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Exploring Physical Activity Maintenance in Middle Aged and Older Women: A Qualitative Study

by

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ABSTRACT

Literature on physical activity determinants among middle and older aged women focuses mainly on short term participation. However, previous studies have largely overlooked the factors affecting long term participation in physical activity. Using an ecological framework and self-determination theory, this study examined physical activity behaviours related to past and current physical activity experiences in women who have maintained a physically active lifestyle for more than three years. This study also explored the role of four factors (motivation, social support, physical environment, and barriers) on the physical activity behaviours of active middle aged and older women. Nine semi-structured interviews, four with middle aged women (39 to 45 years) and five with older women (60 to 68 years) were audio-taped, transcribed verbatim and analyzed. Qualitative findings revealed that, remaining healthy, experiencing positive feelings, fun/enjoyment, socializing, internal and external influences and weight control/appearance were key motivational factors. All of the women had strong social support provided by family, friends, community program participants and physicians. The type of social support provided was encouragement, companionship and informational. In terms of their physical environments, accessibility, safety, and good walking/enjoyable scenery were important characteristics to remaining physically active. Of barriers reported, health, time and weather were most salient. The women used various coping strategies in order to overcome their physical activity barriers (e.g., wearing orthotics). These findings have important implications for researchers and practitioners involved in designing and implementing behaviour change interventions aimed at increasing physical activity for inactive middle and older aged women.

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CHAPTER I

INTRODUCTION

Physical activity has been shown to prevent a multitude of health problems (Dunn & Blair, 2002). Obesity (World Health Organization, 2003), coronary heart disease (Bhargava, 2003) and diabetes (Zinman, Ruderman, Campaigne, Devlin, Schneider, & American Diabetes Association, 2004) for example have all been shown to have reduced risk with physical activity. Despite these benefits, the 2000/01 Canadian Community Health Survey determined that of Canadians aged 20 years and older, 56% are inactive, while only 20% are meeting recommendations (Canadian Fitness and Lifestyle Institute, 2002). Certain populations are more at risk for physical inactivity than others. One such group is middle aged (39-45) and older women (60-68). Indeed, these women are of concern because only 15% of these women are meeting physical activity recommendations (Canadian Fitness and Lifestyle Institute, 2002). Women at this age are also at risk for the onset of a variety of different diseases, such as cancer (Merill & Weed, 2001), osteoporosis (Litt, Kleppinger, & Judge, 2002) and hypertension (Heart and Stroke Foundation, 2004).

While the number of people who are inactive is concerning, the number of people dropping out of physical activity is also a problem. Within the first six months, at least 50% of new participants will drop out (Annesi, 1998; Dishman, 1988). Physical activity maintenance is clearly a problem and more studies examining physical activity maintenance are needed (McAuley, Jerome, Elavsky, Marquez, & Ramsey, 2003; Rhodes, Martin, Taunton, Rhodes, Donnelly, & Elliot, 1999). This study focused on middle aged and older women who are able to maintain physical activity. A growing number of specialists in this area (Cousins, 2001; McAuley et al., 2003) have called for a focus on this group. These women are particularly

interesting to explore because they have successfully maintained physical activity and the reasons for their success could be examined and applied to inactive women of this same age group. Specifically, the purpose of this study was to better understand physical activity maintenance in middle aged and older women. It explored the role of motivation, social support, the physical environment and barriers in their physical activity maintenance. In order to develop future interventions to increase physical activity maintenance, it is important that we learn more about individuals who are able to maintain physical activity (Marcus, Dubbert, Forsyth, McKenzie, Stone, Dunn, et al., 2000).

In recent years, the literature on physical activity patterns has emphasized social and physical aspects of a person's environment. Ecological models are designed to focus on a multitude of factors that influence individuals' physical activity behaviours. Sallis and Owen (1999) developed a framework divided into three main categories: Intrapersonal factors, social environmental factors, and the physical environment. In the present study, one key factor was explored within each category of the framework in order to better understand how middle aged and older women maintain their physical activity. However, while we are only focusing on one main factor, unanticipated themes within each of the factors were explored at each level of the ecological model i.e. within social support, community program participants emerged as an important theme.

Within the intrapersonal category, motivation was explored using self-determination theory (Deci & Ryan, 2002). Although other motivational theories exist, self-determination theory was best suited for this study. For example, since the theory of planned behavior (Ajzen, 1991) focuses on individuals intention and behavioural control and the women in the current study were maintaining physical activity, their intention and behavioural control would

presumably both be high, preventing us to utilize the theory to explain our results. Similarly, the transtheoretical theory (Prochaska & Velicer, 1997) with its focus on the different stages of change would also be less effective for us to use since the women only fit into one stage of change, maintenance. Since self-determination theory does not focus on intention, behavioural control, self-efficacy or stages of change, this theory best suited the current study which explored women who were maintaining physical activity. Landry and Solomon (2002) pointed out that specifically for women, self-determination theory can be used to understand the multifaceted interactions of factors that affect women's physical activity behaviours. By examining the women's motivation qualitatively, we were able to understand how their motivation has evolved over time and what factors motivated them to remain physically active. We know that overall motivation decreases as adults age (Deci & Ryan, 2002), however, the nature of the individuals' motivation who do maintain regular physical activity is unknown (Deci & Ryan, 2002). This study explored not only what motivated middle aged and older women to be physically active, but how their motivation had changed over time to help them remain physically active.

In the social environmental category, social support was explored. Social support was important to examine as it had been found to be consistently and positively associated with physical activity (Trost, Owen, Bauman, Sallis, & Brown, 2002). While numerous studies have examined social support and physical activity, this study went beyond determining whether or not social support was important for these women to be physically active, and explored the way in which social support played a role in these women's lives and helped them remain physically active. In addition to the women's current physical activity experiences, we also explored social support throughout their lives, which enabled us to understand how their social support had changed, while helping them remain physically active.

In the physical environment category, we explored both the constructed and natural environment to see if and how it influenced middle aged and older women's physical activity maintenance. King, Castro, Wilcox, Elyer, Sallis and Owen (2000) and Trost et al. (2002) stated that research examining the effect of the physical environment on physical activity remains a high priority for future research. Spence and Lee (2003) also stated that more research needs to be done on how the physical and social environment affects individuals' physical activity behaviour. In this study, while we explored the effect the physical environment had on middle aged and older women's physical activity, we also explored how their physical environments have changed over time and whether this had an effect on their physical activity behaviours.

Lastly, while barriers are not outlined in Sallis and Owen's (1999) ecological framework, we anticipated that barriers would be prevalent within all three categories of the ecological framework. Research has shown that there are numerous barriers to physical activity including social, personal, psychological, environment and policy factors (Cousins, 2003; Sherwood & Jeffery, 2000; Trost et al., 2002; Wen, Thomas, Jones, Orr, Moreton, & King, 2002). While we looked at what barriers these women encounter, we were also interested in exploring how these women deal with these barriers once faced with them. For example, we asked the women about the types of strategies they use when they encounter barriers (i.e. imagery and/or goal setting to overcome their barriers). We also asked the women how their barriers have changed over time and whether or not this has had an effect on their physical activity behaviours. As Cousins (2003) stated, we need to explore women's physical activity barriers in order to determine the best way to overcome these barriers.

In response to these issues, the main purpose of this study was to better understand physical activity maintenance in middle aged and older women. Specifically, it consisted of

conducting interviews with nine middle aged women and older aged women to explore the role of motivation, social support, the physical environment and barriers to physical activity maintenance in the women's current physical activity behaviour. This was done using the ecological framework (Sallis & Owen, 1999). In addition to the interviews, the women completed the CHAMPS physical activity questionnaire in order to ensure they were still maintaining physical activity (Stewart, Mills, King, Haskel, Gillis, & Ritter, 2001).The secondary purpose was to examine the four factors throughout the women's lifespan. This allowed us to better understand how these factors influenced active middle and older aged women's present physical activity behaviours and how they have remained active over time.

Life histories were designed to aid in the comprehension of an individual's subjective experience with physical activity (Sparkes, 1994). This method allowed us to capture the women's past physical activity experiences to help us understand their present physical activity context (Hardcastle & Taylor, 2001) as well as the evolution of these factors over time. Kluge (2002) found that earlier physical activity experiences influenced the likelihood that women would participate in physical activity later in life.

The present study was a follow-up to a quantitative, longitudinal study by Kowal and Fortier (2005), which comparatively examined the barriers and environmental characteristics of middle aged and older women and how these factors predicted physical activity change. The next chapter will provide research that has been conducted in the various bodies of literature related to physical activity maintenance in middle aged and older women. Chapter III will provide an overview of the methodology that was used in the current study. Chapter IV is an article based on the present study. The final chapter discusses practical considerations for future physical activity interventions with sedentary middle and older aged women. This chapter is not intended

to provide a comprehensive intervention, but merely provide considerations for future researchers based on the findings from the present study. Lastly, a brief conclusion will follow the final chapter of the thesis.

CHAPTER II

REVIEW OF LITERATURE

Benefits of Physical Activity

Physical activity is key in the prevention of health problems (Booth, Owen, Bauman, Clavisi, & Leslie, 2000; Dunn & Blair, 2002). It has been shown to have many benefits, which include reducing the risk of obesity (World Health Organization, 2003), osteoporosis (Litt et al., 2002), hypertension (Heart and Stroke Foundation, 2004), coronary heart disease (Bhargava, 2003), diabetes (Zinman et al., 2004), and colorectal cancer (Friedenreich, 2001). As well, physical activity has been shown to increase energy levels, self-confidence, emotional well-being, and decrease stress and depression (Piko, 2000). Health Canada (2003) and the Canadian Society for Exercise Physiology (2003), recommends that adults accumulate 30 to 60 minutes of moderate physical activity everyday in order to gain health benefits. In terms of older adults, Health Canada (2003) recommends 30 to 60 minutes of moderate physical activity most days. These activities can include endurance, flexibility, strength, and balance activities.

According to the 2000/01 Canadian Community Health Survey, 56% of Canadians (20 and older) are inactive, while 24% are moderately active (1.5-2.9 kilocalories per kilogram of body weight per day) and 20% ($\geq$3 KKD) active (Canadian Fitness and Lifestyle Research Institute, 2002). Certain populations are more at risk for physical inactivity than others, such as middle aged and older women; 58% and 68% of whom respectively are inactive, while only 18% and 13% respectively are meeting healthy recommendations (Canadian Fitness and Lifestyle Research Institute, 2002).

Speck and Harrell (2003) stated that in order to achieve optimal health benefits from physical activity, maintaining this activity on a long-term basis is essential. However, within the

first six months, the dropout rate for physical activity is 50% or greater (Annesi, 1998; Dishman, 1988). While the number of people dropping out of physical activity is alarming, this study focused on the individuals, specifically middle and older aged women who are able to maintain regular physical activity. There have been few, if any studies that explore the predictors of maintenance of physical activity in older adults (Cousins, 2001; McAuley et al., 2003). In addition, from a population health perspective, it is important that we learn more about individuals who maintain physical activity, in order to gear interventions to increase physical activity maintenance (Marcus et al., 2000).

Ecological Framework

In order to explore physical activity maintenance in middle aged and older women, an ecological framework was used (Sallis & Owen, 1999). This framework takes a multilevel approach to explore physical activity behaviour, rather than solely focusing on the individual. Ecological models posit that individual behaviour is influenced in many ways (Spence & Lee, 2003). These models have evolved over recent decades, however, all of them make the specification that intrapersonal variables, interpersonal and cultural factors, and the physical environment can all influence behaviour (Sallis, Bauman, & Pratt, 1998). It has not been until recently, however, that ecological models have been applied to physical activity behaviour (Gauvin, Levesque, & Richard, 2001; Humpel, Owen, & Leslie, 2002; Sallis et al., 1998; Satariano, & McAuley, 2003).

McLeroy, Bibeau, Steckler, and Glantz (1988) first developed an ecological model to help researchers assess the effect of multiple levels of influence on health behaviours. This model conceptualizes different levels of behavioural influence. They identified five levels of influence on health behaviours; intrapersonal, interpersonal, institutional, community factors,

and public policy. However, McLeroy and colleagues did not specify physical environment factors (Sallis et al., 1998), which is a drawback to this particular ecological framework.

Sallis & Owen (1999) stated that ecological models hold particular promise in explaining physical activity behaviours. They developed an ecological framework that was based on four concepts: a) the general importance of multilevels of influence, b) the distinction between physical environment influences and social influences, c) policies and laws as important aspects of the social environment, and d) the importance of studying various behaviour settings and acknowledging that the behaviour of individuals and groups are a function of the personal characteristics they bring to the behaviour setting.

Sallis and Owen's (1999) framework is divided into three major categories: intrapersonal, social environment, and physical environment factors. The physical environment category was subsequently divided into two subcategories, the natural and constructed environment (see Appendix A). By examining each of the categories separately, the interaction between categories and looking at overall physical activity experiences, it is easier to determine what factors affect an individuals' physical activity behaviour. To fully understand what affects individuals' physical activity behaviours, it is important to explore a variety of influences using a multilevel approach (Sallis & Owen, 1999). An ecological approach has the basic assumption of multiple influences on behaviour, which is appropriate for the physical activity context given the complexity of this lifestyle behaviour.

Sallis and Owen's (1999) ecological framework was selected for this study because it is comprehensive and explores the physical environment in conjunction with social factors. Within each of these categories, an individual's physical activity behaviour can be affected both positively and negatively.

Sallis and Owen (1999) suggest that within the intrapersonal category, demographics, biological, cognitive/affective, and behavioural factors all may have an effect on physical activity behaviour. Spence and Lee (2003) also added that at the intrapersonal level, people's behaviour may be affected by their motivation, individual attributes, attitudes, and beliefs. We decided to focus on women's motivation for this level because research with middle and older aged women indicated that there are many motives that drive them to be physically active or inactive. In addition, motivation has been shown to be an excellent predictor of adherence to physical activity (King, Friedman, Marcus, Castro, Forsyth, Napolitano & Pinto, 2002; Ploncynzski, 2000). Among the social environmental factors, Sallis and Owen (1999) stated that supportive behaviours, social climate, culture, policies governing incentives for physical activity/inactivity, resources and infrastructures related to physical activity/inactivity all have an effect on physical activity behaviours. In this study, we focused on social support because we wanted to explore not only who was providing the social support, but the type of support that was provided. In addition, social support has been shown to be important for physical activity maintenance (Poole, 2001).

Within the physical environment factors, Sallis and Owen (1999) made the distinction between the natural environment and the constructed environment. In the natural environment, weather and geography can both have an effect on physical activity behaviour. In the constructed environment, the architecture, transportation, entertainment infrastructure, recreation infrastructure, urban/suburban environment, and the information in the environment can all influence physical activity behaviours (Sallis & Owen, 1999).

Booth et al. (2000) stated that there is a significant positive association between the accessibility of facilities and older peoples' physical activity levels. For example, facilities that

are located on a bus route or within walking distance can have a positive influence on physical activity behaviour. Kowal and Fortier (2005) also discovered that the most commonly reported elements of the physical environment included; enjoyable scenery, the prevalence of sidewalks, streetlights, bicycle paths, walking trails, and the presence of others exercising. The physical designs of neighbourhoods are significant in terms of physical activity participation. In the present study, we focused on both the natural and constructed environment to examine physical activity maintenance.

Lastly, barriers to physical activity were explored at all levels of the ecological framework. Research has shown that there are a variety of barriers to physical activity, which include: social, personal, psychological, environmental and policy factors (Cousins, 2003; Sherwood & Jeffery, 2000; Trost et al., 2002; Wen et al., 2002). We anticipated that barriers toward physical activity would be prominent in all categories of the ecological framework, having an effect on intrapersonal, social environmental, and physical environmental factors.

While the ecological framework is gaining recognition, more research needs to be done to examine how the physical and social environment affects individuals' physical activity behaviour in this population (Spence & Lee, 2003). In addition, the majority of ecologically oriented studies have been quantitative in nature. We qualitatively examined middle and older aged women's physical activity maintenance using this ecological framework. A qualitative study went allowed us to go beyond determining the factors that affected the women's physical activity level, and determine why and how these factors affect their physical activity behaviours. In addition, no studies were found that used an ecological framework to examine participants past physical activity behaviours.

The following sections explore each of the four factors from different levels of the ecological framework: motivation, social support, physical environment, and barriers that were examined in this study.

Motivation and Physical Activity

Within the intrapersonal category of the ecological framework, motivation was an important factor to explore. Motivation was important to examine because it helps predict adherence to exercise (King et al., 2002; Ploncynzski, 2000). Motivation was also essential to explore in depth because the type of motivation has different effects on physical activity behaviours (Mullan & Markland, 1997). Since motivation explains the why of the behaviour, it was necessary to understand this fully in order to explore physical activity maintenance in middle and older aged women. Numerous reasons have been reported for engaging in regular physical activity, such as; health, social interaction, stress relief, skill development, personal satisfaction, enjoyment, and appearance (Hassandra, Goudas, & Chroni, 2003; Mullan & Markland, 1997; Sherwood & Jeffery, 2000).

Research indicates that a diverse set of motives drive individuals to be physically active. Deci and Ryan (2002) state that stress release, weight control, and fitness can all drive individuals to be physically active. Scharff, Homan, Kreuter and Brennan (1999) stated that as women age and their roles change, the determinants of physical activity in women also change. These in turn have an effect on the decisions women make about physical activity.

In terms of middle aged women and older women, Scharff et al. (1999) and Kluge (2002) found that health was the single most significant motivator for physical activity behaviour. Scharff et al. (1999) discovered that in middle aged women, weight maintenance is one of the primary motives for being physically active. Cousins (2001) examined older women's

motivation and discovered that what triggers their motivation to maintain their level of physical activity varies a lot. This can include; realizing that their pain can be decreased by regular physical activity, discovering that the community is offering fitness classes for older adults that are not too expensive and realizing that regular physical activity is the essence of their life. Cousins (2003) also discovered that active older people participate in physical activity because they experience psychological and social benefits as well as good health. In addition, Hardcastle and Taylor (2001) determined that older women are motivated to be physically active to avoid some effects of aging such as, weight gain, having less physical capabilities, and to avoid operations and rehabilitation. Poole (2001) discovered that middle aged and older women are committed to exercise to maintain health, strength, mobility, and endurance. In order to examine motivation in this study, the self determination theory was used in conjunction with an ecological framework.

Self-Determination Theory

Deci and Ryan (1985) developed self-determination theory (SDT) to contribute to previous literature on motivation. More specifically, they wanted to create a theoretical framework based on the idea that humans are motivated by three psychological needs: autonomy, competence, and relatedness to others (Deci & Ryan, 2002).

Autonomy reflects individuals who believe that they are in control of their behaviours (Deci & Ryan, 2002). Competence can be defined as feeling capable in one's life and having opportunities to show one's effectiveness (Deci & Ryan, 2002). Lastly, Deci and Ryan described relatedness to others as a feeling of belonging and being associated with and cared for by others within their own community. As individuals feel more autonomous, competent, and related to

others, the more self-determined and intrinsically motivated they will be. Deci and Ryan (2002) detail how individuals interact with their environment to fulfill these three needs.

