

**The Impact of Early Career Transitions on Physical Activity Behaviour of Canadian Academic Professors: An Application of the Theory of Planned Behaviour**

by

Megan A. Kirk  
B.A., University of Victoria, 2008

A Masters Thesis Submitted in Partial Fulfillment  
of the Requirements for the Degree of

MASTERS OF ARTS

in the School of Exercise Science, Physical and Health Education

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## **Supervisory Committee**

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## Abstract

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Regular physical activity (PA) has shown to reduce the risk of several chronic diseases and improve physiological and psychological health, yet over half of the Canadian population remains inactive. Young adults, ages 25-44, show the sharpest declines in PA, but a paucity of research explaining the reasons for this deflection point exists. Recent research has indicated that life-transitions, such as marriage and parenthood, are probable reasons for the decline in PA, but little is known about how early career transitions impact PA status. Professional occupations have shown to be associated with the highest number of work hours per week and highest level of sedentary behaviour at work. The purposes of this study were to evaluate the changes in PA behaviour of new professionals across the early career transition using retrospective analysis and determine the critical correlates of changes in PA using the theory of planned behaviour. A Canada-wide sample of 267 new academic professors was examined. 30.7% of the sample reported meeting current PA guidelines. RM ANOVAs provided evidence that PA frequency ( $d = .36-.43$ ) and total minutes ( $d = .39-.42$ ) significantly declined across the transition to employment. PA levels across the transition were further attenuated after controlling for marital status, long work hours (>70 hrs/wk). The presence of young children in the home moderated the PA levels across the transition. The TPB explained 28-35% of PA behaviour ( $f^2 = .39-.54$ ), with intention and PBC emerging as independent predictors. Intention, in turn, was predicted by PBC, affective attitude, and instrumental attitude and explained 42% of the variance ( $f^2 = .72$ ).

Perceptions of enjoyment and control based on limited time, inconsistent work schedule, heavy work demands, and pressure to reach tenure were critical correlates that distinguished between those who remained active across the transition from those who did not. The findings from this study highlight the importance for targeted PA interventions administered prior to the transition to professional employment to prevent habitual inactivity.

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## **Dedication**

This thesis is dedicated to Chris, my biggest fan and greatest support.

## Chapter 1: Introduction

Physical inactivity is a major public health concern and has demonstrated to be linked to over 25 chronic diseases and adverse health conditions such as cardiovascular disease, stroke, colon and breast cancers, type 2 diabetes mellitus, overweight/obesity, hypertension, osteoporosis and musculoskeletal disorders (Katzmarzyk & Janssen, 2004; Warburton, Katzmarzyk, Rhodes, & Shephard, 2007). The health consequences of physical inactivity have an enormous detrimental impact on the quality of life of afflicted individuals and their family, and place a significant economic burden on Canada's health care system. In 2004, the annual economic burden of physical inactivity was estimated at \$5.3 billion dollars accounting for 2.6% of Canada's total health care costs (\$201.3 billion) (Katzmarzyk & Janssen, 2004). Thus, research efforts aimed at promoting physical activity (PA) are a public health priority.

From a public health standpoint, existing research has repeatedly confirmed the role of regular PA in the primary and secondary prevention of chronic disease and all-cause mortality (Penedo & Dahn, 2005; Warburton et al., 2007; Warburton, Nicol, & Bredin, 2006). Warburton et al. (2007) reviewed all existing meta-analyses and reviews pertaining to PA and health and indicated that a 20-30% lower risk of colon and breast cancers can result from regular PA. Furthermore, longitudinal studies investigating the health benefits of PA have shown that regular PA can reduce the risk of cardiovascular-related premature mortality by 20-35% (Warburton, et al., 2007). Overall, substantial evidence has indicated that a 20% lower risk in all-cause mortality is likely for individuals who engage in regular PA (Warburton et al., 2007).

In addition to disease prevention, regular PA has also demonstrated to play an important role in improving mental and emotional health (Canadian Fitness and Lifestyle Research Institute [CFLRI], 2009). Depressive symptoms and high levels of anxiety have shown to be minimized

by regular PA (CFLRI, 2009; Warburton et al., 2007). Additionally, the effect of PA on improving self-esteem and self-confidence has been well established (CFLRI, 2009; Centers for Disease Control and Prevention [CDC], 2009; Spence, McGannon, & Poon, 2005). The extant literature supports regular PA as an important contributor for improved physical and mental health outcomes, self-rated quality of life and self-esteem, and overall wellbeing (CFLRI, 2009; (World Health Organization [WHO], 2009). Thus, these findings reinforce the importance of research efforts aimed at promoting regular PA among the entire Canadian populace to help alleviate the economic and personal health burdens associated with inactivity.

To achieve the health benefits associated with regular PA, the Public Health Agency of Canada [PHAC] (2003) recommends accumulating 60 minutes of mild PA every day (e.g., light walking, gardening, stretching) or engaging in a minimum of 20-30 minutes of moderate to vigorous PA at least 4 times per week (e.g., swimming, jogging, dancing, aerobics). The recommended PA levels are best accumulated all at once, or can be achieved with short bouts of exercise of at least 10 minutes (PHAC, 2003; CFLRI, 2009). The Canadian PA recommendation is similar to the WHO international guidelines that recommend 30 minutes of moderate PA at least 5 days per week, and the US recommendation of accumulating 150 minutes of moderate PA every week (CDC, 2009, WHO, 2009).

Prior PA promotion strategies have tended to focus on youth and older-adults given the obvious primary (e.g., habitual PA development, chronic disease prevention) and tertiary (e.g., rehabilitative, enhanced physical functioning, sustained quality of life during older-adulthood) aims. PA initiatives specifically targeting young- and middle- aged adults are scant. According to the 2005 Canadian Community Health Survey, Canadian youth aged 12-17 were the most active demographic with dramatic declines in PA status beginning at age 18 and extending into older

adulthood (> 65 years) (CFLRI, 2007; Gilmour, 2007). Despite a negative trend in PA levels across the lifespan, however, the trend is not linear. National cross-sectional surveys have indicated that the sharpest declines in PA status occurs during young adulthood, and continues to decline into middle- and older-adulthood (Gilmour, 2007). When considering those ages 25-44, young adults are almost half as likely to be as active as when they were 12-17 years (CFLRI, 2007; Gilmour, 2007). Young adults appear to be an important target population for PA promotion strategies, but research efforts aimed at explaining the reasons for this critical deflection point are limited. Thus, additional research is urgently needed to understand the reasons for changes in PA among this population to help prevent habitual inactivity and inform targeted health promotion interventions.

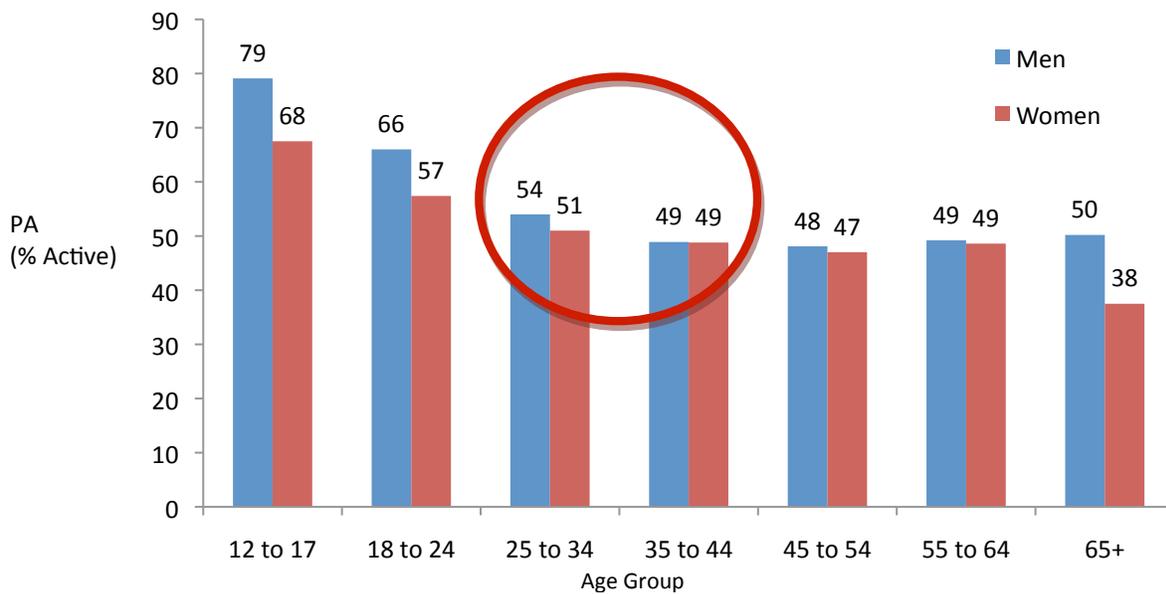


Figure 1. Physical activity participation during leisure-time by age and gender based on the 2005 Canadian Community Health Survey.

Young adulthood is considered a complex period of life where the formation of a personal identity independent of parents is established (Marini, 1985). Key outcomes during young

adulthood include shifting away from being fully dependent on parents towards financial, residential, and emotional independence (Jekielek & Brown, 2005). In Erikson's (1959) work on identity formation across the life cycle, young adulthood was also described as a time where individual's sought to form new intimate relationships with people outside of the family. New social roles such as becoming an active citizen (e.g., age of majority, voting rights, tax-payer), a spouse/partner, a parent, and a worker are all typical experiences during young adulthood (Erikson, 1959; Jekielek & Brown, 2005). Typical life-transitions experienced during young adulthood that have been identified in the literature include living independently from parents/guardians, entering post-secondary education, entering the full-time workforce, cohabitation with a partner, marriage, and parenthood (Allender, Hutchinson, & Foster, 2008; Baranowski, Cullen, Basen-Engquist, Wetter, Cummings, Martineau, et al., 1997; Bell & Lee, 2005). Since new role responsibilities and expectations are being established during this turbulent time period, it is likely that changes in health promoting behaviours will occur as a way to cope with these life-transitions (Baranowski, et al., 1997). Thus, further research efforts aimed at understanding the impact of life-transitions on health behaviours are needed to support this conjecture.

There is some recent evidence indicating that complex life-transitions are the probable reasons for the dramatic decline in PA among young adults (Allender et al., 2008; Bellows-Riecken & Rhodes, 2008). In particular, studies have consistently shown notable declines in PA levels among young adults during the transition to university (Bray & Born, 2004; Bray, 2007; Pullman, Masters, Zalot, Carde, Saraiva, Dam, et al., 2009; Wing Kwan, Ginis, & Bray, 2009) and the transition to parenthood (Bellows-Riecken & Rhodes, 2008; Cramp & Bray, 2009).

One critical life-transition that may be an important contributor to decreased PA is the shift from postsecondary education to the workforce. In 2009, 67%, or 6.3 million Canadian young adults were postsecondary graduates, with 23% (1.5 million) obtaining a university degree (Human Resources and Skills Development Canada [HRSDC], 2010; Statistics Canada, 2009a, 2009c). Among postsecondary graduates, an additional 13% (0.8 million) chose to pursue further postgraduate education (Statistics Canada, 2009a, 2009c). There is a link between educational attainment and occupation status, indicating that those with higher education levels are more likely to be employed in higher status occupations (HRSDC, 2010). Thus, young adults choosing to complete postgraduate education (e.g., doctorate, M.D.) are likely to enter professional careers including academia, medicine, and law. Thus, entering into a professional occupation requiring postgraduate university education may be a potential reason for the sharp downward trajectory in PA among young adults.

Compelling evidence has shown that professional occupations requiring professional education (e.g., business management, law, academia) are associated with the highest number of work hours per week and the lowest on-the-job activity compared to blue-collar occupations (McCormack, Giles-Corti, & Milligan, 2006; PHAC, 2004; Shields, 1999). The impact of entering into a professional career (e.g., long work hours, low on-the-job activity, heavy psychological demands) on PA status of young adults has been understudied. Given the potential number of years young adults may spend in their chosen career before retirement, a closer examination of the impact of professional job characteristics on PA patterns seems urgently needed to help inform future interventions aimed at preventing habitual inactivity.

A burgeoning example of a professional occupation requiring long work hours, heavy work demands, and low occupational energy expenditure is that of academia (Canadian Association of

University Teachers [CAUT], 2007; Jacobs & Winslow, 2004; Wilbur, Naftzger-Kang, Miller, Chandler, & Montgomery, 1999). Common characteristics of an academic professor include long work hours, multiple work responsibilities and demands (e.g., teaching, research, service), and low occupational energy expenditure (e.g., reading, computer use). In particular, Canadian Assistant Professors (e.g., recently employed) aiming to be tenured (e.g., job security, full professor) have reported higher levels of stress, negative physical health symptoms, and work-life imbalance compared to other professional workers (CAUT, 2007; Jacobs & Winslow, 2004). To our knowledge, no known studies have explicitly examined the salient beliefs towards participating in regular PA among a subsample of new professionals (e.g. within the last 5-years) employed as professors at a Canadian academic institution. According to the 2009-2010 Canadian Association of University Teachers Almanac, new professors (< 44 years) represent the majority (52.4%) of all Canadian faculty members (CAUT, 2010). Therefore, new professors represent a large proportion of academic professionals and are especially in need of targeted interventions to prevent habitual inactivity.

Before launching PA interventions, additional research identifying the individual correlates of PA behaviour among professional young adults is needed. PA interventions are best implemented by well-validated theoretical models (Rhodes & Pfaeffli, 2009). While prior research has confirmed that several demographic (e.g., age, gender), social (e.g., social support), environmental (e.g., access, cost) factors are associated with PA participation, research aimed at identifying the critical theoretical correlates of changes in PA among professional young adults is lacking (Troost, Owen, Bauman, Sallis, & Brown, 2002). To my knowledge, no known study has integrated a well-validated theoretical model of behaviour change to help identify the critical correlates of PA behaviour among young adults transitioning to a professional occupation. One

leading theoretical framework that has been used extensively in the PA domain and has shown to have predictive utility in understanding PA behaviour is Ajzen's (Ajzen, 1991) Theory of Planned Behavior (TPB). Briefly, the TPB postulates that behaviour is determined by the motivation to act (intention) and the perception of control over behavioural performance (perceived behavioural control (PBC)). In turn, intention is formed via PBC, the evaluation of the behaviour being performed (attitude), and the perceived pressure from others to perform the behaviour (subjective norm).

To my knowledge no known research has exclusively investigated the PA behaviours of a Canada-wide sample Academic Professors during their early career transition. Given the significant proportion of young adults in Canada who are not meeting the minimum national PA recommendations combined with an increasing percentage of young adults who are completing higher education, an evaluation of the within-person reasons for the sharp decline in PA among professional young adults seems prudent. From a public health standpoint, research efforts aimed at identifying the critical correlates of this sharp deflection point are urgently needed to prevent PA levels from further declining into middle- and older-adulthood (Gilmour, 2007). Therefore, this study aimed to expand the existing literature examining the relationship between life-transitions and PA patterns by following a robust research agenda using elements of longitudinal recall of PA over three time periods to investigate the PA patterns of a representative sample of young adults recently employed in a professional occupation (e.g., academia). Findings from this research will be used to help inform targeted policies and interventions aimed at promoting regular PA among new young professionals.

## **Purpose Statement**

The purpose of this study was to investigate the variations in PA patterns across the transition to professional employment among a representative sample of professional young adults. To achieve this, this study 1) elicited the salient beliefs towards participating in PA among professional young adults, 2) evaluated the patterns of PA during leisure-time prior to, and during the transition to the professional workforce using longitudinal retrospective analysis, and 3) predicted the within-person changes of PA and identified the key theoretical variables associated with PA during the transition to the professional workforce using Ajzen's TPB.

## **Research Questions and Hypotheses**

The study addressed the following research questions:

### ***Physical Activity Behaviour***

1. Does LTPA among new professionals decline during the transition to the full-time professional workforce in comparison to their prior PA habits?

**H<sub>1</sub>:** *PA will decline as a result of entering full-time professional employment and will generally remain lower than baseline status measured in the last year of full-time doctoral education, but the nature (e.g. linear or curvilinear) and the extent of the decline has yet to be determined.*

### **Exploratory Research Question**

2. Do certain sociodemographic profiles (e.g., ethnicity, parenthood status) moderate PA status across the transition to the professional workforce?

### ***Social Cognitive Correlates of Physical Activity***

1. What theoretical constructs from the TPB correlate with leisure-time PA of young professionals in transition to the workforce?

**H<sub>2</sub>:** *Intention will be a significant correlate of PA and it will in turn be predicted by PBC via control beliefs about limited leisure-time, fatigue, and role demands.*

#### Exploratory Research Question

2. Can leisure-time PA be predicted and differentiated between young adult professionals who maintain their PA habits, as defined by Canada's recommended guidelines, across time from those who do not using the TPB framework?

### **Operational Definitions**

For the purposes of this study, the following operational definitions will be used:

#### ***Leisure-Time Physical Activity***

Engaging in any type of volitional (e.g., under own control) exercise, sport, or recreation activity not associated with one's regular occupation and/or household duties (Sylvia-Bobiak & Caldwell, 2006).

#### ***Young Adult***

It is important to note that no standardized age-range categorizing young adulthood has been identified in the literature. For the purposes of this study, a young adult will be defined as a person between the ages 25-45. Because this study will focus on young adults entering professional occupations, this age range has been selected based on the minimum years of post-secondary and post-degree education required to enter most professional occupations (~ 11 years based on a 4-year undergraduate degree and 7-years of post-degree training).

### ***Life Transition***

A temporary event or occurrence, including social, psychological, and environmental, which require an adjustment or change in an individual's previous pattern of living. For the purposes of this study, the transition from full-time education to full-time employment within the last 5-years will be the defined life-transition (Allender et al., 2008).

### **Study Assumptions**

The following assumptions were made for this research:

1. The obtained sample characteristics were relatively representative of new professionals
2. The transition to the professional workforce was a relatively similar experience for all professional young adults
3. Responses to questionnaire items were as honest and accurate as possible
4. The pilot sample and their beliefs that emerged from the elicitation study corresponded with the main TPB target sample in terms of their demographic characteristics
5. All instruments used to obtain data were valid and reliable measures

### **Study Delimitations**

Eligible participants' met the following criteria:

1. Participants were between the ages of 25-44
2. Participants completed post-degree doctoral education within the last 5-years
3. Participants were currently employed as a faculty member at an accredited university or college in Canada that has membership with the Association of Universities and Colleges of Canada (AUCC).
4. Participants have not been employed in their current profession for more than 5-years
5. Participants had full-time employment status (e.g. 35 hours of work per week).

## **Study Limitations**

This research had the following limitations:

1. The cross-sectional retrospective design of the study may have caused participants to inaccurately recall their PA habits over long durations of time (~5 years)
2. Questionnaire items were based on self-reported measures and may have resulted in a social desirability bias or reporting bias
3. The study findings can only be generalized to the professional young adult sample recruited and may not be entirely representative of the young adult population
4. Limitations to the TPB framework including 1) the assumption that the population under investigation always makes rational, systematic decisions, 2) the failure to take into account the personality, demographic and cultural differences that are present among the population, and 3) the assumption that perceived behavioural control predicts actual behaviour control, and 4) the measured time interval between behavioural intention and actual behaviour may limit the predictive utility of the TPB in explaining exercise behaviour in this study (Symons Downs & Hausenblas, 2005a).

## **Chapter 2: Literature Review**

Recent evidence has indicated that the sharpest decline in PA occurs during young adulthood (Gilmour, 2007; Statistics Canada, 2005). Since several life-transitions are experienced during young adulthood, a review of the existing literature pertaining to the PA behaviour of young adults during key life-transition periods is needed to help inform future research strategies targeting this at risk population. The following review of the literature has been divided into four main sections. The first section will describe the current trends and characteristics of young adults living in Canada. The second section will discuss and summarize the current research that examines a relationship between key life-transitions and PA patterns of young adults. The third section will focus on the literature investigating the transition to the workforce and young adult PA status; a detailed review of the characteristics of professional occupations and how a professional career can impact PA patterns will be highlighted. The fourth section will examine the use of Ajzen's (1991) TPB, a leading social cognition model that can help guide research investigating the individual-level PA behaviours among young adults during the transition to professional occupations.

### **Young Adults in Canada**

In Canada, young adults represent a large portion (20% or 6.7 million) of the entire national population (Clark, 2007). Of the 6.7 million young adults living in Canada, 41% of are under the age of 25 and the majority (59%) are between 25-34 years of age (Clark, 2007). Among Canadian young adults, 20% were born in a foreign country and one in 6 young adults' had identified themselves as a member of a visible minority (Clark, 2007). Therefore, it can be concluded that Canadian young adults are an extremely heterogeneous demographic.

The onset of young adulthood in Canada is considered to be at the age of 18 when legal voting rights are permitted. It is important to note that no universal definition or time-span of young adulthood has been identified in the literature. According to Clark (2007), a reasonable indicator of when an individual transitions from young adulthood to adulthood is by the number of traditional life-transitions one has made. Today's young adults have shown to be prolonging young adulthood well into their mid to late thirties. According to data from the Canadian Censuses of Population, the transition to adulthood is taking much longer to complete than in previous years (Clark, 2007). Young adults in 2001 had gone through fewer transitions compared to a 1971 cohort of young adults, and the timing of these transitions differed based on gender. The transition periods of current young adults are delayed and elongated due to the increased time being required to complete the first major transition of finishing education (Clark, 2007). Compared to 30 years ago, a substantially greater number of young adults are choosing to complete postsecondary education (25% in 1971 vs. 48% in 2001), and the percentage of women who have become university-educated has increased fourfold from 7% in 1971 to 29% in 2001 (Clark, 2007). Also, an increased number of men and women are choosing to complete higher education at later ages (median age of master's graduation = 29; median age of doctoral graduation = 33), and subsequently, postponing the onset of other critical life-transitions. Entering into a marriage has become less common among today's young adults. Compared to married young adults (65% men and 80% women) in 1971, only 34% of men and 49% of women in 2001 were married (Clark, 2007). Additionally, young adults are less likely to be in a relationship than they were 30 years ago, and if they are, it is more likely to be common-law rather than a conjugal relationship.

It is not surprising that today's young adults are also postponing parenthood considering the increased number of men and women who are choosing to complete higher education; even those who have not completed postsecondary education have delayed parenthood (Clark, 2007). In 2001, only 18% of young adults were married with children compared to 42% of young adults in 1971 (Clark, 2007). According to Clark (2007), Canadian young adults are delaying traditional transitions because of the push to complete higher education. Not only do those holding a university-degree earn a significantly higher income than those who have only finished high school, but the number of careers that require a university-degree has doubled since 1990 (Clark, 2007). In addition, Clark (2007) highlights that tuition fees and government and banking loans have steadily increased during the past few decades. The financial burden of completing postsecondary education may deter young adults from progressing through other transitions until they feel financially ready. Overall, young men and women have postponed the transition to adulthood compared to 30 years ago as a result of staying in postsecondary education longer, and it is now thought that the completion of young adulthood commonly occurs between the ages 35-39 (Clark, 2007).

### **Life-Transitions and Physical Activity Rates**

An abundance of cross-sectional research aimed at identifying the determinants of PA among adults has indicated that key life-transitions including marriage, parenthood, and employment are negatively associated with PA rates (Allender et al., 2008; Nomaguchi & Bianchi, 2004; Trost et al., 2002; Zick, Smith, Brown, Fan, & Kowaleski-Jones, 2007). These findings provide supporting evidence that life-transitions influence PA patterns, but robust scientific conclusions regarding the longitudinal changes in PA patterns across the transition are unclear. In addition, generalizability to the young adult population is limited since the majority

of cross-sectional research has been conducted on adults ages 18-65. Thus, an investigation of the literature examining the longitudinal changes in PA patterns among young adults can help identify when sharp declines in PA occur and the circumstances surrounding the change in PA.

### ***Entering Postsecondary Education and Physical Activity Status***

There is some convincing evidence indicating that the transition to postsecondary education after high school is associated with declines in PA among young adults ages 18-25 (Pullman et al., 2009; Wing Kwan, Bray, & Ginis, 2009). In a recent 10-month longitudinal prospective study conducted by Pullman et al. (2009), males, ages 17-20, that transitioned to university reported a significant decrease in their fast aerobic activity (> 20 minutes of sweating and accelerated breath) over the transition period compared to the summer prior to beginning university. Self-reported slow aerobic activity (> 30 minutes of no sweating), strength, and flexibility did not significantly decrease at the end of the winter semester of their first year. These findings are in congruence with a recent study conducted by Wing Kwan et al. (2009) that used elements of longitudinal retrospective recall to examine the weekly frequency of 30 minutes of moderate-vigorous PA among a sample of 212 university students ( $M=17.79$  years) at three time periods: 8-months prior to university, during the first month of university, and current PA 8-weeks after the first month of university. The authors found a significant decline in MVPA frequency (3.4 days/wk 8-months prior to university vs. 2.9 days/wk during university) during the transition to university ( $F(1,211) = 16.04, p < 0.01$ ) (Wing Kwan et al., 2009).

Among studies that have relied on retrospective recall of PA patterns across the transition, reported PA levels were also found to decrease across the transition to university (Bray, 2007; Bray & Born, 2004). A cross-sectional study of 145 first year students, ages 18-19, using longitudinal recall over 6-months found that 50% of students who were vigorously active had

become insufficiently active during the transition to university (Bray & Born, 2004). The mean number of vigorous PA sessions per week (> 20 min) significantly declined from 3.32 to 2.68 sessions per week among the university sample ( $F(1,144) = 6.88, p = 0.01$ ). Overall, the authors concluded that 66.2% of the sample was active in high school compared to 44.1% in university (Bray & Born, 2004). In a similar study examining the self-reported PA patterns of 127 first year students across 15-months (last 8-months of high school to the first 7-months of university), Bray (2007) found that that average MET hours per week of PA declined by 17% across the transition to university. Bray (2007) concluded that PA tracked moderately from the pre-transitions (15 months prior to university) to the first year of university with past PA accounting for 32% of first year PA. Although these studies have produced consistent results in support of a negative association between university transitions and PA, it is important to note that the length of the transition period being measured varied (range = 6 months to 15 months) across the studies making it a challenge to understand the full impact of the transition on PA levels. In addition, the age-range of the samples used in the analyses was much younger (ages 17-21) than the target 24-44 year-old young adults for this study making generalizations difficult.

### ***Relationship Transitions and Physical Activity Status***

Since health behaviours developed during young adulthood can transcend into middle- and older-adulthood additional studies that examine the life-transitions experienced after postsecondary education during are needed to help further explain the sharp decline in PA (Bell & Lee, 2006; Cragg, Wolfe, Griffiths, & Cameron, 2007). To my knowledge, only five known studies (4 independent samples) have employed longitudinal designs to assess the changes in PA across relationship transitions, and the findings have been mixed (Bell & Lee, 2005; Brown & Trost 2003; Burke, Beilin, Dunbar, & Kevan, 2004; King, Kiernan, Ahn, & Wilcox, 1998; The &

Gordon-Larsen, 2009). A recent 6-year longitudinal analysis of cross-sectional data from the National Longitudinal Study of Adolescent Health found cohabiting and married couples had less healthy PA profiles than single/dating pairs (The & Gordon-Larsen, 2009). The authors found that entry into cohabitation and marriage was associated with a significant decrease in PA, but the effect was small (~10% decrease). Furthermore, the authors found that married couples were more likely to have one or two less physically active partners (PR = 2.00-2.15) compared to couples that were not living together. In addition, couples who lived together for over 2-years were significantly more likely (OR = 1.93-2.24) to be less active compared to those who were not living together (The & Gordon-Larsen, 2009).

