feel you would like me to stop the recorder, please tell me. I will shut the device off and we can continue with the interview if you feel comfortable enough to do so.

Primary Questions

1. Please tell me about what kinds of physical activities you do on a regular basis.
    a. How often do you engage in these activities?
    b. What are your favorite types of activities?

2. With whom do you engage in physical activity?

3. What other kinds of activities would you like to do?
    a. If you had the access?
    b. What restricts this?

4. Would you prefer to be involved in recreational type activities or more competitive activities? Why?

5. Did you receive physical activity counseling when you were diagnosed with diabetes?
    a. If yes: Did you find it helpful?
    b. If yes: What was included in the counseling?
    c. If no: Would you have liked to have received counseling?
        i. What would you have liked to learn?

6. What do you think of when you hear phrase 'physical activity'?
    a. How about 'aerobic activity'?
    b. How about 'resistance activity'?

7. What is your understanding of the physical activity guidelines?

8. Do you do any resistance training?
    a. If no: Would you be interested in trying it?
    b. What do you think the health benefits of resistance training are?
    c. What are your thoughts about resistance training? Prompts: too costly, unsafe to perform

9. What would your optimal physical activity program be? No restraints.

Closing Questions

10. Would you be willing to be contacted again to clarify any of your responses?

11. Would you like to receive a copy of the summarized results from the study interviews sent to you by mail?

Do you have any questions or comments you would like to add?

Copies of the results will be mailed out in the summer.

Would it be okay to contact you at a later date to ask if you are interested in completing another study?

Yes:
No:

Thank you very much for time and have a good day/night.

Appendix V

Ethics Approval

UNIVERSITY OF ALBERTA

Faculty of Physical Education and Recreation
Office of the Associate Dean (Research)

E-477 Van Vliet Centre
Edmonton, Alberta, Canada T6G 2H9

Tel 780 492 5910
Fax 780 492 6549

Faculty of Physical Education and Recreation
Research Ethics Board

Certificate of Ethics Approval for Fully-Detailed Research Proposal

Applicant(s):	**Cynthia C Forbes**
Co-Investigator(s):	**Ron Plotnikoff**
Faculty:	**Physical Education and Recreation**
Project Title:	***Physical Activity Preferences and Type 2 Diabetes: Exploring Social-Cognitive, Behavioural and Demographic Differences***
Research Ethics Application #:	**07-09**
Research Ethics Approval Expiry Date:	**March 6, 2008**

Certification of Faculty of Physical Education and Recreation Research Ethics Approval

I have received your application for research ethics review and conclude that your proposed research meets the University of Alberta standards for research involving human participants (GFC Policy Section 66). On behalf of the Faculty of Physical Education and Recreation's Research Ethics Board (FPER REB), I am providing **research ethics approval** for your proposed project.

This research ethics approval is valid for one year. To request a renewal after March 6, 2007 *(today's date + 1 year)* please contact me and explain the circumstances, making reference to the research ethics review number assigned to this project (see above). Also, if there are significant changes to the project that need to be reviewed, or if any adverse effects to human participants are encountered in your research, please contact me immediately.

Chair, Research Ethics Board
Faculty of Physical Education and Recreation

Print Name: Dr Marcel Bouffard **Signature:** [signature]

Date: March 6, 2007