For this study, SDT was selected for three major reasons. First, SDT, unlike other motivation theories describes a broad range of motivational types, which are placed on a continuum. This allows for more advanced understanding of human motivational functioning, rather than just categorizing behaviour as either extrinsic or intrinsic (see Appendix B).

SDT was also selected because it accounts for different motivational consequences or outcomes. More self-determined behaviours will result in positive outcomes, that is, physical activity maintenance, while non self-determined motives will generally have the opposite effect. This gives us a better understanding of the motivational process.

The last reason for selecting SDT was because it takes into account the origins of human motivation. Deci and Ryan (2002) state that autonomy, competence, and relatedness to others are three fundamental needs for human motivation. By understanding these motivational needs, we can more clearly understand an individual's motivation. In addition, SDT has also been utilized extensively in the physical activity domain and was found to be valid and useful to understand motivation and the different forms of self-regulation (Fortier & Grenier, 1999; Landry & Solmon, 2002, 2004; Mullan & Markland, 1997; Pelletier, Fortier, Vallerand & Brière, 2001; Wilson, Rodgers, Hall, & Gammage, 2003). In addition, some of these studies have focused on women and extended our knowledge about the interaction of factors that affect women's physical activity (Landry & Solmon, 2002, 2004; Wilson & Rodgers, 2004).

SDT is made up of four mini-theories that are usually presented as one. These four theories include: cognitive evaluation theory, organismic integration theory, causality orientations theory, and basic needs theory (Deci & Ryan, 2002). For this study, the organismic

integration theory will be discussed in more depth, as it is the most relevant to this study because we wanted to explore the women's motivation along the self-determination continuum, which this sub-theory utilizes.

Organismic Integration Theory

Types of Motivation

Deci and Ryan (2002) have determined that there are three main types of motivation that can be displayed on a continuum that ranges from the most non self-determined to the most self-determined behaviour: Amotivation, extrinsic motivation, and intrinsic motivation.

Amotivation is the most non self-determined type of motivation. Amotivation can be defined as having no intention to engage in the behaviour. An individual who is amotivated acts without intent, or lacks the intent to act (Pelletier et al., 2001). Some reasons why individuals may feel amotivated toward a particular behaviour include a) not valuing the activity or its outcome or b) feeling as though they are unable to achieve the desired outcome (Deci & Ryan, 2002).

Vallerand and Rousseau (2001) described extrinsic motivation as engaging in a behaviour, or an activity, as a means to an end, rather than participating for the activity itself or for pleasure. Deci and Ryan (2002) state that within extrinsic motivation, there are four types of regulation: 1) external regulation, 2) introjected regulation, 3) identified regulation and 4) integrated regulation, with the latter being the most self-determined type.

External regulation occurs when a behaviour is controlled externally. This behaviour is not chosen, but instead done to please an external source (Deci & Ryan, 2002). For example, an older aged woman may initiate physical activity to lose weight to please her physician. Moving along the self-determination continuum, introjected regulation occurs when the behaviour has

been partially internalized, but not to the extent that it is internally regulated. In other words, the individual may still experience pressure externally, but also self-impose the pressure (Vallerand & Rousseau, 2001). An example of this would be when a middle aged woman goes to the gym because she feels guilty if she does not go. Introjected regulated behaviours are often manifested to increase feelings of worth, or to avoid feelings of guilt and shame (Deci & Ryan, 2002).

Identified regulation can be described as engaging in an activity or behaviour because individuals value its importance, although they might not find pleasure in doing it. This is also an activity or behaviour in which individuals choose to participate. This type of regulation is more self-determined than the external and introjected regulation because the individuals identify the behaviour as important, and place a conscious value on the behaviour (Deci & Ryan, 2002). For example, an individual who chooses to be physically active as a way to reach their goals or in order to help them become the person they aim to be would be identified regulation.

Individuals experience integrated regulation when they engage in a behaviour or activity by choice. However, this decision occurs after they evaluate the behaviour and compare it with their current values, goals, and needs. Although individuals do engage in the behaviour out of personal choice, it is still extrinsically motivated because the activity is done for personal outcomes, not because they find the activity inherently enjoyable (Deci & Ryan, 2002). Examples of this would be when a middle aged woman is physically active because it is in line with her main beliefs or because it represents who she is.

The most self-determined form of motivation is intrinsic motivation. Vallerand and Rousseau (2001) stated that intrinsic motivation occurs when an individual performs a behaviour for the enjoyment and interest of it. According to these authors, there are three main types of intrinsic motivation: to know, to accomplish, or to experience stimulation.

The more internalized a behaviour becomes, the more self-determined it will be. For example, if a woman is encouraged by her partner to participate in a fitness class once a week and it is an activity/behaviour that she does not find enjoyable and interesting, she would initially be extrinsically motivated to participate in the activity. After a period of time, the woman begins to internalize the activity/behaviour and incorporates it with her sense of self. At this point, she participates in the fitness class autonomously regardless of her partner's encouragement and because she enjoys the activity (Deci & Ryan, 2002). Another example of intrinsic motivation would be an older woman who swims everyday because she loves the way she feels while she does it and because it makes her happy.

Internalization

The organismic integration theory assumes that people naturally integrate their ongoing experiences (Deci & Ryan, 2002). This sub-theory of SDT includes the idea that when individuals are not intrinsically motivated to do certain activities/behaviours, they will participate in the activity/behaviour initially because they feel external pressure to do so. Eventually, they will autonomously participate in the activity/behaviour. This occurs when they experience external prompts from individuals to whom they are close, or are influential in their lives by, for example, spouses, friends, or physicians. This process is known as internalization (Deci & Ryan, 2002). As previously mentioned, the more internalized a behaviour becomes, the more self-determined the behaviour will be.

Motivational Consequences

SDT, and more specifically the organismic integration theory, posits that different types of motivation bring about different outcomes. These outcomes change depending on the level of self-determination and where along the continuum the motivation can be categorized. Vallerand

(1997) stated that more self-determined forms of motivation will result in positive outcomes, while more non self-determined forms will result in negative outcomes. Numerous studies have found that the more self-determined individuals are, the more likely they will be motivated to be physically active and enjoy the activity (Pelletier et al., 2001).

In addition, Fortier and Grenier (1999) and Pelletier et al. (2001) discovered that higher levels of self-determined motivation are associated with higher levels of physical activity persistence. For example, Pelletier et al. (2001), revealed that competitive swimmers who were more autonomously motivated were more persistent in their practice of competitive swimming at the end of two competitive swimming seasons. In other areas, similar findings have been discovered in terms of high levels of self-determination and persistence. For example, in smoking cessation, Williams, Gagne, Ryan and Deci (2002) discovered that when individuals had higher levels of self-determination, they were more successful at quitting smoking. Similarly in the educational setting, Vallerand, Fortier and Guay (1997) discovered that low levels of self-determination in high school students increased their intention to drop out of school, leading to actual dropout later.

Individuals who are in the later stages of exercise adoption (maintenance) report more intrinsic motives for being active (Ingeldew, Markland, & Medley, 1998; Kluge, 2002; Leblanc & Fortier, 2003; Mullan & Markland, 1997; Ryan, Frederick, Lepes, Rubio, & Sheldon, 1997). In a recent longitudinal study, it was found that as individuals progress from the action to maintenance stage of change, their self-determined physical activity motivation increased (Fortier, Sweet, Tulloch, Blanchard, Sigal & Kenny, 2004).

While it is clear that motivation is an important factor in middle aged and older women's physical activity behaviours, little is known regarding how motivation towards exercise varies by

phases of exercise, for example the maintenance phase (Sherwood & Jeffery, 2000). Deci and Ryan (2002) also point out that while overall motivation appears to decline as older adults age, the nature of the motivation for older adults who do maintain regular physical activity is still unknown. This study contributed to filling these gaps by exploring in depth the physical activity motives of physically active middle and older aged women. Using a qualitative approach, we were able to explore and understand why and how their motivation affects their physical activity behaviour, which a quantitative approach is unable to do. In addition, not much qualitative research has been done using self-determination theory. Along with motivation, social support was another factor that was important to consider in understanding physical activity maintenance.

Social Support and Physical Activity

Within the social environment category of the ecological framework, social support was examined. General social support is when an individual has support from others, however, the support is not necessarily related to physical activity. For example, a woman may have social support from her spouse in terms of her children and her job, but not for physical activity specifically. Social support specific to physical activity might include: giving a non-driver a drive to an exercise class, telling a friend about a new walking path, providing encouragement, exercising with a significant other, or reinforcement for learning a new physical activity (Elyer, Brownson, Donaltelle, King, Brown, & Sallis, 1999). While general social support has been shown to predict physical activity adherence (Litt et al., 2002) social support specific to physical activity is a better predictor of physical activity adherence than general social support (Litt et al., 2002; Trost et al., 2002).

In a review of literature by Trost et al. (2002), social support was found to be a consistent important correlate of adult physical activity. Every study (between 1998-2000) that included a measure of social support for physical activity found a strong positive association. Similar findings were also discovered by Sallis and Owen (2002) who also found a positive relationship between social influences and physical activity. Social support specific to physical activity has been shown to be important for women (Trost et al., 2002).

In terms of social support and physical activity for women, Sternfeld, Ainsworth and Quesenberry (1999) discovered that women with the highest levels of physical activity participation also had high social support for physical activity. In order to understand social support and physical activity in this study, it was important to look closely at what previous studies have discovered about middle and older aged women in terms of social support and physical activity.

In a study by Elyer et al. (1999), middle aged and older women with low social support for physical activity were more sedentary compared to those with high levels of social support for physical activity. In a study by Litt et al. (2002), older women's exercise behaviour was assessed at three month intervals. Specifically, self-efficacy, readiness to change, orientation toward exercise, social support in general, and support specifically to exercise were measured. It was discovered that the best predictor of physical activity behaviour at 12 months for older women was social support. Regardless of the levels of self-efficacy and social support at baseline, individuals with social support for their physical activity behaviour after they have started, have a better chance of maintaining physical activity.

The importance of social support extends beyond the initiation phase of physical activity. McAuley et al. (2003) discovered that for older women who were followed for 12 months, the

only significant correlate of physical activity adherence was social support. It was also discovered that women who experienced social support within the physical activity setting experienced more positive affect during their exercise bouts (McAuley et al., 2003). For example, these women stated that they their enjoyment of physical activity was high.

Wankel, Mummery, Stephens and Craig (1994) in their qualitative study, found that older women stated their intention to be physically active increased when they had social support from their doctors, family and spouse compared to younger people. In addition, Poole (2001) reported that older women highlighted that the benefits of social networking and support from others were major factors in their commitment to regular physical activity. In another study, Ploncyznski (2003) found that influences such as having a companion, socializing, and family support were all positively associated with increases in physical activity in middle and older aged women.

While there has been a lot of research done on social support and physical activity, this study involved conducting interviews and using open ended questions surrounding the issue of social support. Due to the qualitative nature, we were able to gain an in depth understanding of the interviewees and their perceptions of social support. This study also allowed us to look at who was providing the support and in what way the support was given. Social support was an important factor to examine to better understand physical activity maintenance, however, the physical environment also needed consideration.

Physical Environment and Physical Activity

The physical environment is situated within the physical environment category of Sallis and Owen's (1999) ecological framework. Physical environment characteristics can be defined as attributes of the environment, such as enjoyable scenery, the presence of sidewalks, parks, recreation facilities, streetlights, hills, hiking trails, weather, and transportation. This category of

the framework distinguishes between the natural and constructed environment. Elements of both types of environments can affect physical activity behaviours. For example, in the natural environment, O'Brien Cousins (1998) discovered that severe climate such as cold and ice are seen as barriers to older adults, and in turn reduce physical activity participation. In terms of the constructed environment, Booth et al. (2000) discovered that individuals who were active reported that they had access to facilities in their environment, compared to their inactive counterparts. These facilities included: a park, a swimming pool, a golf course, a cycle path, and a recreation center.

The physical environment has both direct and indirect influences on individuals' physical activity participation (Spence & Lee, 2003). For example, if a middle aged woman worked in a building on the eighth floor, and there was no elevator, she would have to take the stairs to get to her office. In this way, the environment would have a direct influence on her. However, if there was an elevator, but the stair well was decorated nicely and was bright and safe to take, the woman might take the stairs by choice, instead of taking the elevator. In this case, the environment would have an indirect effect on this individual. In their review, Trost et al. (2002) discovered that safe footpaths for walking and having access to parks were significantly associated with adults' regular physical activity.

Characteristics of the physical environment can influence physical activity participation both positively and negatively (Cameron, Craig, Stephens, & Ready, 2002). For example, a neighbourhood that has no sidewalks or streetlights may negatively influence individuals to be physically active if they do not feel safe in their environment. On the other hand, if individuals have access to hiking/walking trails that are easily accessible, these would have a positive effect on their physical activity behaviours.

In a review by Humpel et al. (2002), many positive associations were found between physical activity and the physical environment. The review looked at 19 studies that assessed the relationship between the physical environment and physical activity. Elements of the physical environment that had a positive association with physical activity were categorized under five categories: accessibility of facilities, opportunities for activity, weather, safety, and aesthetics. Environmental variables that were found to have a positive association with physical activity within the accessibility of facilities category included: an accessible cycling path, access to facilities, facilities on frequently traveled routes, and a park or beach within walking distance. Among opportunities for activity, home equipment, awareness of facilities, satisfaction with recreation facilities, a coastal residence and local clubs, and others providing facilities were all positively associated with physical activity. Contrary to other studies, (King et al., 2000; Salmon, Owen, Crawford, Bauman, & Sallis, 2003; Scharff et al., 1999), weather was found to not have an association with physical activity. In terms of safety, safe footpaths and low crime were positively associated. Lastly, positive associations between physical activity and the aesthetics of the physical environment included: friendly neighbourhood, home area pleasant, local area is attractive, enjoyable scenery and living environment. Ball, Bauman, Leslie, and Owen (2001) also conducted a study with adults and discovered that environmental aesthetics, and environmental convience had a positive association with physical activity.

In middle aged and older women, physical environment factors have also been explored in terms of their influence on physical activity behaviours. Kowal and Fortier (2005) discovered that for Canadian middle aged and older women, the most commonly reported environmental characteristics included: sidewalks, streetlights, and seeing others exercising. Enjoyable scenery and presence of others exercising were both related to increases in physical activity over time.

Similarly, King et al. (2000) determined that American middle aged and older women reported that characteristics of their environment that were the most likely to increase their physical activity were an enjoyable scenery and seeing others exercising.

While these elements of the physical environment facilitate physical activity, middle aged and older women also report that certain physical environment factors hinder their physical activity participation. Such barriers include, lack of feeling safe, unavailability of programs or facilities (Craig, Cameron, Russell, & Beaulieu, 2001), poor or no sidewalks or benches, bad weather and fear of crime (Ploncyznski, 2003).

Although the effects of the physical elements of the environment in terms of physical activity behaviour have been neglected in the literature, it has been shown that physical environments do affect physical activity (Humpel et al., 2002; King et al., 2000; Sallis & Owen, 1999; Spence & Lee, 2003). The influence of the physical environment on physical activity participation remains a high priority for future research (Trost et al., 2002). Indeed these researchers also stated that there is a need to better understand how the physical environment might influence physical activity. Spence and Lee (2003) also call for more research to determine how physical and social environments affect individuals' physical activity behaviour. A recent review of literature stated that the psychosocial and behavioural determinants of physical activity have been examined, however, there is a need for more research on the influence of environmental determinants (Humpel et al., 2002; King et al., 2000). Therefore, in the present study, we examined the influence that the physical environment had on middle and older aged women who have maintained their physical activity.

Barriers and Physical Activity

Barriers can be defined as real or perceived individual, interpersonal, or contextual factors that hinder an individual to be physically active (Booth, Bauman, & Owen, 2002). In Sallis and Owen's (1999) ecological framework, there is no distinct category for physical activity barriers. However, within each of the three categories, we anticipated that physical activity barriers would be present.

Research has shown that there are a variety of barriers to physical activity (Cousins, 2003; Sherwood & Jeffery, 2000; Trost et al., 2002; Wen et al., 2002). Linked to the intrapersonal category of the ecological model, many studies exploring physical activity and barriers have found time constraints to be the biggest barrier (Booth et al., 2002; King, et al., 2000; Kowal & Fortier, 2005; Salmon et al., 2003; Scharff et al., 1999; Trost et al., 2002). Salmon et al. (2003) also reported that fatigue, disabilities, and injuries were also common barriers to being physically active. In addition, King et al. (2000) discovered that a lack of energy, feeling too tired, and self-consciousness about physical appearance all presented barriers to physical activity.

Linked to the social environment category of the ecological model, Salmon et al. (2003) found that work and family commitments were reported as barriers. Grubbs and Carter (2002) also discovered that a common barrier reported was that physical activity takes too much time away from family responsibilities and that family members did not encourage participants to be physically active. Wen et al. (2002) and King et al. (2000) also discovered that the role of motherhood (multiple demands) and the lack of support were physical activity barriers.

Linked to the physical environment, Salmon et al. (2003) found that weather, cost to attend a facility and participate in physical activities, safety, noise pollution, no sidewalks, and

lack of access to facilities, were reported as common environmental barriers to being physically active among adults. Scharff et al. (1999) and King et al. (2000) also determined that bad weather was a barrier of physical activity. In addition, Wen et al. (2002) and King et al. (2000) also discovered that an unsafe environment or lack of a safe environment to be physically active was a barrier.

For Canadian women, it appears as though lack of time (69%), energy (65%) and motivation (59%), are the most common reported barriers to being physically active. Other reported barriers include disability, cost, illness, feeling uncomfortable being physically active, long-term illness, lack of skill, and fear of injury (Canadian Fitness and Lifestyle Research Institute, 2002). The Canadian Fitness and Lifestyle Institute (2002) also stated that these reported barriers have increased significantly since 1995 due to a sizeable increase in the amount of men reporting these barriers.

With regards to our specific population, middle aged and older women also report specific barriers. In a study by Kowal and Fortier (2005), middle aged and older women reported that their most common barriers were daily activities (39.6%), being too busy (31.5%), feeling too tired (20.1%), and feeling too lazy (19.5%). Experiencing health problems (14.8%), having difficulty managing time (14.8%), and not wanting to exercise alone (12.8%) were also reported. Similarly, Booth et al. (2002) and Trost et al. (2002) also discovered that common barriers reported by this population include lack of energy and health problems. In a review by Trost et al. (2002), it was also stated that these groups of women find lack of time, fear of falling, bad weather, no facilities, and lack of an exercise partner to be barriers. Scharff et al. (1999) also discovered that when women had a contraindication towards physical activity, this presented a barrier because these women felt less comfortable being physically active.