Secondary analysis of longitudinal data across 4-years of 7281 women ages 18-23 at baseline, enrolled in the Australian Women's Longitudinal Health Survey (AWLHS) showed that the onset of marriage was significantly associated with a greater likelihood of physical inactivity (OR = 1.5,  $p < 0.01$ ) compared to women who remained single (Brown & Trost, 2003). According to a study that analyzed the same dataset of Australian women conducted by Bell and Lee (Bell & Lee, 2005) moving into a cohabiting relationship increased the likelihood of inactivity (RR = 1.3, 95% CI = 1.1 – 1.5,  $p < .0001$ ), and entering into marriage was associated with a greater likelihood of decreased PA (RR = 1.8, 95% CI = 1.5-2.3,  $p < .0001$ ), when compared to those who remained single.

According to a study conducted by Burke et al. (2004), that examined 7-years of cross-sectional surveys of a cohort of 194 men and 211 women ages 18-25, changes in PA showed a significant interaction between sex and living with a partner. Among men living with a partner, fitness levels fell by 1.5W/kg compared to an increase of 0.4W/kg among women living with a

partner across the 7-year period. Overall, the authors noted that a 29% increase in sedentary behavior among men moving in to a cohabiting relationship was found over the 7-year analysis.

In contrast, King, Kiernan, Ahn, and Wilcox (1998) found no significant differences in PA between transition groups: single-married, remained single, remained married, married-single across a 10-year period. All transition groups showed a small, non-significant, decline in PA level over the 10-years. Interestingly, the authors found that the single to married group demonstrated a steeper negative decline in PA during the initial transition period, but showed a greater increase in their reported overall PA levels compared to the other transition groups (King, et al., 1998). This finding supports the notion that the onset of a key transition may produce initial declines in PA, but are not necessarily permanent. Overall, there appears to be convincing evidence that supports a negative association between the onset of marriage/cohabitation and PA levels, but inconsistent measures including heavy reliance on self-reported, survey-created measures of PA, single-gendered samples, and cross-sectional data prevent us from understanding the full contribution of relationship transitions on PA patterns of young adults.

### ***Parenthood Transitions and Physical Activity Status***

Existing research investigating the impact of life-transitions on PA behaviours of young adults ages 25-34 has focused heavily on the impact of parenthood on PA behaviour and indicated that a negative association exists (Allender et al., 2008; Bellows-Riecken & Rhodes, 2008). The meta-analytic findings of studies included in Bellows-Riecken and Rhodes' (2008) systematic review of PA and parenthood transitions demonstrated that parenthood had a small-moderate effect on PA status (summary  $d = 0.41-0.48$ , corrected for sampling error) when compared with non-parents. Furthermore, the review indicated that parenthood appeared to have

more of a negative effect on the leisure-time PA behaviour of mothers compared to non-mothers and fathers indicating that gender may act as a moderator (Bellows-Riecken & Rhodes, 2008). Findings across the few studies examining the PA patterns of both male and female participants have produced inconsistent results, which indicates the presence of potential moderators (e.g. gender, multiple social roles) (Bellows-Riecken & Rhodes, 2008). Nomaguchi and Bianchi (2004), found that female parents spent approximately 1 hour 30 minutes less on PA every two weeks compared to male parents. Conversely, Burton and Turrell (2000) found that living with dependent children was found to have a meaningful negative effect on participation in leisure-time PA among both female (OR = 2.19) and male (OR = 1.61) participants. The inconclusive findings may be attributed to the use of cross-sectional research focused primarily on female participants; the PA patterns of fathers are underrepresented. In general, however, the review suggested that parenthood transitions negatively impact PA behaviour among both men and women.

According to Bellows-Riecken and Rhodes (2008), the strongest evidence in support of an inverse relationship between PA and life-transitions comes from longitudinal studies examining the within person comparisons of PA across the transition period. However, only 4 of the 31 articles included in the review had longitudinal designs making it challenging to generalize the findings. Of the longitudinal studies, only two specifically examined young adults, and both were conducted on the same dataset of Australian women. Secondary analysis of longitudinal data of 7281 women ages 18-23 at baseline, enrolled in the Australian Women's Longitudinal Health Survey (AWLHS) showed that the onset of parenthood was significantly associated with a greater likelihood of physical inactivity (OR = 1.78,  $p < 0.01$ ) compared to non-mothers (Bell & Lee, 2005; Brown & Trost, 2003).

Consistent with these findings, more recent investigations of PA patterns prior to, during and post childbirth have confirmed that PA patterns decline at the onset of parenthood among women (Albright, Maddock, & Nigg, 2005; Cramp & Bray, 2009; McIntyre & Rhodes, 2009; Symons Downs & Hausenblas, 2004). A 20-month prospective study of women's PA patterns 3 months prior to conception to 7-months postpartum found that leisure-time PA levels gradually declined during pregnancy compared to pre-pregnancy levels (Cramp & Bray, 2009). After childbirth, leisure-time PA was found to increase, and by 5-month postnatal leisure-time PA levels had returned to pre-pregnancy levels (Cramp & Bray, 2009).

In contrast with the findings of Cramp and Bray (2009), a study conducted by McIntyre and Rhodes (2009) used retrospective analysis to assess patterns of PA among women during the transition to motherhood. The results revealed that PA levels significantly declined during motherhood especially in strenuous frequency (McIntyre & Rhodes, 2009). Further results from the study showed that 31% of participants who reported being active prior to motherhood discontinued PA upon the parenthood transition (McIntyre & Rhodes, 2009). In accordance with these findings, Symons Downs and Hausenblas (2004) examined the PA patterns of women across the transition to parenthood (pre-pregnancy to 5-months following childbirth) using longitudinal retrospective recall. The authors found significant differences across time for strenuous exercise ( $\eta^2 = .54$ ) moderate exercise ( $\eta^2 = .41$ ) and mild exercise ( $\eta^2 = .32$ ), but no significant difference between pregnancy and postpartum PA levels were found. Furthermore, a cross-sectional study by Albright et al. (2005) that used longitudinal retrospective recall to examine women's PA patterns across the transition to parenthood found that among women who reported being active prior to pregnancy, 43% were inactive following childbirth. Additionally, the authors found that 21.5% of women were inactive before and after childbirth; 22.7% were

active before and after childbirth; and 12.6% were inactive before and active after childbirth. Overall, 68% of women were inactive following childbirth and among those who reported a decrease in PA following childbirth, the mean number of days “being active” reduced per week was 1 ( $\pm$  3.2 days) (Albright et al., 2005). Despite the small sample ( $N = 79$ ) used in this study and use of survey-created self-reported PA, the sample included multiethnic women from Hawaii, which strengthened the generalizability of the results. Overall, there is convincing evidence that the transition to parenthood negatively affects PA patterns among women. Future prospective studies extending well after the postpartum period that examine both male and female participants would provide further understanding of the full impact of parenthood on PA patterns.

### ***Occupation Transitions and Physical Activity Status***

One understudied life-transition experienced during young adulthood is the transition to the full-time workforce following full-time education. In Canada, over 18 million adults (ages 18+) are employed full- or part-time in the labour force (Statistics Canada, 2009b). Those working in full-time occupations spend an average of 39.5 hours per week in their place of employment, and young adults transitioning from education for the workforce may spend over 25 years in their career before retirement (Cragg et al., 2007). Existing research has generally supported an inverse relationship between employment and PA among young adults, but the strength of the relationship across the transition period from full-time education to full-time employment is largely unexplored. Cross-sectional studies investigating the impact of full-time employment among both male and female participants have produced inconclusive findings. A cross-sectional study examining time diaries of a representative sample of participants ages 15-29 found that employment status did not influence the likelihood of participating in 30 minutes of daily PA

among females (Zick et al., 2007). Among males, the likelihood of engaging in PA declined if a male was employed and also enrolled in education (Zick et al., 2007). Furthermore, Nomaguchi and Bianchi (2004) also concluded that employment was inversely related to PA, but the association was small. Among males, ages 18-64, full-time employment was associated with a decrease in PA compared to those working part-time or those who were unemployed (Nomaguchi & Bianchi, 2004). Employment status appeared to have no effect on PA among females (Nomaguchi & Bianchi, 2004). These findings indicate that full-time workforce is associated with decreased PA among males, however, longitudinal investigations of PA patterns prior to and during the transition to employment among a representative sample are needed to determine the overall effect of occupation transitions on PA patterns of young adults.

To my knowledge, only three known studies have conducted longitudinal assessments of the PA patterns of young adults transitioning to the workforce (Bell & Lee, 2005; Brown & Trost, 2003; Horn, O'Neill, Pfeiffer, Dowda, & Pate, 2008). All three studies examined female samples, with two of the studies analyzing the same dataset of Australian women. Overall, Australian women (ages 18-23) entering the workforce (OR = 1.18) were more likely to be inactive at the 4-year follow-up compared to those not working after controlling for age, income and education, but the effect was trivial (Bell & Lee, 2005; Brown & Trost, 2003). In contrast, Horn et al. (2008) found that women (ages 18-21) who were employed after high school graduation were over 5-times more likely to be active than those who were not employed after graduation. Despite the preliminary evidence in support of an inverse relationship between occupation transitions and PA status, there are inherent limitations to the methods used that prevent further understanding of the longitudinal changes in PA patterns. First, the equivocal findings in the literature may be largely attributed to the lack of measures used to distinguish

between occupation type (e.g., teacher, lawyer, construction worker), or occupation characteristics (e.g., weekly work hours, job demands). The type of occupation and occupation characteristics (e.g., work-related stress, work hours, occupational physical activity) that may potentially impact PA patterns of young adults is unknown, but may provide important clues about the reasons for changes in PA status. Second, studies investigating the relationship between employment and PA status have relied heavily on cross-sectional data comparing between-person PA levels among those who have or have not experienced a particular life-transition (Bellows-Riecken & Rhodes, 2008). The issue with cross-sectional data is that the individual changes in PA patterns across the transition period are unknown. An investigation of PA patterns at intervals prior to, during, and after the transition period can help advance our knowledge of the within-person changes in PA patterns and provide important clues regarding when PA changes actually occur, rather than merely stating that a change occurred. Third, most of the evidence in support of a negative association between life-transitions and PA status has been conducted on unrepresentative samples (e.g., Australian women, small sample sizes), which makes generalizations to the entire young adult population impossible. Research conducted on large, representative samples of professional young adults can help identify the circumstances surrounding changes in PA. Fourth, longitudinal studies investigating PA changes during employment have measured PA at only two intervals: prior to and after the transition. Thus, it remains unclear whether the initial transition period has any influence on PA patterns. Overall, the current state of the literature examining the transition to the workforce is rife with methodological inconsistencies, and further research is warranted.

## **Professional Occupations**

Research efforts aimed at identifying which occupations are most likely associated with declines in PA among young adults are scant. Prior research examining the health and well-being of those employed in the labour force has focused heavily on the socio-economic determinants (e.g., income, education level, social position in society) of health (Cragg et al., 2007; Trost et al., 2002). Convincing evidence has shown that low socio-economic status, including those employed in lower status occupations (e.g., manual labour), tend to be at higher risk of poor health outcomes and inactivity compared to those in higher socio-economic positions (e.g., higher education, higher income) (Cragg et al., 2007). These findings may be biased because they are attributed to overall socio-economic status including income, education level and perceived social position within society and not necessarily to the occupation characteristics that come with specific careers (e.g., on-the-job activity, overtime, work demands). Despite the general assumption that PA is directly associated with socio-economic status, however, emerging research has suggested that the positive association between socio-economic status and PA plateaus at the postsecondary level and at the highest income levels (Cragg et al., 2007). More specifically, emerging research investigating occupation characteristics has indicated that those employed in professional occupations (e.g. law, academia) are also at high risk of not meeting the minimum PA levels for health (Cragg et al., 2007; Kirk & Rhodes, manuscript in review). Compelling evidence has shown that professional occupations (e.g., law, academia) are associated with the highest number of work hours per week and the lowest on-the-job activity compared to blue-collar occupations (McCormack et al., 2006; PHAC, 2004; Shields, 1999). These findings provide convincing

evidence that entering a professional career may be an important determinant of the critical deflection point in PA among young adults.

### **Long Work Hours and Physical Activity Status**

According to data from the 1994-1997 National Population Health Survey, men reporting long work hours spent an average of 55 hours per week on the job and women reported working an average of 51 hours per week (Shields, 1999). In addition, 32% of men and 19% of women reported working over 60 hours per week (Shields, 1999). Those working long work hours were more likely to be male, employed in professional occupations that require postsecondary education training, and between the ages 25-34 (Shields, 1999). In Canada, young adults employed in the professional occupations (e.g. managerial, law, academia, medicine) are working more hours than ever (Shields, 1999). According to a Canadian study by Duxbury and Higgins (2001), the incidence of long work weeks (> 50 hours per week), rose from 10 – 25% between 1991 and 2001 (as cited in PHAC, 2004). The authors further added that 20% of Canadian workers now regularly work at home in addition to normal working hours (PHAC, 2004). Given the increased number of work hours young adults appear to be completing, it seems logical that declines in PA are inevitable due to decreased time, especially during leisure.

Research focused on understanding the relationship between long work hours and PA status has indicated that those employed in positions that require long work weeks are not meeting the minimum recommended PA levels for health (Artazcoz, Cortes, Escriba-Aguir, Cascant, & Villegas, 2009; Burton & Turrell, 2000). A recent cross-sectional study conducted by (Artazcoz et al., 2009) found that working 41-50 hours per week and 51-60 hours per week was associated with lower leisure-time PA compared to those working standard work hours (30-40 hrs/wk) among men. Consistent with this finding, Burton and Turrell (2000) found that men

working over 50 hours per week were 50% more inactive compared to those working part-time (1-14hours). Additionally, rates of inactivity were 34-36% higher among men working 35-49 hours per week compared to part-time workers (Burton & Turrell, 2000). The authors noted that a greater proportion of persons employed in professional occupations worked 50 hours or more per week. These findings provide convincing evidence that long work hours limit the amount of time one can spend engaging in regular PA. Thus, further research is needed to determine if young adults entering professional careers that demand long hours are warranted.

### **Occupational Physical Activity and Physical Activity Status**

The accessibility of technological advances (e.g., elevators, computers, robotics, cell phones) in the workplace has expanded at an unprecedented rate and created a dramatic reduction work-related activity (Cragg et al., 2007). Therefore, it seems logical that those employed in sedentary occupations are at a higher risk of not meeting the minimum recommended PA for health, but the impact of work-related PA on participation in leisure-time PA is not widely understood across the literature. The strongest evidence showing a negative association between work-related PA and overall PA status comes from studies using direct measures of PA (e.g., accelerometers, pedometers). A study by McCormack, Giles-Corti, and Milligan (2006) that used pedometers to measure total PA found the largest effect for achieving the recommended 10 000 steps/day was for men working in blue-collar occupations ( $d = 1.26$ ). Men working in blue-collar occupations were more likely to achieve 10 000steps/day (aOR = 4.45, 95%CI = 1.61-12.31) compared to men working in manager/professional occupations (McCormack et al., 2006). Further, 80.2% of blue-collar workers compared to only 38.2% of professionals achieved 10 000 steps/day (McCormack et al., 2006). Another study conducted by Tudor-Locke, Burton, and Brown (2009) used a direct measure of PA and found that women in

more active jobs (e.g., manual labour) took 1279 more steps per day than women who reported working in less active jobs. These findings suggest that higher-status occupations (e.g., professionals) are at risk of inactivity (Tudor-Locke, Burton, & Brown, 2009).

Supporting research conducted by Steele and Mummery (2003) examined work-related PA across occupation categories in a sample of Australian workers. The study found a significant difference in PA level based on occupation category. Professionals reported the lowest number of steps ( $M = 2835$ ) at work compared to white-collar ( $M = 3616$ ) and blue-collar ( $M = 8757$ ) workers (Steele & Mummery, 2003). Consistent with these findings, a Dutch study conducted by Proper and Hildebrandt (2006) indicated that work-related PA contributed to 30% of total PA. According to the study findings, higher status occupations showed the least work-related PA compared to white-collar and blue-collar occupations (Proper & Hildebrandt, 2006). A follow-up study conducted by Jans, Proper and Hildebrandt (2007) confirmed these findings and found that on average, those employed in professional occupations reported 162 minutes of sitting during work hours (Jans et al., 2007). This was 2.5 times greater than those employed in lower status occupations (Jans et al., 2007). These findings suggest that those in sedentary occupations are (e.g. professionals) not compensating for their low on-the-job activity by being more active during leisure-time. Since increasing PA at work is unlikely to be commensurate with a professional occupation, targeted interventions that promote PA during leisure-time are critical to prevent young adults entering these occupations from developing lifelong habitual inactivity. Therefore, young adults entering professional occupations that demand long work hours and low on-the-job activity are at risk of developing poor health habits that may transcend into middle- and older-adulthood.

**Barriers towards Physical Activity among Professionals**

To my knowledge, no known studies have explicitly examined the perceived barriers towards participating in regular PA among new young professionals. Data from the 2006 Physical Activity Monitor (PAM), however, found that 42% of all Canadian workers reported lack of time due to work as the most common barrier towards participating in PA, and over one-third of respondents (34%) said that constant tight deadlines at work also contributed to low PA (Cragg et al., 2007). Among Canadian professional and management workers, a greater percentage of people reported lack of time due to work and constant deadlines as significant barriers towards PA compared to those in lower status occupations (Cragg et al., 2007). In addition to these barriers, data from the 2006 PAM have also found that those working in professional jobs report greater work-life conflict and stress compared to any other occupation (Cragg et al., 2007). While these findings provide important insight into the perceived barriers among professional workers, we can only speculate that professional young adults also consider these as their most common barriers towards PA participation. Future research eliciting the salient beliefs about participating in regular PA is needed to further our understanding of the impact of entering a professional career on the PA behaviours of young adults.

**Benefits of Physical Activity for Professional Workers**

According to the 2006 PAM, the majority of Canadian workers agree (91%) that regular PA can help reduce work-related stress and drastically improve work productivity (89%). In addition, Canadian workers (88%) have reported that regular PA helps them recover more quickly from illness, and improves their overall effectiveness at work (85%) (Cragg et al., 2007). Despite these self-reported positive beliefs of PA, however, few studies have actually measured and evaluated the long-term work-related benefits of regular PA. One of the first studies to

document a meaningful relationship between PA and indices of work performance was conducted in 2004 by Pronk, Martinson, Kessler, Beck, Simon, and Wang. The study examined the effect of PA on days absent from work, work performance and interpersonal relationship with coworkers among a sample of 683 workers ages 20-69 years of age (Pronk et al., 2004). Findings revealed that moderate and vigorous PA had a positive association on overall job performance ( $\beta = 0.052-0.054$ ,  $P < 0.01$ ), but the effect was trivial. Furthermore, cardiorespiratory fitness, based on age, gender, height, weight, and frequency of weekly strenuous exercise, was associated with a reduction in the decrement of work performance related to how much work gets completed and how much extra time and effort is required ( $\beta = 0.21$ ,  $P = 0.03$ ) (Pronk et al., 2004).

In accordance with Pronk et al. (2004), Van Amelsvoort, Spigt, Swaen, and Kant (2006) conducted an 18-month prospective study investigating the relationship between leisure-time PA and absenteeism at work on a large sample of 8902 working adults. The authors found that active workers ( $> 2$  days/wk) reported significantly less sickness absence (OR = 0.87, 95%CI = 0.78-0.97) especially due to musculoskeletal disorders of the spine (OR = 0.62, 95%CI = 0.45-0.84) compared to inactive workers. Overall, workers who reported being active during leisure-time spent fewer days per year off work due to sickness (14.8 days vs. 19.5 days) compared to inactive workers (Van Amelsvoort, Spigt, Swaen, & Kant, 2006). The findings from these studies provide support for the benefit of regular PA in improving work related performance, but the findings must be interpreted with caution. First, both studies relied on self-reported PA measures and neither study distinguished between which jobs were most influenced by PA. Thus, the overall benefit of regular PA during the transition to professional employment remains largely unexplored.

### **The use of a Theoretical Framework**

Additional research information that identifies and quantifies the critical correlates of PA among young adults transitioning to the professional workforce is needed before launching intervention campaigns for this population (Baranowski, Anderson, & Carmack, 1998). Many correlates of PA participation among adults have been identified and collectively grouped into individual (e.g., age, gender, education level), psychological (e.g., attitude, self-efficacy, intention to exercise), behavioural (e.g., past exercise, health habits), social (e.g., social support, family influence), and environmental (e.g., facility accessibility, cost of programs) correlates (Dowda, Ainsworth, Addy, Saunders, & Riner, 2003; Pan et al., 2009; Trost et al., 2002). These correlates have been extensively reviewed in the literature, but they may not correspond entirely to the professional young adult population.

Another approach towards understanding the within-person reasons for changes in PA across a transition period is the use of a theoretical framework as an organizing mechanism for correlates of PA (Baranowski et al., 1998). Theoretical models applied to health research provide the framework necessary for understanding, measuring and identifying factors that determine health behaviours (Glanz, Marcus-Lewis, & Rimer, 1997). Thus, health interventions are thought to be best implemented from evidence using well-validated models of behaviour change (Baranowski et al., 1998; Rhodes & Pfaeffli, 2009). Several theories including the Health Belief Model (HBM), Bandura's Social Cognitive Theory (SCT), Fishbein and Ajzen's Theory of Reasoned Action (TRA), and Prochaska, Norcross and Diclemente's Transtheoretical Model have been frequently used to gain insight to the critical factors associated with individual health behaviours (Glanz et al., 1997).

## **The Theory of Planned Behaviour**

One well-validated theory that has been used extensively in the PA domain that has been shown to have predictive utility in understanding PA behaviour is Ajzen's (1991) Theory of Planned Behaviour (TPB) (Hagger, Chatzisarantis, & Biddle, 2002; Symons Downs & Hausenblas, 2005a). The TPB is an extension of Ajzen and Fishbein's (1980) Theory of Reasoned Action (TRA). The TRA suggests that intention, one's motivation or willingness to engage in a specific behaviour, is the most proximal determinant of human action (Ajzen & Fishbein, 1980). The TRA postulates that intention is influenced by two social cognitive variables: attitude and subjective norm (Ajzen & Fishbein, 1980). Attitude represents a person's positive or negative evaluation of performing a certain behaviour and subjective norm represents a person's evaluation of the perceived social pressures to perform the behaviour (Ajzen & Fishbein, 1980). Despite the success of the TRA in predicting numerous behaviours, it is limited to predicting volitional behaviours, whereby a person has complete power to adopt the behaviour (Ajzen & Fishbein, 1980). Prior research has recognized, however, that not all behaviours are completely volitional and external factors (e.g. illness, parenthood status, time constraints) that are, or are perceived to be, beyond complete volitional control also influence behaviour intentions (Ajzen, 1991). As a result, the Theory of Planned Behaviour (TPB) was created as an extension to the TRA to accommodate the nonvolitional factors that are potentially present in most behaviours (Ajzen, 2002b).

As seen in Figure 2, the TPB is a social-cognitive belief-based model. According to the TPB, the immediate antecedent of behavioural performance is an individual's intention to engage in the behaviour (Ajzen, 1991). Intention represents the motivational factors (e.g., willingness, desire, effort) that influence the likelihood of performing a behaviour. A strong intention to

engage in a volitional behaviour increases the likelihood that the behaviour will be performed (Ajzen, 1991). Behavioural intentions are a function of 3-constructs: an individual's attitude, subjective norm, and PBC. These three-constructs are ultimately shaped by one's behavioural, normative, and control beliefs towards engaging in a behaviour (Ajzen, 1991).

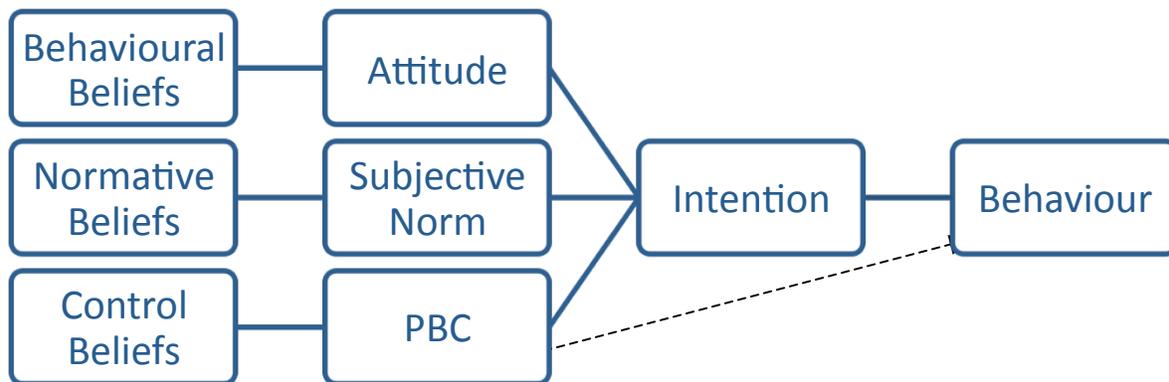


Figure 2. Constructs of Ajzen's (1991) Theory of Planned Behaviour.

Attitude refers to a person's positive or negative evaluation towards engaging in a specific behaviour (Ajzen, 1991). Attitudes can be divided into two distinct subcomponents: affective attitude (e.g. enjoyable/unenjoyable) and instrumental attitude (e.g. cost/benefit) (Ajzen, 1991). Behavioural beliefs shape one's attitude toward performing a behaviour and represent the perceived consequences or benefits of performing the behaviour (Ajzen, 1991). The TPB assumes that behaviours believed to produce desirable outcomes will be associated with a positive attitude, and behaviours believed to produce undesirable outcomes will be associated with a negative attitude (Ajzen, 1991).

The subjective norm construct refers to the perceived social pressure from important referent individuals that either facilitates or impedes the performance of a behaviour (Ajzen, 1991). Subjective norm has two distinct subcomponents: injunctive norm (e.g., important referents approve of the behavior) and descriptive norm (e.g., important referents engage in the

behavior themselves). Subjective norm is influenced by an individual's normative belief that important referent individuals or groups approve or disapprove of engaging in a specific behaviour (Ajzen, 1991). The belief that important referents (e.g., family, friends, physician) would approve of engaging in a certain behaviour combined with how much the person cares about the referent approval strongly increases one's intention to perform the behaviour (Ajzen, 1991).

The construct of PBC accounts for nonvolitional behaviours and represents the perceived ease or difficulty of performing a behaviour (Ajzen, 1991). PBC is shaped by the control beliefs people hold about performing a behaviour. Control beliefs represent one's evaluation of the difficulty or ease of engaging in a behaviour based on their perceived control over the resources, skills, and opportunities available for the specific behaviour (Ajzen, 1991). Control beliefs can be internal (e.g., lack of time, lack of confidence, perceived skill) or external (e.g., environmental, access to facilities) (Ajzen, 1991). According to the TPB, PBC is thought to influence behaviour directly or indirectly through behavioural intention.

In summary, the TPB assumes that people will form strong intentions to perform a behaviour when they perceive it is under their control, positively evaluate the behaviour, and believe that referent individuals and groups want them to engage in the behaviour (Ajzen, 1991). A strong intention to engage in a behaviour combined with a strong perceived behavioural control will increase the likelihood of performing that behaviour (Ajzen, 1991).

### **The Theory of Planned Behaviour in the Exercise Domain**

The TPB has been chosen for this study based on its predictive utility in identifying the key theoretical variables associated with PA behaviour (Hagger et al., 2002; Symons Downs & Hausenblas, 2005a). In 2002, Hagger et al. (2002) conducted a meta-analysis of the TPB and

exercise behaviour to determine the predictive validity to the TPB model in the exercise domain. Meta-analysis techniques were conducted on 72 studies to examine the influence of the TPB constructs on predicting PA behaviour. The results of the meta-analysis indicated that the TPB accounted for 44.5% of the variance in PA intentions and 27.4% of the variance in PA behaviour (Hagger et al., 2002). The meta-analysis found medium to large effect sizes for the intention-behaviour, attitude-intention, and PBC-intention associations (Hagger et al., 2002). Hagger et al. (2002) also confirmed that attitude ( $\beta = 0.40$ ), PBC ( $\beta = 0.33$ ), and subjective norm ( $\beta = 0.05$ ) were significant predictors of PA intentions. Overall, the authors found that attitude was the predominant influence on PA intention and highlighted that the immediate decision-making cognitions that shape intentions are important for understanding PA behaviour (Hagger et al., 2002).

Findings from a more recent meta-analysis of the TPB applied to exercise produced similar results with Hagger et al.'s (2002) previous TPB review (Symons Downs & Hausenblas, 2005a). Symons Downs and Hausenblas (2005a) conducted a meta-analytic review of 111 exercise studies that applied the TPB constructs to examine the predictive utility of the TPB constructs with exercise behaviour. The results found large effect sizes for intention-behaviour ( $ES = 1.01$ ), intention-PBC ( $ES = 0.90$ ), and intention-attitude ( $ES = 1.07$ ) (Symons Downs & Hausenblas, 2005a). Additionally, intention and PBC were found to explain 21.0% of the variance in exercise behaviour; however, PBC did not emerge as a significant predictor of behaviour (Symons Downs & Hausenblas, 2005a). Attitude, PBC and subjective norm accounted for 30.4% of the variance in intention with only the attitude-intention and PBC-intention associations emerging as significant, and attitude emerging as the strongest determinant of intention. These findings indicate that the strongest determinant of exercise behaviour is one's intention to perform the

behaviour, which is most strongly influenced by their attitude (Symons Downs & Hausenblas, 2005a).

### **Advances to the Theory of Planned Behaviour Framework**

Recent advances to the traditional 3-component TPB framework (attitude, subjective norm, and PBC) have supported the use of a multicomponent model to strengthen the predictive utility of the TPB in explaining exercise intentions and behaviour (Rhodes, Blanchard, & Matheson, 2006; Rhodes & Courneya, 2003a). The extended TPB model recognizes the multifaceted nature of each construct in the TPB and separates them into multiple components (e.g., Attitude - affective vs. instrumental attitude; Subjective Norm - descriptive vs. injunctive norm; PBC - skills/abilities, opportunities, and resources) (Rhodes et al., 2006). Empirical measurement of the predictive validity of the multicomponent TPB framework has found the attitude and PBC components to significantly predict exercise intention (Rhodes et al., 2006; Rhodes & Courneya, 2003a). In particular, Rhodes et al. (2006) found that the affective attitude component in the multicomponent TPB had the strongest effect on exercise intention ( $R^2 = .47$ ) and exercise behaviour ( $R^2 = .37$ ) compared to any other distinctive components.

The contribution of the affective component of attitude to the prediction of physical activity behaviour has gained recent attention. Affective attitude refers to the proximal emotional evaluations (e.g., enjoyment, fear, pleasure) of performing a certain behaviour (Lowe, Eves, & Carroll, 2002). Within the PA domain, affective evaluations are based on the immediate consequences of engaging in exercise (e.g., fatigue, muscle pain) and have been found to outweigh the more distal instrumental beliefs of the long-term benefits of being physically active (Lowe et al., 2002; Rhodes, Fiala, & Connor, 2010). In a recent meta-analysis of affective evaluations and PA, the affective component was found to have a robust medium effect on PA

behaviour (summary  $r = 0.42$ , 95%CI = 0.37-0.46) (Rhodes et al., 2010). In addition, meta-analytic procedures calculating the affective attitude-intention correlation using the TPB framework resulted in an even larger effect than PA behaviour (point estimate  $r = 0.65$ ) (Rhodes et al., 2010). Based on this evidence, the adoption of an affective component in the TPB model should enhance the predictive utility of the model in explaining PA intention and behaviour. In turn, a clear understanding of the antecedents of affective attitude can help develop targeted PA interventions that focus on positive affective experiences.

Overall, the TPB has demonstrated to be an efficacious theoretical framework for explaining intention and behaviour in the exercise domain, and has been chosen as the guiding framework for this study to evaluate the PA behaviours of professional young adults during the transition to their professional career. Applying the TPB to this investigation will help identify the key theoretical variables associated with PA during the transition to the professional workforce to help develop sound interventions targeting inactivity among professional young adults.

### **Summary of the Literature**

There is preliminary evidence indicating that life-transitions including postsecondary education, marriage and parenthood are the probable reason for the sharp decline in PA among young adults. After an extensive review of the literature, however, the existing research is rife with methodological inconsistencies. Numerous studies have reported cross-sectional between-person findings, used non-representative samples (e.g., women only), lacked theory-based research, and lacked consistent use of well-validated and reliable measures of PA (Bellows-Riecken & Rhodes, 2008). Thus, sound scientific conclusions about the overall impact of life-transitions on PA patterns of young adults remain heavily undetermined.

To my knowledge, no prior research has examined the relationship between PA status and the transition to the professional workforce among a representative sample of young adults, ages 25-44. The overall contribution of occupation characteristics (e.g., long work hours, job demands) on PA status of the general population has indicated that those employed in professional occupations are not compensating for their low on-the-job activity and long work hours by being more active during leisure-time (Kirk & Rhodes, manuscript in review; Shields, 1999). Thus, an evaluation of what professional occupation variables influence the PA patterns among young adults seems prudent given the potential number of years they will spend in their professional career before retirement. Future studies that measure PA patterns prior to, during, and after a transition would provide sound evidence of the within-person reasons for changes in PA. Additionally, the use of a leading social cognitive model can provide the framework necessary for understanding, measuring, and identifying factors that determine PA behaviour among this at risk population. Therefore, the purpose of this study was to evaluate the PA behaviour of young adults transitioning to the professional workforce by applying a leading social-cognitive theory (Ajzen's TPB) to identify the key theoretical variables associated with PA during the transition to the professional workforce. This study expands the existing literature examining the influence of life-transitions on PA behaviour among young adults by evaluating PA behaviours across the transitions period to the full-time professional workforce using elements of longitudinal retrospective recall. Results from this study can help inform future health intervention programs aimed at increasing PA among new young professionals entering their career.

### **Chapter 3: Methodology**

The purpose of this study was to describe and analyze the relationship between PA and the transition to the professional workforce among young adults using a well-validated theoretical framework. The following methodology section will be divided into two separate studies. The purpose of Study 1 was to help develop the questionnaire that was used in the Study 2. The first section provides a detailed description of Study 1 and includes the study design, participant characteristics and recruitment procedures, and instrumentation. The second section describes the detailed methodology for Study 2 and includes the study design, participant characteristics and recruitment strategy, outcome measures and instruments used, and statistical analysis plan. Please refer to Appendix A for a detailed timeline outlining the process of this study.

#### **Study 1: Theory of Planned Behaviour Beliefs Elicitation Pilot Study**

##### ***Study Design***

A theory-based qualitative study was conducted using the belief elicitation procedures recommended by Ajzen's (2002a) protocol for developing a TPB questionnaire. According to Ajzen (2002a), constructing a tailored questionnaire requires that pilot work be conducted to identify the modal salient beliefs towards participating in PA commonly held by the target population. An elicitation study ensures that the TPB belief constructs are representative of the population, helps provide a better understanding of the psychosocial and cognitive determinants of PA among a target population, and ensures that the TPB's predictive utility towards understanding PA intention and behaviour is not compromised (Ajzen, 2002a; Symons Downs & Hausenblas, 2005b).

According to a systematic review of elicitation studies and the TPB, Symons Downs and Hausenblas (2005b) found large associations between the elicited beliefs and TPB constructs.

The elicited beliefs demonstrated to have a large magnitude of effect with the TPB constructs and explained 34-56% variance in attitude, subjective norm, and perceived behavioural control constructs (Symons Downs & Hausenblas, 2005b). This finding is important to help identify the factors that impede or facilitate attitudinal, subjective norm, or perceived behavioural control changes toward PA behaviour, and support the applicability of the TPB for understanding and explaining PA behaviour (Symons Downs & Hausenblas, 2005b). Despite the support of elicitation studies in helping to explain PA behaviour, however, a lack of information regarding the elicitation study methods and participant characteristics was found among the majority of studies. As recommended by Symons Downs & Hausenblas (2005b), detailed elicitation studies that include the methodology and participant characteristics are needed to 1) ensure correspondence between the elicitation and the TPB study participants is adequate, and 2) help future researchers replicate the measures in future studies.

### ***Participants***

Participants for this study were delimited to a pilot sample of professional young adults, ages 25-44, who completed doctoral education within the past 5-years and were currently employed as new full-time faculty members at a Western Canadian University affiliated with the Association of University and Colleges of Canada. The age range of the participants was based on 1) current research indicating that declines in PA extend into middle- and older-adulthood and 2) considerations of the length of time required to complete doctoral education. It is important to note that no standardized definition of or span of the early career transition period exists within the literature. Based on considerations that those completing doctoral education may choose to travel or take time off before entering their professional career, a 5-year transition period was chosen. Additionally, faculty members were chosen as the leading example of a professional

occupation associated with high levels of stress, the highest number of work hours per week and lowest on-the-job activity based on prior research (CAUT, 2007; Jacobs & Winslow, 2004; Shields, 1999; Wilbur et al., 1999).

### ***Recruitment Procedure***

This study met the requirements for ethical approval from the academic institution in which the participants were recruited. Contact with eligible participants was made via an appointed proxy (e.g., departmental secretary) neutral to the study. A pre-notice phone call to the Human Resource department at the University was made to request that the contact information of eligible participants be sent directly to the appointed proxy to ensure the privacy and confidentiality of the participants was protected. Upon retrieval of the contact information of newly hired faculty members, the appointed proxy sent a notice of research, consent form, and study invitation via email to each newly hired faculty member at the University inviting them to participate in a focus group session (See Appendix B and C). Participants unable to attend the focus group sessions were given the opportunity to complete an in-person or phone interview with the primary investigator. Since this study was exploratory in nature, in-person interviews were conducted in addition to the focus groups to ensure saturation of the beliefs responses (Vaughn, Schumm, & Sinagub, 1996). Two reminder emails were sent 3-days and 7-days after the initial email to obtain a maximum participation rate at the focus group sessions. As a final attempt to obtain a high response rate, the appointed proxy sent a hard-copy study invitation and consent form to new faculty members through on-campus mail. Interested participants were instructed to contact the primary investigator directly by email or phone to confirm their attendance at a focus group or interview session. The primary investigator sent a confirmation

email to interested participants indicating the time and location of the focus group session or interview.

### ***Instrumentation***

The focus group and interview questions used the belief elicitation procedures recommended by Ajzen (2002). In accordance with the recommendations from Ajzen (2002) and Symons Downs & Hausenblas (2005b), the questions were designed to elicit the salient behavioural, normative, and control beliefs of engaging in 30 minutes of moderate to vigorous PA at least four times per week over the next month. This is in accordance with the PHAC (2003) PA guidelines. All questions used an open-ended format to ask participants about the advantages and disadvantages of participating in PA, whether important referent groups would approve or disprove of them participating in PA, and what facilitating and impeding factors would influence participation in PA (See Appendix D).

## **Study 2: Canada-Wide Physical Activity and Theory of Planned Behaviour Questionnaire**

### ***Study Design***

This study followed a descriptive epidemiological research design to explore the patterns of leisure-time PA among young adults in transition to the professional workforce. This study conducted primary analysis of cross-sectional data from a Canada-wide sample of new professionals employed as academic professors. In addition, an element of longitudinal retrospective recall measuring PA was employed to investigate the within-person patterns of PA during the early career transition. All data were obtained through a self-administered online questionnaire.

### ***Participant Characteristics***

Participants were delimited to a minimum of 180 young adults, ages 25-44, who completed doctoral education and were currently employed as a faculty member within the past five-years at an accredited university or college that has membership with the Association of Universities and Colleges of Canada (AUCC). Participants currently employed as faculty members have been chosen as the burgeoning example of a sedentary professional occupation based on current evidence that academic occupations are associated with low on-the-job PA and a high number of work hours per week (CAUT, 2007; Jacobs & Winslow, 2004; Shields, 1999; Wilbur et al., 1999). Leaving full-time education and entering the workforce is considered a key transition, however, a standard induction phase for new academia professionals has not been identified in previous research. Therefore, this study proposed the first five-years of employment as the acceptable time frame reflecting a transition period.

Furthermore, participants for this study were limited to professional young adults who were designated as full-time employees ( $\geq 35$ hrs/week). Professionals who worked part-time or

were completing an un-paid internship were not included in this study because their PA patterns may have differed as a result of fewer work hours and not the transition to the professional workforce itself.

### ***Justification of Sample Size***

The proposed minimum sample size ( $N = 180$ ) was based on the main repeated measures design for **H<sub>1</sub>**. The G-Power Analysis Program (Erdfelder, Faul, & Buchner, 1996) was used to calculate an *a priori* power analysis considering Cohen's (1988) medium effect size ( $f^2 = .20$ ), power of 0.8, and an alpha set to  $p < 0.05$  (correlation among factors  $r = .70$ ). Based on these parameters, a minimum sample size of 180 participants was obtained for the study to provide ample testing power (Cohen, 1988).

Based on the multiple regression analysis for **H<sub>2</sub>**, a power analysis set with similar criteria considering Cohen's (1988) medium effect size ( $R^2 = 0.20$ ), power of 0.8, an alpha set to  $p < 0.05$ , and 5 TPB predictor variables requires a sample size of  $N = 58$  (Cohen, 1988). Therefore, the proposed sample size for **H<sub>1</sub>** was adequate to address the **H<sub>2</sub>** research aims.

### ***Recruitment Procedure***

Prior to recruitment for the study, ethical approval for this research study was obtained from the University of Victoria Human Research Ethics Committee. Eligible participants were contacted by an appointed proxy (See Appendix E). First, the Canadian Association of University Teachers was contacted by phone. A detailed description of the study was given and the CAUT was asked if they would be willing to act as the proxy by sending the recruitment materials to the CAUT members. Second, the HR departments of all English-speaking institutions associated with the AUCC were contacted by phone to see if they would be willing to send the recruitment materials to new faculty members via a list-serve email to inform them of

the study. A follow-up phone call to each HR department was conducted after seven days if no response to the email was given. As a final approach, 6 randomized universities were selected based on region (i.e., Western, Central, Eastern Canada) and faculty size (i.e., medium 500-1000 faculty; large >1000 faculty). Manual search of personal email addresses was conducted and recruitment of participants was made via an appointed proxy from the University of Victoria.

Contact with eligible participants was made following a modified version of Dillman's (2007) Tailored Design Method (TDM) for mail and internet surveys (Dillman, 2007). The Tailored Design Method (TDM) is an extension of Dillman's (1978) Total Design Method that follows specific criteria for conducting successful self-administered questionnaires. This method considers the unique features of the survey situation and provides implementation procedures designed to reduce four types of survey error (e.g., coverage, sampling, measurement, and non-response) (Dillman, 2007). The TDM is based on considerations of social exchange and assumes that 1) the likelihood of responding to a questionnaire is enhanced when the respondent perceives that the rewards of responding will outweigh the anticipated costs, and 2) multiple attempts must be made to achieve meaningful response rates (Dillman, 2007). Surveys that adhered to the Total Design Method have produced response rates from 58-92%, with an average response rate of 74% (Dillman, 1978). Dillman (1978) found that survey response rates were highest when all elements of the Total Design Method were implemented, however, those that only used partial components of the Total Design Method had lower response rates. Because this study will employ a modified version of the Dillman's (2007) revised TDM, an expected response rate of 25% seems achievable.

Eligible participants were sent three emails. First, participants were sent a study pre-notice email that informed them of the study, explained how their participation would be beneficial, and

acknowledged that their time spent completing the survey was greatly appreciated (Dillman, 2007). A formal notice of research and study invitation was attached to the email (See Appendix F, G, H). According to Dillman (2007), sending a pre-notice letter 2-3 days before the survey establishes a positive impression of the survey and increases the likelihood that the recipient will connect the memory of the initial contact with the second contact.

After 2-3 days, a second email containing the online survey link that also includes a detailed cover letter outlining why a response to the survey is important was sent (See Appendix I). Ineligible participants (e.g., those who completed doctoral education greater than 5-years ago, those not within the predefined age-range) were screened out in the first 3-questions of the survey to ensure that only those meeting the eligibility criteria completed the survey. Participants were assured that the online questionnaire used encrypted software that required a password only known by the primary investigator. A detailed outline of the study was provided and online implied consent was obtained from participants prior to completing the survey. Additionally, participants were notified that participation in the study was completely voluntary and they reserved the right to refuse to answer any question. Participants were assured that their individual records were kept in a secure location in the Behavioural Medicine Laboratory at the University of Victoria, and their individual results would remain confidential and not be discussed with anyone other than the primary investigator and academic supervisor.

One week after the online survey link was emailed, participants received a third email expressing appreciation for responding, and a reminder that if the questionnaire has not yet been completed it is hoped that it will be completed soon (Dillman, 2007). This 3<sup>rd</sup> contact included the online survey link and alternate ways to respond to the survey (See Appendix J). A hard-copy

of the questionnaire was made available for participants if they wanted to print it and resend via facsimile or a mail. The reminder email thanked participants for their time and consideration.

A final contact was made after all data had been collected. The email thanked participants for their time and consideration of the study. This point of contact helps participants feel appreciated for their involvement (Dillman, 2007).

### ***Measurement and Instrumentation***

#### *Basic Demographics and Health Indicators*

Basic demographics were obtained for each participant via self-reported measures of age, gender, ethnicity, marriage and parenthood status (See Appendix K). Health indicators included smoking status, prevalence of chronic diseases, and a self-rated overall health status using a modified version of the 36-item Short-Form Health Survey (SF-36) (McHorney, Ware, Lu, & Sherbourne, 1994; Ware & Gandek, 1998). The SF-36 is a multi-purpose health survey that has been used in over 400 publications as a useful tool that measures the functional health and well-being, including physical and mental health, and the overall evaluation of health of the target population (McHorney et al., 1994; Ware & Gandek, 1998). The SF-36 has been extensively documented as a valid and reliable measure of health status among various populations (McHorney et al., 1994; Ware & Sherbourne, 1992). Brazier, Harper, Jones, O’Cathain, Thomas, Userwood, et al. (1992) published a validation study of the SF-36 health survey administered to 1582 patients ranging from 16-74 years. Overall, the SF-36 was found to have a high internal consistency (Cronbach’s  $\alpha > 0.85$ ) (Brazier et al., 1992). Social functioning was found to have the lowest reliability coefficient of 0.74. In addition to the internal consistency measures, the test-retest reliability of the items ranged from 0.60-0.81 indicating excellent reliability (Brazier, et al., 1992). In another evaluation of the SF-36 survey on 3445 patients and 24 subgroups,

McHorney et al. (1994) found the SF-36 health survey to have high data completeness (96%), high item-discriminant validity evaluated by multiple scaling techniques (92% passed), and high scaling success. Reliability coefficients ranged from 0.65-0.94 with a median of  $r^2 = 0.85$ .

Overall, the results support the applicability of the SF-36 health survey to measure health status among heterogeneous populations.

### *Time Use*

A modified version of the 2005 Canadian General Social Survey on Time Use was used to obtain information on the time use of the participants (Statistics Canada, 2006). Participants were asked to report the total number of hours spent doing 1) paid work-related activities (e.g., work, checking emails), 2) unpaid-work related activities (e.g., childcare, grocery shopping), 3) leisure activities (e.g., social events, physical activity), and 4) personal care (e.g., meals, sleep, grooming). Time use estimates were based on information reported for a 24-hour time period. The total number of hours spent in each activity was averaged over a 7-day and a 5-day period based on previous recommendations (Statistics Canada, 2006). The Time-Use Diary is a comprehensive accounting of participation in a variety of important day-to-day activities (Statistics Canada, 2006). Information about the decisions people make about where their time is allocated can help inform policy makers and employers about how to improve work or family conditions. Thus, this study used a modified version of the Time-Use Diary to help highlight the decisions of new professionals about dividing their time between work, family, leisure, and personal care (Statistics Canada, 2006).

### *Physical Activity Behaviour*

Currently, no universally accepted self-report measure of PA exists, and there remains great debate as to which self-report method best captures accurate PA levels (van Poppel,

Chinapaw, Mokkink, Mechelen, & Terwee, 2010). While self-report measures of habitual and lifetime PA may provide a more accurate and valid measure of PA across the transition to the professional workforce (e.g., Lifetime Total PA Questionnaire, Past Year Total PA Questionnaire), the length and detail of these questionnaires may cause further burden to overworked new professionals (Friedenreich, C.M., Courneya, K.S., & Bryant, H.E., 1998; Friedenreich, C.M., Courneya, K.S., Neilson, H.K., Matthews, C.E., Willis, G., Irwin, M. et al., 2006). Therefore, for this study, PA was assessed using a modified version of the Godin Leisure Time Exercise Questionnaire (GLTEQ) (Godin & Shephard, 1985) based on its practicality, applicability, and ease of administration to a large sample size, and for its prior frequency of use in TPB research (Symons Downs & Hausenblas, 2005a). The original GLTEQ is a 3-item query of the frequency, duration, and intensity of PA, which includes detailed intensity descriptors (Godin & Shephard, 1985). The modified GLTEQ assessed usual PA performed for a minimum duration of 30 minutes during leisure-time in a typical 7-day period, which is in accordance with the PHAC (2003) minimum PA recommendations. The modified GLTEQ used a three-item query relating to the frequency and average duration measured in minutes of mild, moderate, and strenuous activity; activity descriptors and intensity descriptors were included. The modified GLTEQ assessed the average frequency, duration and intensity of PA during a typical week at three different time periods to capture the patterns of PA across a transition period:

**Time 1** PA during the last year of undergraduate education;

**Time 2** PA during the last year of doctorate education;

**Time 3** Current PA within the last 7-days (See Appendix K).

*Mild* PA was defined as activities requiring minimal effort such as golf, bowling, and easy walking; *moderate* PA referred to activities that are not exhausting, but cause light perspiration

such as baseball, tennis and easy swimming; *strenuous* activity referred to activities such as running, soccer, and cross country skiing, that cause the heart to beat rapidly and heavy perspiration (Godin & Shephard, 1985).

The GLTEQ has typically measured PA activities over short durations (e.g., 1-month recall), but it has no specified time component suggesting it could be used to measure greater durations of recall (Kriska & Caspersen, 1997). Therefore, this study used both short and long durations of PA recall to assess PA patterns across the early career transition. Previous reliability studies of the GLTEQ indicated that the test-retest reliability correlation coefficients are highest for moderate and strenuous activities (Godin & Shephard, 1985). A reliability study conducted by Godin & Shephard (1985), showed the correlation coefficients between the first test and a two-week retest for moderate activity ( $r^2 = 0.46$ ), strenuous ( $r^2 = .94$ ), and total activity score ( $r^2 = .74$ ) were adequate. Additionally, one-month retest reliability showed that the correlation coefficients were significant for moderate ( $r^2 = .36$ ), strenuous ( $r^2 = .84$ ), and total activity score ( $r^2 = .62$ ) (Jacobs, Ainsworth, Hartman, & Leon, 1993). Validation studies of the GLTEQ with maximum oxygen consumption ( $VO_2\max$ ) indicated that the Pearson product moment correlations were significant for strenuous  $VO_2\max$  ( $r = .38$ ) and total  $VO_2\max$  ( $r = .24$ ) (Godin & Shephard, 1985). Furthermore, the total GLTEQ score was validated against the kcal estimates from the Caltrac activity monitor and NASA physical activity status survey. The Spearman correlations were ( $r = .45$ ) and ( $r = .54$ ) respectively (Miller, Freedson, & Kline, 1994). In addition to these reliability and validity studies, the GLTEQ has been used successfully in several studies examining PA behaviour (Kriska & Caspersen, 1997; McIntyre & Rhodes, 2009).

### *Theory of Planned Behaviour Questionnaire*

The TPB constructs of attitude, social norm, and perceived behavioural control were assessed using Ajzen's (2002a) validated items and the elicited beliefs identified in the pilot work outlined above (See Appendix K). The developed TPB questionnaire was phrased in accordance with the PHAC minimum recommended guideline of 30 minutes of moderate or vigorous PA at least four times per week (PHAC, 2003).

### *Attitude towards PA*

Attitude towards PA was defined as one's overall evaluation of engaging in regular PA, and was comprised of two separable components: *affective attitude* (e.g., pleasant-unpleasant, enjoyable-unenjoyable) and *instrumental attitude* (e.g., important-unimportant, harmful-beneficial). Empirical evidence in the exercise domain has confirmed the utility of measuring two distinct components of attitude (Rhodes & Courneya, 2003a). For this study, the affective component was measured by three items: enjoyable-unenjoyable, pleasant-unpleasant, exciting-boring. For the instrumental component, three items were measured: useful-useless, beneficial-harmful, and wise-unwise. The attitude scale was measured on a 7-point bipolar scale (1 = extremely harmful, 7 = extremely beneficial) suggested by Ajzen (2002a). For the elicited behavioural beliefs, the following statement preceded each behavioural belief adjective: "For me, engaging in regular physical activity over the next month would be" (Ajzen, 2002a).

### *Subjective Norm*

Based on Ajzen's (2002a) protocol, subjective norm was measured by assessing both injunctive and descriptive components of subjective norm to ensure a high degree of internal consistency. For this study, both components of subjective norm were measured using a 7-point bipolar scale (1 = strongly disagree, 7 = strongly agree). Three items measured the injunctive

components of subjective norm: “People who are important to me would want me to,” and “People who are important to me would approve of me,” and “I feel pressure to be regularly physically active over the next month from people who are important to me.” Two items measured the descriptive components of subjective norms: “Most people who are important to me will engaging regular physical activity themselves over the next month,” and “Most people important to me, whose opinions I value, are regularly active” (Ajzen, 2002a).

### *Perceived Behavioural Control*

Based on Ajzen’s (2002a) protocol, PBC is typically measured using two distinct item clusters; self-efficacy and controllability. However, previous research has found that self-efficacy item clusters result in factor complexity between PBC and intention as a result of measurement redundancy (Rhodes & Courneya, 2003b; Rhodes & Courneya, 2004). Rhodes and Courneya (2003b) posit that self-efficacy items capture motivation outside of volitional control (e.g. skills, resources) and are somewhat redundant measures of intention. Therefore, Rhodes and Courneya (2003b) suggested that measures of PBC should include phrases that hold motivation as a positive constant. To ensure PBC will be measured cleanly, the recommendations by Rhodes and Courneya (2003b) were followed.