In terms of women who maintain regular physical activity, Cousins (2003) found that these women still experience many barriers, however, they counter the negative dialogue with positive dialogue and every barrier with a solution. Active women can be differentiated from contemplators by their belief they have about their abilities to overcome barriers (Wen et al., 2002). In addition, Kluge (2002) found that active women use process goals and the ability to resist criticism and negotiate obstacles as methods to remain physically active.

Research exploring the barriers to being physically active, real or imagined, that people experience and how these barriers are best overcome needs to be conducted (Cousins, 2003; Marcus et al., 2000). It is important that we explore barriers to physical activity because research has shown that there is an association with having many barriers to physical activity and a decreased likelihood to reach sufficient participation rates to gain health benefits (Salmon et al., 2003). In this study, physical activity barriers of middle aged and older women were revealed and strategies used to overcome barriers were emphasized. Understanding maintaining women's strategies to overcome their barriers is important because it can be applied to middle aged and older women who experience physical activity barriers they find difficult to overcome.

Purpose of Study

Based on the identified gaps in the literature, the main purpose of the present study was to better understand physical activity maintenance in middle aged and older women. Specifically, we explored the role of motivation, social support, the physical environment, and barriers to physical activity maintenance in the women's current physical activity behaviours. The secondary purpose was to examine the four factors throughout the lifespan in relation to physical activity. This allowed us to better understand how these factors influenced active middle and older aged women's present physical activity behaviours and how they have remained active

over time. The present qualitative study is a follow-up to a quantitative, longitudinal study of Kowal and Fortier (2005), which comparatively examined the barriers and environmental characteristics of active and less active middle aged and older women.

Contributions of the Study

In terms of research on physical activity and women in general, more research needs to be done, especially on specific subgroups of women, such as older women (Landry & Solomon, 2002). In addition, most of the information/data about women and physical activity originates from quantitative studies. While recent studies have employed qualitative techniques (see for instance, Cousins, 2003; Hardcastle & Taylor, 2001; Kluge, 2002) this approach contributed to the existing base of knowledge (Landry & Solomon, 2002) by helping to better understand why and how physical activity is maintained in middle aged and older women.

While there has been some research done in the area of physical activity maintenance, McAuley et al. (2003) stated that it has not been clearly determined what factors influence physical activity maintenance in older adults. Buckworth and Wallace (2002) also stated that there is a need to understand factors involved in physical activity maintenance. In addition, Cousins (2001) pointed out that future research needs to explore the cues that physically active adults use to maintain regular physical activity. Marcus et al. (2000) also stated that in order to understand physical activity maintenance, it is important that we explore early influences on physical activity, such as parents, family, school, and the environment, which is why we used a life history approach. Rhodes et al. (1999) stated in a review that in older adults, few if any studies have explored physical activity maintenance. In the present study, by examining women who are physically active (maintainers), we were able to better understand how they have been able to remain active.

Another contribution of the current study is the life history component of this study. Hardcastle and Taylor (2001) stated that life histories allow for an in depth understanding of individuals physical activity experiences. In addition, few studies have explored motivation, social support, the physical environment and barriers in terms of physical activity over the life span. Kluge (2002) stated that by understanding individuals past physical activity experiences, it can help us understand their physical activity experiences later in life.

In terms of motivation and physical activity, there is a large body of knowledge, however this study explored motivation specifically within the context of women who maintain regular physical activity. Indeed, as previously stated, little is known regarding how motivation to exercise varies by phases of exercise (i.e., maintenance) (Sherwood & Jeffery, 2000). In addition, Deci and Ryan (2002), have stated, that overall motivation appears to decline as older adults age, but for the adults who do maintain regular physical activity, the nature of their motivation is still unknown. This study uncovered the nature of middle aged and older women's motivation by asking in depth questions using self determination theory. Landry and Solmon (2002) stated that by using self determination theory, we can understand the multifaceted interactions of factors that have an effect on women's physical activity behaviours.

While there has been a lot of research done on physical activity in terms of social support and barriers, a qualitative approach allowed us to gain an in depth understanding of how these factors affect middle and older aged women's physical activity behaviours. More specifically, it allowed us to gain a better perspective on what aspects of social support are facilitating or hindering physical activity maintenance.

Research on the physical environment and its effect on physical activity remains a high priority for future research (Humpel et al., 2002; King et al., 2000; Trost et al., 2002). There is a

need for more research to explore how the physical and social environment affects individuals' physical activity behaviour (Spence & Lee, 2003). In the present study, we examined the influence that the physical environment has on middle aged and older women who have maintained their physical activity.

Lastly, in terms of barriers, we were able to explore in depth how middle aged and older women overcome their barriers. Cousins (2003) stated that we need to explore women's physical activity barriers and determine what these barriers are and the best way to overcome these. This study provided us with the opportunity to reveal what strategies these active women use to remain physically active.

CHAPTER III

METHODOLOGY

The following section contains a description of the methodology that was used in the present study. More specifically, the research design, sampling procedures, data collection, steps to ensure trustworthiness and data analysis that was used to answer the research questions put forth in this study are discussed.

Research Design

A predominately qualitative post positivistic approach, using interviewing as a data collection tool was used to gain in depth knowledge of how middle aged and older women are able to maintain a physically active lifestyle. The qualitative data provided us with a deeper understanding of the four main factors that were explored in this study and the influence they had on the participants' physical activity levels (Rubin & Rubin, 1995). A qualitative approach also gave a voice to the participants to describe their physical activity experiences (Denzin & Lincoln, 1994). Using qualitative methods addressed previous limitations that exist in a quantitative positivistic approach (Hardcastle & Taylor, 2001). Quantitative data was gathered through the CHAMPS questionnaire that was administered at the start of the second section of the interview. This provided us with information about the participant's physical activity levels, which a strictly qualitative approach could not provide.

The post-positivistic approach adopted a modified dualistic approach that allowed an interaction between the researcher and participant. In this study, we interacted with the interviewees as conversational partners, as opposed to subjects. The use of semi-structured interviews allowed for the participants to elaborate where they felt necessary and allowed us to

avoid the rigid question answer format of very structured interview questions typically used with a positivistic approach.

The post positivistic paradigm was selected based on the research question, as well as the research design. Lincoln and Guba (1994) outline three basic beliefs that define each of the paradigms, the ontological question, the epistemological and the methodological. This study followed these three basic beliefs. More specifically, under the ontological question, this study critically examined the data to understand reality (Lincoln & Guba, 1994). For the epistemological question the interviewer and interviewee were not seen as separate, however, "objectivity" was still important to maintain. The data gathered was also examined to confirm whether or not it fit with preexisting knowledge (Lincoln & Guba, 1994). Lastly, Lincoln and Guba (1994) stated that for the methodological question, qualitative techniques can be utilized to collect information in a natural setting using either inductive or deductive data analysis techniques. This was also the approach we took to conduct the interviews and to analyze the data. Specifically, for this study, a deductive approach was used because preexisting themes were selected to examine the data, for example, self-determination theory (Deci & Ryan, 1985). The interview guide was designed with specific categories to help organize the themes that came up in the interviews. However, inductive analysis was also conducted to incorporate and analyze themes that emerged in the interviews that were not anticipated by the researcher.

In this study, two different interviewing approaches were used to understand middle aged and older women's physical activity maintenance. The first was a life history approach. "Life histories focus more on the experiences of an individual and what he or she felt as he or she passed through the different stages of life" (Rubin & Rubin, 1995, p. 27). Sparkes (1994) and Hardcastle and Taylor (2001) stated that life histories are beneficial because they allow for an in

depth understanding of the individuals' past physical activity experience. Hardcastle and Taylor (2001) used life history in their study to gain a deeper understanding of the perceptions of exercise and the physician referral process in middle aged women. By using this technique, the authors were able to capture the women's past experiences, which helped them to understand their present physical activity context. Life histories were also helpful because past physical activity experiences have been shown to influence later physical activity patterns. For example, Kluge (2002) found that earlier experiences influenced the likelihood that women would participate in physical activity later in life.

In the present study, the life history component of the interview provided information on the participants' past physical activity experiences as well as the evolution of the four factors over time. We were expecting that issues surrounding the four main factors, that is, motivation, social support, physical environment, and barriers would arise. There have been a variety of different methods shown to help increase the reliability of a participants' ability to recall life events. A few of these methods include, recall calendars (Friedenreich, Courneya, & Bryant, 1998), cognitive interviewing methods (Friedenreich, et al., 1998) and photographs. In the present study, photographs and recall calendars were used during the pilot interviews. The photographs did not work well as the women were unable to find appropriate photographs i.e., being physically active, or they had many from one time period and none of another. In terms of the recall calendar, the women found the calendar overwhelming and found it hard to focus on one time period at a time. In the last pilot interview, the researcher found that using cue cards with life phases, i.e., motherhood, middle adulthood and age ranges were the most effective tools to help the participants recall past events. The cue cards seemed easier for the women to focus on

one time period and since they were introduced one at a time, it seemed to overwhelm the women less. This was the recall tool that was used for the nine interviews of the current study.

The second interviewing approach was to explore their current physical activity experiences in terms of: motivation, social support, physical environment, and barriers. Before the women were interviewed in this section, the CHAMPS physical activity questionnaire was administered. After the women completed the questionnaire, the women were asked questions about each of the four factors in terms of the current physical activity experiences. This portion of the interview was more structured and involved asking the women more questions than the life history section.

Sampling

This study involved recruiting nine women between the ages of 39 and 68 from a larger quantitative study, which examined physical activity behaviour change in middle aged and older women (Kowal & Fortier, 2005). The larger study had a sample of N= 149, recruited from a number of community-based facilities. Of the149 women included in the previous study, 71 women were classified as stable active (maintainers) based on their reported physical activity levels which from the previous study were equal to or above 1500 kcal/week at both Time 1 and Time 2, six months later. More specifically, these women were expending between 1504 and 12511 kcal/week at Time 1 and 1526 and 14419 kcal/week at Time 2 (See Appendix C). This criterion was based on international physical activity guidelines (Health Canada & Canadian Society for Exercise Physiology, 1998). The women's physical activity levels were determined using the CHAMPS questionnaire in both the previous and current study, which will be discussed in a subsequent section.

Twenty-four women (12 middle aged and 12 older aged) who were classified as stable active in the previous study stated that they were willing to participate in a follow-up study. These women ranged between the ages of 39 and 68. We telephoned 12 middle aged women (39-45) and 12 older aged women (60-68) and asked them if they were still willing to participate. There had been a one year time lapse between the previous study (October, 2004) and when the women were telephoned for the current study (October, 2005). Four middle aged women and five older women agreed to participate. We asked the women who were willing to participate, if they were still maintaining their physical activity. Since they all were, we set up a time and place to meet for an interview. These two age groups of adult women were selected due to the findings from Kowal and Fortier (2005), which indicated that the women's physical activity barriers and perceptions of their physical environment varied significantly between these two age groups of women.

We felt that nine interviews provided sufficient rich data to answer the research question. Denzin and Lincoln (1994) state that "In qualitative research adequacy refers to the amount of data collected, rather than to the number of subjects, as in quantitative research. Adequacy is attained when sufficient data have been collected that saturation occurs..." (p.231). Rubin and Rubin (1995) stated that saturation occurs when you are no longer learning anything new and the researcher feels confident that the information gathered is reflective of the specific area being studied. We were open to conducting more interviews if saturation was not met after nine interviews, however saturation was met after nine interviews were completed.

Pilot Study

Prior to conducting the current study, the researcher conducted three pilot interviews. The women interviewed were either middle or older aged, but were personal acquaintances and not

part of the previous study. We asked the three participants in the pilot study the same questions from the interview guide designed for the nine participants, as well as asked for feedback. After conducting the three interviews, the interview guide was modified by deleting questions that were unclear, redundant or did not provide us with any information, as well as adding questions that we felt were missed and would add to the interview. In addition, the three pilot interviews were also video recorded in order to examine the body language of the interviewer, to improve this for the following nine interviews.

Data Collection

After the interview guide had been changed in accordance with the results and feedback from the pilot study, the nine participants were contacted, and an interview time and location was scheduled. Prior to contact with the nine participants, ethics approval was granted from the ethics committee of the University of Ottawa. During the first contact with the participants, the researcher reminded the participants that the interviews were confidential and asked permission to audio record them. A consent form was presented and signed before the interviews. It was also explained that after the interviews were transcribed, a copy would be sent to the participants to confirm accuracy or make corrections and/or omissions. The length of the interviews were approximately one hour and a half. The interviews were conducted during the month of October 2004 by the primary researcher at either the University of Ottawa, or a location that was convenient for the participant. Eight of the interviews were held at the women's homes, while one of the women was interviewed at the University of Ottawa.

Interview Guide

As previously mentioned, semi-structured interviews and a questionnaire were conducted in order to collect data to answer the research questions proposed. The semi-structured format

was selected for the interview guide because it ensured consistency of the interview format between the participants, but still allowed for the participants to add extra information that they felt was important. It also ensured that each of the participants were asked questions in a similar fashion (Rubin & Rubin, 1995). This avoided discrepancies between interviews and large variations in what the participants were asked. Semi-structured interviews also allowed us to explore specific themes and topics, without getting a lot of other potential irrelevant information from the participants.

In order to develop the questions for the interview guide, past research in a variety of areas was examined and the researcher also adopted questions that have been previously used (Cousins, 2003; Kluge, 2002; Poole, 2001), and developed new questions that previous studies indicated were in need of more exploration (Deci & Ryan, 2002; King et al., 2000; Landry & Salomon, 2002). The interview guide was divided into two main sections: life history and current physical activity experiences (see Appendix D). The first section focused on the life history of the participants, which allowed the researcher to gain insight into what factors throughout childhood, adolescence, early adulthood, motherhood (if applicable), early and middle and late adulthood (if applicable) had an influence on the participants' physical activity behaviours. In addition, it provided the researcher with information surrounding the evolution of the four factors over time. Two examples of questions that were asked in this section were: "What sorts of activities did you do growing up?" and "Has your attitude towards physical activity changed throughout your life? If so, how? If not, why?"

The second half of the interview guide incorporated questions about the participants' current physical activity experiences. More specifically, the interview guide included questions pertaining to the four factors from the different levels of the ecological framework (Sallis &

Owen, 1999), namely motivation, social support, physical environment, and barriers. Specifically, questions were asked to determine how these factors influenced their present physical activity experiences. An example of a few questions that were asked in the motivation section were: "Why do you do physical activity presently? What are your main motives for being physically active at this time in your life?" In the section on social support, a few examples of questions were: "Who is the one person in your life who is most influential in your life in terms of physical activity? How is the person influential?" For the physical environment, we asked questions such as: "What elements of your neighbourhood do you find helpful to remain physically active?" Lastly, for barriers, we asked questions such as: "What are some of your barriers to be physically active? What is the biggest barrier for you to be physically active at this time in your life?" and "What are some of the strategies that you currently use to overcome these barriers to remain physically active? What do you tell yourself or do when you are faced with a barrier?"

The technique of probing was also used throughout the interviews. Rubin and Rubin (1995) stated that probes are useful when the interviewer wants a more complete answer or needs some clarity. Due also to the existing data on the nine women from the previous quantitative study, answers from their questionnaires (see Appendix E) were used to help probe the participants on questions about their current physical activity experiences. As the researcher explored the four main factors, that is, motivation, social support, physical environment, and barriers, she used probes from the questionnaire to clarify answers and to help the women remember information they included in the previous questionnaires. By using the information from their previous questionnaires to probe, a deeper understanding of the participants' answers were gained.

Questionnaire

One formal assessment tool was used to assess current physical activity levels; the CHAMPS questionnaire (see Appendix F). The CHAMPS questionnaire was used in the Kowal and Fortier (2005) study in the Fall 2002 (Time 1) and Spring 2003 (Time 2) and was used to ensure that the women in the current study were still stable active (maintainers). The CHAMPS questionnaire also provided the researcher with information about the activities in which they were currently participating, which provided us with a better sense of their physical activity experiences. In addition, a comparison with the two other time points from the Kowal and Fortier (2005) study was also possible. This ensured that the women selected had in fact remained physically active from the Fall of 2002 until presently. The CHAMPS questionnaire was created in 1989 to evaluate an intervention designed to increase physical activity in older adults (Stewart et al., 2001). At this time, Stewart et al. (2001) concluded that there were no other questionnaires that met their needs for an outcome measure for older women and men.

Due to the population for which the CHAMPS questionnaire was designed, this was an appropriate questionnaire for this study to determine the participants' physical activity level and the activities in which they were participating. The questionnaire was administered at the start of the current physical activity questions during the interview and took the participants approximately 10 minutes to complete. The CHAMPS questionnaire lists forty-one activities in which the participants check yes or no if they have participated in the activity in a typical week over the past four weeks. The participants are also asked to record how many times per week and the total hours per week that they usually participate in the activity. The activities range from visiting with friends or family to doing yoga or Tai-chi. The CHAMPS questionnaire has been shown to be an effective tool and has shown to be both reliable and valid (Stewart et al., 2001).

Stewart et al. determined that the test re-test reliability over six months ranged from r = .58 to .67. Harada, Chiu, King and Stewart (2001) found that the construct validity ranged from r =.39 to .54 when correlated with quality of life measures including: SF-36 measures of physical activity, general health, mental health, and pain, body mass index, performance-based tests of lower body functioning and endurance, and Mini-Logger activity monitor from ankle and waist sensors. The CHAMPS questionnaire also allowed for the calculation of the amount of kilocalories that are burned per week. For each activity the CHAMPS metabolic weight was multiplied by 3.5, and by the participants' weight in kilograms and then by 60mins (to convert kcal/min to kcal/hour) (Stewart et al., 2001). All of the activities are then added together to get the kilocalories expended per week.

Steps to Ensure Trustworthiness

Prior to conducting the nine interviews, three pilot interviews were conducted in June and one in September at the University of Ottawa or a location that was more convenient for the participants. Pilot studies are beneficial because they allow the researcher to improve the interview guide to make the questions clearer, as well as add or delete questions according to the feedback from the participants. The three pilot interviews also helped the researcher gain valuable experience working with participants and conducting interviews (Denzin & Lincoln, 1994). Kluge (2002) conducted a pilot study to refine and evaluate her interview guide when she explored the meaning of being physically active in women over the age of 65. Kluge stated that pilot interviews help ensure consistency throughout the interviews. The pilot interviews also helped the researcher maintain consistency between the following nine interviews.

We also used member checks to enhance the trustworthiness of the data (Denzin & Lincoln, 1994). As previously mentioned, this consisted of sending copies of the transcripts to

the participants to confirm accuracy or make any correction and/or omissions (Appendix I). Another method that ensured validity and rigor in the study was keeping an audit trail. Specifically, the main researcher kept a binder in a locked laboratory which included, all the drafts of the research proposal, copies of electronic mail, ethics information, participant information (anonymity protected), transcripts, audio and video cassettes, interview guide, personal reflections and decisions made throughout the process. Audit trails provide a way to trace every step that the researcher has taken to develop the research project. This allows others to reconstruct the steps taken by the researcher (Denzin & Lincoln, 1994).