For this study, PBC/control beliefs were measured by four questions using a 7-point bipolar scale. The four questions were: 1) “If you really wanted to, engaging in regular physical activity over the next month is entirely up to you” (1-strongly disagree to 7-strongly agree); 2) “If you really wanted to, how easy or difficult would it be for you to engage in regular physical activity over the next month?” (1-extremely difficult to 7-extremely easy); 3) “If you really wanted to, how controllable would it be for you to engage in regular physical activity over the next month?” (1-extremely uncontrollable to 7-extremely controllable); 4) “If you really wanted

to, how confident do you feel that you could engage in regular physical activity over the next month?” (1-extremely unconfident to 7-extremely confident) (Ajzen, 2002a; Rhodes & Courneya, 2003b).

### *Intention*

Participants’ intentions to be physically active for at least 30 minutes 4 times per week over the next month were measured by four items using a 7-point bipolar scale. These items were: 1) “How motivated are you to engage in regular physical activity over the next month?” (1 – extremely unmotivated to 7-extremely motivated); 2) “I plan to do everything I can to engage in regular physical activity over the next month” (1-extremely untrue to 7-extremely true), 3) “I intend to engage in regular physical activity over the next month” (1-strongly disagree to 7 – strongly agree) (Rhodes, Blanchard, Matheson, & Coble, 2006). To ensure the intention item in the TPB questionnaire corresponded with the GLTEQ, one item was measured: “I intend to engage in 30 minutes of regular physical activity \_\_\_\_ **times per week** over the next month” (Courneya, 1994).

### *Analysis Plan*

#### *Qualitative Analysis Plan*

A content analysis procedure based on the recommendations of Ajzen (2002a), Morse, Barrett, Mayan, Olson, & Spiers (2002), and Patton (2002), was conducted by the primary investigator and a research assistant. Due to the number of participants who completed an in-person interview ( $n = 10$ ) in lieu of attending a focus group session ( $n = 8$ ), the analysis plan followed two separate procedures. First, all available elicited beliefs from the focus group sessions were independently extracted and coded by the PI and a research assistant. Second, any additional beliefs not mentioned in the focus groups, but stated in the in-person interviews, were

extracted and highlighted. Priority was given to the focus group responses based on the initial study design. Similar responses given in both focus groups achieved the highest ranking. Third, elicited beliefs were then independently coded into themes and rank-ordered 1) based on the presence of mention in the 2 focus groups and 2) presence of mention by the in-person interviews (Ajzen, 2002a). Fourth, 100% congruence on the elicited salient beliefs and themes was obtained by the PI and research assistant. Elicited beliefs and themes were then ranked based on achieving a maximum total of 12 (2 focus groups and 10 interviews). The 8-10 most common behavioural, normative, and control belief based items were integrated into the TPB questionnaire that was administered to the target population in Study #2 based on recommendations by Ajzen (2002a) (See Appendix K).

### ***Quantitative Analysis Plan***

#### *Data Screening and Cleaning*

Quantitative analysis of the data was conducted using the Statistical Package for the Social Sciences (SPSS) version 18.0 for Windows with statistical significance set at  $p < 0.05$ . All data were collected, coded, cross-checked and cleaned by the primary investigator prior to statistical analysis. Initial cleaning of the data was completed by conducting a manual check for data input mistakes and exploring the histograms and frequency box-plots. Next, the normality of distribution among the TPB and PA outcome variables was assessed by converting the skewness and kurtosis statistics to absolute  $z$ -scores. A skewness value greater than 1.96 and outliers larger than 3.29 were detected and remedied (Field, 2005). All outlier scores with a  $z$ -score value greater than 3.29 were rearranged and converted back from a  $z$ -score of 3.00 to fall within an acceptable range (Field, 2005). Among the TPB variables, only the aggregated instrumental attitude construct was negatively skewed ( $S = -2.069$ ), and had three extreme outliers. The

correction applied to the aggregated instrumental attitude construct resulted in an acceptable skewness statistic of -1.85. To assess PA outcome variables, PA was categorized as total weekly frequency for a minimum of 30 minutes of moderate, 20 minutes of strenuous and combined moderate-vigorous PA (MVPA) for all time periods measured based on the PHAC's (2003) minimum PA guidelines. All PA outcome variables had a normal distribution.

### *Descriptive Statistics Analysis*

Descriptive statistics of demographic variables, TPB variables, and PA outcome variables were calculated for each individual and included the means, standard deviations, and skewness and kurtosis values. Prior to hypothesis testing, a correlation matrix of basic demographics and health indicators with PA as the outcome measure was examined to determine the correlates of PA. Correlations that were significant at the  $p < 0.05$  level will be included in subsequent analysis of covariance (ANCOVA).

### ***Research Objective #1: Physical Activity Status Across the Employment Transition***

To evaluate  $H_1$ , a within-person repeated measures analysis of variance (RM ANOVA) was employed to compare the main effect of time on PA levels across the three specified time periods:

**Time 1)** PA during the last year of undergraduate education;

**Time 2)** PA during the last year of doctoral education;

**Time 3)** Current PA within the last 7-days.

PA was categorized based on the total weekly frequency of each PA intensity based on the PHAC's (2003) PA recommendations of at least 20 minutes of vigorous or 30 minutes of moderate PA. Following this statistical procedure, post-hoc analysis using a Bonferroni correction ( $p/3 = 0.016$ ) was conducted to reduce Type-I error and evaluate pairwise differences

among PA variables during each time period (Field, 2005). Follow-up paired samples *t*-tests were conducted to determine if the PA means differed reliably from each other.

### ***Exploratory Research Objective #1***

To determine if certain sociodemographic profiles were potential covariates or moderators of PA behaviour RM ANCOVAs were conducted. Significant main effects of time period and sociodemographic variable including interaction effects on PA status were determined. Post-hoc multiple comparisons using a Bonferroni correction were conducted to evaluate if pairwise differences among PA means were evident. Next, paired samples *t*-tests were conducted to determine if the PA means of each sociodemographic variable differ reliably from each other.

### ***Research Objective #2: Theory of Planned Behaviour Correlates***

Prior to hypothesis testing, the internal consistency of the TPB construct variables was determined using Chronbach's alphas. The PBC subscale ( $\alpha = .88$ ), intention subscale ( $\alpha = .86$ ), affective attitude ( $\alpha = .87$ ), instrumental attitude subscale ( $\alpha = .85$ ), and descriptive norm subscale ( $\alpha = .86$ ) were found to be highly reliable. The injunctive norm subscale ( $\alpha = .62$ ) was found to be less reliable than the other TPB variables.

To evaluate the  $H_2$ , multiple regression analyses were conducted to predict total MVPA frequency, and PA intention. Based on recommendations by Ajzen (1991), a hierarchical multiple regression analysis was performed to predict PA behavior. MVPA frequency was first regressed on intention and perceived behavioural control as the prediction variables in block 1, followed by the remaining TPB constructs (i.e. affective and instrumental attitude, injunctive and descriptive norm) in block 2 (Ajzen, 1991). To predict PA intention, a standard multiple regression analysis was performed where PBC, affective attitude, instrumental attitude,

injunctive norm, and descriptive norm were entered simultaneously as predictor variables for intention.

It is important that the sample size be sufficiently large enough to ensure it represents the population from which it is drawn. Additionally, it is recommended that the participant-to-variable ratio of 10:1 be followed to prevent spuriously high correlations (Thomas, Nelson, & Silverman, 2005). Therefore, the obtained sample size ( $N = 267$ ) was deemed adequate to sufficiently address these concerns.

### ***Exploratory Research Objective #2***

The proportion of participants meeting the PHAC (2003) PA guidelines during each time period measured was calculated. To determine if the proportion of those meeting Health Canada's minimum PA guidelines significantly differs across time a Cochran's  $Q$  test, followed by pairwise comparisons using a Bonferroni correction ( $p = .05/3 = .0167$ ) was conducted.

Next, to determine if PA behaviour could be predicted and differentiated between those who maintain their PA habits across time, as defined by meeting PHAC's national guidelines, from those who do not using the TPB framework, a discriminant function analysis (DFA) followed by univariate ANOVA and post-hoc tests using a Bonferroni correction were conducted. Since this study was the first to assess whether the TPB constructs can predict PA group membership of new professionals, all TPB variables were entered into the DFA analysis simultaneously to determine the strongest TPB predictors. This procedure is in line with prior DFA research (Rhodes, Courneya, & Jones, 2003; Rhodes & Plotnikoff, 2006; Rhodes, Plotnikoff, & Courneya, 2008). The DFA analysis assessed whether TPB constructs could predict group membership into PA classifications over time (e.g., continuously active, never active, active before profession but inactive at present). An *a priori* power analysis considering

Cohen's (1992) medium effect size ( $f^2 = .20$ ), a power of  $\beta = .80$ , and an alpha set at  $p < .05$  was calculated to determine appropriate sample sizes (Erdfelder et al., 1996). Based on these parameters, a minimum sample of 45 participants per group was necessary to determine a meaningful effect. An  $F$  test (using Wilks' Lambda) was used to determine the significance of the discriminant model and which TPB variables were the best predictors of PA behaviour.

## Chapter 4: Results

### **Study #1: Theory of Planned Behaviour Beliefs Elicitation Pilot Study**

#### *Participant Response Rate*

A total of 88 new faculty members were identified by the institution's human resource department. Of these, 14 email addresses were not provided, yielding 74 potential participants. After the study invitation emails were sent, 3 faculty members indicated they were not in the appropriate age category and 3 faculty members indicated they were on leave for the year. A total of 18 participants (12 female and 6 male) completed either the focus group sessions ( $n = 8$ ) or an in-person interview ( $n = 10$ ) making the response rate 26.5% of eligible participants. Descriptives for the sample are presented in Table 1.

Table 1

*Pilot Study Participant Characteristics (N = 18)*

<b>Variable</b>	<b>N, (%)</b>
<i>Demographics</i>	
Age 25-39	15, 83
Age 40-44	3, 17
Female	12, 67
Caucasian	11, 61
<i>Occupation Characteristics</i>	
Full-time Faculty	16, 89
On Sabbatical	2, 11
<i>Faculty/Field of Study</i>	
Humanities	5, 28
Social Sciences	4, 22
Education	3, 17
Engineering	2, 11
Business	2, 11
Medicine	1, 5
Other	1, 5

### ***Behavioural Beliefs***

A total of 163 elicited behavioural ( $n = 59$ ), normative ( $n = 17$ ), and control beliefs ( $n = 87$ ) were mentioned in the study. Of the 59 behavioural beliefs elicited, 40 advantageous and 19 disadvantageous beliefs were mentioned. For normative beliefs, a total of 17 beliefs were elicited with 13 approving referents and 4 disapproving referents being mentioned. For control beliefs, a total of 87 beliefs (32 enabling and 55 limiting) were elicited. The 163 elicited beliefs were collapsed into a total of 45 behavioural ( $n = 16$ ), normative ( $n = 9$ ), and control ( $n = 20$ ) themes based on recommended content analysis procedures (Ajzen, 2002a; Morse et al., 2002; Patton, 2002) (See Table 2).

A total of 16 behavioural themes emerged from the data with the most common theme being the belief that regular PA improves overall work productivity/effectiveness (11 out of 12 documents). Several elicited beliefs (e.g., improves my writing, improves my teaching performance) were included in this category. In addition, improvements in long-term health and stress management were important themes that emerged from the raw data. Long-term health benefits included beliefs pertaining to physical health benefits (e.g., cardiovascular health, weight management, disease prevention). Stress management included various beliefs about regular PA being an ideal way to prevent burnout, and reduce work-related stress. Other important behavioural themes that emerged included the theme that it made participants feel good (e.g., helps me have a more positive disposition, makes me happy, builds my self-confidence/esteem), takes too much time away from other obligations (e.g., work demands, parental roles, relationships), and is a hassle/inconvenience during the day (e.g., inconvenient when travelling to conferences, takes time to change out of professional clothes).

A total of 9 normative themes emerged from the raw data and indicated that family members (e.g., parents, siblings, spouse) were the most common important referent. In addition, spouse/partner was a uniquely mentioned important referent that was closely followed by colleagues and children. Of interest, observing others within the community be active (e.g., run clubs, boot camps, people on walking trails) was an important normative belief for participants.

Of the 20 control themes that emerged, lack of available time was the most common theme mentioned by participants. This was followed by the control belief that a lack of a consistent schedule (e.g., no 9-5 job, work on weekends, no scheduled lunch, unexpected deadlines) strongly impeded PA participation. Heavy work demands/responsibilities emerged as an important control theme that impeded PA participation and included beliefs such as heavy amounts of marking, course planning, meetings, and examination preparation. Pre-existing injuries and health issues (e.g., back pain, stress fracture) also emerged as a common control based theme that prevented participants from engaging in regular PA. Of particular interest, other professional aims (e.g., aiming for tenure, publications, conference attendance, service) emerged as a unique control based theme that impeded PA participation. Participants emphasized that entering into their new career was associated with high levels of external and self-imposed pressure to achieve seniority or a higher status (e.g., tenure track) to establish job stability over time.

Other important themes that emerged included simply not feeling up to exercising, and currently going through other major life-transitions (e.g., marriage, parenthood, change of career). Several participants felt strongly that after a long day of work, the last thing they wanted to do was place additional physical stress on their body through exercise. Instead, several participants indicated that they would rather enjoy a glass of wine, spend time with their spouse,

or read a book. Furthermore, a considerable number of participants stated that they were currently trying to cope with other major life transitions, which negatively impacted their availability and motivation to engage in PA. Two of the participants were in their 2<sup>nd</sup> trimester of pregnancy, three participants indicated that they had recently gotten married, and four participants mentioned they had relocated and changed jobs. Overall, the top 8-10 elicited beliefs from each category were subsequently included in the targeted TPB survey used in Study 2.

Table 2

*Themes of Elicited Behavioural, Normative, and Control Beliefs for Engaging in Physical Activity (N = 45)*

	Ranking <sup>a</sup>
<b>Behavioural Beliefs</b>	
<i>Advantages</i>	
Makes me more effective/productive in my work (e.g. teaching, research)	11
Improves long-term health <sup>b,c</sup>	10
Stress management/Prevents Burnout <sup>c</sup>	10
Makes me feel good (e.g., happy, positive, confident) <sup>c</sup>	9
Improves physical fitness	8
Helps me live a balanced life <sup>c</sup> (e.g. mental, emotional, environmental)	6
Builds connections/relationships with others <sup>c</sup>	5
Makes me look good (e.g., fit, trim, healthy weight) <sup>c</sup>	4
<i>Disadvantages</i>	
Takes time away from other obligations (e.g., work, family) <sup>c</sup>	9
It's a hassle/inconvenience <sup>c</sup>	8
Might cause injury	6
Not my first priority	4
Makes me feel self-conscious (e.g. changing with students, awkward to do)	3
Increases fatigue	1
Not enjoyable/fun to do	1
Feel guilty taking time to exercise	1

Table 2 (continued)

	Ranking <sup>a</sup>
<b>Normative Beliefs</b>	
Family - Extended <sup>c</sup>	9
Spouse <sup>c</sup>	8
Colleagues	7
Child(ren)	6
Supervisor/Boss <sup>c</sup>	4
Friends	3
Sports teams/groups <sup>d</sup>	3
Active people in the community	3
Doctor/Health care system <sup>c</sup>	2
<b>Control Beliefs</b>	
<i>Barriers</i>	
Lack of time <sup>c</sup>	10
Lack of consistent schedule <sup>c</sup> (e.g., no 9-5, work weekends, no lunch, disruptions)	9
Heavy work demands/responsibilities (e.g., marking, course planning, meetings)	9
Previous Injuries/health issues	9
Other Professional Aims <sup>c</sup> (e.g. aiming for tenure, publications, conferences, service)	8
Don't feel like it <sup>c</sup> (e.g., no energy, want to do something more relaxing)	8
Going through other life transitions/changes	8
Maintaining professional dress/appearance <sup>c</sup>	5
Demanding family obligations (e.g., sick child/parent, events)	5

Table 2 (continued)

	Ranking <sup>a</sup>
Lack of affordable/available childcare <sup>c</sup>	4
Sedentary nature of the job (e.g., sitting, computer, reading)	3
<i>Facilitators</i>	
Social support <sup>c</sup> (e.g., friends, exercise buddy, colleagues model PA)	8
Proximity of facilities	7
Access to facilities <sup>c</sup> (e.g., affordable, extended hours, appealing)	6
Awareness/Promotion of PA <sup>c</sup> (e.g., city, workplace, campaigns, speakers, bulletins)	6
Ideal weather/climate conditions	5
Having faculty-only facilities and programs <sup>c</sup>	3
Flexibility of schedule (e.g., non-supervised, make own hours)	3
Committing to class/group	2
Owning equipment	2

<sup>a</sup> Ranking based on number of beliefs that collapsed into themes and times mentioned. Most common to least common.

<sup>b</sup> Shaded area indicates focus groups beliefs

<sup>c</sup> Both focus groups mentioned this theme

<sup>d</sup> Theme not mentioned in focus groups

**Study 2: Canada-Wide Physical Activity and Theory of Planned Behaviour Questionnaire*****Participant Response Rate***

A detailed flow-diagram describing the Canada-wide recruitment process is presented in Figure 3. A total of 78 human resource departments at English speaking institutions associated with the AUCC were contacted to help assist with the delivery of recruitment materials to eligible faculty members. Of these, four institutions agreed to act as a proxy and distribute the recruitment materials following Dillman's (2007) TDM. As an additional recruitment procedure, individual email addresses of faculty members were manually obtained via a random selection of six universities based on faculty size and region (Urbaniak & Plaus, 2008). One medium (500-1000 faculty members) and one large (>1000 faculty members) university from each of the western, central, and eastern regions of Canada were selected for a total of six universities (CAUT, 2010). A total of 4819 faculty email addresses were contacted using Dillman's (2007) TDM. In addition to these recruitment procedures, seven institutions and organizations that expressed interest in the study, but declined using Dillman's (2007) TDM, distributed the recruitment materials via faculty newsletters, websites, and academic journals. The use of multiple recruitment procedures (i.e., appointed proxy, manual search of institution websites, media promotion) prevented faculty members that did not meet the inclusion criteria (e.g., > 45 years, > 5 years employment) from being screened out of the recruitment process. The total number of new faculty contacted via the recruitment process was unknown, and therefore, a true response rate was not available.

A total of 866 faculty members completed the online survey. A software malfunction resulted in a loss of 82 completed surveys yielding 784 completed survey responses<sup>1</sup>. Based on the inclusion criteria of being employed within the last 5-years, 481 participants were eliminated based on reporting greater than 5-years of employment and 36 participants were excluded for not providing any information on years of employment. Therefore, a total of 267 participants (34.1% of the sample obtained) met the inclusion criteria and were subsequently used in analysis.

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<sup>1</sup> It is believed that the survey responses lost were completely random and did not have an effect on the representativeness of the results

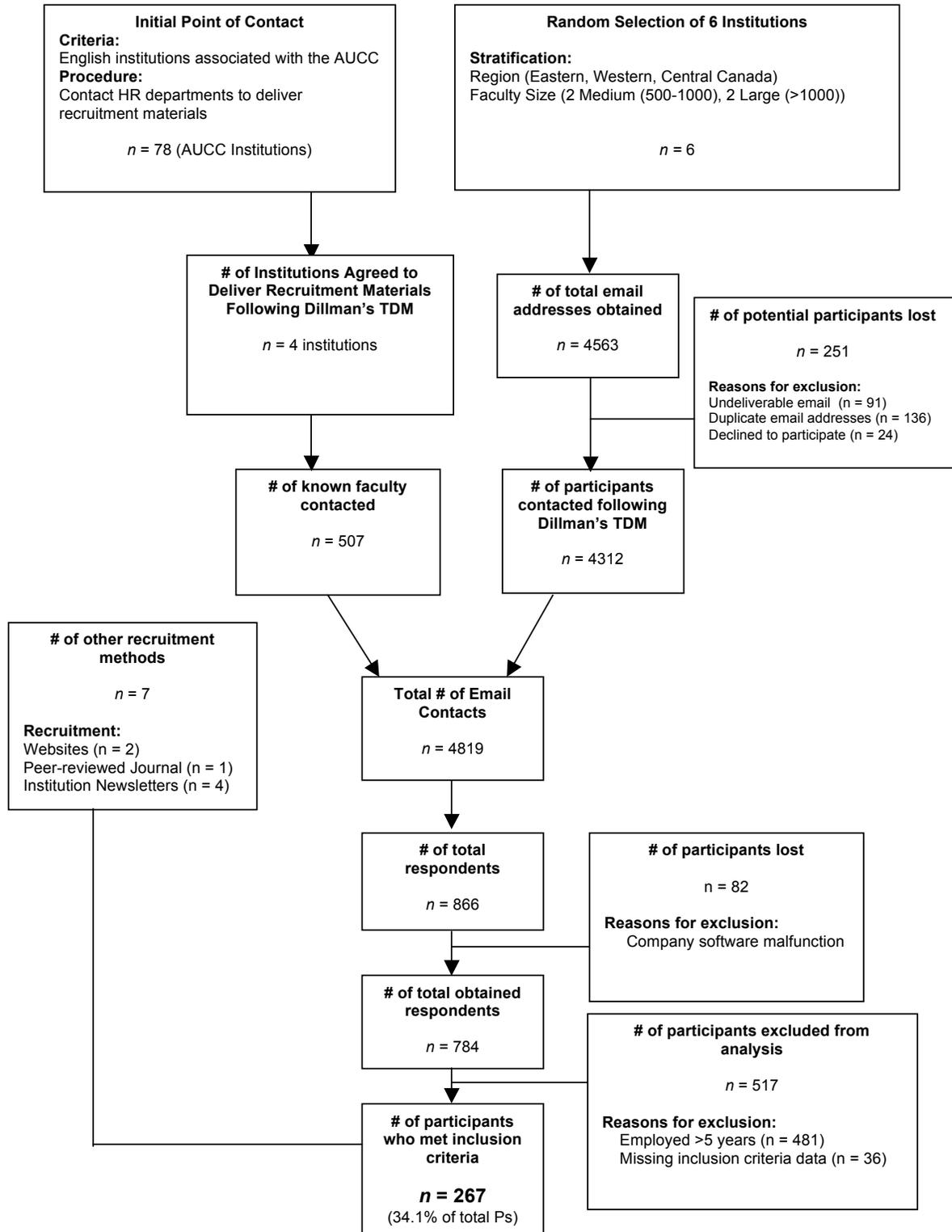


Figure 3. Participant recruitment procedure flow diagram.

### ***Demographic Characteristics***

Detailed demographic characteristics of the sample are presented in Table 3. Of the 267 respondents, 57.3% were female and 42.7% were male with a mean age of 38.30 ( $SD = 6.48$ ). The mean number of years employed as a full-time faculty member was 2.76 ( $SD = 1.70$ ), and participants reported working an average of 58.52 ( $SD = 11.33$ ) hours of work per week. The majority of respondents (76.2%) reported working 50 hours or more per week with 16.9% reporting greater than 70 hours of work per week. Of those reporting ethnicity ( $n = 245$ ), the majority of respondents were Caucasian (89.8%). For social demographics, 85.7% of the sample reported being currently married/common-law, 11.3% reported being single, and 3.0% reported being divorced/widowed. 54.5% of the sample reported having dependent children, of which 64.4% ( $n = 94$ ) reporting having children under the age of 5-years. For health indicators, the majority of respondents (57.7%) reported very-good/excellent self-rated health, but 43.1% believed that their current health was worse now compared to when they were completing their doctorate training. 3.0% of the sample were smokers, 6.7% reported having high blood cholesterol, 5.2% reported having high blood pressure, 2.2% reported having cancer, and 3.0% reported having asthma. In terms of PA, using the GLTEQ, 30.7% of the sample was currently meeting national PA guidelines (PHAC, 2003).

Table 3

*Demographic Characteristics of Respondents (N = 267)*

Item	Value
<u>Personal Demographics</u>	
Age ( <i>M,SD</i> )	38.30, 6.48
Body Mass Index ( <i>M, SD</i> )	24.56, 4.40
Gender (%)	
Male	42.7
Female	57.3
Ethnicity (%)	
Caucasian	89.8
Asian	2.9
African American	1.6
Mixed	3.3
Other	2.4
<u>Social Demographics</u>	
Marital Status (%)	
Single/Dating	11.3
Married/Common-Law	85.7
Separated/Divorced	3.0
Partner Employment Status (%)	
Part-time (0-35 hrs/wk)	15.7
Full-time (35-40 hrs/wk)	50.7
Overtime (> 40 hrs/wk)	14.8
Unemployed/Other	18.8
Parental Status (%)	
No Children	44.5
1 Child	21.9
>1 Child	33.5
Child Status (%)	
Children < 5 years	64.4
<u>Occupation Demographics</u>	
Years of Employment ( <i>M, SD</i> )	2.76, 1.70
Weekly Work Hours ( <i>M, SD</i> )	58.52, 11.33
Daily Work Hours M-F ( <i>M, SD</i> )	11.70, 2.27
Distribution of Weekly Work Hours (%)	
<40	2.4
40-49	21.6
50-59	31.8
60-69	27.5
> 70	16.9

Table 3 (continued)

Region of Employment (%)	
Eastern Canada	26.6
Central Canada	31.9
Western Canada	41.6
Field of Study (%)	
Arts	1.5
Business	4.5
Education	7.9
Engineering	1.5
Humanities	12.0
Science	33.3
Social Science	15.0
Professional Schools (e.g., Medicine, Law, Dentistry)	16.5
Other (e.g., Agriculture)	7.9
<u>Health Indicators</u>	
Meeting PA Guidelines <sup>a</sup> (%)	30.7
Current Self-Rated Health (%)	
Excellent	15.4
Very Good	42.3
Good	31.9
Fair	8.8
Poor	1.5
Current Self-Rated Health Compared to PhD Training (%)	
Much/Somewhat Worse Now	43.1
About the Same	33.5
Much/Somewhat Better Now	23.4
Health Profile (%)	
Smokers	3.0
High Blood Cholesterol	6.7
High Blood Pressure	5.2
Cancer	2.2
Asthma	3.0
Hypothyroidism	1.1

<sup>a</sup> Based on Frequency of >20-30min MVPA According to Health Canada PA Guidelines

***Physical Activity Behaviour across the Transition to Professional Employment***

Bivariate correlations of demographics with total MVPA frequency are presented in Table 4. Self-rated health was significantly correlated to MVPA frequency ( $r = .19, p < .01$ ), with the result being in the small effect size range (Cohen, 1992). No other demographics emerged as being significantly correlated with PA frequency.

Table 4

*Bivariate Correlations of Personal, Social, and Occupational Demographics with Physical Activity*

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1. Total PA Frequency <sup>a</sup>	1	-.02	-.09	-.04	-.08	-.08	-.00	-.04	-.07	.19**	-.05	.05	-.02
2. Age		1	.05	.22**	.04	.04	.13*	-.65**	-.09	.01	.08	-.00	.09
3. Gender			1	-.21**	-.04	-.15*	-.14*	-.16	-.00	.04	.04	-.21**	-.02
4. BMI				1	.03	-.00	.17**	-.18*	.06	-.31**	-.06	-.08	.13*
5. Ethnicity					1	.02	.02	-.07	.02	-.12	.15*	-.07	.05
6. Marital Status						1	.30**	.15	-.01	-.03	-.12	-.03	-.14*
7. # of Children							1	.06	.05	-.05	-.24**	-.15*	.10
8. Child <5 years								1	-.07	.01	-.16	-.06	-.00
9. Region									1	-.06	-.02	-.03	.21**
10. SR Health										1	-.06	-.02	-.18**
11. Work Hours											1	.16*	.07
12. Partner's Employment												1	.05
13. Field of Study													1

Note. <sup>a</sup> Frequency of 20-30 minutes of MVPA per week; \*\* Correlation is significant at the 0.01 level (2-tailed); \* Correlation is significant at the 0.05 level (2-tailed)

*Physical Activity Behaviour*

The mean total MVPA frequency reported across the transition to professional employment is depicted in Figures 4. The sample reported a mean weekly MVPA frequency of 5.00 sessions ( $SD = 3.82$ ) during undergraduate education, 4.70 sessions ( $SD = 3.65$ ) during doctorate education, and 3.30 sessions ( $SD = 3.43$ ) during the past 7-days.

3 x 1 within-person RM ANOVAs were conducted to compare the main effect of time (e.g., undergraduate education, doctorate education, current employment) on PA behaviour across the transition to professional employment. The multivariate results revealed a significant time effect on total MVPA frequency ( $F_{2, 265} = 26.29, p < .001, \eta^2 = .17$ ), vigorous PA frequency ( $F_{2, 265} = 17.83, p < .001, \eta^2 = .12$ ), and moderate PA frequency ( $F_{2, 265} = 14.29, p < .001, \eta^2 = .10$ ). Pairwise comparisons using a Bonferroni correction indicated significant mean PA frequency differences ( $p < .016$ ). Post-hoc analyses using paired samples  $t$ -tests (1-tailed) revealed that total MVPA frequency decreased significantly by 1.69 sessions per week ( $SE = .24$ ) from undergraduate education to current employment ( $t_{266} = 6.95, p < .001, d = .43$ ), and by 1.39 sessions per week ( $SE = .24$ ) from doctorate education, to current employment ( $t_{266} = 5.85, p < .001, d = .36$ ). For vigorous PA frequency, post-hoc analysis also revealed a significant decrease from undergraduate education to current employment ( $t_{266} = 5.63, p < .001, d = .34$ ), and from doctorate education to current employment ( $t_{266} = 4.74, p < .001, d = .29$ ). Moderate PA frequency showed similar results with a significant decrease from undergraduate education to current employment ( $t_{266} = 5.21, p < .001, d = .32$ ), and from doctorate education to current employment ( $t_{266} = 3.75, p < .001, d = .23$ ). Calculated effect sizes for PA frequency means yielded significant small-moderate effects for undergraduate and doctorate PA frequency with current PA frequency (Cohen, 1992). No significant changes in total MVPA frequency ( $t_{266} =$

1.39,  $p = .18$ ,  $d = .09$ ), vigorous PA frequency ( $t_{266} = 1.07$ ,  $p = .29$ ,  $d = .06$ ), and moderate PA frequency ( $t_{266} = 1.08$ ,  $p = .28$ ,  $d = .07$ ) from undergraduate to doctorate education were found.

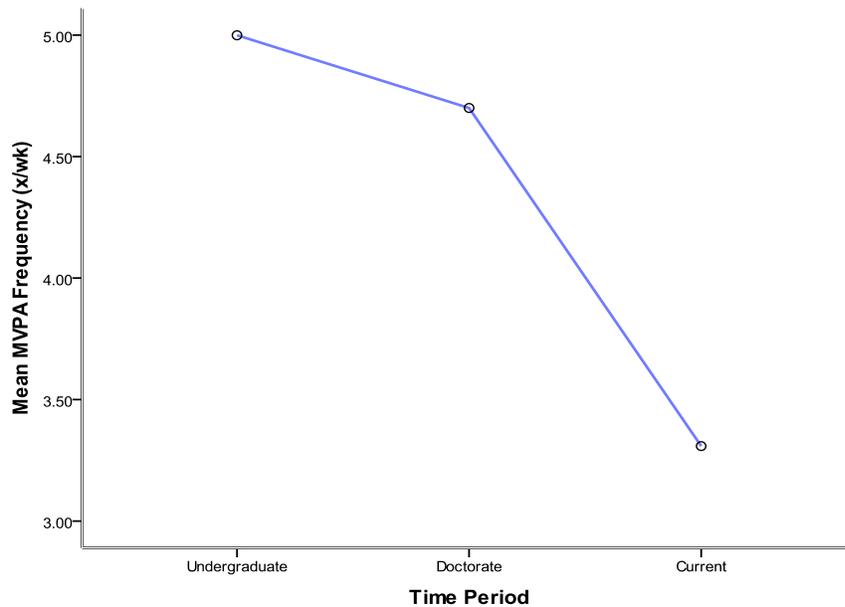


Figure 4. Comparison of mean weekly MVPA frequency across the early career transition.

### *Covariates and Moderators of Physical Activity across the Transition*

Exploratory covariate analysis was conducted using 3 (time period) X 1 (PA behaviour) RM ANCOVAs to assess whether the main effect of time on PA behaviour remained stable after controlling for the following covariates: BMI (0 = <25, 1 = >25), age (0 = 25-34, 1 = 35-44, 2 = 45+), work hours (0 = 0-49 hrs, 1 = 50-69 hrs, 2 = 70+), marital status (0 = single, 1 = married/common law), region (0 = western, 1 = central, 2 = eastern), ethnicity (0 = Caucasian, 1 = other), parenthood (0 = no children, 1 = 1 child, 2 = 2+), children under 5 years of age (0 = no, 1 = yes), gender (0 = male, 1 = female), and partner's employment status (0 = unemployed/other, 1 = part-time, 2 = full-time/overtime). The results from the covariate analysis can be seen in Table 5. A **non-significant** effect represents a covariate that completely accounts for the

relationship of PA across the transition. Partial covariates were considered meaningful if they had an eta-squared change of .14 (large ES).

Table 5

*3 x 1 Repeated Measures Analysis of Covariance and Interaction Effects Summary*

PA Variable	Covariate	Time Effect ( <i>F</i> )	$\eta^2$	$\eta^2_{\text{change}}$	Direction	Interaction Effect ( <i>F</i> )
PA Frequency	Parenthood	8.28 <sup>***</sup>	.06	-.11	-	1.50
	BMI	3.80 <sup>*</sup>	.03	-.14	-	3.48 <sup>*</sup>
	Age	9.86 <sup>***</sup>	.07	-.10	-	1.51
	<b>Work Hours</b>	.67	.01	-.16	-	3.59 <sup>*</sup>
	<b>Marital Status</b>	2.47	.02	-.15	-	0.26
	Region	6.62 <sup>**</sup>	.05	-.12	-	2.91
	Ethnicity	25.78 <sup>***</sup>	.16	.01	-	0.22
	Child < 5	5.15 <sup>**</sup>	.07	-.10	-	3.09 <sup>*</sup>
	Gender	11.62 <sup>***</sup>	.08	-.09	-	0.27
	S-R Health	9.41 <sup>***</sup>	.07	-.10	+	1.25
	Partner Employment	8.08 <sup>***</sup>	.07	-.10	-	0.76

Note. **bold text** indicates covariate \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

*Covariates of Physical Activity Frequency*

For total PA frequency, the main effect of time on PA was attenuated after controlling for the effect of marital status ( $F_{2, 263} = 2.47, p > .05, \eta^2_{\text{change}} = -.15$ ) and work hours ( $F_{2, 252} = 0.67, p > .05, \eta^2_{\text{change}} = -.16$ ). Post-hoc analysis using a Bonferroni Correction revealed that being married/common-law and reporting working long work hours (> 70 hrs) significantly decreased total PA frequency upon the transition to professional employment compared to those who were single and working less than 70 hours per week ( $p < .01$ ).

*Partial Covariates of Physical Activity Frequency*

While the main effect of time period on PA frequency remained statistically significant during the RM ANCOVA analysis, BMI appeared to have a partial covariate effect. Follow-up tests revealed that those reporting a BMI greater than 25 ( $\eta^2_{\text{change}} = .14$ ) reported having lower PA frequency at the onset of professional employment.

*Interaction Effects*

Interaction effects using RM fixed-factors ANOVA were conducted to determine the presence of moderator variables. The analysis revealed a significant interaction effect of the demographics BMI ( $F_{2, 260} = 3.48, p < .05$ ), work hours ( $F_{2, 254} = 3.59, p < .05$ ), and children under the age of 5 years ( $F_{2, 144} = 3.09, p < .05$ ) and time period on total PA frequency. Follow-up tests revealed that those reporting a BMI greater than 25, working long hours (> 70+), and having children under 5 years showed sharper declines in PA frequency upon the transition to professional employment compared to those reporting a BMI less than 25, working less than 70 hours per week, and having no children under the age of 5 years ( $p < .01$ ).

*Social Cognitive Predictors of Physical Activity*

Descriptive statistics including the means and standard deviations for all TPB variables are presented in Table 6.

Table 6

*Descriptive Statistics for the Theory of Planned Behaviour Constructs*

Construct	N	Minimum	Maximum	<i>M</i>	<i>SD</i>
PBC	233	1.00	7.00	4.53	1.71
Intention	266	-1.99	1.50	-0.12	0.88
Affective Attitude	235	2.32	7.00	5.85	1.14
Instrumental Attitude	235	4.33	7.00	6.61	0.67
Injunctive Norm	233	1.57	7.00	5.03	1.14
Descriptive Norm	233	1.00	7.00	4.58	1.61

Bivariate correlations of the TPB constructs with intention and PA behaviour are presented in Table 7. Significant associations between all TPB and PA variables with intention were found ( $p < .01$ ). For total PA frequency, instrumental attitude ( $r = .12, p > .05$ ) and injunctive norm ( $r = .09, p > .05$ ) emerged as non-significant correlates. All other TPB variables were significantly associated with total PA frequency.

Table 7

*Correlation Matrix of the Theory of Planned Behaviour with Physical Activity*

Variable	1	2	3	4	5	6	7
1.Total PA Frequency	1	.59**	.33**	.26**	.12	.24**	.09
2.Intention		1	.50**	.45**	.34**	.30**	.31**
3.PBC			1	.17**	.19**	.23**	.23**
4.Affective Attitude				1	.35**	.20**	.23**
5.Instrumental Attitude					1	.22**	.41**
6.Descriptive Norm						1	.54**
7.Injunctive Norm							1

\*\* . Correlation is significant at the 0.01 level (2-tailed)

\* . Correlation is significant at the 0.05 level (2-tailed)

*Regression Analysis*

The findings from the hierarchical multiple regression analysis can be seen in Table 8. In the first model, the TPB constructs of intention and PBC explained 28% of the variance in PA frequency ( $F_{2, 228} = 45.02, p < .01$ ). The regression analysis resulted in a large effect size for total PA frequency ( $f^2 = 0.39$ ) (Cohen, 1992). For PA frequency, the TPB construct of intention ( $\beta = .48$ ) emerged as the only significant predictor ( $p < .01$ ). No additional significant variance in PA behaviour was explained by the remaining TPB variables in the second block ( $p > .05$ ).

Table 8

*Hierarchical Regression Analysis of the Theory of Planned Behaviour Predictors of Physical Activity Behaviour (N = 267)*

Variable	$R^2$	$R^2_{change}$	$F_{change}$	$df$	$\beta_1$	$\beta_2$
<i>PA Frequency</i> (Block #1)	.28	.28	45.02**	2, 228		
Intention					.48**	.47**
PBC					.09	.09
(Block #2)	.31	.03	2.34	4, 224		
Affective Attitude						.05
Instrumental Attitude						-.05
Injunctive Norm						-.16*
Descriptive Norm						.16*

Note. \*  $p < .05$ , \*\*  $p < .01$ ;  $df$  = degrees of freedom;  $\beta_{1-2}$  = standardized regression coefficients for equations 1 and 2

The results for the multiple regression analysis used to predict intention are presented in Table 9. In the model, all TPB constructs were entered into the regression simultaneously to predict intention. The TPB constructs explained 42% of the variance in intention ( $F_{5, 225} = 32.49$ ,  $p < .01$ ), and yielded a large effect size ( $f^2 = 0.72$ ) (Cohen, 1992). PBC ( $\beta = .39$ ,  $p < .01$ ), Affective Attitude ( $\beta = .31$ ,  $p < .01$ ), and Instrumental Attitude ( $\beta = .12$ ,  $p < .05$ ) emerged as significant predictors.

Table 9

*Multiple Regression Analysis of the Theory of Planned Behaviour Predictors of Physical Activity Intention (N = 267)*

Variable	$R^2$	$F$	$df$	$\beta$
<i>PA Intention</i> (Block #1)	.42	32.49**	5, 225	
PBC				.39**
Affective Attitude				.31**
Instrumental Attitude				.12*
Injunctive Norm				.05
Descriptive Norm				.10

Note. \* $p < .05$ , \*\* $p < .01$ ;  $df = \text{degrees of freedom}$

***Theory of Planned Behaviour Belief-Level Constructs***

Bivariate correlations of the TPB behavioural, normative, and control beliefs with PA intention and PA behaviour are presented in Table 10. All behavioural and normative beliefs were significantly associated with PA intention ( $p < .05$ ), with the exception of “improves my fitness” ( $p > .05$ ), and the normative referent “children” ( $p > .05$ ). The control beliefs of “having an existing injury,” “proximity of facilities,” “faculty-only programs,” and “lack of childcare” were not significantly correlated with intention ( $p > .05$ ). For PA behaviour, the behavioural beliefs “takes time away from other obligations” and “it is hassle/inconvenience” emerged as the strongest behavioural associations with total PA frequency ( $r_{obligations} = -.23, p < .01$ ;  $r_{hassle} = -.34, p < .01$ ). The normative referent “supervisor/boss” emerged as having the strongest association with total PA frequency ( $r = .18, p < .01$ ). In terms of control beliefs, “inconsistent work schedule” had the strongest association with PA frequency ( $r = -.31, p < .01$ ).

Table 10

*Correlation Matrix of the Theory of Planned Behaviour Beliefs with Physical Activity Intention and Behaviour*

Belief	Intention	PA Frequency
<i>Behavioural Beliefs</i>		
Improves my work productivity	.31**	.07
Improves long-term health	.17**	-.04
Prevents burnout/Relieves stress	.41**	.08
Makes me feel good	.38**	.06
Takes time away from obligations	-.25**	-.23**
Is a hassle/inconvenience	-.48**	-.34**
Improves my fitness	.11	-.09
Helps me live a balanced life	.27**	-.02
Builds relationships with others	.18**	.06
Makes me look good	.21**	.02
<i>Normative Beliefs</i>		
Spouse	.23**	.17*
Family	.19**	.09
Colleagues	.16**	.10
Children	.11	.17*
Supervisor/Boss	.17*	.18**
Friends	.22**	.06
<i>Control Beliefs</i>		
Lack of time	-.42**	-.25**
Inconsistent work schedule	-.41**	-.31**
Work demands/responsibilities	-.39**	-.26**
Existing injury/health issue	-.09	-.14*
Other professional aims (e.g., tenure)	-.28**	-.25**
Don't feel like it	-.36**	-.20**
No social support	-.30**	-.13
Life-transitions (e.g., parenthood, marriage)	-.24**	-.12
No facilities in close proximity	-.08	-.02
No faculty-only programs/facilities	-.12	-.08
Lack of childcare	-.09	-.09

Note. \*\*. Correlation is significant at the 0.01 level (2-tailed); \* Correlation is significant at the 0.05 level (2-tailed)

***Early Career Transition and Meeting Health Canada's Physical Activity Guidelines***

The proportion of the sample meeting Health Canada's minimum PA recommendations varied across the transition to professional employment. 50.9% of the sample ( $n = 136$ ) reported meeting the minimum PA recommendations during undergraduate education. 50.6% of the sample reported meeting PA guidelines during doctorate education ( $n = 135$ ). Upon the transition to professional employment, only 30.7% of the sample ( $n = 82$ ) reported meeting the minimum national PA recommendations. Cochran's  $Q$  tests revealed that the proportion of the sample meeting PA guidelines was statistically different ( $Q_2 = 42.42, p < .001$ ). Pairwise comparisons using a Bonferroni correction revealed that the proportion of those meeting PA guidelines during undergraduate education ( $Q_2 = 29.88, p < .001$ ) and during doctorate education ( $Q_2 = 27.31, p < .001$ ) were significantly greater than the proportion of those meeting PA guidelines during current employment. The differences between the percentages of the sample meeting PA guidelines during undergraduate education (Cohen's  $h = .42, p < .01$ ) or doctorate education (Cohen's  $h = .40, p < .01$ ) with current PA yielded a moderate effect size (Cohen, 1992). No significant differences or meaningful effect between the percentages of the sample meeting PA guidelines from undergraduate to doctorate education were found ( $p > .05$ ).

Participants were then categorized into four groups based on whether their patterns of PA across the transition to professional employment were in congruence with Health Canada's PA recommendations. 40.8% of new professors ( $n = 109$ ) were classified as being inactive prior to and during the transition to professional employment. 28.5% of participants ( $n = 76$ ) were classified as being active prior to professional employment, but inactive upon the transition to professional employment. In terms of those who continued regular PA across the transition, 22.1% of participants ( $n = 59$ ) reported continuous PA participation. Of particular interest, 8.6%

( $n = 23$ ) of participants reported that they had been inactive prior to professional employment, but became active upon the transition to their professional career.

### ***Predicting Physical Activity Patterns using Discriminant Function Analysis***

A discriminant function analysis (DFA) was conducted to determine if participants' PA status across the transition to professional employment could be distinguished based on the TPB variables (See Table 11). The group of participants that reported being inactive prior to employment, but active after the transition was not included in the DFA analyses due to the small sample size ( $n = 23$ ) (Erdfelder et al., 1996). For the remaining three groups, the multivariate examination of TPB constructs across transition profiles identified one statistically significant discriminant function ( $\chi^2 = 90.82, p < .05$ ; Eigenvalue = .77, canonical correlation = .66, Wilk's  $\Lambda = .40$ ), with 65.6 % of the variance in groups being explained. Intention, PBC, Affective Attitude, Descriptive Norm, and selected belief-level constructs (i.e., it's a hassle/inconvenience, inconsistent work schedule) were the key correlates with the discriminant function and correctly classified 68.9% of the original groups.

Univariate ANOVAs were conducted to distinguish between groups. As seen in Table 11, intention ( $F_{2, 66} = 36.63, p < .001, \eta^2 = .23$ ), PBC ( $F_{2, 66} = 9.70, p < .001, \eta^2 = .09$ ), and Affective Attitude ( $F_{2, 66} = 9.05, p < .001, \eta^2 = .08$ ), and descriptive norm ( $F_{2, 66} = 5.24, p < .01, \eta^2 = .05$ ) were significant TPB global-level constructs that distinguished between groups. Post-hoc analysis using a Bonferroni correction revealed that intention, PBC, affective attitude and descriptive norm distinguished between participants who were remained inactive from those who were continuously active across the transition to professional employment. Only intention and PBC discriminated between participants who were active prior to but not during the transition to professional employment from those who remained continuously active.

In terms of TPB belief-level constructs, univariate ANOVAs and post-hoc analysis revealed that the behavioural beliefs that PA “is a hassle/inconvenience” ( $F_{2,66} = 11.59, p < .001, \eta^2 = .10$ ), “takes time from other obligations” ( $F_{2,54} = 5.83, p < .01, \eta^2 = .05$ ), and “improves fitness” ( $F_{2,66} = 3.49, p < .05, \eta^2 = .03$ ) were significant and distinguished between participants who failed to be active upon the transition to professional employment versus those who remained active. In terms of control beliefs, having an inconsistent work schedule ( $F_{2,66} = 10.08, p < .001, \eta^2 = .09$ ), heavy work demands ( $F_{2,66} = 6.83, p < .01, \eta^2 = .06$ ), pressure to reach other professional aims ( $F_{2,66} = 5.81, p < .01, \eta^2 = .05$ ), and a lack of free time ( $F_{2,66} = 5.41, p < .01, \eta^2 = .05$ ) distinguished between those who were active prior to the transitions versus those who remained continuously active. The same results with the addition of “not feeling like it” ( $F_{2,66} = 3.16, p < .05, \eta^2 = .03$ ) discriminated between those who were never active from those who were continuously active. No normative beliefs were significant.

To highlight the group centroids, the discriminant function means for the “Never Active” ( $M = -1.01, SD = 1.12$ ), “Active Prior” ( $M = 0.10, SD = 0.90$ ), and “Continuously Active” ( $M = 1.22, SD = 0.97$ ) are presented in figure 6. A follow-up univariate ANOVA was significant ( $F_{2,66} = 44.57, p < .001, \eta^2 = .44$ ), and post-hoc analysis indicated significant differences between all group centroids ( $p < .01$ ).

Table 11

*Discriminant Function Analysis for Predicting Physical Activity Patterns using the Theory of Planned Behaviour Variables*

Variable	Transition to Professional Employment			DFA Correlation	<i>F</i>	$\eta^2$	<i>Post-hoc</i>
	<i>M (SD)</i>						
	NA ( <i>n</i> = 109)	AP ( <i>n</i> = 76)	CA ( <i>n</i> = 59)				
<i>Intention</i>	-0.54 (0.84)	-.24 (0.73)	.52 (0.67)	.47	36.63***	.23	NA, AP < CA
<i>PBC</i>	4.10 (1.77)	4.18 (1.66)	5.26 (1.50)	.37	9.70***	.09	NA, AP < CA
<i>Affective Attitude</i>	5.44 (1.41)	5.85 (1.01)	6.25 (0.71)	.29	9.05***	.08	NA < CA
<i>Instrumental Attitude</i>	6.53 (0.69)	6.64 (0.70)	6.62 (0.63)	.11	0.61	.01	
<i>Descriptive Norm</i>	4.06 (1.63)	4.61 (1.56)	4.91 (1.56)	.28	5.24**	.05	NA < CA
<i>Injunctive Norm</i>	4.99 (1.23)	5.00 (1.13)	4.95 (1.12)	.02	.03	.00	
<i>Behavioural Beliefs</i>							
Improves work productivity	5.35 (1.61)	5.86 (1.38)	5.73 (1.67)	.17	0.84	.01	
Improves long-term health	6.58 (0.86)	6.72 (0.56)	6.56 (0.90)	-.08	1.05	.02	
Manage Stress	6.01 (1.29)	6.32 (0.91)	6.15 (1.23)	.01	1.39	.01	
Makes me feel good	6.06 (1.40)	6.45 (0.92)	6.21 (1.12)	.02	2.04	.05	
Takes time from obligations	6.19 (1.34)	6.05 (1.43)	5.36 (1.73)	-.25	5.83**	.05	NA, AP > CA
Is a hassle/inconvenience	4.74 (1.75)	4.77 (1.57)	3.50 (1.77)	-.28	11.59***	.10	NA, AP > CA
Improves physical fitness	6.48 (0.92)	6.68 (0.66)	6.22 (1.35)	-.05	3.49*	.03	AP > CA
Helps me stay balanced	6.15 (1.11)	6.38 (1.08)	6.08 (1.32)	-.03	1.21	.01	
Helps build relationships	4.18 (1.68)	4.14 (1.79)	4.40 (1.73)	-.05	0.41	.00	
Makes me look good	5.62 (1.40)	5.78 (1.30)	5.68 (1.29)	.06	0.28	.00	
<i>Normative Beliefs</i>							
Spouse would approve	6.14 (1.20)	6.42 (0.93)	6.54 (0.76)	.18	2.62	.03	
Family would approve	6.08 (1.20)	6.11 (1.10)	6.17 (0.93)	.10	0.12	.00	
Colleagues would approve	5.17 (1.46)	5.10 (1.40)	5.47 (1.32)	.14	1.31	.01	
Children would approve	4.80 (1.77)	5.08 (1.58)	5.49 (1.12)	.25	2.25	.03	
Supervisor would approve	4.71 (1.53)	4.67 (1.47)	5.20 (1.33)	.18	2.43	.02	
Friends would approve	5.79 (1.29)	5.97 (1.13)	6.00 (1.08)	.12	0.68	.01	

Table 11 (continued)

<i>Control Beliefs</i>							
Lack of free time	3.78 (2.17)	3.44 (2.00)	4.61 (1.94)	.27	5.46**	.05	AP < CA
Inconsistent Schedule	4.01 (2.14)	3.54 (1.85)	5.08 (1.95)	.24	10.08***	.09	NA, AP < CA
Heavy work demands	3.41 (2.13)	3.08 (1.94)	4.36 (1.98)	.34	6.83**	.06	NA, AP < CA
Preexisting Injury	4.39 (1.99)	3.82 (1.80)	4.41 (1.77)	-.07	2.23	.02	
Other professional aims	3.38 (2.05)	3.44 (1.83)	4.42 (1.80)	.35	5.81**	.05	NA, AP < CA
Don't feel like it	4.32 (1.84)	4.55 (1.68)	5.07 (1.64)	.22	3.16*	.03	NA < CA
No social support	4.78 (1.78)	4.62 (1.77)	5.09 (1.64)	.14	1.17	.01	
Life-transitions	4.28 (1.79)	4.21 (1.60)	4.47 (1.63)	.08	0.37	.00	
No proximal facilities	4.93 (2.02)	4.82 (1.93)	4.79 (1.92)	.00	0.10	.00	
No faculty-only programs	4.75 (2.01)	4.53 (2.08)	4.93 (1.93)	.10	0.63	.01	
Lack of childcare	3.93 (1.97)	4.05 (1.79)	4.19 (1.71)	.11	0.24	.00	
<i>Discriminant Function 1</i>	-1.01 (1.12)	0.10 (0.90)	1.22 (0.97)		44.57***	.44	NA < AP < CA

Note. Bonferroni Correction Used for Pairwise Comparisons; NA – non-active, AP – active prior, CA – continuously active

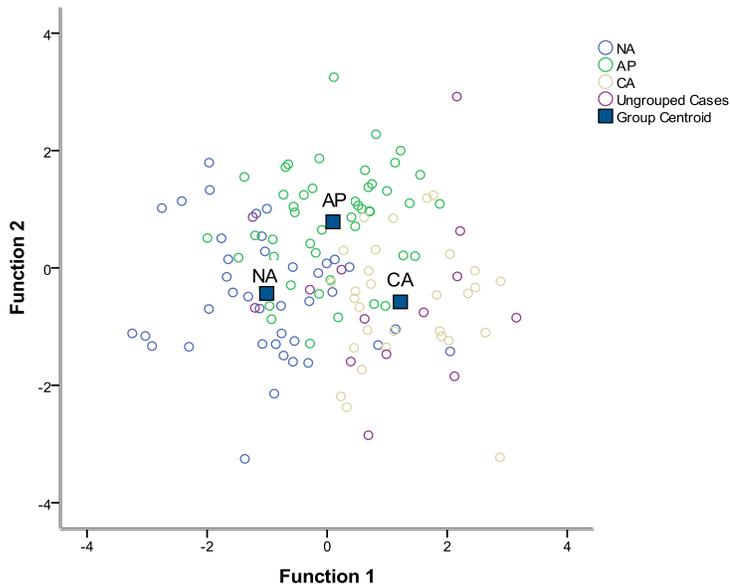


Figure 5. Combined-groups plot of canonical discriminant functions with TPB constructs.

## Chapter 5: Discussion

Young adulthood represents a complex time period associated with dramatic declines in regular PA participation (Gilmour, 2007; CFLRI, 2007; Jekielek & Brown, 2005; Marini, 1985). Although emerging evidence has supported a negative association between key life-transitions and PA participation among adults, a paucity of research investigating the impact of employment transitions on PA status exists (Allender et al., 2008, Bellows-Riecken & Rhodes, 2008). Indeed, only three known studies have investigated a relationship between employment transitions and patterns of PA among young adults, and have found limited evidence in support of an association (Bell & Lee, 2005; Brown & Trost, 2003; Horn et al., 2008). Unrepresentative samples, heterogeneous outcome measures, the use of dichotomous occupation measures, and a lack of theory-based research has limited our understanding of whether entering into a certain type of career (e.g., professional occupation) or certain occupation characteristics (e.g., work hours, work demands) impacts PA behaviour.