Other members of the research team with expertise in the area also reviewed the data and debriefed with the primary researcher to help interpret the data and provide any necessary feedback (Culver, Gilbert, & Trudel, 2003). This process is known as peer reviewing.

Data Analysis

The interview data were analyzed using the NVivo qualitative analysis software program. Due to the deductive nature of the study, the NVivo coder was developed using the four main factors, namely, motivation, social support, barriers and the physical environment as a preliminary guideline to develop free nodes, tree nodes and child nodes. Within these major themes, subthemes from the literature and the self-determination theory in terms of motivation were also used to code the meaning units in the interview transcripts. While the researcher read through the nine interviews and coded them, inductive analysis was also used to interpret other themes that came up in the interviews that were unanticipated by the researcher and were subsequently added to the coder. After four interviews were coded both deductively and inductively, the final codes were developed and the first four interviews were recoded and the remaining five coded. The results from the nine interviews were discussed in conjunction with

the existing literature and the self-determination theory in terms of motivation, social support, physical environment, and barriers.

CHAPTER IV

RESULTS

This chapter of the thesis is an article titled: Physical Activity Maintenance in Middle Aged and Older Women: A Qualitative Study. The article will be submitted to the Journal of Aging and Physical Activity.

PHYSICAL ACTIVITY MAINTENANCE IN MIDDLE AGED AND OLDER WOMEN: A QUALITATIVE STUDY

INTRODUCTION

Physical activity is key in the prevention of health problems (Booth, Owen, Bauman, Clavisi, & Leslie, 2000; Dunn & Blair, 2002). It has been shown to reduce the risk of obesity (World Health Organization, 2003), osteoporosis (Litt, Kleppinger, & Judge, 2002), hypertension (Heart and Stroke Foundation, 2004), coronary heart disease (Bhargava, 2003), diabetes (Zinman, Ruderman, Campaigne, Devlin, Schneider, & American Diabetes Association, 2004) and colorectal cancer (Friedenreich, 2001). Physical activity has also been found to promote well-being. For example, Piko (2000) discovered that physical activity increases energy levels, self-confidence, and decrease stress and depression. Health Canada and the Canadian Society for Exercise Physiology (2003) recommend that adults, including older adults, accumulate 30 to 60 minutes of moderate physical activity on most days in order to gain health benefits. Similarly, the American College of Sports Medicine recommends that every American adult should accumulate at least 30 minutes of moderate intensity physical activity on most, preferably all days of the week, which provides substantial health benefits (American College of Sports Medicine, 2003).

However, according to the 2000/01 Canadian Community Health Survey, 56% of Canadian adults are inactive, while 24% are moderately active and 20% are sufficiently active. Certain populations are more at risk for physical inactivity than others. For instance, on average, only 15% of middle aged and older women are meeting recommendations (Canadian Fitness and Lifestyle Research Institute, 2002). In terms of American adults, more than 50% do not get enough physical activity to provide health benefits. In addition, 25% of adults are not active at all

in their leisure time. Specifically, for American women, 27% are inactive (Centers for Disease Control and Prevention, 2002).

Speck and Harrell (2003) stated that in order to achieve optimal health benefits from physical activity, maintaining this activity on a long-term basis is essential. However, within the first six months, the dropout rate for physical activity is 50% or greater (Annesi, 1998; Dishman, 1988). While the number of people dropping out of physical activity is alarming, this study focused on the individuals, specifically middle and older aged women who are able to maintain regular physical activity. There have been few, if any studies that explore the predictors of maintenance of physical activity in older adults (Cousins, 2001; Rhodes, Martin, Taunton, Rhodes, Donnelly, & Elliot, 1999). In addition, from a population health perspective, it is important that we learn more about individuals who maintain physical activity, in order to gear interventions to increase physical activity maintenance (Marcus, Dubbert, Forsyth, McKenzie, Stone, Dunn, & Blair, 2000).

An ecological framework (Sallis & Owen, 1999) was used in order to explore physical activity maintenance in these women. This framework takes a multilevel approach to explore physical activity behaviour, rather than solely focusing on the individual. Indeed, ecological models posit that individual behaviour is influenced in many ways (Spence & Lee, 2003). These models have evolved over recent decades, however, all of them make the specification that intrapersonal variables i.e., motivation, interpersonal and cultural factors i.e., social support, and the physical environment i.e., accessible facilities, can all influence behaviour (Sallis, Bauman, & Pratt, 1998).

Sallis and Owen's (1999) ecological framework was selected for this study because it is comprehensive and explores the physical environment in conjunction with intrapersonal and

social factors. Specifically, it is divided into three major categories: intrapersonal, social environment, and physical environment factors. Although the framework is divided into categories, the interaction between the categories is as equally important to explore as each level in itself. Within the framework, the intrapersonal category includes, demographics, biological, cognitive/affective, and behavioural factors and their effect on physical activity behaviour. Within the intrapersonal category, motivation was selected because it is one of the key predictors of exercise adherence (King, Friedman, Marcus, Castro, Forsyth, Napolitano, & Pinto, 2002). The social environmental category includes social supportive behaviours, social climate, culture, policies governing incentives for physical activity/inactivity, resources and infrastructures related to physical activity/inactivity. Social support was explored within this category because it is a predictor of physical activity adherence and has been found to be a consistent important correlate of physical activity (Trost et al., 2002). The physical environment category is subsequently divided into two subcategories, the natural and constructed environment. In the natural environment, weather and geography can both have an effect on physical activity behaviour. In the constructed environment, the architecture, transportation, entertainment infrastructure, recreation infrastructure, urban/suburban environment, and the information in the environment can all influence physical activity behaviours (Sallis & Owen, 1999). In the present study, we explored both the constructed and natural environment to see if and how it influences middle aged and older women's physical activity maintenance.

Motivation was explored using self-determination theory, specifically the organismic integration theory (Deci & Ryan, 2002). Landry and Solmon (2002) pointed out that specifically for women, self-determination theory can be used to understand the multifaceted interactions of factors that affect women's physical activity behaviours. Self-efficacy theory (Bandura, 1997)

has been used extensively in the physical activity domain and been show to be a strong predictor of physical activity (McAuley, Jerome, Elavsky, Marquez, & Ramsey, 2003). However, this theory was not selected because the women in the current study are already maintaining physical activity. Presumably, these women would have high self-efficacy and therefore this theory would not be as advantageous to use. SDT was selected for this study for three major reasons. First, SDT, unlike other motivation theories describes a broad range of motivational types, which are placed on a continuum. This allows for more advanced understanding of human motivational functioning, rather than just categorizing behaviour as either extrinsic or intrinsic.

SDT was also selected because it accounts for different motivational consequences or outcomes. More self-determined behaviours will result in positive outcomes, that is, physical activity maintenance, while non self-determined motives will generally have the opposite effect. This gives us a better understanding of the motivational process.

The last reason for selecting SDT was because it takes into account the origins of human motivation. Deci and Ryan (2002) state that autonomy, competence, and relatedness to others are three fundamental needs for human motivation. By understanding these motivational needs, we can more clearly understand an individual's motivation. In addition, SDT has also been utilized extensively in the physical activity domain and was found to be valid and useful to understand motivation and the different forms of self-regulation (Fortier & Grenier, 1999; Landry & Solmon, 2002, 2004; Pelletier, Fortier, Vallerand & Brière, 2001). In addition, some of these studies have focused on women and extended our knowledge about the interaction of factors that affect women's physical activity (Landry & Solmon, 2002, 2004; Wilson & Rodgers, 2004).

This theory postulates two broad types of motivation, autonomous and non-autonomous. Autonomous motivation is a combination of identified regulation and intrinsic regulation and can be defined by a person who initiates and chooses a behaviour because of the personal importance of the behaviour or for pleasure and enjoyment (Williams, Gagné, Ryan, & Deci, 2002). An example of autonomous motivation is when an older woman swims everyday because she loves the ways she feels while she does it.

Non-autonomous motivation is a combination of introjected regulation and external regulation and can be defined as a behaviour that is controlled, and not performed out of choice, but instead out of pressure by others or oneself (Williams et. al, 2002). An example of non-autonomous motivation is when a middle aged woman goes to the gym because she feels guilty if she does not go.

Individuals who are autonomously motivated are more likely to maintain physical activity than non autonomously motivated individuals (Mullan & Markland, 1997). Specifically for women, Landry and Solmon (2004) discovered that individuals who are maintaining physical activity are more likely to be self-determined than those who are not regular exercisers. There have been few studies that have examined how physical activity motivation varies by phases of exercise (i.e. maintenance) (Sherwood & Jeffery, 2000). However, we do know that overall motivation decreases as adults age. The motivation of individuals who maintain physical activity is unknown (Deci & Ryan, 2002). This study explored not only what motivates middle aged and older women to be physically active, but how their motivation has changed over time to help them remain physically active.

Within the social environment category, social support was selected because it has been found to be consistently and positively associated with physical activity (Trost, Owen, Bauman,

Sallis, & Brown, 2002), and appears particularly important for women's physical activity (Sallis, Hovell, & Hofstetter, 1992). Chogahara (1999) discovered that social support specific to physical activity is provided by family, friends and physicians. Glasgow, Eakin, Fisher, Bacak, & Brownson (2001) also revealed that physician social support for physical activity was also important. Similarly, Poole (2001) found that particularly for women, social support is important from family and friends.

Various types of social support specific to physical activity have been reported in the literature. Some of these include: emotional support, instrumental support, informational support and appraisal support (Glantz, Rimer, & Marcus, 2002). Chogahara (1999) also discussed three types of social support: companionship, informational and esteem support. Social support specific to physical activity might include: giving a non-driver a drive to an exercise class, telling a friend about a new walking path, providing encouragement, exercising with a significant other, or reinforcement for learning a new physical activity (Elyer, Brownson, Donaltelle, King, Brown, & Sallis, 1999). While numerous studies have examined women's social support and physical activity and have found it to be an important factor (Hardcastle & Taylor, 2005; Plonczynski; 2003; Speck & Harrell, 2003), this study went beyond determining whether or not social support is important for these women, it also explored who was providing the support and in what way the support was given. This enabled us to understand the ways in which social support plays a role in these women's lives and helps them remain physically active. In addition to the women's current social support for physical activity, we also explored social support throughout their lives, which enabled us to understand how their social support has changed, while helping them remain physically active throughout their lives.

The physical environment has a variety of influences on physical activity behaviour. In a review by Trost et al. (2002) several environmental influences on physical activity were identified. Common correlates of physical activity included, access to facilities, satisfaction with the recreation facilities, neighbourhood safety, seeing others participating in physical activity, enjoyable scenery and hilly terrain. King, Castro, Wilcox, Elyer, Sallis and Owen (2000), Spence and Lee (2003) and Trost et al. (2002) stated that research examining the effect of the physical environment on physical activity remains a high priority for future research. In this study, while we explored the effect the physical environment has on middle aged and older women's physical activity, we also explored how their physical environments have changed over time and whether this has had an affect on their physical activity behaviours.

While barriers are not outlined in Sallis and Owen's (1999) ecological framework, they are prevalent within all three categories of the ecological framework, namely the intrapersonal, social environment and physical environment. Research has shown that there are numerous barriers to physical activity including social, personal, psychological, environment and policy factors (Cousins, 2003; Sherwood & Jeffery, 2000; Trost et al., 2002; Wen, Thomas, Jones, Orr, Moreton, & King, 2002). In terms of middle aged and older aged women, Kowal and Fortier (2004) and Eyler et al. (1998) discovered that common physical activity barriers include, being too busy, feeling too tired and lazy, experiencing health problems, having difficulty managing time and not wanting to exercise alone. We were interested in exploring barriers to physical activity maintenance in the women's current physical activity as well as examining the contribution of the women's past physical activity barriers. We were also interested in how the women's barriers have changed over time and whether or not this had an effect on their physical activity behaviours. While we looked at what barriers these women encountered, we were mostly

interested in exploring how these women deal with these barriers once faced with them and what strategies they use to overcome them as recommended by Cousins (2003).

The overall purpose of this study was to better understand physical activity maintenance in middle aged and older women. Specifically, the role of motivation, social support, the physical environment, and barriers to physical activity maintenance in the women's current physical activity behaviour was examined. This was done using Sallis and Owen's (1999) ecological framework. The secondary purpose was to examine the evolution of the four factors throughout the lifespan in terms of physical activity.

Through the exploration of these women's past and current physical activity experiences specifically in terms of motivation, social support, the physical environment and barriers, this study contributes to research on physical activity maintenance in middle aged and older women. As stated by Landry and Solomon (2002), more research needs to be done on physical activity and women in general, especially on specific subgroups of women, such as older women. While there has been some research done in the area of physical activity maintenance, it has not been clearly determined what factors influence physical activity maintenance specifically in older adults (Buckworth & Wallace, 2002; McAuley et al., 2003; Rhodes et al., 1999). In addition, Cousins (2001) pointed out that future research needs to explore the cues that physically active adults use to maintain regular physical activity. Marcus et al. (2000) also stated that in order to understand physical activity maintenance, it is important that we explore early influences on physical activity, such as parents, family, school, and the environment.

In addition, most of the information/data about women and physical activity originates from quantitative studies. However, recent studies have employed qualitative techniques and this approach has contributed to the existing base of knowledge (Landry & Solmon, 2004). Landry

and Solmon (2004) also stated that in terms of examining motivation, qualitative methodologies would provide valuable insight. In the present study, by examining women who are physically active (maintainers), we were able to better understand how they have been able to remain active throughout the years.

METHODOLOGY

Participants and Procedures

This study involved recruiting nine women between the ages of 39 and 68 from a larger quantitative study, which examined physical activity behaviour change in middle aged and older women (Kowal & Fortier, 2005). The larger study had a sample of N=149, recruited from a number of community- based facilities. Of the 149 women included in the previous study, 71 women were classified as stable active (maintainers) based on their reported physical activity levels which from the previous study were equal to or above 1500kcal/week at both Time 1 and Time 2, six months later. More specifically, these women were spending on average 7007 kcal/week at Time 1 and 7972 kcal/week at Time 2. This criterion was based on Canadian physical activity guidelines (Health Canada & Canadian Society for Exercise Physiology, 1998). The women's physical activity expenditures were determined by the CHAMPS questionnaire which is discussed in a subsequent section.

Twenty-four women (12 middle aged and 12 older) who were classified as stable active in the previous study stated they were willing to participate in a follow-up qualitative study. The women in this study were selected based on the previously mentioned criteria as well as their willingness to participate in the study. After contacting the 24 women, nine women agreed to participate in the present study. Prior to recruitment, ethics approval was granted from the ethics committee of the University of Ottawa. The potential participants were telephoned and asked if

they were willing to participate in a follow-up study and a time and location was arranged to conduct an interview. In addition, the women were also informed that the interviews are confidential and the researcher asked permission to audio record them. These women ranged between the ages of 42 and 67. The nine women all live in Ottawa, Ontario, were mainly Caucasian, married, well-educated and had a high socio-economic status (see Table 1).

Research Design

A post positivistic approach, using interviewing as a data collection tool was used to gain in depth knowledge of how middle aged and older women are able to maintain a physically active lifestyle. This study was predominately a qualitative study, although quantitative data from the CHAMPS questionnaire was used to verify the women's physical activity expenditure. The qualitative data provided us with a deeper understanding of the four main factors, both throughout the life span and currently, that were explored in this study and the influence they have on the participants' physical activity levels (Rubin & Rubin, 1995). A qualitative approach also gives a voice to the participants to describe their physical activity experiences (Denzin & Lincoln, 1994).

Data Collection

Quantitative

One formal assessment tool was used to assess current physical activity levels; the CHAMPS questionnaire. The participants filled out the CHAMPS questionnaire at the start of the each interview. The CHAMPS questionnaire was used in the Kowal and Fortier (2005) study in the Fall 2002 (Time 1) and Spring 2003 (Time 2) and was used to ensure that the women in the current study were still stable active (maintainers) (see Table 2). The CHAMPS questionnaire also provided the researcher with information about what activities the women

were currently participating in, which provided us with a better sense of what current physical activities they are participating in, the duration and the number of days per week for each activity. The CHAMPS questionnaire lists forty-one activities in which the participants check yes or no if they have participated in the activity in a typical week over the past four weeks. The participants are also asked to record how many times per week and the total hours per week that they usually participate in the activity. The CHAMPS questionnaire has been shown to be an effective tool and has shown to be both reliable (r =.58 to .67) (Harada, Chiu, King, & Stewart, 2001) and valid (r =.39 to .54) (Stewart, Mills, King, Haskell, Gillis, & Ritter, 2001). It also allows for the calculation of the amount of kilocalories that are burned per week. For each activity the CHAMPS metabolic weight was multiplied by 3.5 and by the participants weight in kilograms and then by 60 mins (to convert kcal/min to kcal/hour) (Stewart et al., 2001). All of the activities are then added together to get the kilocalorie expended per week. Due to the population for which the CHAMPS questionnaire was designed, this was an appropriate questionnaire for this study.

Qualitative

As previously mentioned, semi-structured interviews were conducted in order to collect data to answer the research questions proposed. The semi-structured format was selected for the interview guide for several reasons. These reasons include, ensuring consistency of the interview format and questions between the participants (Rubin & Rubin, 1995), but still allowing for the participants to add in extra information that they feel is important and allows us to explore specific themes and topics without getting a lot of other additional information from the participants.

In order to develop the questions for the interview guide, past research in a variety of areas was examined. Some previous used questions (Cousins, 2003; Kluge, 2002; Poole, 2001), were chosen and new ones were developed that earlier studies indicated were in need of more exploration (Deci & Ryan, 2002; King et al., 2000; Landry & Salomon, 2002). The interview guide was divided into two main sections according to the purposes of the study: life history and current physical activity experiences.

Life History

The first section focused on life history, which allowed the researcher to explore past physical activity experiences. It also helped the researcher gain insight into how the four factors had an influence on the participants' physical activity behaviours throughout childhood, adolescence, early adulthood, motherhood (if applicable), and middle and late adulthood (if applicable). This also allowed us to see the evolution of each of the four factors, namely, motivation, social support, physical environment and barriers over time. Two examples of questions that were asked in this section were: "What were your main motives for being physically active at this point in your life (i.e. early adulthood)?" and "Did your neighbourhood have an impact on your physical activity at that time? If so, how?"

Current Physical Activity

The second half of the interview guide incorporated questions about the participants' current physical activity experiences. In addition, the interview guide included questions pertaining to the four factors from the different levels of the ecological framework (Sallis & Owen, 1999), namely motivation, social support, physical environment, and barriers. Specifically, questions were asked to determine how these factors influenced their present physical activity experiences. An example of a question that was asked in the motivation section

was: "Why do you engage in physical activity at present?" In the section on social support, an example of a question was: "Who are the people who are most influential in your life in terms of physical activity?" For the physical environment, we asked questions such as: "What elements of your neighbourhood do you find helpful to remain physically active?" Lastly, for barriers, we asked questions such as: "What are some of the barriers that prevent you from being physically active currently in your life?" and "What are some of the strategies that you currently use to overcome these barriers to remain physically active?"

The technique of probing was also used throughout the interview. Probes aid the researcher to gain further depth in the participants' answers, as well as clarify answers (Rubin & Rubin, 1995). Due also to the existing data on the nine women from the previous quantitative study, answers from their questionnaires from the Kowal and Fortier (2005) study were used to help probe the participants on questions which they could not provide the researcher with an answer or were have difficulty, and for questions in which the researcher noticed that the participants provided a different answer than was what previously mentioned in their questionnaire. For example, in one of the interviews, the woman stated her barriers and did not mention financial barriers, which was a barrier that she had previously stated in her questionnaire as a major one. The researcher asked her about financial barriers and the women elaborated on this as a key barrier. Without the use of probes, this information would have not come out in the interview itself.

Ensuring Trustworthiness

Prior to conducting the nine interviews, three pilot interviews were conducted. These were beneficial because they allowed the researcher to improve the interview guide according to the feedback from the participants. In addition, due to concerns about the participants ability to

recall past events, we tried a few different methods to prevent this, such as recall calendars, (Friedenrich, Courneya, & Bryant, 1998), and personal photographs to determine what method would be best to use during the interviews. The three pilot interviews helped the researcher gain valuable experience working with participants and conducting interviews (Denzin & Lincoln, 1994).

We also used member checks to enhance the trustworthiness of the data (Denzin & Lincoln, 1994). This consisted of sending copies of the transcripts to the participants to confirm accuracy or make any correction and/or omissions. Other members of the research team with expertise in the area also reviewed the data and debriefed with the primary researcher to help interpret the data and provide any necessary feedback (Creswell, 1998). This process is known as peer reviewing.

Another way to ensure trustworthiness of the data is through triangulation. Triangulation is when the researcher uses different sources or methods of data to help corroborate the information gathered (Creswell, 1998). In the present study, the CHAMPS questionnaires and the interview transcripts were compared to ensure that the information was the same. For example, during the course of the interviews, if a participant left something out or gave a different response, the researcher probed the participant further to ensure an accurate response.

Data Analysis

The interview data was analyzed using the NVivo qualitative analysis software program. The researcher read through the nine interviews and coded the interviews. Once the interviews were coded, the meaning units that reappeared in many of the interviews were clustered together in order to develop common themes (Creswell, 1998). Due to the deductive nature of this study, the four main themes were: motivation, social support, physical environment, and barriers.

Within these major themes, subthemes from the literature and the self-determination theory in terms of motivation were also used to code the meaning units. However, an inductive analysis was also used to interpret other themes that came up in the interview that were unanticipated by the researcher.

RESULTS

Motivation

At the intrapersonal level of Sallis and Owen's (1999) ecological framework, motivation using self-determination theory (Deci & Ryan, 2002) was explored. In this sample, the women were both autonomously and non-autonomously motivated to be physically active. However, all nine women gave autonomous reasons, while seven of the women gave non-autonomous reasons. On average, each of the women provided three motives for being physically active, the first two usually being autonomous and the last being non-autonomous.

Autonomous Motivation (AM)

In terms of autonomous motivation, the most common reasons for being physically active included: health reasons/benefits (n=8), positive feelings associated with being physically active both during and post physical activity (n=6), and because they found it fun and enjoyable (n=6). The women also provided specific intrinsic reasons for being physically active when asked about what it is about physical activity that they enjoy. Other autonomous motives that were mentioned, but less often were: 1) to "zone out", 2) it "grounds" them and 3) they enjoy the solitude.

AM: Health

The number one autonomous motive for being physically active identified by eight of the nine women was health reasons. Women participated in physical activity to improve their current

health, to stay healthier longer, and to prevent onset of diseases. For example, Participant 6, age 42 [P6 (42)] said, "I think my motivation is more health wise." P5 (65) stated: "It just kind of grounds you. You need it to be physically, mentally and emotionally healthy."

AM: Positive Feelings/Emotions

The feelings and emotions associated with being physically active were stated by six of the nine women as a main motivator for them. These feelings included the way they felt during and after physical activity. This autonomous reason emerged inductively, as we did not anticipate this as a physical activity motive. P2 (45) stated, "I have a nice bike path over on the Aylmer bike path and I just love it. It's all in the woods and the trees and it's just a pleasant experience. I just forget about everything, but I do a lot of thinking too. It's a good sort of zone-out as well." Similarly, P6 (42) said, "I think the way it makes you feel. There's nothing like it. Whether it's a good game or bad you are out there doing it and however this affects you, it's always a good thing." P1 (61) also discussed positive feelings related to physical activity. "It just makes me feel good."

AM: Fun/Enjoyment

In terms of autonomous motivation, six of the nine women stated that what motivates them to be physically active is because they find it fun and enjoyable. A few examples from some of the participants demonstrate that they truly enjoy their experiences with physical activity. "I like to do it for enjoyment" (P3, 63). "If you consider it a burden, then you need some motivation, but to me it's not, its fun" (P4, 66).

When asked what it was about physical activity that the women enjoyed the most, all six women's responses related to specific types of intrinsic motivation; namely intrinsic motivation

to accomplish and intrinsic motivation to experience stimulation. For example, P8 (67) discussed her intrinsic motivation to accomplish:

> When you have a square that has competent dancers in it and you all get through it and you've done everything so it's all worked out, there's that feeling of accomplishment that you've been able to do this fairly complicated dance and the others with you. You all sort of say woo hooray, we've done this. There's that kind of feeling about it.

While intrinsic motivation to accomplish was discussed by P8 (67), all six women mentioned intrinsic motives to experience stimulation. For example, P2 (45) said, "Rollerblading and skating I kind of lump those together because they are the same kind of movements, depending on what time of the year it is. I like the smoothness, the stroke, the kind of gliding aspect of it." Similarly, P8 (67) said, "With the dancing, there's both the physical thing like the moving to music, which I enjoy…"

Non-autonomous Motivation (NAM)

While all nine of the women were motivated for autonomous reasons to be physically active, seven of the nine women gave non-autonomous reasons for being physically active after they discussed their main motives, which were autonomous. The most common non-autonomous reasons stated were to socialize with others (n=5), because of internal and external influences (n=4), and to control weight and improve appearance (n=3). Other non-autonomous motivators included: 1) financial reasons i.e. feeling accountable to go to the gym since they have paid for it, 2) to set an example for their children, 3) seeing a friend lose weight and 4) obligation to remain physically active.

NAM: Socializing

Socializing with others was a common non-autonomous motive for being physically active. When asked what motivates her to be physically active, P4 (66) replied, "Well the aqua fitness is a very nice group of people." P6 (42) provided a similar response:

> Well I am in two pretty social sports…you do play in foursomes and the league I am in, the four ladies we get along really well. We met at the league but we continued on with each other during the winter as well. Curling is also very social.

P5 (65) also said, "I really like the social nature of our aerobics group. We're actually quite tightly bonded in some way. We've been doing it with the same group for about 8 years."

NAM: Internal and External Influences

Four of the seven women interviewed were non-autonomously motivated by internal pressure to be physically active and pressure they felt by others. P3 (63) discussed that one of the reasons she is physically active is because she wants to prove to others that she is able to do it. She also states that proving that she can be physically active acts as a motivator. "Knowing that I have been able to keep up with my husband makes all of the training worthwhile."

One of the women explained how her husband's physical activity level makes her feel as though she needs to remain physically active in order to keep up to him during the activity. "I sometimes almost feel like I have to keep up to him" (P5, 65).

NAM: Weight Control/Appearance

Three of the seven women who had non-autonomous motives were motivated to be physically active to either lose weight or to improve their appearance. For example, P2 (45) stated, "Maybe if I go to one more fitness class I'll maybe burn off another 600 or 700 calories, so maybe that will help with my goal to get to a more normal weight…"

Evolution of Motivation

During childhood, all of the women stated that they were intrinsically motivated to be physically active, mainly to experience stimulation. Specifically, they stated that they were physically active because they enjoyed it and it was fun. For example, P2 (45) said, "Probably didn't realize it, but just to have fun." Most of the women stated that as they reached adolescents, they still enjoyed physical activity, but a main motive for being physically active was to socialize and be with friends. For example, P7 (44) said that from childhood to adolescence, "It was just a lot more social. You had friends and they were all active and it was just the same group of people who moved through the different sports so you kind of stuck with that." During early adulthood, the women reported no changes in their motivation from adolescence despite experiencing an increased amount of barriers.

Eight of the nine women who were interviewed were mothers. This had an effect on the women's motivation during adulthood. At this point, the women were motivated for reasons related to motherhood. Some of these included: a) to get back into shape to improve appearance after giving birth, b) to set an example for their children, and c) to participate in family activities to be active with their children. The majority of these reasons are non-autonomous. Women at this point in their lives did not discuss autonomous reasons such as fun and enjoyment. For example P4 (66) stated upon being asked what motivated her during motherhood, "I wanted to get back into shape…"

Of the women interviewed, four of the women were older women. These women discussed their motivation to be physically active after adulthood/motherhood. These women provided both autonomous and non-autonomous motives for being physically active in late adulthood. Their motives were unrelated to having children, unlike adulthood. Some of their

motives included: enjoyment, remaining healthy, more conscious of effects of aging and the feelings they experience while being physically active. In terms of the evolution of motivation, in childhood the women were motivated for autonomous reasons. In adolescence, they were still autonomously motivated, but were also motivated for non-autonomous reasons. This pattern continued into adulthood (motherhood) and once in later adulthood, the women seemed to be mainly motivated again for autonomous reasons (see Table 3).

Social Support (SS)

In the social environmental category of Sallis and Owen's (1999) ecological framework, we focused on social support, specifically, who was providing the support and in what way the support was given. All nine women stated that social support was important for them to remain physically active. Eight of the nine women stated that family (husbands and children) provided social support for them in terms of physical activity. Five of the seven women who were married stated that the number one person who provides social support is their husband. Five out of the nine also stated that friends, physicians and community programs also provide social support for physical activity.

In terms of what type of social support is provided, the three most common stated by the women were: encouragement (n=9), having a companion to be physically active with (n=9), and obtaining information from their physicians (n=6). However, other types of social support that were also mentioned included sharing care giving responsibilities of children and grandchildren i.e., watching the children, esteem support, and being called on the telephone when they do not attend physical activity classes. (see Table 4).

SS: Family

As previously mentioned, eight of the nine women stated that family provided social support for physical activity, in particular their husbands for the women who are married. Family provided encouragement (n=8); and companionship (n=7); for physical activity. In terms of encouragement, P8 (67) stated, "I think my husband and I also encourage each other, one or the other of us will suggest well let's get out and go for a walk because we haven't done anything today." P4 (66) discussed how her daughter provides companionship support for her: "I have this crummy [exercise] cd…I ask [my daughter] to put it in for me because I don't know how to put it in. We are just dancing away."

SS: Friends

Seven of the nine women stated that friends provide social support specifically for physical activity. Similar to family, friends provided encouragement (n=7) and companionship (n=6) support for the women. P3 (63) stated, "I've lived in the neighbourhood for a long time, everybody knows everybody, you know three or four of us go out walking together type of thing. We meet neighbours, friends along the way." Similarly, P1 (61) said, "It's fun, [my friends] talk if we go for walks…so it's fun." In terms of encouragement, P7 (44) stated, "My friends are always encouraging me to join their volleyball team or soccer team. They really help keep me active."

SS: Physicians

Six out of the nine women stated that their physician provides them with social support in terms of giving them information (n=6) related to physical activity and encouraging (n=6) them to be physically active. The women stated that they asked their physicians up front for information and their doctors offered it spontaneously as well. These women believed that their

physicians were very informative and helpful in this respect. In terms of the type of information with which they were provided, the physicians spoke with them about controlling health risks with physical activity such as, blood pressure, cholesterol, and body weight. For example, P1 (61) stated, "[My doctor] speaks about my health condition, my blood pressure, my cholesterol and my weight."

The women also stated that when they are injured, their physician provides them with information about how to proceed with physical activity safely and what can be done to improve the injury. For example P7 (44) discussed her knee problems with her physician:

> I'll say, "Well my knee is hurting." "Well what are you doing?" Then they'll say, "Well you have to look at doing this"...So I've focused more on strength training and weights and things like that.

Interestingly, many of the women also stated that their physicians are physically active themselves and this helps to encourage themselves to be active. For example, P5 (65) stated, "I admire her for [encouraging me], for sure. I also know that she's very active too. I think there's a bit of a bond that way too."

SS: Community Program Participants

In terms of social support from participants in their community programs, six of the nine women discussed how having others in their community with whom they can be physically active made it more enjoyable. Community program participants as social support providers emerged inductively, as we did not anticipate the importance of these individuals. P8 (67) said:

> That's part of the attraction of both the square dancing and the active living group. You go out and you are usually chatting with someone while you're walking and not even realizing how far you are going because you are talking.

P4 (66) reported: "If I don't go to the aqua fitness, someone from the group will call me and ask me what happened to you? We didn't see you in the pool."

Evolution of Social Support

Similar to motivation, we also asked the women about the evolution of their social support. All of the women stated that their social support in childhood came from family (parents and siblings) and friends. The type of support that they provided included: encouragement and companionship. For example, P8 (67) stated, "My one sister that was closest to my age, we would walk to school together, cycle together, that sort of thing." In terms of adolescence, all of the women stated that their social support also came from their family and friends. P2 (45) stated:

> A lot of my friends were [physically active], so I was pretty much daily doing canoeing or kayaking down at the beach, either practicing or going into regattas on weekends. That was more of a social thing to hang around with the kids afterwards.

In early adulthood, parents and siblings were less prominent in terms of providing social support for the women, instead husbands, friends and co-workers provided social support for physical activity. The type of support provided mainly included companionship. For example, P9 (45) stated, "There was a bunch of us from work and we'd go to either aerobics classes or play squash. We all played squash, that was fun. I remember that being a lot of fun."

In adulthood (motherhood) the women stated that their social support came from the same people, however, their husbands provided the most amount of social support in terms of physical activity. The type of social support was both companionship and encouragement in nature during this time period. P8 (67) said, "My husband and I are active together and he's endlessly encouraging me to go out with him and walk." For the older women who were able to

reflect back on adulthood, they did not differentiate between social support at that time and the social support they currently receive. In terms of the evolution of social support, in childhood the support came from parents and siblings, and friends. As the women aged, family became less prominent and friends, co-workers and particularly husbands became the main source of physical activity social support (see Table 3).

Physical Environment

Within the physical environmental category of Sallis and Owen's (1999) ecological framework, we discovered what elements of the participants' physical environment, more specifically their neighbourhoods, were helpful in terms of remaining physically active as well as changes they make to their neighbourhoods. It was discovered that within their physical environments, both the natural and constructed environments were relevant to the participants. Overall, all nine women were satisfied with their physical environments, and enjoyed being physically active either in their immediate neighbourhoods or close by at a facility. Elements of their neighbourhoods that they found helpful to staying physically active included, a) easy access to facilities (n=9), b) feeling safe (n=9), and c) having good scenic walking areas, which include green space (n=6) (see Table 4).

Environment: Accessibility

All of the women stated that having facilities or areas in or near their neighbourhoods where they can be physically active helped them remain physically active. The facilities or areas that the women used included: walking/biking paths, community centers, curling clubs, golf courses, Rideau Canal, rinks and parks. For example, P2 (45) discussed her involvement in the community center: "I tapped into the community center, which is great. I'm there for play groups, I'm there for aerobics classes, I'm there all the time…This is sort of my life line most

mornings." P3 (63) enjoys the park near her home, "We have a park just a couple of blocks from here that I spend a lot of time at with the girls. There are bicycle paths just up at the top of the street so we can go from there." P5 (65) commented on the convenience of the Rideau Canal, "In the wintertime, I can put my skates on here and walk over (laugh), that's okay." All of the women gave examples of facilities that are close to where they live that help them remain physically active. While all of the women discussed facilities that are close to their home that they use, four out of the nine women weight train in their home environment in addition to going to facilities outside of their homes.

Environment: Safety

When asked if the women felt comfortable and safe being physically active in their neighbourhood, all nine of the women agreed. A few of the women commented that they do not like to be physically active at night in their neighbourhood, but during the day they feel safe. For example, P7 (44) stated, "I mean I wouldn't have any issues going out if I was going to do that, go for a walk or anything like that." Similarly, P3 (63) states, "Well it certainly is easy to participate at least we feel it's a fairly safe neighbourhood...The area itself is safe to be out in even later in the evenings." While all nine women stated that they feel safe in their physical environments, some of the women still take precautions when they are physically active. For example, P1 (61) said, "If I walk, I stay on the main roads and the good walking areas. I live in a good location where I can continue walking, it's safe." Similarly, P9 (45) takes precautions:

> Although I [feel safe, I do] take precautions... I don't like to be too far from my vehicle. I map out routes where I may have to do the circuit a few times, but it's never a real problem...When I run I always carry with me a little waist pouch. It is very useful. I have ID, money, and a cell phone.

Environment: Good Walking Area/Enjoyable Scenery

Six of the nine women stated that having a good walking area helps them remain physically active. They also stated that within this walking area, enjoyable scenery and green space is important. For example, P2 (45) stated, "Most of all I think I like having this green space back here that's really nice. We can walk there." P4 (66) stated, "[The neighbourhood] is nice to walk around and it's a nice walk because the road is winding and you go up and down hills. It's like a Swiss village. It's very pleasant…" Similarly, P1 (61) said, "[My neighbourhood] is sort of like a park setting. You know lots of trees, lots of nice areas, nice homes, nice gardens. You walk and you see things. It's nice, it's not boring when you're walking." P9 (45) said, "I can go for a run right now at 3:00 pm and there's nobody, it's beautiful and wonderful. So it's really conducive to a personal moment, you just go, it's beautiful."

Changes to their Physical Environment

While all of the women stated that they were happy with their current physical environment, most of the women did have changes they would make to both their constructed and natural physical environments if they were given the opportunity. Within the constructed environment, some of the women stated that they would like to see more bike paths in their neighbourhood, a pool, improving the slant of the roads, and a lower speed limit to slow traffic down.

Some of the changes that they would like to see done to the natural environment included more trees, preventing the development of green space i.e. building more homes, and making the area less hilly. For example, P6 (42) stated, "The green space is shrinking, like I said we lost 21 acres on Hunt Club… I don't know if you can stop progress." While the women were generally

quite happy with their physical environments, there were still changes that they felt would improve their physical environment, to make them more conducive to physical activity.