Prior research has indicated that those employed in professional occupations requiring long work hours, heavy work demands, and low work-related energy expenditure are at risk of poor PA profiles (Cragg et al., 2007). From a public health standpoint, research investigating whether entering into a professional occupation is associated with dramatic reductions in PA seems prudent to help prevent habitual inactivity from extending into middle- and older-adulthood. Thus, the purposes of this study were to advance a limited literature examining the impact of early career transitions on patterns of PA by investigating a representative sample of new professionals using a valid and reliable PA measure (Godin, 1985), as well as determine the critical correlates of within-person changes of PA participation using a well-validated social cognitive theory (Ajzen's TPB). Additional exploratory research objectives were to ascertain if

certain sociodemographic profiles moderated PA status across the transition to professional employment, and to determine if PA status could be predicted and differentiated between new professionals who maintained their PA habits from those who did not using the TPB framework. This study was the first known research investigation to explore a relationship between early career transitions and PA behaviour among a Canada-wide sample of new professionals.

This research investigation was composed of two separate studies. The following discussion section was categorized into two main sections. The first section highlights the study purpose, the research findings, implications of the results and study limitations for the pilot study. The second section presents the study purpose, main hypotheses and objectives, research findings and implications of the results of the Canada-wide study.

### **Study 1: Theory of Planned Behaviour Beliefs Elicitation Pilot Study**

The purpose of this study was to elicit the salient beliefs towards engaging in regular PA among a pilot sample of new professionals to help inform future TPB research and health interventions. To date, no known research has focused on eliciting the salient beliefs towards engaging in regular PA among a sample of professional young adults starting their full-time professional career. Prior research examining the impact of occupation transitions on PA patterns of young adults has not focused on professional occupation transitions or integrated a leading theoretical model to help understand the salient beliefs and barriers towards engaging in regular PA young adults entering professional careers (Bell & Lee, 2005; Brown & Trost, 2003; Horn et al., 2008). Thus, this pilot study advanced the existing literature by identifying the modal salient beliefs towards engaging in regular PA among a previously understudied population. Since belief-based analysis is exploratory in nature, it was hypothesized that the majority of the elicited beliefs would be control-based beliefs with a lack of time, heavy work demands, and conflicting

role demands emerging as the most common beliefs influencing PA participation among new professionals (McIntyre & Rhodes, 2009).

### ***Behavioural Belief Findings***

The results suggested that 45 PA-related beliefs were salient to the new professional population. Of the 45 salient beliefs, 16 behavioural beliefs, 9 normative beliefs, and 20 control beliefs were identified. Common positive behavioural beliefs about PA participation among new professionals included increased productivity and effectiveness at work, improved long-term health, stress relief and feeling good. Behavioural disadvantages included taking time away from other important obligations (e.g., family, work), and being too much of a hassle to do (e.g., changing, organizing). Thesis findings indicate that new professionals have several positive and negative behavioural beliefs towards engaging in regular PA that, in some ways, are in congruence with Symons Downs and Hausenblas' (2005b) review of TPB salient beliefs. Symons Downs and Hausenblas (2005b) found that the most salient behavioural advantage of PA was improved overall health, and the most common disadvantage was preexisting health concerns (e.g., pain, illness). The findings from this study suggest that new young professionals are more concerned about the impact of PA on work-life balance. Thus, future interventions focusing on reducing chronic disease may not be the most important targets for this unique population. Health promotion strategies targeting more proximal behavioural beliefs about stress relief, work-life balance, and feeling good may be more useful among this target population.

### ***Normative Belief Findings***

A total of 9 modal normative beliefs were identified in this study. According to the results, family members, especially one's spouse/partner, as well as one's colleagues emerged as the most important referents for new professionals. While valuing the opinions of one's spouse

parallels Symons Downs and Hausenblas' (2005b) review, the emergence of colleagues as an important normative referent is somewhat unique. Since new professionals spend a considerable number of hours in the workplace adjusting and adapting to the work environment, it seems logical that the health patterns and behaviours of other colleagues would potentially influence the behaviours of new professionals. Thus, future health promotion efforts could potentially benefit from establishing workplace wellness initiatives that emphasize PA participation as a means to build a sense of community, social support and workplace morale.

### ***Control Belief Findings***

The majority of salient beliefs identified were control-based factors, which support our initial hypothesis. 20 modal control beliefs were identified in this study. The results suggested that lack of time, lack of a consistent schedule, heavy work demands and expectations, pre-existing injuries and other professional aims were common salient control themes. The value placed on certain control-beliefs in this study differ somewhat from Symons Downs and Hausenblas' (2005b) review that highlighted that health issues, proximity to facilities, lack of motivation, and no social support were the most common control beliefs that limited PA participation. Scheduling challenges, work demands and professional aims are unique control beliefs that emerged for this population, and emphasize the importance of identifying the control-based determinants of PA participation among the target population (Symons Downs & Hausenblas, 2005b).

New professionals entering demanding professional careers may spend over the standard 35-hour workweek at work to fulfill numerous work responsibilities including marking students' papers and exams, fulfilling research and publication expectations, and preparing for course teaching. Thus, a lack of time due to work appears to be a logical barrier towards engaging in

regular PA among new professionals. Additionally, several of the participants indicated that the inconsistency of their work schedule made it challenging to develop and maintain a regular exercise routine. A new professor who instructs courses will undoubtedly have heavy periods of marking throughout a typical semester that may disrupt any type of routine. Also, most university semesters change every four months making it even more challenging to establish a consistent exercise regimen. Finally, another unique barrier that emerged in this study was the pressure to meet other professional expectations. In particular, new professionals employed as faculty members are on probation during the first few years of employment. It is during this time that junior-ranked faculty members must meet certain expectations such as aiming to obtain tenure, securing funding for research projects, producing a certain number of publications, and presenting a certain number of presentations to secure a stable position as an associate professor (CAUT, 2007). Not surprisingly, the added pressures associated with the desire to aim for tenure was expressed by several of the participants. From these findings, we would suggest that future research investigating the relationship between control beliefs and PA be conducted to better understand the strongest determinants of PA participation among new professionals.

### ***Beliefs Elicitation Study Limitations***

Although this pilot study expands the limited literature examining the reasons for changes in PA behaviour among new professionals, it is important that this study be interpreted within the context of its limitations. First, the sample obtained may not generalize entirely to new professional population. Sixty-seven percent ( $n = 12$ ) of the participants were female while only 33% ( $n = 6$ ) of the participants were male. The underrepresentation of males in this study may limit the generalizability of the results to the target population since the distribution of the gender in the sample obtained was not representative of the University of Victoria faculty, which

currently has 42% female and 58% male faculty members (University of Victoria [UVIC], 2009). In addition, the low response rate (26.5%) may also limit the generalizability of the results, but was expected due to the heavy workload and demands associated with academic professions. Further, two of the participants were on sabbatical, and not currently working at the institution. While their elicited beliefs may potentially limit the generalizability of the results to full-time new professors, the two participants both indicated that they had only been on sabbatical for a period of one-month, and felt that they could accurately recall their full-time working experience. Second, the beliefs elicited in this study may not be representative of all salient beliefs about PA participation among new professionals. Because this study used a pilot sample of new professionals employed in only one type of professional occupation (e.g., academia), other beliefs not measured in this study (e.g., law, medicine, CEO) may also be important contributors to PA participation.

In summary, this beliefs elicitation study provides preliminary evidence of the potential factors that may influence PA behaviour among professional adults. From an intervention perspective, effective TPB interventions should be built upon the modal salient beliefs of the target population (Ajzen, 2002). Overall, believed outcomes such as improved overall work performance and stress management combined with believed barriers such as a lack of available time, pressure to reach tenure, and heavy work demands were the unique beliefs that emerged as influencers of PA participation among new faculty during the early career transition period. Thus, education-based campaigns targeting improved health would appear to be ineffective among this population. Instead, targeted interventions should focus on making PA participation convenient, enjoyable, and rewarding for participants by offering express exercise classes during extended hours, active fit breaks in the office, or departmental fitness challenges. Furthermore,

this elicitation study can help ensure that future TPB investigations targeting new professionals maintain the predictive utility of the TPB by tailoring the questionnaire items. The findings from this pilot work help inform future TPB research and interventions aimed at preventing habitual inactivity among new professionals across the lifespan.

### **Study 2: Canada-Wide Physical Activity and Theory of Planned Behaviour Questionnaire**

This study was the first to attempt to explain the sharp decline in PA level among young adults by applying the TPB framework and using a Canada-wide sample of new professionals employed as faculty members. The purposes of this main research study were to evaluate the patterns of PA across the transition to professional employment and determine if the TPB variables could predict PA intention and behaviour among a representative sample of new faculty members. Overall, the results support prior research suggesting that life-transitions are the probable reason for dramatic declines in PA levels among young adults (Allender et al., 2008; Bellows-Riecken & Rhodes, 2008), and also advance the extant literature on the critical theoretical correlates of young adults' PA participation.

#### ***Demographics***

The novelty of this study is the evaluation of PA patterns among a large Canada-wide sample of new faculty members. Analysis of the descriptive data indicated that the proportion of female participants (54.7%) was slightly higher than the overall proportion of males (40.6%) employed as faculty members in Canada, however, with a steady increase in the proportion of female faculty members being appointed in Canada, the gender breakdown obtained for this study was expected (CAUT, 2010). Another interesting finding was the large proportion of Caucasian (89.8%) respondents. According to data from the Canadian Association of University Teachers (2010), the proportion of Canadian faculty that are of Caucasian ethnicity is 84.2%.

Thus, our results reflect this. Eighty-six percent of the sample reported being married/common-law, and 44.5% of the respondents indicated that they did not have any children. These findings deviate slightly from the national census data, which suggests that 68.6% of families are married couples with children (Milan, Vezina, & Wells, 2007). The unique sociodemographic status of new faculty members obtained in this study reflects the changing social trends of Canadian young adults (Clark, 2009). The higher percentage of non-parents obtained in this sample can be attributed to the demanding nature of academic professions, the increasing number of women achieving higher education and entering the labour force, as well as the greater percentage of young adults choosing to delay typical life-transitions as a result of completing higher education (CAUT, 2007; Clark, 2009). Overall, the descriptive data of the sample obtained highlights new academics as a unique target population.

### ***Physical Activity Patterns across the Transition***

The main hypothesis of this study was that new professionals would report lower current PA levels when compared to PA levels prior to professional employment. Indeed, this hypothesis was supported. Based on the findings, only 30.7% of the sample was currently meeting the minimum PA recommendations of 20-30 minutes of MVPA, which is far below the national Canadian average of 49-54% for young adults ages 25-44 (Gilmour, 2007). Compared to undergraduate and doctorate education, the results showed that total MVPA frequency dropped to below national guidelines (e.g., MVPA most days per week) by nearly 2 sessions per week from pre- to post-transition. The magnitude of the drop in PA was observed to be a small effect size, which is quite meaningful. That is, participants' total PA frequency fell below national guidelines upon the transition to professional employment compared to undergraduate and doctorate education. The findings from this study mimic prior research investigating the impact

of life-transitions on patterns of PA and clearly indicate that declines in PA can be attributed to critical life-change events (Allender et al., 2008; Bell & Lee, 2005; Brown & Trost, 2003).

The magnitude of drop in PA across the transition to professional employment is not surprising given the nature of academic professions. Prior research has identified academia as an occupation that demands long work hours, heavy work demands and pressures, and heightened levels of stress (CAUT, 2007; Jacobs & Winslow, 2004). The typical occupation characteristics associated with academic professions undoubtedly compete for one's available time, and thus, appears to result in limited available leisure time to engage in health promoting behaviours such as regular PA. Of particular importance, however, prior research investigating occupational stress among academic professors has found that the nature of academic professions appears have more of a negative effect on assistant professors in the 30-49 age category compared to those in higher ranks (e.g., full professor, associate professor) and other age categories (CAUT, 2007). Assistant professors reported the least job satisfaction, highest physical and general health symptoms, and poorest work-life balance (CAUT, 2007). Arguably, assistant professors in the 30-49 age range are aiming to become tenured while also experiencing other obligations and role demands (e.g., marriage, parenthood) that are further contributing to declines in PA. The combination of heavy work demands with "role overload" among new faculty may translate into adverse health *and* work related consequences (CAUT, 2007). Thus, the results from this study provide future researchers with convincing evidence that early career transitions effect PA status among young adults and emphasize the importance of promoting PA among those entering professional occupations.

While the results need to be interpreted with some caution due to the longitudinal retrospective nature of this research, the results highlight that transition to professional

employment is a unique contributor to dramatic declines in PA among the young adult population. The findings from this study support prior life-transition research at the general level (Allender et al., 2008; Bellows-Riecken & Rhodes, 2008; Bray & Born, 2004; Brown & Trost, 2003). Most notably, however, the magnitude of drop in PA that occurred at the onset of entering the professional workforce contradicts previous research studies that have found limited evidence in support of an association between employment transitions and declines in PA status (Allender et al., 2008; Bell & Lee, 2005; Brown & Trost, 2003; Horn, et al., 2008). Previous studies relied on a dichotomous classification of employment (e.g., yes vs. no, full-time vs. part-time). Thus, our understanding of what types of occupations (e.g., blue-collar, professional, labour intensive, sedentary work) are associated with dramatic declines in PA was limited. This study advances the limited literature by explicitly examining the changes in PA that occur while entering into a specific occupation. Thus, the use of a more sensitive and detailed occupation measure combined with the use of a valid and reliable PA measure in this study are potential reasons that the early career transition emerged as a unique contributor to declines in PA. Future researchers investigating the impact of entering the workforce are encouraged to measure PA status among a variety of specific occupation types to help identify the most important targets.

### ***Covariates of Physical Activity Status across the Transition***

Potential covariates that attenuated the main effect of time on PA were analyzed using RM ANCOVAs. Overall, the main effect of time period on PA was not independent of certain sociodemographic profiles. After controlling for marital status and work hours the time effect on PA disappeared and was no longer significant. That is, those who indicated they were married, and worked 70 + hours of work per week reported decreased PA across the transition compared to those who were single and working less than 70 hours. These results were expected and are in

congruence with prior research investigating the impact of marital status on PA (Bell & Lee, 2005; Brown & Trost, 2003; Burke et al., 2004; King et al., 1998; The & Gordon-Larsen, 2009; Trost et al., 2002), but the emergence of long work hours as a covariate of PA status is somewhat novel (Kirk & Rhodes, manuscript in review). Previous research investigating the influence of work hours on PA levels have found inconsistent evidence for a negative relationship (Shields, 1999; van der Hulst, 2003). Prior research has relied heavily on inconsistent measures of work hours (e.g., full-time vs. part-time) that did not differentiate between various thresholds of work hours (e.g., 31-40; 41-50; 51-60; 61-70 hours per week) and its influence on PA. Thus, drawing sound conclusions about the relationship between long workhours and PA has been a challenge. More recently, a review conducted by Kirk and Rhodes (manuscript in review) examining occupation correlates of PA found that among studies that examined a detailed breakdown of work hours in relation to PA participation, a negative threshold effect occurred. That is, those working more than 50 hours per week demonstrated greater declines in PA as a result of limited available leisure time. The findings from this study are in line with Kirk and Rhodes' (manuscript in review) review and suggest that working in excess of 70 hours per week in a demanding professional occupation is associated with a poor PA profile.

### ***Moderators of Physical Activity Status across the Transition***

When interaction effects were considered, an observed time period x child age interaction was found and suggested that having children under the age of 5 years had a negative effect on PA levels of participants. This finding supports Bellows-Riecken and Rhodes (2008) review of parenthood and PA status which demonstrated that parenthood has a small-moderate effect on PA levels of parents. The growth and development of children under the age of five requires more parental attention and care since the child is heavily dependent on parents to provide basic health

needs (Bellows-Riecken & Rhodes, 2008; Nomaguchi & Bianchi, 2004; Cody & Lee, 1999). In addition, while the provision of available and affordable childcare is critical for allocating time for parents to engage in PA, having children under the age of five poses an increased challenge considering there is a lack of childcare and children of this age are not yet old enough to be able to attend the public education system. Thus, it seems logical that the combination of having children under the age of five with entering a professional occupation emerged as an interaction term that further impacted PA status of new professionals given the increased demands on time. This findings supports the need for further multivariate analyses of the interaction and impact of various social roles on PA to help identify the underlying moderators of PA.

From an intervention perspective, strategies that consider a multivariate approach by emphasizing the interdependent influence of sociodemographic roles on PA status would be particularly useful. The findings from this study reveal that a focus on structural and policy level strategies are urgently needed. First, changes to the structure of tenure-track positions should be considered to help assist new academics to achieve an appropriate work-life balance. Standardized work weeks and overtime expectations should adhere to national labour laws and be clearly enforced by supervisory staff. This may require that the tenure-track expectations be standardized and revised where new professionals are not expected to produce an unreasonable number of peer-reviewed publications, conference presentations, grants, teaching opportunities, and community service prior to being considered for a tenured position. Consistent and objective standards and expectations that consider number of years worked, performance feedback, and research contributions should be established across all disciplines and once new faculty have met these standards a tenure-track position should be granted. Second, an increased availability of childcare, especially during extended hours, should be made available to faculty to allocate time

for PA participation. Third, a healthy and active work environment emphasizing overall health and wellbeing should be available for all faculty. Weekly PA programs, contests, guest speakers, and group classes are potential ways that could help encourage PA participation, social support, and overall job satisfaction.

### ***Social Cognitive Correlates of Physical Activity Behaviour***

There is a paucity of research examining the theoretical correlates of PA among new professionals. The second hypothesis of this study was to attempt to explain PA behaviour and intentions using the TPB constructs. It was hypothesized that intention would be strongly correlated with PA behaviour and in turn, would be predicted by PBC. The hypotheses were partially supported. In terms of PA behaviour, intention explained 28.0% of the variance in total PA frequency. The variance in PA behaviour explained by the TPB constructs was considered to be in the large effect size range and supports the predictive utility of the TPB in explaining PA behaviour of new professionals. These findings are in congruence with prior TPB reviews that suggest strong intention-behavior and PBC-behaviour relationships (Hagger et al., 2002; Symons Downs & Hausenblas, 2005a).

For predicting PA intentions, the TPB constructs of PBC, affective attitude and instrumental attitude emerged as significant predictors and explained 42% of the variance in intention. This is in line with prior TPB reviews, and further supports the predictive utility of the TPB in explaining PA intentions (Symons Downs & Hausenblas, 2005a). Overall, the findings from this study confirm the utility of the TPB, but also highlight that PBC and control-based factors are an even more important predictor of PA participation among the new professional population compared to the general adult population (McIntyre & Rhodes, 2009; Wing Kwan et al., 2009).

Identifying the modal salient beliefs most strongly associated with PA participation helps inform future PA promotion research. The belief-based correlates of PA behaviour found in this study were in line with prior TPB reviews, but also highlighted the unique beliefs that new faculty hold towards engaging in PA (Symons Downs & Hausenblas, 2005b). Overall, the unique findings from this study revealed that the behavioural belief that PA was a hassle/inconvenience, and several control-based beliefs such as lack of time, inconsistent work schedule, other professional aims, and not feeling up to it were most strongly correlated to PA behaviour. The emergence of PBC and control-based factors as unique reasons for declines in PA behaviour is not surprising among this population since entering into a professional occupation is typically associated with new work responsibilities, heavy work demands, pressure to reach professional benchmarks, and long work hours (Cragg et al., 2007; Shields, 1999). More specifically, the nature of academic professions demands exceptionally long work hours, heavy work demands, and higher levels of stress compared to other professional occupations (CAUT, 2007; Jacobs & Winslow, 2004). The combination of heavy time demands with an inconsistent work schedule, self-imposed pressure to publish and reach tenure are likely explanations for the emergence of PBC as a unique predictor of PA behaviour (Jacobs & Winslow, 2004). Therefore, control-based barriers contributing to declines in PA behaviour among new professionals should be considered as important targets in future intervention strategies.

From an intervention perspective, the findings clearly support interventions that target both PBC and attitudes of new professionals at the general level. In terms of PBC, these analyses indicate that interventions aimed at assisting new professionals to plan and cope with decreased time availability and inconsistent work schedules would be helpful. For affective attitude, the results highlight the importance of promoting PA as an enjoyable and complementary activity.

Affective attitude is thought to be an important contributor to PA motivation and behaviour because it is the proximal evaluation of the enjoyment and pleasure of engaging PA (Lowe, et al., 2002). Recent findings from Rhodes, Fiala and Conner (2010) have indicated a robust moderate effect for affective attitude and PA that was invariant to target populations, outcome measures and cultural variables. Thus, when considering intervention strategies for this population, the findings suggest that promoting PA as an enjoyable and fun activity that also enhances work-related performance would be particularly useful. This reinforces the importance of interventions targeting enjoyment of PA and future researchers are encouraged to measure the role of affective attitude across the transition to professional employment.

In summary, the results of this study support the use of the TPB as a useful theoretical model in explaining and understanding the psychosocial determinants of PA intentions and behaviours in new professional populations. Findings from this study do not support the sole use of education-based campaigns aimed at instrumental attitudes or norms, but rather control- and affective-based strategies that focus on promoting PA as a convenient and enjoyable activity.

### ***Predicting Physical Activity Patterns using the TPB***

A unique component of this study was the full application of the TPB to elicit the salient beliefs and evaluate the critical correlates of PA behaviour among new professionals. As part of our exploratory research, DFA was performed to determine if PA patterns could be predicted and differentiated from those who maintained their PA habits from those who did not using the TPB constructs. When applying the TPB to evaluate correlates of PA across the transition to professional employment, the results revealed that the TPB constructs discriminated between those who continued to be active from those who did not. Overall, intention and PBC, and selected behavioural and control beliefs emerged as a key discriminators between those who

continued to be active from those who became inactive. The aggregate attitude and subjective norm constructs failed to emerge as significant discriminators. Behavioural beliefs about taking time from other obligations, PA being a hassle/inconvenience, and the importance of PA in improving physical fitness emerged as key discriminators, suggesting that new professionals who expected PA to complement and enhance their work-life balance were more likely to continue with PA. Viewing PA as an inconvenience and further time barrier has been highlighted in previous research, but may be further emphasized among the new professional population given the heightened demands and expectations of their profession (CAUT, 2007; Cragg et al., 2007). PBC significantly discriminated between those who were continuously active from those who were not and showed a large effect-sized difference (Cohen, 1992). Control beliefs concerning lack of free time, inconsistent work schedule, work demands, and pressure to reach professional expectations helped identify the underlying reasons for PBC. The concern of limited free time has been established in previous literature examining the barriers towards engaging in PA (Cragg et al., 2007), but inconsistent work schedules, heavy work demands, and professional aims have emerged as unique barriers towards engaging in regular PA among new professionals. These findings seem logical given the structure of academic professions that require faculty to change routines at least every four months due to the presence of fall and winter semesters, and the expectation that conference attendance and service to the community are required as part of the profession. Overall, low intentions to engage in PA, the presence of an inconsistent work schedule, a lack of available leisure-time, and the belief that PA is a hassle are leading reasons for PA disparity due to early career transitions.

These results are important for the development of targeted PA interventions during the transition to professional employment. To date, TPB interventions for new professionals do not

exist, but this study indicates that control- and behavioural-based interventions appear to be the most robust targets. Individual-level interventions designed to address low levels of PA intentions should focus on helping new professionals develop planning and coping strategies for PA participation during periods of heavy work demands and inconsistent work days. A particular focus on ways to make PA convenient and enjoyable for the participant with a particular emphasis on the work-related benefits (e.g., more energy, improved focus, reduced burnout) that are indirectly associated with PA participation would also be useful. From a broader perspective, PA promotion strategies that aim to provide a variety of total body workout PA classes during extended hours (e.g., early morning, late evenings) may reduce feelings of PA being an inconvenience or hassle. In addition, express lunch PA classes offered right in the work environment of the participants would reduce the travel and changing time necessary to attend PA classes at a gym facility. At the policy level, these findings support the importance of enforcing standardized work weeks, availability of child care, and reduced work demands and expectations. Overall, the findings from this study suggests that the TPB constructs help discriminate between those who remained active from those who did not across the transition to professional employment. PA intentions, PBC, and selected control and behavioural-beliefs emerged as key discriminators, and provide important targets for future PA promotion strategies among new professionals during their early career transition.

### ***Study Limitations***

Although the novelty of this research study advances the limited literature investigating the relationship between early career transitions and PA patterns, the findings must be interpreted within the context of its limitations. First, the sampling frame used in this study attempted to obtain a diverse and representative sample by including multiple recruitment methods at

institutions across Canada. Indeed, the sample obtained was relatively representative of the three major regions in Canada, but despite the efforts to obtain a large representative sample, the maximum number of participants reached was unknown and a subsequent participant response rate could not be determined. To remedy the situation, the human resource departments of the institutions that followed Dillman's (2007) TDM were contacted to obtain information on the overall percentage of new faculty hires within the last 5-years to determine the representativeness of the sample obtained. According to the human resource departments of the 10 institutions included in this study, the average proportion of new faculty hired within the last 5-years was 30.1%. While a true response rate is unknown, the overall response rate obtained (34.1%) for this study was deemed relatively representative of the proportion of Canadian new faculty younger than 45 years of age (CAUT, 2010).

Second, the longitudinal retrospective design used in this study to measure PA patterns may be subject to validity issues. The GLTEQ was modified to recall PA patterns of up to several years, which may have resulted in reporting inaccuracies, especially PA participation during undergraduate education. The GLTEQ has not specifically been validated for such long periods of recall, and self-report measures are often subject to selection bias, unreliable memory recall and a tendency to overestimate actual PA levels (van Poppel et al., 2010; Thomas & Nelson, 2005). In terms of current PA levels, few Canadian based studies have examined the proportion of adults meeting the minimum national PA recommendations, and are often a challenge to compare since PA definitions and analysis differ across studies. Data from the 2005 Canadian Community Health Survey indicated that 49-54% of young adults ages 25-44 were at least moderately active (defined as expending a minimum of  $1.5 \text{ kg} \cdot \text{kcal}^{-1} \cdot \text{day}^{-1}$  or walking 30 minutes per day) (Gilmour, 2007). The results from a recent study examining the proportion of

Canadian adults, ages 18-55, who were meeting the minimum MVPA recommendations set out in Canada's Physical Activity Guide to Health Active Living using data from the 2007 Canadian Community Health Survey found that ~64% of adults ages 26-45 were meeting PA guidelines (Bryan & Katzmarzyk, 2009). The normative data from the CCHS indicates that a 20-34% greater proportion of young adults are meeting PA guidelines than the proportion of new professionals (30.7%) reporting meeting the minimum PA guidelines obtained in this from this study. This, these findings indicate that overestimation bias has not occurred in this study.