Evolution of Physical Environments

We asked the women about the various physical environments in which they have lived and the effect that these have had on their physical activity over time. After analyzing the interview transcripts, it was apparent that this particular factor was difficult to explain. Many of the women have lived in a variety of neighbourhoods in many different cities and did not go into detail about all of the neighbourhoods in which they have lived. In terms of general trends, all of the women were satisfied with the physical environments in which they lived and were physically active in their neighbourhoods, with the exception of one of the women who grew up in Pakistan and for cultural reasons was unable to be physically active. However, the other eight women were all able to be active in their neighbourhoods. For example, P2 (45) talks about one of her neighbourhoods:

> We lived in the beaches area of Toronto so we had a beach and a boardwalk which was very nice. It was a nice place to grow up when we were young, it was beautiful you know. I was always down there even when I was younger in the sand, playing in the sand. I swam in Lake Ontario, which was another thing.

While a few of the women did do activities outside of their neighbourhood, they were still active in their immediate neighbourhood throughout their life. All of the women felt safe being physically active in all of their neighbourhoods, with the exception of the woman living in Pakistan.

All of the women, regardless of their stage of life, had facilities in their neighbourhood such as, community centers, rinks, parks, beaches, tennis courts and outdoor pools. P6 (42)

reported: "There was an outdoor pool, a community center and an outdoor rink in the winter time and then there was a YMCA." Although most of them had facilities available to them, many of them grew up playing informal games that did not require any facilities. For example, P5 (65) said, "We played on the street as I remember…I could remember biking along the Blind River on the weekend, there were monkey trails. We were doing wheelies and things like that."

Barriers

While barriers do not fall into one specific category of Sallis and Owen's (1999) ecological framework, we explored them within all categories of the framework. Within the intrapersonal category, health problems (n=8) were the most common barrier reported. In the intrapersonal and social environment categories, time/responsibilities (n=7) was commonly reported by the women. Lastly, within the physical environment category, weather (n=7) was another common barrier stated. However, barriers such as beliefs about physical activity, lack of motivation and financial barriers were also mentioned by some of the women (see Table 5).

Health Barriers

In terms of barriers at the intrapersonal level of the ecological framework, the number one barrier stated by eight of the nine women were barriers related to health. Illness and accidents left the women unable to participate in physical activity: "Well I have physical limitations from arthritis. I would love to play tennis again. I really love to play tennis, but I can't run" (P4, 66). Similarly, P8 (67) talks about ill health as a barrier:

> I had to quit the Scottish Country dancing because I have very pronated feet and in fact my one foot is kind of deformed, it's so far over…. The Scottish Country dancing you are dancing on the balls of your feet which I found very painful and you are also doing a hop,

which was also hurting my feet. My feet bothered me after I would dance, my feet would hurt even when I walked.

P3 (63) also reported health barriers related to aging: "I've had a few problems through menopause... you just don't have the same energy to do as much... The body tells you once in a while whoa (laugh)." In addition to these examples, sore bones and muscles related to the aging process were also mentioned as barriers to being physically active.

Time/Responsibilities Barriers

In terms of the ecological framework, time barriers were prevalent in the intrapersonal category and the social environment category. The women's time barriers were due to behavioural factors (i.e., time management skills) as well as their culture and social climate i.e., being a mother and working full time. Time was the second most common barrier to physical activity, mentioned by seven of the nine women interviewed. Lack of time stemmed from work responsibilities, motherhood and competing priorities with physical activity. Many of the women stated that work, in particular traveling, and increased responsibilities at work made it harder for them to be physically active: "Right now I guess it's probably time restraints. Where I am, I am in more meetings than I have ever been in. I don't travel for work, but there's a lot more responsibility" (P6, 42). Similarly P7 (44) explains, "Time is still a factor. Work related issues trying to duck out for an hour or an hour and a half at lunch time sometimes doesn't work." P5 (65) stated, "I think it would be time and the calendar activities that would maybe interfere with physical activity and all of the other things that you have to do."

Weather Barriers

In terms of the physical environment category of the ecological framework, weather was another major barrier that was also stated by seven of the nine women. The warmer months of

the year seemed to be more of a barrier than the colder months, although the women did cite barriers in the winter months as well. Not only did the temperature outside present barriers, the general weather conditions also did i.e. thunderstorms, rain, snow, etc. The weather presented a barrier in terms of physical activity by limiting transportation or walking to their physical activities. Bad weather also caused cancellations in physical activities (i.e., hiking trips). In warmer climates, health problems were exacerbated and the women's motivation to be outside during undesirable weather decreased. In the summer time, P4 (66) said that, "I don't really like hot humid weather, so yes it does affect me when it's hot and humid…I don't even want to go outside when it's like 30-35 degrees Celsius and humid." In terms of the winter months P5 (65) said: "Yeah if I was a tiny bit by myself I might be inclined to snuggle down in bed instead of getting out (laugh), especially in the winter time". Another woman stated:

> Golf, you are not allowed to play if its' thunder and lightening and this summer I played Tuesday nights and I can tell you that for the first half of the season every Tuesday night we had a thunderstorm. We went into 2 eight-week increments and for the first 8 weeks, we only played half of our games [P6 (42)].

Less Reported Barriers

While health, time/responsibilities and weather were the most commonly reported physical activity barriers, other less reported barriers included beliefs about physical activity, lack of motivation and financial barriers. A few of the women stated that their beliefs about physical activity presented barriers. These beliefs included, not wanting to participate in physical activities in which they did not participate at a younger age because they felt they could not do them, not feeling confident, and believing that sometimes it is easier not to be physically active. For example, P1 (61) stated, "I have to be cautious, I have got to be you know. I mean I'm 61 so

I can't be doing badminton. I've never done it in my young life." In terms of lack of motivation, a few of the women also stated that not feeling motivated to be physically active presented a barrier for them. P8 (67) explained: "Sometimes I have to push myself a little bit. I just don't feel like I want to go for a walk some days." Lastly, a few of the women reported financial barriers to physical activity. These women discussed not being able to participate in some physical activities that they would like to due to financial reasons, for example, joining a gym, going downhill skiing with their family and affording a babysitter so that they could be physically active. For example, P2 (45) said, "I mean I'd love to go and ski on the weekends all of the time, but then I would have to put my son into babysitting. I can't afford that."

Strategies Employed to Overcome Barriers

What are perhaps more interesting than the barriers these women experience, are the ways in which these women cope and overcome these barriers to remain physically active. All of the women use a variety of coping strategies to deal with their barriers (see Table 5). For example, some of the strategies that are used to overcome health barriers include finding alternative physical activities that are not as hard on their bodies, wearing orthotics, strengthening muscles, and taking multivitamins. P8 (67) explained how she overcame her feet problems, "I couldn't keep with the Scottish Country dancing, it was just too painful. It spoiled the enjoyment so I had to give that up…I found another activity to replace the first."

In terms of barriers related to time and responsibilities, the women used strategies such as being flexible with their schedules, making a weekly allocation for physical activity, shortening their workouts and making a firm commitment to be as physically active as they can. For example, P9 (45) stated: "I'll tell myself that absolutely at 2:00pm I am calling it quits for whatever I am doing and I am going for a run or whatever. I'll figure it out so that I can do it."

In terms of weather, the women purchased exercise equipment for their homes, attended a gym or indoor facility and continued to walk during bad weather. For example, P1 (61) explained; "I have an exercise bike in the house in my bedroom that I use." Similarly, P6 (42) said, "If it's really cold in the morning, my husband will drop me off and I'll walk home when it's a little warmer in the afternoon."

Although barriers related to beliefs, lack of motivation and finances were discussed by fewer of the women, they still identified their coping strategies to overcome these barriers. In terms of beliefs related to physical activity, the women used positive self-talk, thought about how they would feel after being physically active and reflected on family members deteriorating health. When the women lacked motivation to be physically active, the set goals, put their exercise clothing on as soon as they got us and paid for a facility to feel more accountable and inclined to go. Lastly, in terms of lack of finances, the women participated in affordable programs, became a member at a more affordable facility and purchased affordable home equipment. The strategies that these women discussed were particularly effective in terms of helping them remain physically active despite their barriers.

While the women did discuss strategies that they used to cope with their barriers, they often had difficulty identifying their strategies. Often they did not view the strategies that they were using as strategies per se as they had been using for a long time to remain physically active and they became part of their regular routines. In addition, two of the women had difficulty identifying their barriers because they believed since they have successfully remained physically active, they do not have any barriers. For example, when the researcher asked P1 (61) about her barriers, she replied, "What is the most difficult thing about remaining active? The physical activity I am doing now, is that not enough? ... I have no reason to not be active." Similarly, P4

(66) said, "I don't have any barriers." Throughout the rest of the interview, barriers for both of these women did present themselves, however. P4 (66) later stated, "The arthritis, maybe it's a barrier. But I don't consider it a barrier as long as I can do something."

Evolution of Barriers

We also asked the women about the evolution of their physical activity barriers and how they have changed over time. In childhood, most of the women stated that they did not have any barriers that prevented them from being physically active. However, some of the women did talk about their parents' inability to register them in organized sport and not being able to attend certain sports facilities for financial reasons. For example, P9 (45) said, "I didn't do a lot of those expensive kinds of sports, although I probably didn't know any better, like we weren't skiing and we weren't doing dance lessons because we couldn't really afford it." In adolescence, the same barriers that were mentioned in childhood were stated by the women.

In early adulthood, time became a major barrier for seven of the nine women. At this point, the women had less time to be physically active because they were attending university and/or working full time and had more responsibilities. P5 (65) stated:

> My work had changed at this point and I was traveling an enormous amount so I guess actually that would be a barrier in the sense it was using up an enormous amount of time and I didn't have the opportunity to exercise when I was teaching.

Similarly P2 (45) stated, "I went to Winnipeg to intern, that was a hard year, just a lot of work, so I wasn't very physically active." In adulthood (motherhood), time was still a major barrier, as well as increased responsibilities and health for some of the women while they were pregnant. For example, P9 (45) stated:

> When I got pregnant, I thought oh great, I'll take an aqua fitness class. That did not pan itself out, so I wasn't able to. I had a difficult pregnancy, so I was on bed rest most of my pregnancy. That laid me up for that period of time.

Many of the women talked about having less time due to care giving responsibilities, which made it hard to be physically active. For example, P1 (62) said, "Physical activity was furthest from my mind. You had to go to work, come back and look after kids and that kept me busy, so physical activity didn't come into play." For the women over 60 years old, during middle adulthood, time was still considered a barrier, as well as health problems, which made it more difficult for them to be physically active. However, many of these women commented that they had fewer barriers at this time than when they were younger (Table 3).

An advantage of using the ecological framework, is that it hypothesizes that the levels of the framework interact with each other. We asked all of the women how they see the four factors interacting with each other using a worksheet provided (see Table 6). Unfortunately, all of the women were unable to explain this interaction. This does not mean that there is not an interaction between levels, however, the women were unable to see relationships between these factors, other than by stating that they all helped them remain physically active. The women also seemed to rank the factors, instead of explaining the relationship.

DISCUSSION

The overall purpose of this study was to better understand physical activity maintenance in middle aged and older women. Specifically, the role of motivation, social support, the physical environment, and barriers to physical activity maintenance were examined. The secondary purpose was to examine the evolution of the four factors throughout the lifespan in relation to physical activity.

Within the intrapersonal category of the ecological model (Sallis & Owen, 1999) motivation was explored using self-determination theory (Deci & Ryan, 2002). In the current study, we discovered that the women were both autonomously motivated and non-autonomously motivated to be physically active in middle to late adulthood. However, all of the women were mainly autonomously motivated. When asked what their current main motive was to be physically active, all of the women provided an autonomous reason. This is in line with the findings of Ingledew, Markland and Medley (1998), Ingledew, Markland and Sheppard (2004), Landry and Solmon (2004), and Mullan and Markland (1997) who discovered that women as well as men who are in the maintenance phase of physical activity are more self-determined than women in the early stages of change.

In the present study, the most common autonomous motive stated by most of the women was health reasons. In terms of the literature on women's participation motivation, improving current health is a main motivator (Anderson, 2003; Davis et al., 1995; Kluge, 2002; Poole, 2001). In addition, Cousins (2001) and Kluge (2002) discovered that the women in their study participated in physical activity to stay healthier longer and prevent the onset of diseases. In terms of practical applications, it would be important to educate sedentary women about the health benefits of physical activity. This could be done by physicians, as our results indicated that many of the women appreciated the informational social support they received from the physicians.

Many of the women also stated that the positive feelings associated with physical activity motivated them. This is in line with past research (Kluge, 2002; Poole, 2001; Titze, Stronegger, & Owen, 2005). In a study by Stone and Klein (2004), it was stated that the most surprising result was the importance of feelings associated with physical activity as a motivator. In terms of

a practical application of this for personal trainers, physical activity counselors, health care providers or physical activity participants themselves, it would be important to encourage women to participate in physical activities that make them feel good and that they enjoy. In fact, the women in the current study stated that they are motivated to be physically activity because they find it fun/enjoyable. It appears as though maintainers who choose physical activities they enjoy are able to continue to be physically active on a long term basis. This is in line with self-determination theory, specifically intrinsic motivation (Deci & Ryan, 2002). Kluge (2002), Titze et al. (2005) and Wilson and Rogers (2004) also reported that fun and enjoyment were important physical activity motivators for the participants.

When the women discussed the positive feelings they associate with physical activity, it was interesting that many of them shared feelings about the way they physically and emotionally felt during and after physical activity. These positive feelings fall into two particular types of intrinsic motivation detailed by Vallerand and Rousseau (2001), namely intrinsic motivation to accomplish and intrinsic motivation to experience stimulation. Breaking down intrinsic motivation into specific categories: intrinsic motivation to know, to accomplish and to experience stimulation is helpful when exploring physical activity maintenance. This allows us to go further than recognizing that the women are intrinsically motivated, by helping us understand the specific reasons behind their intrinsic motivation. In support of Vallerand and colleagues' (1989, 1992, 1993) subcategories of intrinsic motivation, it might be helpful to add them to self-determination theory. The implication of the women sharing feelings about the way they felt during physical activity is that it would be important to provide interventions that will help people explore how they want to feel and design their life and activities based on this. One

example of such an intervention/consulting approach is resonance (Newburg, Kimiecik, Durand-Bush, & Doell, 2002).

The women in the present study were also non-autonomously motivated to be physically active, however, to a lesser degree than they were autonomously motivated. The number one non-autonomous motive to be physically active stated by the women was to socialize, which is in accord with other studies (Markland & Hardy, 1993; Poole, 2001; Wen et al., 2002). Women were also non-autonomously motivated to be physically active because of internal and external pressures. These women wanted to prove to themselves and to others that they can be physically active or as active as others. This has also been found in the impression management literature reviewed by Hausenblas, Brewer and Raalte (2004) and Martin Ginnis and Leary (2004). Some of the women in the current study stated that wanting to lose weight and improve appearance were physical activity motives. This is in line with physical activity participation motivation research done by Anderson (2003), Cousins (2001), Hausenblas et al. (2004), Kluge (2002), and Stone and Klein (2004). Interestingly, a practical application cited by Culos-Reed, Brawley, Martin, and Leary (2002) was that women who are motivated to be physically active for reasons of self-presentation should be educated by health practitioners about the relationship between self-presentation motives and health benefits. For example, a woman who is physically active to lose weight should be educated about the other benefits she is receiving by remaining physically active, such as; decreased chance of heart disease, osteoporosis, colon cancer, etc. It is interesting that even women, whose main motivation is autonomous in nature, are still motivated for non-autonomous reasons. What is practical about self-determination theory is that it presents a continuum that is dynamic and allows for someone to be intrinsically motivated in one area of physical activity, but extrinsically motivated in another. For example, a woman might be

intrinsically motivated to run because she loves the way she feels when she does it, however, she is motivated to do an aerobics class to lose weight.

In terms of the evolution of motivation, the women were autonomously motivated in childhood and as they grew up, both autonomous and non-autonomous reasons, specifically non-autonomous, seem to emerge at the stage of adolescence. However, autonomous motives were the main motive stated by the women as they aged. A few possible explanations for the women to be autonomously motivated in older adulthood could have been because they had more freedom, less responsibilities, they become more in tune with how they felt, and because they had more time. According to body image literature across the life span there is a strong negative correlation between age (starting at 20 years old) and appearance anxiety (Tiggemann & Lynch, 2001). This could partially explain these results since as the women aged, they seemed to be more autonomously motivated. It would be interesting to quantitatively and qualitatively examine the association between appearance anxiety and physical activity motivation over time. In the present study, we discovered that the women were more intrinsically motivated when they were children than when they reached adolescence. This finding indicates that it would be important to foster intrinsic motivation during and after adolescence to increase autonomous motivation. This could be done by encouraging people to participate in physical activities that they enjoy or by providing people with a choice of physical activities.

A lot of interesting information emerged from the life histories in this study, however, some of the older women had problems remembering various events and details in their lives when they were younger. Perhaps using some of the recall tools that were not tested/used in the pilot study would have improved the information gathered. In terms of practical implications, by understanding the evolution of motivation, we can tailor interventions aimed at particular life

stages where women are less physically active/motivated to increase their participation. Evenson, Wilcox, Brunner, King, and McTiernman (2002) and Friedenreich, Courneya, & Bryant (1998) stated that retrospective studies on physical activity patterns over the lifespan can be useful in understanding physical activity behaviours later in life.

In addition to motivation, all of the women stated that social support of their physical activities was important for them to remain physically active. This is in line with the research of Ståhl, Rütten, Nutbeam, Bauman, Kannas, Abel et al. (2001) who discovered that social support specific to physical activity is important. In the current study, the most common groups of people from whom women received social support specific to physical activity were from their families, friends, physicians and participants in their community programs. In terms of social support, Booth et al. (2000), Eyler et al. (1998) and Kluge (2002) found family to be an important source of social support, specific to physical activity. Booth et al. (2000), Eyler et al. (1998), Poole (2001) and Trost et al. (2002) stated that friends are another important social support provider. Physicians (Glasgow et al., 2001; Poole, 2001) and participants in community programs (Hardcastle & Taylor, 2005) were also found in some studies to provide social support.

In the current study, family and friends provided both encouragement (Booth et al., 2000; Glasgow, Eakin, Fisher, Bacak, & Brownson, 2001) and companionship support (Ball et al., 2001; Booth et al., 2000). Physicians encouraged the women to be physically active, however, the most common type of social support they provided was informational support. This is in line with research by Eyler et al. (1999) and Glasgow et al. (2001). Similar to the findings from Hardcastle and Taylor (2005), the current study also found that other women in the participants' community programs also provided encouragement and companionship support, similar to family and friends.

A practical implication of the current findings is that physicians should provide social support to their patients in terms of physical activity as many of the women identified their physicians as someone who provides them with social support. Physicians have the opportunity to inform and encourage their patients about the advantages and importance of physical activity (Elley, Kerse, Arroll, & Robinson, 2003; Petrella & Lattanzio, 2002). Interventions in which physicians provided physical activity counseling have been shown to be effective in terms of increasing physical activity (Calfas, Long, Sallis, Wooten, Pratt, & Patrick, 1996). Petrella and Lattanzio (2002) reported that interventions that included written materials for patients, considered behavioural change strategies, and provided training and materials for physicians were effective in increasing physical activity levels. In addition, friends and family should also be encouraged to provide support in terms of physical activity by being a companion and encouraging physical activity behaviours.

Exploring in depth the evolution of women's social support, while considering both the type of social support and who provides it is an interesting area of future research in order for us to learn how to effectively provide social support to increase/encourage physical activity behaviours. To date, little research has explored qualitatively the role that social support has had on women growing up and its effects later in life. Quantitative or mixed methodology would also be insightful, however, qualitative findings would be able to reveal more in depth information on how this social support increases physical activity.

In terms of the physical environments of the women, all of them were generally satisfied with their neighbourhoods, which helped them to remain physically active. This is corroborated by Booth et al's. (2000), and Rütten and Abur-Omar's (2004) research. Elements of the physical environment that the women found helpful in terms of remaining active included: having access

to facilities, which is supported by Booth et al. (2000), Elyer et al. (1998), Giles-Corti and Donovan (2002), Humpel et al. (2002), Owen, Humpel, Leslie, Bauman, and Sallis (2004), Sallis et al. (1998) and Trost et al. (2002). In addition to have accessible facilities, the women discussed have a safe neighbourhood as important (Humpel et al., 2002 ; Owen et al., 2004 ; Trost et al., 2002). Have a good walking area was also mentioned. This is in line with the research done by Eyler et al. (1998) Humpel et al. (2002) and Owen et al. (2004). Lastly, the women stated that having enjoyable scenery helps them remain physically active. This is corroborated by Ball et al's. (2001); Eyler et al's. (1998), Humpel et al's. (2002), Kluge's (2002), Kowal and Fortier's (2005), Owen et al's. (2004), Sallis et al's. (1998) and Trost et al's. (2002) research.

However, the women, while satisfied with their physical environments, still had changes that they would like to see made to their neighbourhood in order to improve their experience with physical activity. These changes included more bike paths, a pool, a decrease in speed limit, improved roads, more tress, less hills, and more green space. More studies need to examine the changes that individuals would like to make to their neighbourhood. These changes could then be incorporated into urban planning to increase physical activity levels (Owen et al., 2004). There is also a need for public consultation in urban planning in order to create living areas that are conducive to physical activity. Craig et al. (2002) stated that in order to produce desirable physical environments for physical activity, it is essential that a multidisciplinary collaboration occur between urban planners, public health practitioners and transportation researchers. Some recent studies have started to explore this collaboration in order to increase physical activity in the physical environment, which have held particular promise (Saelens, Sallis, & Frank, 2003; Sallis, Frank, Saelens, & Kraft, 2004).

Lastly, while all of the women maintained physical activity, they still encountered barriers that presented obstacles in terms of remaining active. The most common physical activity barrier was health (Booth et al., 2002; Eyler et al., 1998; Kowal & Fortier, 2005; Taylor et al., 2005; Trost et al., 2002). A possible explanation for this being the number one stated barrier could be due to the age of the women in the study. Most of these health barriers were related to the aging process in women, for example, menopause, arthritis, sore joints (Booth, Bauman, & Owen, 2002; Eyler et al., 1998). Since time/responsibilities was another common barrier, it would be useful for these women to learn time management strategies in order to help them overcome it (Kowal & Fortier, 2005; Scharff, Homan, Kreuter, & Brennan, 1999; Stone, & Klein, 2004). Canada has both a distinct winter and summer climate, and the women stated that the weather during these two seasons presented barriers. This is supported in the literature by Salmon, Owen, Crawford, Bauman, & Sallis (2003), Scharff et al. (1999), Lim & Taylor (2005) and Trost et al. (2002).

What is interesting and innovative in this study is that we explored the coping strategies that the women used to overcome their barriers. We discovered that all of the women used coping strategies. These were very barrier specific (see Table 5). For example, for health barriers, the women used a multitude of coping strategies including finding alternatives to physical activities that are not as hard on their bodies, wearing orthotics, and strengthening muscles. In terms of time and responsibilities, the women were flexible with their schedules, made weekly allocation for physical activities and made a firm commitment to be physically active. When weather was a barrier, the women purchased home exercise equipment, attended an indoor facility and continued to walk even when the weather was poor. The women who experienced financial barriers, attended affordable physical activity programs and facilities and

purchased affordable home equipment. Some of the strategies that the women in the current study discussed have been incorporated into intervention programs for women. For example in a study by Segar, Jayaratne, Hanlon and Richardson (2002), an intervention was designed specifically for women, which paid particular attention to the barriers that women commonly experience. This intervention emphasized the importance of making time for physical activity and involved learning time management strategies in order to remain physically active.

The women in the current study also seemed to be good problem solvers and able to easily adapt to obstacles related to physical activity. While some studies have explored coping strategies women use when they encounter barriers (Cousins, 2003; Hardcastle & Taylor, 2001, 2005; Kluge, 2002; Stone & Klein, 2004), more research needs to explore the strategies that middle and older aged women use. By understanding the strategies that successful physically active women use, this information can be incorporated into future interventions to help sedentary women be more effective at overcoming their physical activity barriers. A practical implication of the present study is that it provides effective coping strategies for physical activity barriers that middle or older aged women may encounter.

Limitations exist within this present study. Firstly, the women had a relatively high socio-economic status, were Caucasian, and well-educated, therefore the findings have limited generalizability. In addition, interviewing nine women also limits the generalizability because it is not a large representative sample of middle aged and older women. Building rapport with the participants was also difficult because we only met with each woman once. This may have resulted in less rich dialogue between the researcher and participant. For example, if multiple interviews were conducted, the participants might have felt more comfortable and confident in

revealing information that they might not have felt comfortable discussing in the first interview, particularly information related to feelings.

Social desirability was another potential limitation. Participants may have provided answers during the interview that they believed the interviewer wanted to hear or that placed the participant in a positive light. The life history approach of the interview also had limitations because the accuracy of the information relied on how well the participants could recall past life events. Important life events and physical activity experiences may have been forgotten. We did use a few different methods to prevent this, such as recall calendars (Friedenreich et al., 1998), and personal photographs, however during the pilot interviews, these methods did not seem very effective. The photographs did not work well as the women were unable to find appropriate photographs i.e., being physically active, or they had many from one time period and none of another. In terms of the recall calendar, the women found the calendar overwhelming and found it hard to focus on one time period at a time. While an advantage of the ecological framework is that it allows for a combination of variables at each level to be assessed, we selected to focus on only one factor at each level due to time constraints and scope of a Master's thesis.

Another limitation of the current study is that we were unable to determine how the categories within the ecological framework interacted. While, the ecological framework does hypothesize an interaction between categories, the women in the current study were unable to explain this. It would be interesting for future research to explore the interaction that exists between categories and find different ways to help individuals identify these interactions.

In terms of the CHAMPS physical activity questionnaire, the women's caloric expenditures might have been inflated due to social desirability because the questionnaire is self-reported. The caloric expenditure might have also been inflated because the women in the

current study maintain physical activity. More specifically, the MET scores that are used to calculate caloric expenditure are adjusted according to the age of the population, and perhaps for physically active older adults, this measure produces inflated scores. Future research should use an objective measure to attain more accurate caloric expenditures. In addition, the CHAMPS questionnaire also includes many household activities that may have also inflated the caloric expenditures.

In terms of future research that has not been previously mentioned, examining how middle aged and older women's experiences with physical activity differ between cultures would be an interesting area to explore (Kluge, 2002). This would be interesting to look at as the participants in the current study had limited cultural differences. Conducting a similar study as the present one, but with middle and older aged men would also contribute to the current physical activity literature because few qualitative studies have explored physical activity maintenance in healthy middle aged and older men. Comparing perceptions about physical activity between women who are recreationally active and those who are physically active through activities of daily living could also provide insight into different types of physical activity maintainers. It would be interesting to know how their physical activity behaviours differ. This information could be included in future interventions to specifically target different types of physical activity in which participants are participating.

While the current study was able to uncover the women's participation motivation, their goal motives were not explored. Goal motives can be defined as the "what" of individuals' motivation (Ryan & Deci, 2000). More specifically, goal motives are the reasons why the goal is important. The women's goal motives would have been interesting to explore because according to self-determination theory, while their reasons for participating may have been autonomous,

their goal motivation could have been autonomous or non-autonomous. By understanding their goal motivation, the women's overall motivation and well-being could have been more clearly understood. For example, Schmuck, Kasser and Ryan (2000), Sheldon, Ryan, Deci and Kasser (2004) and Vansteenkiste, Simons, Lens, Sheldon and Deci (2004), all discovered that when the goal motive was intrinsic in nature, the participants experienced increased psychological well-being. In terms of future research, it would be interesting to explore participation motivation and goal motivation surrounding physical activity since it has been shown to increase psychological well-being (Piko, 2000).

In terms of methodology, future research exploring physical activity over the lifespan could involve interviewing a family member or close friend in addition to the participant, which could be used to triangulate the information. While other factors of physical activity maintenance would have been interesting to explore, we selected to focus on motivation, social support, physical environment, and barriers. Perhaps future research could extend the factors explored to gain a broader understanding of all of the factors that have an effect on middle and older aged women's physical activity behaviours.

Lastly, a study that would be interesting to conduct would be an intervention study designed around the findings of the current study. While the women in the current study were maintaining physical activity, it would be interesting to design an intervention aimed at middle aged and older women who are in the first few months of the adoption phase of physical activity. The practical suggestions made in the present discussion could be integrated into an intervention to help these women move from the adoption to the maintenance phase of physical activity. In a review by Kahn, Ramsey, Brownson, Heath, Howze, Powell et al. (2002), it was stated that there is strong evidence that supports individually adapted interventions to increase levels of physical

activity. Therefore the women would be interviewed prior to the intervention to tailor the intervention to each woman's motivation, social support, barriers and physical environment. Accordingly, to test this intervention, a multiple single subject design would be appropriate because it addresses individual differences (Thomas & Nelson, 2001).

In conclusion, the current study revealed that even though the women are maintaining physical activity, they still encounter barriers. However, the women were good problem solvers and able to develop effective coping strategies to help overcome their barriers. In addition, while we did explore the women's physical activity maintenance using an ecological framework, the women were unable to describe the interaction with the categories of the framework. Lastly, all of the women provided an autonomous reason as their main physical activity motive.

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Table 1

Socio-demographic Information of Participants

Code	Age	Marital	Ethnic Status	Education Background	Occupation	Socio-Economic Status (Household Income)	Mother
P1(61)	61	Widowed	Asian	Secondary School	Retired	$0-14,999	Y
P2(45)	45	Married	Caucasian	University Undergraduate	Mother	$60,000-74,999	Y
P3(63)	63	Married	Caucasian	University Undergraduate	Retired	$45,000-59,999	Y
P4(66)	66	Separated/ Divorced	Caucasian	University Graduate	Retired	$45,000-59,999	Y
P5(65)	65	Married	Caucasian	University Undergraduate	Artist	$75,000+	Y
P6(42)	42	Married	Caucasian	Secondary School	Bank Employee	$75,000+	N
P7(44)	44	Married	Caucasian	University Undergraduate	Ministry of Transportation	$75,000+	Y
P8(67)	67	Married	Caucasian	University Undergraduate	Retired	$45,000-59,999	Y
P9(45)	45	Married	Caucasian	University Undergraduate	Canadian Nurses Association, Graduate Student	$60,000-74,999	Y

Table 2

K/cal Expenditures

Participants	Time 1 **(Oct, 2001)** (kcal/week)	Time 2 **(May, 2002)** (kcal/week)	Time 3 **(Present Study, Oct 2004)** (kcal/week)	Time 3 (Main physical activities)
1	2688.1	1694.3	2139.3	aqua fitness, resistance training in home
2	3072.4	2691.0	2428.4	rollerblading, aerobics
3	3305.6	6151.5	9787.4	walking, cycling
4	2679.1	3846.7	8074.0	aqua fitness, walking
5	2680.7	3254.0	3612.7	walking, resistance training in home
6	3619.6	3316.1	2954.5	curling, golfing
7	2774.6	3818.2	3854.4	volleyball, resistance training in home
8	2630.8	2012.3	6273.0	dancing, walking
9	2691.3	4790.3	4440.9	running, aerobics

Table 3

Evolution of Four Factors

	Childhood	Adolescence	Early Adulthood	Adulthood	Late Adulthood
Motivation	autonomous	autonomous, non-autonomous (+)	autonomous, non-autonomous	autonomous, non-autonomous (+)	autonomous
Social Support	Parents, siblings, friends	Parents, siblings, friends	Husbands, friends, co-workers	Husbands (+), friends, co-workers	Husbands, friends
Physical Environment	Women didn't differentiate between time periods. They were satisfied and active in their neighbourhoods over the life span				
Barriers	Few, parents inability to support them	Few, parents inability to support them	Time (+), responsibilities	Time (+), health (pregnant)	Time (-), health

Table 4

Summary Factor Table

Factors	Key concepts
Motivation	
• Autonomous	improve current health, stay healthier longer, prevent onset of diseases, feelings associated with physical activity, fun, enjoyment
• Non-Autonomous	socialize, pressure put on themselves and by others, wanting to prove themselves, lose weight, improve appearance
Social Support	
• Provided by	family, friends, physicians, community programs
• Type of Support	informational, encouragement, companionship support
Physical Environment	
• Helpful	access to facilities, safe, good walking area, enjoyable scenery
• Changes	more bike paths, a pool, decreased speed limit, improve roads, more trees, less hills stop development of green space
Barriers	health problems, time, weather
• Strategies to overcome	finding alternative physical activities that are not as hard on the body, wearing orthotics, taking a multivitamin, strengthening muscles, flexible with schedule, shortening workouts, make a commitment, purchase home equipment, attend an indoor facility, walk

Table 5

Barriers and Overcoming Barriers

Barrier	Coping Strategy
Health	finding alternative physical activities that are not as hard on their bodies, wearing orthotics, strengthening muscles and taking multivitamins
Time/Responsibilities	being flexible with their schedules, making weekly allocation for physical activity, shortening their workouts, making a firm commitment to be as physically active as they can
Weather	purchased exercise equipment for their homes, attended a gym or indoor facility, continued to walk during bad weather
Beliefs*	self-talk, think about mothers ill health, think about how they will feel after being physically active
Financial*	participate in affordable programs, become a member at a more affordable facility, purchased home equipment
Lack of Motivation*	step onto scale to see their weight, pay for a facility to feel more accountable and inclined to go, put exercise clothing on as soon as they get up, set goals, think about how they will feel after

*These barriers and coping strategies were identified by less than three out of nine women.

Table 6

Relationship between factors: Worksheet for participants

Motivation

Social Support

Neighbourhood

Barriers

CHAPTER V

FUTURE CONSIDERATIONS FOR PHYSICAL ACTIVITY INTERVENTIONS

Based on the current findings, this section presents future considerations for researchers and practitioners developing interventions for middle and older aged women who intend on becoming physically active. Indeed this is a key group to target as only 15% are meeting physical activity recommendations (Canadian Fitness and Lifestyle Institute, 2002). Women at this age are also at an increased risk for the onset of a variety of different diseases (Amonkar & Mody, 2002; Merrill & Weed, 2001; Tremollieres et al., 1999).

While the literature on physical activity intervention is extensive, relatively few interventions target women and their specific physical activity barriers (Scharff et al., 2002). In a review by Conn, Minor, Burks, Rantz and Pomeroy (2003), physical activity interventions have been shown to be effective to increase physical activity levels in aging adults, however, they stated that new interventions are needed as gaps still exist in the literature. They also stated that multilevel interventions, focusing on the personal, social, and community levels of physical activity have not yet been designed for older adults. Given that many experts (Fisher, Li, Michael, Cleveland, 2004; King, Stokols, Talen, Brassington, & Killingsworth, 2002; Sallis, 2003; Sallis and Owen, 2002; Spence and Lee, 2003) are recommending a multilevel approach to facilitate behaviour change, this would appear to be an important avenue. Hence the following recommendations are presented within the context of Sallis and Owen's (1999) ecological framework and are based on findings presented in the current study.

Within the intrapersonal category of the ecological framework, all of the women in the current study cited health as their main motive for engaging in physical activity. All of the women also stated that they enjoy the physical activities in which they participate. Physical

activity interventions should therefore facilitate autonomous motivations by focusing on physical activities that the participant finds intrinsically enjoyable to promote continued participation (Kowal & Fortier, 2005; Stone & Klein, 2004). We explored motivation using self determination theory (Deci & Ryan, 2002). Interventions based on self-determination theory hold particular promise in terms of promoting adherence to physical activity because they address initiation and maintenance (Landry & Solmon, 2002). Self-determination theory has also been successfully used in interventions outside of physical activity. For example, Williams (2002) found self-determination theory effective for smoking cessation interventions.

Deci and Ryan (2002) state that individuals are motivated by three psychological needs: autonomy, competence, and relatedness to others. As individuals experience these psychological needs, the more autonomously motivated they will be. Since autonomy is increased when individuals believe that they are in control of their behaviours (Deci & Ryan, 2002), it would be important for future interventions to provide participants with the opportunity to choose the types of physical activities they will be doing.

In terms of competence, future interventions should provide feedback and positive reinforcement to participants about their progress to encourage perceived competence (Landry & Solmon, 2002). Helping participants set and achieve realistic goals is another way that future interventions could increase competence in terms of physical activity. In the current study, the women discussed the importance of having significant others, as well as members of the community encouraging them and providing companionship to them for continuing to remain physically active. Future interventions should encourage women who seek companionship to be physically active with others to increase their feelings of belonging and being cared for by others.

Aside from psychological needs, most of the women in the current study stated that they were motivated to be physically active because they understood the health benefits. Therefore, future interventions should educate participants about the benefits of physical activity if they do not understand them initially. In a review by van der Bij, Laurant and Wensing (2002), all interventions that included an educational component showed positive increases in physical activity levels. In addition it was stated that education is an essential component to promote the development of positive beliefs and perceptions of physical activity (van der Bij et al., 2002).

Within the social environmental category of the ecological framework, we found that encouragement and companionship from family and friends is important in terms of physical activity. Therefore, future interventions should encourage social support specifically for physical activity from salient others by having them participate in physical activities with them. In addition, future interventions could educate significant others about the importance of physical activity and their encouragement. Eyler et al. (1999) stated that physical activity interventions that promote increased encouragement are important in terms of behaviour change. We also found that the dissemination of information about physical activity from physicians was also important. Accordingly, it is important that future interventions encourage physicians and primary health care practitioners to provide information to their patients about the importance of physical activity and refer them to people who can help get them started i.e., personal trainers.

Indeed, physical activity promotion in the primary care setting can be effective in terms of increasing physical activity in middle aged and older adults who intend on becoming more physically active (Goldstein, Pinto, Marcus, Lynn, Jette, & Rakowski, et al., 1999). In addition to physicians, an effective way to promote and educate individuals about the importance of physical activity is through physical activity counselors. In a review by Eakin, Glasgow and

Riley (2000), it was reported that physical activity counselors in the primary care setting are effective and recommended. Similar findings were described in a review by Elford, MacMillan and Wathen (2001). Presently, a physical activity counselor trial is testing the impact of the addition of a physical activity counselor to the primary health care team (Fortier, Hogg, O'Sullivan, Sigal, Blanchard, Doucet, et al., 2004).