Published studies that have examined PA levels of undergraduate university students using the GLTEQ have primarily reported vigorous PA frequency and found that frequency ( $M = 1.95-2.82$ ;  $SD = 2.00-2.42$ ) of vigorous PA per week (Gyurcsik, Bray, & Brittain, 2004; Rhodes & Courneya, 2003) was in line with the reported vigorous PA of 2.23 sessions ( $SD = 2.14$ ) per week found in this study. Thus, there is no evidence that overestimation of self-reported PA has occurred in our study. In addition, the PA levels reported during undergraduate to doctorate education were not significantly different suggesting that recall of typical PA patterns is stable over time. The results from this study highlight the need to target decreased PA among new professionals, particularly those entering academic professions. Future research using objective measures of PA, such as accelerometry, that measure PA across various domains (e.g., work, transportation, home, leisure-time) would help provide a more accurate depiction of PA levels and where decreases in PA are most notable.

Third, due to *a priori* analysis, the small sample of those who became active after the employment transition were not included in our analyses. This subsample is a potentially interesting group that may have unique reasons for positive changes in PA patterns that could help inform future health promotion strategies among this target population. Thus, subsequent

research would benefit from investigating the behavioural, normative, and control based beliefs towards engaging in PA among this subpopulation.

Fourth, this correlational design of this study prevents us from determining causal relationships, which can only be established by experimental designs. Despite the design limitations, correlational studies provide a foundation for causation and the findings from this research study indicate that early career transitions to professional employment may influence PA patterns of new professionals. Future longitudinal investigations using an experimental design and objective measure of PA are warranted.

In summary, the issue of health behaviours among new professionals within Canadian society is a potential public health priority. Identifying how life-transitions experienced during young adulthood impact PA may illuminate the most opportune health promotion strategies for developing and maintaining habitual PA across the lifespan. This study provided evidence that PA levels significantly declined during the transition to professional employment. Marriage, long work hours, and having children under the age of 5 further exacerbated the results. In addition, this study supports the utility of the TPB in explaining and predicting PA behaviour. Perceptions of limited control based on time, professional aims, work demands emerged as the critical correlates that distinguished those who continued with PA and those who did not. This study helps researchers better understand the changes in PA status during transitions to professional occupations. Future researchers should consider conducting longitudinal research among new professionals.

### ***Conclusions***

The purpose of this study was to evaluate and explain patterns of PA among a previously understudied population at risk of inactivity. The results of this research support that young

adults are not meeting the minimum PA recommendations, and the early career transition to professional employment is a unique contributor to decreased PA. Further analyses indicated that new professionals' perceptions of control based on inconsistent work schedules, heavy work demands, and limited time, and affective outcomes (e.g., hassle/inconvenience) are the key correlates that differentiated those who remained active from those who did not across the transition to professional employment. Thus, the use of the TPB framework in explaining and understanding PA behaviour is supported. Further, this study highlights that PA status across the transition is not solely dependent on the early career transition, but is further attenuated by marital status, long work hours, and having young children. Overall, this study advances the limited literature investigating a relationship between PA and life-transitions and provides useful insight for the future development of PA interventions targeting new professionals during their early career transition.

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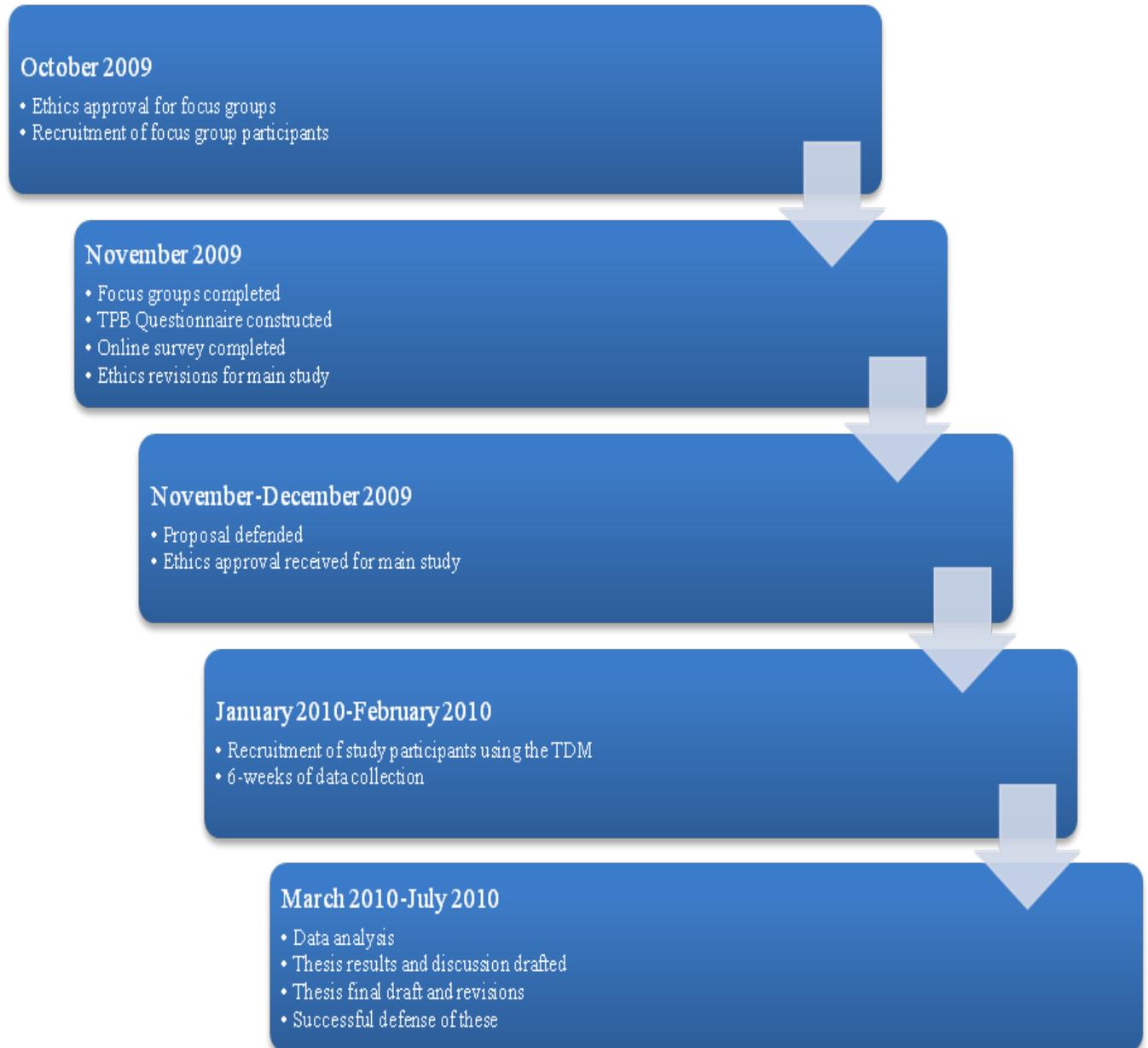
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## Appendices

### Appendix A: Time Frame of the Study



Appendix B: Focus Group Study Invitation



Monday, September 28, 2009

Dear Dr. \_\_\_\_\_,

It is with great excitement that I invite you to be a part of an important pilot study titled “**Identifying the beliefs towards participating in leisure-time physical activity among new young professionals, ages 25-44, in transition to the professional workforce: A pilot study**”. I am inviting all young adults, ages 25-44, who have recently completed doctoral education and are now employed as faculty members at the University of Victoria. Those with any level of physical activity from sedentary to highly active are welcome to attend the **20-minute** focus group session. The primary investigator is Megan Kirk, a graduate student in the School of Exercise Science, Physical and Health Education at the University of Victoria. The study is being supervised by Dr. Ryan E. Rhodes, an associate professor in the School of Exercise Science, Physical and Health Education. This study is supported by a Canadian Institutes of Health Research graduate student scholarship.

**Project Rationale**

Large-scale national surveys have indicated that young adults, ages 25-44, show the sharpest decline in physical activity and greatest increases in overweight/obesity. Life-transitions (e.g., marriage, parenthood) have been identified as the probable reason for these conditions. Emerging research has suggested that those entering a **professional occupation** are at high risk of developing poor health habits that may transcend into middle- and older-adulthood. Research has shown that professional careers are associated with the highest number of work hours per week, the greatest psychological demands, and the lowest on-the-job activity! Despite these findings, however, relatively little is known about the individual reasons for changes in health behaviours during occupation transitions. To my knowledge, research investigating how the transition to the professional workforce influences health behaviours (e.g., physical activity) of young adults does not exist! **Thus, YOUR participation is of utmost importance to help inform future health promotion strategies aimed at improving the health and quality of life of new young professionals!**

**Purpose of the Study**

The purpose of this study is to identify the common beliefs towards participating in physical activity among new young professionals. This study follows Ajzen’s (2001) protocol for developing a tailored Theory of Planned Behaviour questionnaire to assess and evaluate the theoretical correlates of exercise behaviour. The findings from the focus groups will be used to construct a tailored TPB questionnaire that will then be administered Canada-wide to all new faculty members, ages 25-44, working in universities and colleges across Canada. This pilot study has been approved by the Human Research Ethics Board at the University of Victoria and meets the rigorous requirements for ethical approval. To verify the ethical approval of the study please contact 250-472-4545. Any questions about the research may be directed to Megan Kirk at [megan@uvic.ca](mailto:megan@uvic.ca), or Dr. Ryan Rhodes at 250-721-8384.

**What do I have to do to Participate?**

We ask that you please attend a focus group session on **Thursday, October 1<sup>st</sup>, 2009 OR Friday, October 2<sup>nd</sup>, 2009 at 3:00pm** in **McKINNON BUILDING RM 155**. Nine brief questions will be asked regarding your beliefs towards participating in physical activity, and should take no more than **20-30** minutes of your time. There is no right or wrong response to the questions; it is an opportunity to share your insight and experience. Light snacks and refreshments will be provided during the focus group sessions. **Please send RSVP to Megan Kirk – [megan@uvic.ca](mailto:megan@uvic.ca)**

**PLEASE NOTE:** If you cannot attend a focus groups session and would be willing to do a 15-minute phone or in-person interview, **please** contact Megan Kirk at [megan@uvic.ca](mailto:megan@uvic.ca) or 250-472-5488.

Thank you for taking the time to consider being a part of this very important research! We welcome all newly hired faculty members from every department to participate in the focus group session.

Appendix C: Focus Group Consent Form



University of Victoria

British Columbia  
Canada

**Participant Consent Form**

**IDENTIFYING THE BELIEFS TOWARDS PARTICIPATING IN LEISURE-TIME PHYSICAL ACTIVITY AMONG NEW YOUNG PROFESSIONALS IN TRANSITION TO THE PROFESSIONAL WORKFORCE: A PILOT STUDY**

You are being invited to participate in a study entitled *Identifying the Beliefs Towards Participating in Leisure-Time Physical Activity among New Young Professionals in Transition to the Professional Workforce: A Pilot Study* that is being conducted by Megan Kirk, a graduate student in the School of Exercise Science, Physical and Health Education at the University of Victoria. You may contact Megan Kirk if you have further questions about the study at [megan@uvic.ca](mailto:megan@uvic.ca) or 250-472-5488. This study is being conducted as part of the requirements for a Master's of Arts degree and will be conducted under the supervision of Dr. Ryan Rhodes, an associate professor in the Faculty of Education at the University of Victoria. You may contact Dr. Rhodes at [rhodes@uvic.ca](mailto:rhodes@uvic.ca) or 250-721-8384 for further information.

**STUDY PURPOSE:** The purpose of this research project is to follow Ajzen's (2001) protocol for developing a Theory of Planned Behaviour (TPB) questionnaire by eliciting the salient behavioural, normative, and control beliefs of the target population using focus groups. The focus groups will help us understand how the transition to a professional occupation has influenced patterns of physical activity among young adults, ages 25-44. The findings from this study will help to construct a tailored questionnaire that will be administered to a large representative sample of professional young adults in future research to help identify the patterns and reasons for change in physical activity during occupation transitions.

**IMPORTANCE OF THIS RESEARCH:** The issue of health behaviours among young adults entering professional occupations within Canadian society is a public health priority. Professional occupations are associated with the highest number of work hours per week and the highest level of sedentary on-the-job activity. Therefore, research examining how the transition to professional employment during young adulthood impacts physical activity behaviour is critical. The proposed study will help identify the behavioural, normative, and control beliefs that professional young adults have towards participating in physical activity. Findings will help develop a comprehensive and tailored questionnaire to administer to the target population in a future study.

**SELECTION OF PARTICIPANTS:** You are being asked to participate in this study because you meet our inclusion criteria of being a young adult between the ages 25-44, currently employed as a full-time employee in a professional occupation, and having completed professional education within the past 3-years. This criterion captures the transition period from full-time education to the professional workforce.

**WHAT DO PARTICIPANTS HAVE TO DO?** If you volunteer to participate, you will be asked to attend one focus group session which will take approximately 15-30minutes to complete. The focus group will have 5-6 participants and you will be asked 7-9 questions that pertain to your beliefs towards participating in physical activity. You will be asked to discuss the questions and provide answers that are as honest and accurate as possible.

**BENEFITS OF PARTICIPATING:** Little research investigating the impact of life transitions on the health behaviours of young adults exists. Conducting pilot work is a necessary first step in developing robust research designs among this target population. The insight you provide will benefit future research agendas that aim to explain health behaviours among young adults entering professional occupations. The findings of this study will be shared, **as group data only**, with health researchers, health professionals and policy makers to help inform future health promotion strategies that target physical inactivity among young adults during the transition to the workforce.

**As a way to compensate you for any potential inconveniences related to your participation, you will be provided with light refreshments and snacks, as well as a free parking pass. It is important for you to know that it is unethical to provide undue compensation or inducements to research participants and, if you agree to be a participant in this study, this form of compensation to you must not be coercive. If you would not otherwise choose to participate if the compensation was not offered, then you should decline.**

**PERSONAL CONFIDENTIALITY AND ANONYMITY:** Due to the social nature of focus groups 100% confidentiality is not possible. Your confidentiality and the confidentiality of the data will be protected by ensuring that the name, contact information, and occupation details of the participants will not be released to anyone other than the principle investigator and her academic supervisor. You will be assigned a number at the beginning of the focus group and your responses will be referred to and identified by your number throughout the remainder of the study. All information will be kept confidential, and data will be stored in a secure and locked cabinet in the Behavioural Medicine Laboratory at the University of Victoria. All results will be identified as group data only, with NO individuals being identified. The findings of this study will be used to construct a questionnaire for future investigation, and may be shared at scholarly conferences and in peer-reviewed academic journals. All of the information that you and the other participants contribute during the session is to be kept anonymous and confidential.

**Your participation in this research must be completely voluntary. If you do decide to participate, you may withdraw at any time without any consequences or any explanation.** If you do withdraw from the study your data will be used in a summarized form with NO identifying information. In addition to being able to contact the research team at the above phone number and emails, you may verify the ethical approval of this study, or raise any concerns you might have, by contacting the Human Research Ethics Board at the University of Victoria 250-472-4545. Your signature below indicates that you understand the above conditions of the participation in this study, elect to take part in the study, and that you have had the opportunity to have your questions answered by the researchers.

Name of Participant

Signature

Date

**A copy of this consent will be left with you, and a copy will be taken by the researcher.**

Appendix D: Salient Belief Questions for Focus Groups



**“Identifying the beliefs towards participating in leisure-time physical activity among new young professionals in transition to the professional workforce: A pilot study”**

**Eliciting Salient Behavioural Beliefs**

1. What do you believe are the advantages of participating in exercise activities performed at a moderate or vigorous intensity (sweating, heavier breathing, rapid heart beat) for at least 30 minutes, 4 days a week over the next month?
2. What do you believe are the disadvantages of participating in exercise activities performed at a moderate or vigorous intensity for at least 30 minutes, 4 days a week, in the forthcoming month?
3. Is there anything else you associate with your participation in exercise activities performed at a moderate or vigorous intensity for at least 30 minutes, 4 days a week, in the forthcoming month?

**Eliciting Salient Normative Referents**

1. Are there any individuals or groups in your life who would approve of you participating in exercise activities at a moderate or vigorous intensity (sweating, heavier breathing, rapid heart beat) for at least 30 minutes, 4 days a week, in the forthcoming month?
2. Are there any individuals or groups who would disapprove of you participating in exercise activities at a moderate or vigorous intensity for at least 30 minutes, 4 days a week, in the forthcoming month?
3. Are there any other individuals or groups who come to mind when you think about participating in exercise activities at a moderate- or vigorous intensity for at least 30 minutes, 4 days a week

**Eliciting Salient Control Factors**

1. What factors or circumstances would enable you or make it easy for you to participate in exercise activities performed at a moderate or vigorous intensity (sweating,

heavier breathing, rapid heart beat) for at least 30 minutes, 4 days a week, in the forthcoming month?

2. What factors of circumstances would make it *difficult* or *impossible* for you to participate in exercise activities performed at a moderate or vigorous intensity for at least 30 minutes, 4 days a week, in the forthcoming month?

3. Are there any other issues that come to mind when you think about the difficulty of participating in exercise activities performed at a moderate or vigorous intensity for at least 30 minutes, 4 days a week, in the forthcoming month?

Is there anything else you would like to add about how the transition to your professional occupation has influenced your participation in moderate or vigorous exercise for at least 30 minutes, 4 days a week, in the forthcoming month?

Thank you for taking the time to complete this questionnaire!

Megan Kirk

Appendix E: Verbal Script to an Appointed Proxy



Dear     Name of Proxy    ,

My name is *Megan Kirk* and I am a graduate student working under the supervision of Dr. Ryan Rhodes in the School of Exercise Science, Physical and Health Education at the University of Victoria. As part of the requirements for my Master's of Arts (Kinesiology) degree, I will be conducting some very exciting research. I am investigating the patterns of physical activity among new young professionals, ages 25-44, who have recently entered their careers as faculty members (within the last 5-years) at institutions associated with the Association of Universities and Colleges of Canada.

Research has shown that professional careers are associated with the highest number of work hours per week, the greatest psychological demands, and the lowest on-the-job activity! This is worrisome considering the increasing number of young adults completing doctoral education and entering academic occupations. Thus, the purpose of this Canada-Wide study is to 1) evaluate the patterns of PA during leisure-time among a representative sample of Canadian young professionals entering their professional career as new faculty members using longitudinal retrospective analysis, and 2) predict the individual reasons for changes in PA using a leading theoretical model. To achieve this, I have created a detailed online health survey that will take approximately **15 minutes** to complete. New faculty members will be informed of the study, be provided with a survey link, and have access to complete the study using online encrypted software.

The findings from this study will be written for publication in peer-reviewed journals, and presented at regional, national, and international conferences to help inform future research strategies aimed at promoting regular PA among professional adults in early career transitions. It is very exciting that this research has been approved by the Human Research Ethics Board at the University of Victoria to be a Canada-Wide study.

As part of the ethical considerations for this study, I must have an **appointed proxy member** distribute the recruitment materials via email to faculty members across Canada. I have prepared 5 short emails to be sent over a 6-week period to obtain the highest response rate from new faculty members. Emails may be sent using a listserve or the personal email of a new faculty member. If you choose to distribute the emails via a listserve, ineligible participants will be screened out on the first section of the online survey.

Would you be willing to act as my appointed proxy to send out the study invitation, online survey link, and reminder emails? Once participants receive the study invitation (that also includes my contact information) you can simply forward any inquiries to me directly or the participants can decide to contact me directly with any further questions regarding the research.

If you have any questions regarding this research, please do not hesitate to contact me at [megan@uvic.ca](mailto:megan@uvic.ca) or 250-472-5488 or Dr. Ryan Rhodes at [rhodes@uvic.ca](mailto:rhodes@uvic.ca) or 250-721-8384. You can verify the ethical approval of this study by contacting the Human Research Ethics Board at [ethics@uvic.ca](mailto:ethics@uvic.ca) or 250-472-4545.

Thank you very much for your consideration and time! I look forward to hearing from you regarding your decision to act as my appointed proxy member for the distribution of the study materials.

Sincerely,  
Megan Kirk

## Appendix F: Notice of Research



**NEW FACULTY HEALTH STUDY: NOTICE OF RESEARCH**

**“The Impact of Early Career Transitions on Patterns of Physical Activity Among Professional Adults Entering the Professional Workforce: An Application of the Theory of Planned Behavior”**

Dear Faculty Member,

It is with great excitement that I invite you to be a part of an important research study titled “**The Impact of Early Career Transitions on Patterns of Physical Activity among Professional Adults Entering the Professional Workforce: An Application of the Theory of Planned Behavior.**” I am inviting new professionals across Canada who have recently completed doctoral education and are now employed as new faculty members at institutions associated with the Association of Universities and Colleges of Canada. I welcome all new faculty members from every Canadian university and college associated with the Association of Universities and Colleges of Canada with any level of physical activity from sedentary to highly active to complete the online survey. The primary investigator is Megan Kirk, a graduate student in the School of Exercise Science, Physical and Health Education at the University of Victoria. The study is being conducted as part of the requirements for a Master’s of Arts degree (Kinesiology) and is being supervised by Dr. Ryan E. Rhodes, an associate professor in the School of Exercise Science, Physical and Health Education.

**Project Rationale**

Large-scale national surveys have indicated that young adults show the sharpest decline in physical activity and greatest increases in overweight/obesity. Life-transitions (e.g., marriage, parenthood) have been identified as the probable reason for these conditions. Emerging research has suggested that those entering a **professional occupation** are at high risk of developing poor health habits that may transcend into middle- and older-adulthood. Research has shown that professional careers are associated with the highest number of work hours per week, the greatest psychological demands, and the lowest on-the-job activity! Despite these findings, however, relatively little is known about the individual reasons for changes in health behaviours during occupation transitions. To my knowledge, research investigating how the transition to the professional workforce influences health behaviours (e.g., physical activity) of new professionals does not exist! **Thus, YOUR participation is of utmost importance to help inform future health promotion strategies aimed at improving the health and quality of life of new professionals!**

**Purpose of the Study**

The purpose of this Canada-Wide study is to 1) evaluate the patterns of PA during leisure-time among a representative sample of Canadian professionals in transition to the professional workforce using longitudinal retrospective analysis, and 2) predict the within-person changes of PA and identify the key theoretical variables associated with PA during the transition to the professional workforce using Ajzen’s TPB. New faculty members have been chosen as the burgeoning example of a demanding professional occupation. The findings from this study will be written for publication in peer-reviewed journals, and presented at regional, national, and international conferences to help inform future research strategies aimed at promoting regular PA among professional adults in transition to their career. This study has been approved by the Human Research Ethics Board at the University of Victoria and meets the rigorous requirements for ethical approval. To verify the ethical approval of the study please contact [ethics@uvic.ca](mailto:ethics@uvic.ca) or 250-472-4545. Any questions about the research may be directed to Megan Kirk at [megan@uvic.ca](mailto:megan@uvic.ca) or 250-472-5488, or Dr. Ryan Rhodes at [rhodes@uvic.ca](mailto:rhodes@uvic.ca) or 250-721-8384.

**What do I have to do to Participate?**

If you volunteer to participate, you will be asked to complete an online survey that will take approximately **15-20 minutes** to complete. You will be asked to provide basic health indicators (e.g., self-rated health, smoking status) and demographics (e.g., age, ethnicity, marital status). In addition, you will be asked to recall your past and current physical activity patterns during leisure and at work across the transition from education to the workforce. You will also be asked various questions about how your attitude, subjective norm, perceived control, and intention towards exercise influence your physical activity behavior (Ajzen’s Theory of Planned Behavior).

## Appendix G: Information Letter



University  
of Victoria | British Columbia  
Canada

## *Participant Consent Form*

### **The Impact of Early Career Transitions on Patterns of Physical Activity among Professional Adults Entering the Professional Workforce: An Application of the Theory of Planned Behavior**

You are being invited to participate in a study titled *The Impact of Early Career Transitions on Patterns of Physical Activity Among Professional Adults Entering the Professional Workforce: An Application of the Theory of Planned Behavior*. The primary investigator is Megan Kirk, a graduate student in the School of Exercise Science, Physical and Health Education at the University of Victoria. This study is being conducted as part of the requirements for a Master's of Arts (Kinesiology) degree and will be conducted under the supervision of Dr. Ryan Rhodes, an associate professor in the Faculty of Education at the University of Victoria. If you have any questions regarding the nature of this research please contact Megan Kirk at [megan@uvic.ca](mailto:megan@uvic.ca) or 250-472-5488, or Dr. Ryan Rhodes at [rhodes@uvic.ca](mailto:rhodes@uvic.ca) or 250-721-8384.

**STUDY PURPOSE:** Emerging research has suggested that those entering a **professional occupation** are at high risk of developing poor health habits that may transcend into middle- and older-adulthood. Research has shown that professional careers are associated with the highest number of work hours per week, the greatest psychological demands, and the lowest on-the-job physical activity! Despite these findings, however, relatively little is known about the individual reasons for changes in health behaviours during occupation transitions. Therefore, the purpose of this proposed study is to 1) evaluate the patterns of PA during leisure-time among a representative sample of new professionals (e.g. faculty members) recently employed in the professional workforce using longitudinal retrospective analysis, and 2) predict the within-person changes of PA and identify the key theoretical variables associated with PA during the transition to the professional workforce using Ajzen's TPB. The findings from this study will be written for publication in peer-reviewed journals, and presented at regional, national, and international conferences to help inform future research strategies aimed at promoting regular PA among young adults in transition.

**IMPORTANCE OF THIS RESEARCH:** The issue of health behaviours among professionals employed in professional occupations within Canadian society is a public health priority. Therefore, research examining how the transition to professional employment impacts physical activity behaviour is critical for the prevention of habitual physical activity across the lifespan.

**SELECTION OF PARTICIPANTS:** You are being asked to participate in this study because you meet our inclusion criteria of being a professional adult currently employed as a full-time faculty member at an institution that has membership with the Association of Universities and Colleges of Canada, and having completed professional doctoral education. While this research is focused on faculty in their early career, **we welcome ALL faculty members to participate.**

**WHAT DO PARTICIPANTS HAVE TO DO?** If you volunteer to participate, you will be asked to complete an online survey that will take approximately 15-20 minutes of your time. You will be asked to provide basic health indicators (e.g., self-rated health, smoking status) and demographics (e.g., age, ethnicity, marital status). In addition, you will be asked to recall your past and current physical activity patterns during leisure and at work across the transition from education to the workforce. You will also be asked various questions about how your attitude, subjective norm, perceived control, and intention towards exercise influence your physical activity behavior (Ajzen's Theory of Planned Behavior).

**BENEFITS OF PARTICIPATING:** Little research investigating the impact of occupation type on the health behaviours of professional adults exists. Conducting research grounded in theory is a necessary first step in developing robust health interventions that target inactivity among new professionals. The insight you provide will benefit future research agendas that aim to explain health behaviours among young adults entering professional occupations as well as help inform targeted interventions.

**PERSONAL CONFIDENTIALITY AND ANONYMITY:** Your confidentiality and the confidentiality of the data will be protected by using online encrypted software that requires a case-sensitive password only known by the primary investigator and her academic supervisor. **No personal identification including the name, contact information, and occupation details of the participants will be obtained.** Your online survey will be assigned a specific code and your responses will be referred to and identified by your code throughout the remainder of the study. All results will be identified as **group data only**. The findings of this study may be shared at scholarly conferences and in peer-reviewed academic journals. All of the information that you and the other participants contribute will be kept anonymous and confidential in either locked file cabinets or on a computer requiring a password only known by the primary investigator and her academic supervisor in the Behavioural Medicine Laboratory at the University of Victoria.

**Your participation in this research must be completely voluntary. If you decide to participate by filling-out the online questionnaire, you may withdraw at any time without any consequences or any explanation.** If you do withdraw from the study your data will be used in a summarized form with NO identifying information.