In the current study, we discovered that middle aged and older women received social support from participants in their community centers in addition to family and friends. Future interventions could encourage middle aged and older women to join a community center for those who do not have other social support. In a review by King, Rejeski and Buchner (1998), it was discovered that community programs can be an effective way for older adults to receive social support specific to physical activity. Similarly, in a review by Kahn, Ramsey, Brownson, Heath, Howze, Powell, et al. (2002), they stated that interventions in community settings are effective at increasing physical activity levels. These community interventions can provide supportive relationships by encouraging participants to "buddy" up with other community members to provide companionship support, as well as by creating new social networks in a social setting outside of the family. When designing physical activity interventions for middle aged and older women, it is important that social support from family, friends and primary care practitioners be incorporated.

Within the physical environment category of the ecological framework, it was revealed that the women's physical environment preference for physical activity was in a safe, accessible, and aesthetically pleasing environment. Kowal and Fortier (2005) stated that future interventions should encourage middle and older aged women to be physically active in an aesthetically pleasing environment to enhance their enjoyment. In addition, future interventions should

encourage urban planners, public health professionals and transportation researchers to collaborate with the public to determine environmental preferences for promoting physical activity (Craig, Brownson, Cragg, & Dunn, 2002; Dunn & Blair, 2002; King et al., 2002; Sallis, Frank, Saelens, & Kraft, 2004).

Lastly, in terms of the influence of the physical environment on physical activity behaviour, the current study discovered the importance of having facilities in close proximity to the home. Therefore, future interventions should educate participants about the facilities that are available in their physical environments. This could be done by having participants mapping out facilities in their community, followed by educating the individuals about the other facilities in their area. In a review by Humpel et al. (2002), they suggested that accessible facilities increase physical activity participation. Similarly, in a review by Kahn et al. (2002), it was stated that increasing access to facilities to be physically active combined with informing participants about the facilities, increased physical activity levels.

Although barriers are not outlined in Sallis and Owen's (1999) ecological model, we explored physical activity barriers within each category of the framework. According to the current study, the main barriers that effect middle aged and older women include; health, time/responsibilities, and weather. Future interventions should tailor interventions to address physical activity barriers in the target population. For example, in a study by Segar et al. (2002), it was discovered that physical activity interventions were more effective when they are tailored to the needs and interests of the participants.

In the current study, the women engaged in alternative indoor activities when outside conditions precluded participation (or dampened enthusiasm). Educating participants about

indoor activities as an alternative during increment weather is another important element that should be incorporated into future interventions.

In the current study, the women were able to develop effective coping strategies to overcome their barriers. For example, when time was a barrier, the women were flexible with their schedules i.e., were physically active at different times during the day that they were less busy, made weekly allocation for physical activity and shortened their workouts. Scharff et al. (1999) stated that interventions should highlight and show individuals how physical activity can easily be incorporated into women's daily lives. Kowal and Fortier (2005) also stated that future interventions should teach women time management strategies to decrease physical activity barriers. While many studies have explored coping strategies that women use when they encounter barriers (Cousins, 2003; Hardcastle & Taylor, 2005; Kluge 2002), it is important that future interventions use this information to educate participants about effective methods to overcome each relevant physical activity barrier. In an intervention specific to women, Segar et al. (2002) discovered that helping them develop coping strategies for physical activity barriers increased their physical activity participation during and even after the intervention ended. Studies that examine physical activity behaviours of maintainers can be very useful in terms of providing information that can be incorporated into future physical activity interventions.

Lastly, offering affordable physical activity programs across community centers for older adults with physical impairments is another intervention that could help increase or maintain physical activity. However, when designing interventions, the most important thing is the empower people to design their own life, identify obstacles and be creative in finding solutions to solve them. It has to come from them, if not, chances that they will own the process, maintain behaviour and be accountable for their actions are limited.

In conclusion, while the current study did not uncover any interaction between the categories of the ecological framework, we did uncover how the four factors, namely; motivation, social support, the physical environment and barriers have an effect of the women's physical activity maintenance. In terms of the women's current physical activity experiences, all of the women provided an autonomous reason as their primary motive. The women also stated that having social support specific to physical activity is essential. In addition, feeling safe, having accessible facilities and enjoyable scenery in the women's neighbourhood were also helpful for the women in terms of remaining physically active. Lastly, in terms of barriers, all of the women experienced physical activity barriers, however they were all able to develop effective coping strategies to overcome these barriers.

In terms of the life history section, it appears as though all of the women followed particular trends within each of the factors. For example, in terms of motivation, the women were autonomously motivated in childhood. In adolescence, early adulthood, and adulthood the women were both non-autonomously motivated and autonomously motivated, however in both adolescence and adulthood they were more non-autonomously motivated. Lastly, in late adulthood they were autonomously motivated. By exploring physical activity maintenance in middle aged and older women, we can reveal how these women remain physically active and apply this knowledge to less active individuals.

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APPENDIX A

Ecological Framework (Sallis & Owen, 1999)

Intrapersonal Factors	**Social Environmental Factors**	**Natural Environment (Physical Environment Factors)**	**Constructed Environment (Physical Environment Factors)**
Demographics	Supportive Behaviours	Weather	Information environment
Biological	Social Climate	Geography	Urban/suburban environment
Cognitive/affective	Culture		Architectural environment
Behavioural	Policies governing incentives for activity/inactivity		Transportation environment
	Policies governing resources and infrastructures related to activity/inactivity		Entertainment infrastructure
			Recreation infrastructure

APPENDIX B

The Self-Determination Continuum (Deci & Ryan, 2002)

Type of Motivation

Amotivation	Extrinsic Motivation				Intrinsic Motivation
Type of Regulation					
Non-regulation	External	Introjected	Identified	Integrated	Intrinsic
Quality of Behaviour					
Non-Autonomous	Non-Autonomous		Autonomous		Autonomous
Non self-determined					Self-determined

APPENDIX C

K/cal Expenditures

Participants	Time 1 **(Oct, 2001)** (kcal/week)	Time 2 **(May, 2002)** (kcal/week)	Time 3 **(Present Study, Oct 2004)** (kcal/week)	Time 3 (Main physical activities)
1	2688.1	1694.3	2139.3	aqua fitness, resistance training in home
2	3072.4	2691.0	2428.4	rollerblading, aerobics
3	3305.6	6151.5	9787.4	walking, cycling
4	2679.1	3846.7	8074.0	aqua fitness, walking
5	2680.7	3254.0	3612.7	walking, resistance training in home
6	3619.6	3316.1	2954.5	curling, golfing
7	2774.6	3818.2	3854.4	volleyball, resistance training in home
8	2630.8	2012.3	6273.0	dancing, walking
9	2691.3	4790.3	4440.9	running, aerobics

APPENDIX D

Interview Guide

Part 1- Life History

1. Can you tell me what physical activity means to you?
2. Can you tell me what sorts of physical activities you were doing at each of these stages in your life and if applicable, how has your level of physical activity changed? (From childhood, to adolescence, to early adulthood, (to motherhood), to now in middle or older adulthood?)

Probes (These will only be asked if they do not come out at each stage of the life stages)

Motivation

1. What were your main motives for being physically active at this point in your life?

Social Support

1. Who were your closest significant others at this time?

2. Were these people physically active? Did they encourage you to be physically active? If yes, how? If not, how did this effect or impact your physical activity?

Probe: Who was the most influential person at this point in your life in terms of physical activity? How were they influential?

Physical Environment

1. Did your neighbourhood have an impact or effect on your physical activity? If so, how?

Barriers

1. Were there things at this point in your life that prevented you from being physically active?

2. Did you use any strategies to remain physically active? If so, what were they?

Part 2- Current Physical Activity Experiences

We will be administering CHAMPS first (See Appendix E).

Motivation-

1. Why do you do physical activity presently? What are your main motives for being physically active at this point in your life?
2. Are you more motivated to be physically active when you are alone or when you are with others? Why?
3. Have there been times over the past few weeks that it has been hard to motivate yourself?
4. Can you give me an example of a time lately when it was hard to motivate yourself?
5. If you needed to motivate yourself to be physically active, what did you do or tell yourself? Did you use a specific strategy? If yes, what as it and how did you find this effective?
6. What do you usually do or tell yourself when your motivation is low?
7. Has your motivation levels changed over the last 6 months? If so, how has it?
8. What types of physical activities do you enjoy the most?
9. What is it that you enjoy about these physical activities?

Social Support-

1. What are the physical activity levels of the people that surround you, such as co-workers, family and friends? Does this influence your physical activity? How?
2. Who is the one person who is the most influential in your life in terms of physical activity?
3. How do they influence you to be physically active or inactive?

   Probe- Are they physically active themselves? How does this affect you?

   Do you do physical activity together? How does this affect you?
4. Do you have support from your family and friends in terms of physical activity? If not, how has a change or lack of support affected your physical activity level?
5. Is having support from your family and friends essential for you to be active?
6. Do you think you would be active if you didn't have the support you do now?
7. Does your doctor or nurse provide you with any support in terms of physical activity? If so, how, and is it helpful? If not, do you think that this would be of benefit to you?
8. What kind of information would be helpful for your doctor or nurse to provide you with in order to help you remain physically active?

Physical Environment- First, I will define what a neighbourhood is.

1. Do you think that your neighbourhood has an affect on your physical activity level?
2. Do you have facilities that are close to your house for you to use? For example, a gym, pool, park, walking trails, arena, tennis courts, track, beach, basketball courts, etc. What types of facilities do you have? If so, do you use them?

3. What elements of your neighbourhood do you find helpful to remain physically active?
4. What elements of your neighbourhood do you find to be barriers to remaining physically active?
5. What changes would you make in your neighbourhood that would help you remain physically active? What have you seen in other neighbourhoods that you would like to see in your own?
6. Do you find that the weather affects your physical activity level? How?

Barriers-

1. Are there some weeks that you have trouble being more physically active than others?
2. Can you give me a recent example of a time when you had problems being physically active? What happened/what was the barrier?
3. What are some of the other things that prevent you from being physically active currently in your life?
4. What is the biggest barrier for you to be physically active at this time in your life?
5. When you are faced with a barrier, how do you feel?
6. What are some of the strategies that you currently use to overcome these barriers to remain physically active? What do you tell yourself or do when you are faced with a barrier? Do you set goals?
7. Where did you learn these strategies?
8. Are there ways that you tried to deal with barriers that have been ineffective?
9. What is the most difficult part for you in trying to remain physically active?

10. What thoughts or images related to physical activity makes you feel the most anxious or negative?
11. What thoughts related to physical activity makes you feel the most happy and positive?

Relationship between factors: Worksheet for participants

Motivation

Social Support

Neighbourhood

Barriers

APPENDIX E

Factors Associated with Physical Activity Behaviour Change in Middle-Age Women Questionnaire

(Kowal & Fortier, 2005)

THE FOLLOWING QUESTIONS REFER TO THE PHYSICAL ACTIVITIES IN WHICH YOU ENGAGED OVER THE PAST SIX MONTHS.

For each of the following questions, please indicate your opinion.

1. Over the **past six months**, I intended to increase my participation in physical activity.

   Strongly disagree 1 2 3 4 5 6 7 Strongly agree

2. I intended to increase my participation in physical activity over the **past three months**.

   Strongly disagree 1 2 3 4 5 6 7 Strongly agree

3. Over the **past six months**, on a scale from 0% to 100%, how **motivated** were you to increase your participation in physical activity?

   Not at all motivated 0 20 40 60 80 100% Very motivated

4. Over the **past six months**, on a scale from 0% to 100%, how **confident** were you of increasing your participation in physical activity?

   Not at all confident 0 20 40 60 80 100% Very confident

For me, increasing my participation in physical activity over the past **six** months was...

5.	Useful	1 2 3 4 5 6 7	Useless
6.	Enjoyable	1 2 3 4 5 6 7	Unenjoyable
7.	Harmful	1 2 3 4 5 6 7	Beneficial
8.	Pleasant	1 2 3 4 5 6 7	Unpleasant
9.	Good	1 2 3 4 5 6 7	Bad
10.	Stressful	1 2 3 4 5 6 7	Relaxing

---

11. How much control did you have over whether or not you increased your participation in physical activity over the **past six months**?

    No control 1 2 3 4 5 6 7 Complete control

12. I easily increased my participation in physical activity over the **past six months**.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

13. Over the **past six months**, I had control over whether or not I increased my involvement in physical activity.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

14. Most people who are important to me believed I should have increased my level of participation in physical activity over the **past six months**.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

15. In my social environment, people who are important to me believed I should have increased my participation in physical activity over the **past six months**.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

16. How much support did you receive from those close to you to increase your physical activity level over the **past six months**?

No support 1 2 3 4 5 6 7 Complete support

---

17. Who is the adult who influenced you the most over the **past six months**?

___ Spouse
___ Friend
___ Family member (specify_____)
___ Other (specify_____)

PLEASE NOTE THAT IN THE NEXT SECTION, THIS PERSON WILL BE REFERRED TO AS YOUR "SIGNIFICANT OTHER."

Please indicate to what extent the following items correspond to your opinions by circling the most appropriate number.

Strongly disagree			***Moderately agree***			***Strongly agree***
1	**2**	**3**	**4**	**5**	**6**	**7**

Over the past six months, my significant other...

1. provided me with opportunities to make personal decisions concerning physical activity. 1 2 3 4 5 6 7
2. pressured me to increase my level of physical activity. 1 2 3 4 5 6 7
3. openly acknowledged my thoughts and feelings regarding physical activity. 1 2 3 4 5 6 7
4. pushed me to increase my level of physical activity. 1 2 3 4 5 6 7
5. asked about my opinions regarding physical activity. 1 2 3 4 5 6 7

6. criticized me when I engaged in physical activity.	1 2 3 4 5 6 7
7. tried to make me feel guilty when I did not engage in physical activity.	1 2 3 4 5 6 7
8. provided me with choices regarding physical activity.	1 2 3 4 5 6 7
9. encouraged me to increase my level of physical activity.	1 2 3 4 5 6 7
10. supported me when I engaged in physical activity.	1 2 3 4 5 6 7
11. engaged in physical activity with me.	1 2 3 4 5 6 7
12. praised me when I participated in physical activity.	1 2 3 4 5 6 7
13. helped me engage in physical activity.	1 2 3 4 5 6 7

Using the following scale, indicate to what extent you agree with each reason for wanting to increase your level of participation in the physical activities over the <u>past six months</u>.

Strongly disagree			***Moderately agree***			***Strongly agree***
1	**2**	**3**	**4**	**5**	**6**	**7**

Over the <u>past six months</u>, <u>WHY</u> did you want to increase your level of participation in physical activity?

1. Because I wanted to take responsibility for my own health.	1 2 3 4 5 6 7
2. Because I would have felt guilty or ashamed of myself if I did not.	1 2 3 4 5 6 7
3. Because I personally believed it was the best thing for my health.	1 2 3 4 5 6 7
4. Because others would have been upset with me if I did not.	1 2 3 4 5 6 7
5. Because I have carefully thought about it and believed it was very important for many aspects of my life.	1 2 3 4 5 6 7
6. Because I would have felt bad about myself if I did not.	1 2 3 4 5 6 7
7. Because it was an important choice I really wanted to make.	1 2 3 4 5 6 7
8. Because I felt pressured by others to do so.	1 2 3 4 5 6 7
9. Because it was consistent with my life goals.	1 2 3 4 5 6 7
10. Because I wanted others to approve of me.	1 2 3 4 5 6 7
11. Because it was very important to be as healthy as possible.	1 2 3 4 5 6 7
12. Because I wanted others to see I could do it.	1 2 3 4 5 6 7

Indicate to what extent the following items correspond to your reasons for <u>not doing more</u> physical activity over the <u>past six months</u> by circling the most appropriate number.

Strongly disagree			***Moderately agree***			***Strongly agree***
1	**2**	**3**	**4**	**5**	**6**	**7**

Why didn't you do more physical activity over the <u>past six months</u>?

1. Because I didn't like to exercise alone.	1 2 3 4 5 6 7
2. Because I lacked confidence when it came to physical activity.	1 2 3 4 5 6 7
3. Because I was not interested in physical activity.	1 2 3 4 5 6 7
4. Because I didn't think physical activity would benefit me.	1 2 3 4 5 6 7
5. Because I didn't have access to an exercise/sport facility.	1 2 3 4 5 6 7
6. Because I was too busy.	1 2 3 4 5 6 7
7. Because of health problems.	1 2 3 4 5 6 7
8. Because I was too lazy.	1 2 3 4 5 6 7
9. Because I felt uncomfortable about my body.	1 2 3 4 5 6 7

10. Because my daily activities took the majority of my time.	1 2 3 4 5 6 7
11. Because I didn't have enough money to exercise.	1 2 3 4 5 6 7
12. Because I was too tired.	1 2 3 4 5 6 7
13. Because I didn't have safe environments in which to engage in physical activity.	1 2 3 4 5 6 7
14. Because I had difficulty managing my time.	1 2 3 4 5 6 7

To what extent were the following conditions present in your neighbourhood over the <u>past six months</u>?

Not at all present			***Somewhat present***			***Very present***
1	**2**	**3**	**4**	**5**	**6**	**7**

1. Sidewalks.	1 2 3 4 5 6 7
2. Heavy traffic.	1 2 3 4 5 6 7
3. Hills.	1 2 3 4 5 6 7
4. Street lights.	1 2 3 4 5 6 7
5. Dogs that are unattended.	1 2 3 4 5 6 7
6. Enjoyable scenery.	1 2 3 4 5 6 7
7. High levels of crime.	1 2 3 4 5 6 7
8. Frequently seeing people walking or exercising.	1 2 3 4 5 6 7
9. Bicycle paths.	1 2 3 4 5 6 7
10. Walking trails.	1 2 3 4 5 6 7

Sociodemographic Questions

1. What is your marital status?

___ Married
___ Living with common-law partner
___ Single (never married)
___ Separated/Divorced
___ Widowed

2. How old are you? ___

3. What is your height and weight? _____ ft or m _____ lbs or kg

4. What is your ethnic background?

___ White
___ African American
___ Hispanic
___ Asian
___ Other (Please specify _____)

5. Do you currently have any health problems? Yes No (Circle one)
   Please list your health problems: _____
   _____
   _____

6. Are you currently taking any medication? Yes No (Circle one)
   Please list your medication: _____
   _____
   _____

7. What is your highest level of education completed or in progress?

___ Primary school
___ Secondary school
___ University (Undergraduate program)
___ University (Graduate program)

___ College

8. Over the past year, what is the total revenue (before taxes) earned by people living in your household?

___ $0-14,999
___ $15,000-29,999
___ $30,000- 44,999
___ $45,000-59,999
___ $60,000- 74,999
___ $75,000 and above

THANK YOU VERY MUCH FOR YOUR PARTICIPATION!