In addition to being able to contact the research team at the above phone number and emails, you may verify the ethical approval of this study, or address any questions you might have, by contacting the Human Research Ethics Board at the University of Victoria 250-472-4545.

Thank you for considering this research. You will receive the online survey link within 2-3 days.

Appendix H: Recruitment Email #1

**Dear Faculty Member,**

My name is *Megan Kirk* and I am a graduate student working under the supervision of Dr. Ryan Rhodes in the School of Exercise Science, Physical and Health Education at the University of Victoria. As part of the requirements for my Master's of Arts (Kinesiology) degree, I will be conducting some very exciting Canada-wide research! I am investigating the health patterns among new professionals who have recently been employed as faculty members (within the last 5-years) at institutions associated with the Association of Universities and Colleges of Canada.

Research has indicated that professional careers requiring higher education are associated with the highest number of work hours per week, the greatest psychological demands, and the lowest on-the-job activity! This is worrisome considering the increasing number of adults completing doctoral education and entering professional occupations. To my knowledge, research investigating how the transition to the professional workforce influences health behaviours (e.g., physical activity) of new professionals does not exist! Thus, the purpose of this Canada-Wide study is to 1) evaluate the patterns of PA during leisure-time among a representative sample of Canadian young professionals entering their professional career as new faculty members, and 2) predict the individual reasons for changes in PA using a leading theoretical model.

The potential societal benefits of participating in this study include helping health researchers identify the salient behavioural, normative and control beliefs that professional adults in transition have towards participating in physical activity. Professional occupations may be a critical contributor to the sharp declines in PA among Canadians. Thus, the patterns of PA need to be better understood across this transition to help develop targeted health promotion strategies for this turbulent time period. Therefore, I have developed a theoretically sound questionnaire to try and capture the impact of transitioning to a professional career on physical activity levels. Thus, YOUR participation in this research is of utmost importance to help inform future health promotion strategies aimed at improving the health and quality of life of new professionals!

In the next **2-3 days**, you will be receiving an online survey link to access a 15-20 minute questionnaire that asks you specific questions about 1) your past physical activity levels, 2) your current physical activity behaviours and 3) your beliefs towards participating in physical activity. The survey is based on Ajzen's (1991) Theory of Planned Behaviour to help predict the individual reasons for changes in physical activity across the transition period. In the mean time, I have attached a detailed information letter outlining the study in detail, and welcome any questions or concerns.

I am aware that your current work situation is extremely busy, and I certainly appreciate your consideration and time for helping me with this research. Should you have any questions about the study please contact me at [megan@uvic.ca](mailto:megan@uvic.ca) or 250-472-5488, or my supervisor, Dr. Ryan E. Rhodes and [rhodes@uvic.ca](mailto:rhodes@uvic.ca) or 250-721-8384. For your convenience, I have attached a notice of research outlining the study in more detail.

Please look for my next email that contains the survey link.

Sincerely,

Megan Kirk

Canadian Institutes of Health Research Canada Graduate Scholarship

Masters of Arts in Exercise Psychology (c)

School of Exercise Science, Physical and Health Education

University of Victoria, Victoria, British Columbia

Email: [megan@uvic.ca](mailto:megan@uvic.ca)

Work Phone: (250) 472-5488

Appendix I: Second Email to Faculty

**Dear Faculty Member,**

2-3 days ago you received a pre-notice email regarding my research investigating the health patterns of professionals employed as faculty members at Canadian universities and colleges. Again, my name is *Megan Kirk* and I am a graduate student working under the supervision of Dr. Ryan Rhodes in the School of Exercise Science, Physical and Health Education at the University of Victoria.

**Please click on the following link to access the survey:**

<http://www.askitonline.com/survey/the-impact-of-early-career-tra/>

The online survey takes approximately 15-20 minutes of your time and asks you specific questions about 1) your past physical activity levels, 2) your current physical activity behaviours and 3) your beliefs towards participating in physical activity. The survey is based on Ajzen's (1991) Theory of Planned Behaviour to help predict the individual reasons for changes in physical activity across the transition period.

To my knowledge, no known studies have examined the impact of professional occupation transitions on the health behaviours of new professionals. The current state of the literature will be expanded by this research and the understanding and knowledge gained from this study will be shared with health researchers, health professionals and policy makers to help inform future health promotion strategies that target physical inactivity among professional adults during the transition to the workforce. Thank you for taking the time to consider being a part of this important research.

I am aware that you may be extremely busy in your career, so I greatly appreciate your time and consideration helping me with this research. Should you have any questions about the study please contact me at [megan@uvic.ca](mailto:megan@uvic.ca) or 250-472-5488, or my supervisor, Dr. Ryan E. Rhodes and [rhodes@uvic.ca](mailto:rhodes@uvic.ca) or 250-721-8384.

Sincerely,

Megan Kirk

Appendix J: Email Reminder to Faculty

**Dear Faculty Member,**

This is just a short reminder if you have not yet accessed the online Canadian faculty health survey, you can do so by clicking the following link:

**FACULTY HEALTH SURVEY**

<http://www.askitonline.com/survey/the-impact-of-early-career-tra/>

The online survey takes approximately 15-20 minutes of your time and asks you specific questions about 1) your self-rated health, 2) your past physical activity levels, 3) your current physical activity behaviours and 4) your beliefs towards participating in physical activity. The survey is based on Ajzen's (1991) Theory of Planned Behaviour to help predict the individual reasons for changes in physical activity across the early career transition period.

This is the FIRST known Canadian study investigating the impact of entering a professional occupation on the patterns of physical activity of professionals employed as faculty members. The current state of the literature will be expanded by this research and the understanding and knowledge gained from this study will be shared with health researchers, health professionals and policy makers to help inform future health promotion strategies that target physical inactivity among new professionals entering demanding occupations. Thus, YOUR participation in this research is extremely important.

I am aware that it is an extremely busy time of year for you right now, and I certainly appreciate that you have taken the time to consider this research. Should you have any questions about the study please contact me at [megan@uvic.ca](mailto:megan@uvic.ca) or 250-472-5488, or my supervisor, Dr. Ryan E. Rhodes and [rhodes@uvic.ca](mailto:rhodes@uvic.ca) or 250-721-8384.

Thank you for considering this research.

Sincerely,

Megan Kirk

Canadian Institutes of Health Research Canada Graduate Scholarship

Masters of Arts in Kinesiology (c)

School of Exercise Science, Physical and Health Education

University of Victoria, Victoria, British Columbia

Work: (250) 472-5488

Email: [megan@uvic.ca](mailto:megan@uvic.ca)

Appendix K: Canadian New Faculty Online Questionnaire



**University  
of Victoria**



**The Impact of Early Career Transitions on Patterns of Physical Activity Among Professional Adults, ages 25-44, Entering the Professional Workforce: An Application of the Theory of Planned Behavior**

**Megan A. Kirk – University of Victoria, Masters Candidate  
Dr. Ryan E. Rhodes – Associate Professor, University of Victoria**

**CONSENT FORM**

Thank you for deciding to participate in the research study titled “Investigating Patterns of Physical Activity among New Young Professionals, ages 25-44, in Transition to the Professional Workforce: An Application of the Theory of Planned Behavior” conducted by Megan Kirk ([megan@uvic.ca](mailto:megan@uvic.ca) or 250-472-5488) a graduate student in the School of Exercise Science, Physical and Health Education at the University of Victoria. This research study is funded by the Canadian Institutes of Health Research. The purpose of this research program is to evaluate the patterns of physical activity among new professionals across the transition to their professional occupation and identify the theoretical correlates associated with changes in physical activity behavior among a representative sample of young adults.

We ask that you complete a short online survey, which should take approximately 15 minutes of your time. There are no right or wrong answers. Please provide responses that are as honest and accurate as possible. If you choose to participate, please note that your participation is completely voluntary. No information regarding your personal contact information or place of work will be asked. Should you decide to withdraw from the study prior to completing the survey, please note that your responses will be kept and used as summary group data. Access to the online survey data is not accessible to anyone other than the primary investigator and her academic supervisor, Dr. Ryan E. Rhodes, an associate professor in the School of Exercise Science, Physical and Health Education. The online survey uses encrypted software that requires a secure password only known by the primary investigator and her academic supervisor. All results will be interpreted and displayed as **group data only** with no personal identifying information. As well, all data will be stored in a secure location either in locked file cabinets or on encrypted password protected computer files in the Behavioural Medicine Laboratory at the University of Victoria for five years after collection. All data will be deleted, shredded, and permanently destroyed after the five year time period.

Should you have any concerns regarding the study please contact Megan Kirk at [megan@uvic.ca](mailto:megan@uvic.ca) or 250-472-5488 or Dr. Rhodes at [rhodes@uvic.ca](mailto:rhodes@uvic.ca) or 250-721-8384. This research project has met the rigorous requirements for ethical approval from the University of Victoria Human Research Ethics Board. You may also verify the ethical approval of this study, or raise any concerns you might have, by contacting the University of Victoria Human Research Ethics Committee at 250-472-4545 or [ethics@uvic.ca](mailto:ethics@uvic.ca).

By clicking **“NEXT”** you have indicated that you understand the above conditions of the participation in this study, elect to take part in the study, and that you have had the opportunity to have your questions answered by the researchers.

## Demographics

1. What is your age? (please fill in): \_\_\_\_\_
2. Gender: Male  Female
3. Height: \_\_\_\_\_ feet \_\_\_\_\_ inches OR \_\_\_\_\_ m \_\_\_\_\_ cm
4. Weight: \_\_\_\_\_ kgs OR \_\_\_\_\_ lbs
5. Ethnicity/Race (please fill in): \_\_\_\_\_
6. Number of years as a faculty member (please fill in): \_\_\_\_\_
7. Faculty (field of study) you currently work in: \_\_\_\_\_
8. Number of years since completing doctoral education : \_\_\_\_\_
9. What province/territory are you currently teaching in: \_\_\_\_\_

**10. Marital Status:**

- Single/Dating
- Common-Law
- Married
- Separated/Divorced
- Widowed

**8. Partner Status:**

a. Is your partner currently employed

- part-time (0-35 hrs/wk)
- full-time (35-40 hrs/wk)
- overtime (>40 hrs/wk)

b. What is your partner's current occupation (please fill in): \_\_\_\_\_

**9. Parenthood Status:**

- No children – Please skip to HEALTH INFORMATION
- 1 child
- 2 children
- 3 children
- Other (specify): \_\_\_\_\_

**Age of children**

- 0-5 years
- 5-7 years
- 8-10 years
- > 10 years
- other: \_\_\_\_\_

## **Health Information**

**This next part of the questionnaire is needed to help understand the general physical and emotional health of the people participating in the study. For this reason, it is very important information. All the information is held in strict confidence and its presentation to the public will be through group data only.**

### **1. General Health Information:**

**Do you currently smoke cigarettes?**

Yes

If “Yes,” how many cigarettes do you usually smoke in a day? \_\_\_\_\_

No

**Has a health care professional (e.g., physician, nurse) ever told you that you have/had the following chronic conditions? (Please check all that apply)**

Angina

Heart Attack

Stroke

High Blood Cholesterol

High Blood Pressure

Cancer

Diabetes

Other: (please specify) \_\_\_\_\_

**In general, compared to other people your age, how would you rate your overall health?**

Excellent

Very Good

Good

Fair

Poor

**Compared to when you were completing your doctoral education, how would you rate your overall health in general now?**

Much better now than when I was in doctoral education

Somewhat better now than when I was in doctoral education

About the same

Somewhat worse now than when I was in doctoral education

Much worse than when I was in doctoral education

**Compared to when you were completing your undergraduate education, how would you rate your overall health in general now?**

- Much better now than when I was in undergraduate education
- Somewhat better now than when I was in undergraduate education
- About the same
- Somewhat worse now than when I was in undergraduate education
- Much worse than when I was in undergraduate education

**How true or false is each of the following statements for you?**

**1. I seem to get sick a little easier than most people?**

- Definitely True
- Mostly True
- Don't Know
- Mostly False
- Definitely False

**2. I am as healthy as anybody I know**

- Definitely True
- Mostly True
- Don't Know
- Mostly False
- Definitely False

**3. I expect my health to get worse**

- Definitely True
- Mostly True
- Don't Know
- Mostly False
- Definitely False

**4. My health is excellent**

- Definitely True
- Mostly True
- Don't Know
- Mostly False
- Definitely False

## **2. Energy and Emotions:**

**These questions are about how you feel and how things have been with you since you started working in your professional occupation. For each question, please give the answer that comes closest to the way you have been feeling (please check only one response).**

**Do you feel full of pep?**

- All of the time
- Most of the time
- A good bit of the time
- Some of the time
- A little bit of the time
- None of the time

**Have you been a very nervous person?**

- All of the time
- Most of the time
- A good bit of the time
- Some of the time
- A little bit of the time
- None of the time

**Have you felt so down in the dumps that nothing could cheer you up?**

- All of the time
- Most of the time
- A good bit of the time
- Some of the time
- A little bit of the time
- None of the time

**Have you felt calm and peaceful?**

- All of the time
- Most of the time
- A good bit of the time
- Some of the time
- A little bit of the time
- None of the time

**Did you have a lot of energy?**

- All of the time
- Most of the time
- A good bit of the time
- Some of the time
- A little bit of the time
- None of the time

**Have you felt downhearted and blue?**

- All of the time
- Most of the time
- A good bit of the time
- Some of the time
- A little bit of the time
- None of the time

**Did you feel worn out?**

- All of the time
- Most of the time
- A good bit of the time
- Some of the time
- A little bit of the time
- None of the time

**Have you been a happy person?**

- All of the time
- Most of the time
- A good bit of the time
- Some of the time
- A little bit of the time
- None of the time

**Did you feel tired?**

- All of the time
- Most of the time
- A good bit of the time
- Some of the time
- A little bit of the time
- None of the time

## **24-Hour Time-Use**

These next set of questions will help us understand the typical amount of time you spend in a 24-hour period in various day-to-day activities, and the decisions you make about dividing your time between various activities.

### **PAID WORK AND RELATED ACTIVITIES**

Paid work and related activities include all functions directed toward market activity including 1) commuting to and from work, 2) time spent completing work related tasks (e.g., marking, teaching, presentations), 3) other related activities including answering work-related emails, completing work tasks outside of the workplace, etc.

1. During a typical 24-hour time period during a weekday (e.g, Thursday), I spend \_\_\_\_\_ hours of time doing PAID WORK ACTIVITIES.
2. During a typical 24-hour time period during a weekend day (e.g., Sunday), I spend \_\_\_\_\_ hours of time doing PAID WORK ACTIVITIES.

### **UNPAID WORK ACTIVITIES**

Unpaid work includes all work directed toward non-market oriented activity. It includes household work and related activities (shopping, childcare), as well as social support, civic and volunteer activities.

1. During a typical 24-hour time period during a weekday (e.g, Thursday), I spend \_\_\_\_\_ hours of time doing UNPAID WORK ACTIVITIES.
2. During a typical 24-hour time period during a weekend day (e.g., Sunday), I spend \_\_\_\_\_ hours of time doing UNPAID WORK ACTIVITIES.

### **LEISURE-TIME ACTIVITIES**

Leisure-time/free-time activities include time spent socializing (e.g., in restaurants, home, bars), doing passive leisure (e.g., TV/movie viewing, reading, music), active leisure (entertainment/sporting events and activities).

1. During a typical 24-hour time period during a weekday (e.g, Thursday), I spend \_\_\_\_\_ hours of time doing LEISURE-TIME ACTIVITIES.
2. During a typical 24-hour time period during a weekend day (e.g., Sunday), I spend \_\_\_\_\_ hours of time doing LEISURE-TIME ACTIVITIES.

### **PERSONAL CARE ACTIVITIES**

**Personal care activities include time spent sleeping (e.g., nighttime or essential sleep), preparing/having meals at home (e.g., not restaurant), and other personal care (e.g., washing, grooming, dressing, naps).**

- 1. During a typical 24-hour time period during a weekday (e.g, Thursday), I spend \_\_\_\_\_ hours of time doing PERSONAL CARE ACTIVITIES.**
- 2. During a typical 24-hour time period during a weekend day (e.g., Sunday), I spend \_\_\_\_\_ hours of time doing PERSONAL CARE ACTIVITIES.**

## Parental Support

The next set of questions ask you about the amount of support you get from your parent(s) or in-laws to help you with childcare needs (if applicable). We ask you to consider both your parents first, followed by your in-laws.

### Your Parents

1. Is your mother alive? Yes \_\_\_\_\_ No \_\_\_\_\_
2. Is your father alive? Yes \_\_\_\_\_ No \_\_\_\_\_
3. Does your mother and/or father live in close proximity to you (please check the statement below that best describes your situation)?
  - \_\_\_\_\_ yes, in the same neighbourhood
  - \_\_\_\_\_ yes, in the same city but not in the same neighbourhood
  - \_\_\_\_\_ no, not in the same city
  - \_\_\_\_\_ no, not in the same country

### Your In-laws

Now please consider your in-laws (i.e., spouse's or partner's parents). Please note that we will use the term "in-law" to denote your partner's parents throughout but you do not have to be married to answer these questions.

1. Is your mother in-law alive? Yes \_\_\_\_\_ No \_\_\_\_\_
2. Is your father in-law alive? Yes \_\_\_\_\_ No \_\_\_\_\_
3. Do your in-laws live in close proximity to you (please check the statement below that best describes your situation)?
  - \_\_\_\_\_ yes, in the same neighbourhood
  - \_\_\_\_\_ yes, in the same city but not in the same neighbourhood
  - \_\_\_\_\_ no, not in the same city
  - \_\_\_\_\_ no, not in the same country

**Please read each statement carefully and choose the best response that applies to you**

1. \_\_\_\_\_ I can depend on my **mother/father** to help with childcare (i.e., baby sitting, child minding) if I really need it.

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree	neutral	Slightly Agree	Moderately Agree	Strongly Agree

2. \_\_\_\_\_ I can depend on my **in-laws** to help with childcare (i.e., baby sitting, child minding) if I really need it.

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree	neutral	Slightly Agree	Moderately Agree	Strongly Agree

3. \_\_\_\_\_ If I needed help with childcare (i.e., baby sitting), my **mother/father** would be there in an instant.

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree	neutral	Slightly Agree	Moderately Agree	Strongly Agree

4. \_\_\_\_\_ If I needed help with childcare (i.e., baby sitting), my **in-laws** would be there in an instant.

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree	neutral	Slightly Agree	Moderately Agree	Strongly Agree

5. \_\_\_\_\_ My **mother/father** enjoy the childcare-related aspects of being a grandparent.

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree	neutral	Slightly Agree	Moderately Agree	Extremely Agree

6. \_\_\_\_\_ My **in-laws** enjoy the childcare-related aspects of being a grandparent.

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree	neutral	Slightly Agree	Moderately Agree	Strongly Agree

**Godin Leisure-Time Exercise Questionnaire**

For this next question, we would like you to recall your average weekly physical activity done during a typical week during your LAST YEAR OF FULL-TIME UNDERGRADUATE (e.g., B.A., B.Sc) EDUCATION.

When answering these questions please:

- consider your average weekly physical activity done in your **LEISURE-TIME** (i.e. Not occupation or household duties).
- note that the main difference between the three categories is the intensity of the activity.
- please write the average frequency on the first line and the average duration on the second line.

**Times Per Week    Average Duration**

a. **STRENUOUS ACTIVITY** \_\_\_\_\_  
 (HEART BEATS RAPIDLY, SWEATING) \_\_\_\_\_

(e.g., running, jogging, hockey, soccer, squash, vigorous swimming, vigorous long distance bicycling, vigorous aerobic dance classes, heavy weight training)

b. **MODERATE ACTIVITY** \_\_\_\_\_  
 (NOT EXHAUSTING, LIGHT PERSPIRATION) \_\_\_\_\_

(e.g., fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, alpine skiing, popular/folk dancing, vigorous housework and gardening)

c. **MILD ACTIVITY** \_\_\_\_\_  
 (MINIMAL EFFORT, NO PERSPIRATION) \_\_\_\_\_

(e.g., easy walking, yin yoga, bowling)

**Godin Leisure-Time Exercise Questionnaire**

For this next question, we would like you to recall your average weekly physical activity done during a typical week during your LAST YEAR OF FULL-TIME DOCTORAL (e.g., PhD) EDUCATION.

When answering these questions please:

- consider your average weekly physical activity done in your **LEISURE-TIME** (i.e. Not occupation or household duties).
- note that the main difference between the three categories is the intensity of the activity.
- please write the average frequency on the first line and the average duration on the second line.

**Times Per Week      Average Duration**

a. **STRENUOUS ACTIVITY** \_\_\_\_\_  
 (HEART BEATS RAPIDLY, SWEATING) \_\_\_\_\_

(e.g., running, jogging, hockey, soccer, squash, vigorous swimming, vigorous long distance bicycling, vigorous aerobic dance classes, heavy weight training)

b. **MODERATE ACTIVITY** \_\_\_\_\_  
 (NOT EXHAUSTING, LIGHT PERSPIRATION) \_\_\_\_\_

(e.g., fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, alpine skiing, popular/folk dancing, vigorous housework and gardening)

c. **MILD ACTIVITY** \_\_\_\_\_  
 (MINIMAL EFFORT, NO PERSPIRATION) \_\_\_\_\_

(e.g., easy walking, yin yoga, bowling)

**Godin Leisure-Time Exercise Questionnaire**

**For this next question, we would like you to recall your average physical activity done DURING THE PAST 7-DAYS.**

When answering these questions please:

- consider your average weekly physical activity done in your **LEISURE-TIME** (i.e. Not occupation or household duties).
- note that the main difference between the three categories is the intensity of the activity.
- please write the average frequency on the first line and the average duration on the second line.

**Times Per Week      Average Duration**

a. **STRENUOUS ACTIVITY** \_\_\_\_\_  
 (HEART BEATS RAPIDLY, SWEATING) \_\_\_\_\_

(e.g., running, jogging, hockey, soccer, squash, cross-country skiing, vigorous swimming, vigorous long distance bicycling, vigorous aerobic dance classes, heavy weight training)

b. **MODERATE ACTIVITY** \_\_\_\_\_  
 (NOT EXHAUSTING, LIGHT PERSPIRATION) \_\_\_\_\_

(e.g., fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, alpine skiing, popular/folk dancing, vigorous housework and gardening)

c. **MILD ACTIVITY** \_\_\_\_\_  
 (MINIMAL EFFORT, NO PERSPIRATION) \_\_\_\_\_

(e.g., easy walking, yin yoga, bowling)

**Current Environment**

**Convenient Facilities**

*Please circle the best answer that corresponds to you.*

1. There is facility with treadmills (e.g., recreation centre, aerobic dance studio, Gym) within a 5 min drive or 10 min walk of my **home**.

- |                      |                        |                      |         |                   |                     |                   |
|----------------------|------------------------|----------------------|---------|-------------------|---------------------|-------------------|
| 1                    | 2                      | 3                    | 4       | 5                 | 6                   | 7                 |
| Strongly<br>Disagree | Moderately<br>Disagree | Slightly<br>Disagree | neutral | Slightly<br>Agree | Moderately<br>Agree | Strongly<br>Agree |

2. There are walking/hiking trails within a 5 min drive or 10 min walk of my **home**.

- |                      |                        |                      |         |                   |                     |                   |
|----------------------|------------------------|----------------------|---------|-------------------|---------------------|-------------------|
| 1                    | 2                      | 3                    | 4       | 5                 | 6                   | 7                 |
| Strongly<br>Disagree | Moderately<br>Disagree | Slightly<br>Disagree | neutral | Slightly<br>Agree | Moderately<br>Agree | Strongly<br>Agree |

3. There is facility with treadmills (e.g., recreation centre, aerobic dance studio, Gym) within a 5 min drive or 10 min walk of my **workplace**.

- |                      |                        |                      |         |                   |                     |                   |
|----------------------|------------------------|----------------------|---------|-------------------|---------------------|-------------------|
| 1                    | 2                      | 3                    | 4       | 5                 | 6                   | 7                 |
| Strongly<br>Disagree | Moderately<br>Disagree | Slightly<br>Disagree | neutral | Slightly<br>Agree | Moderately<br>Agree | Strongly<br>Agree |

4. There are walking/hiking trails within a 5 min drive or 10 min walk of my **workplace**.

- |                      |                        |                      |         |                   |                     |                   |
|----------------------|------------------------|----------------------|---------|-------------------|---------------------|-------------------|
| 1                    | 2                      | 3                    | 4       | 5                 | 6                   | 7                 |
| Strongly<br>Disagree | Moderately<br>Disagree | Slightly<br>Disagree | neutral | Slightly<br>Agree | Moderately<br>Agree | Strongly<br>Agree |

## **Occupational Physical Activity**

**These questions inquire about the amount of time you spend sitting during a typical week while at work or doing work related activity (e.g., course preparation, marking, instruction, work from home).**

1. During the last 7-days, how much time in total did you spend **sitting** doing work or work related activity?

\_\_\_\_\_ hours \_\_\_\_\_ minutes

2. How **physically** demanding is your occupational work?

- Not at all physically demanding
- A little physically demanding
- Quite physically demanding
- Very physically demanding
- Extremely physically demanding

3. How **mentally** or **psychologically** demanding is your occupational work?

- Not at all mentally or psychologically demanding
- A little mentally or psychologically demanding
- Quite mentally or psychologically demanding
- Very mentally or psychologically demanding
- Extremely mentally or psychologically demanding

## Attitudes About Physical Activity

The following questions ask you to rate how you feel about engaging in regular physical activity over the next month. We define regular physical activity as accumulating at least 30 minutes of moderate (e.g., slight perspiration) or vigorous (e.g., heavy breathing, heavy perspiration) 4 times per week. Pay careful attention to the words at each end of the scales and circle the number that best represents how you feel about engaging in regular physical activity over the next month. Please circle the best response that applies to you.

For me, engaging in regular physical activity over the next month would be:

1.
 

1	2	3	4	5	6	7
extremely enjoyable	moderately enjoyable	slightly enjoyable	neutral	slightly unenjoyable	moderately unenjoyable	extremely unenjoyable
2.
 

1	2	3	4	5	6	7
extremely useful	moderately useful	slightly useful	neutral	slightly useless	moderately useless	extremely useless
3.
 

1	2	3	4	5	6	7
extremely pleasant	moderately pleasant	slightly pleasant	neutral	slightly unpleasant	moderately unpleasant	extremely unpleasant
4.
 

1	2	3	4	5	6	7
extremely wise	moderately wise	slightly wise	neutral	slightly unwise	moderately unwise	extremely unwise
5.
 

1	2	3	4	5	6	7
extremely exciting	moderately exciting	slightly exciting	neutral	slightly boring	moderately boring	extremely boring
6.
 

1	2	3	4	5	6	7
extremely beneficial	moderately beneficial	slightly beneficial	neutral	slightly harmful	moderately harmful	extremely harmful

For these questions, we would like to ask you more specific questions about regular physical activity. Please answer the questions by writing the number that best represents your belief in each space provided. Please use the following numerical scale as a yardstick. **Remember: We define regular physical activity as accumulating at least 30 minutes of moderate (e.g., slight perspiration) or vigorous (e.g., heavy breathing, heavy perspiration) 4 times per week.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Strongly Agree

For me, regular physical activity over the next month would....

1. Makes me more effective/productive in my work (e.g. writing, teaching) \_\_\_\_\_
2. Improves long-term health \_\_\_\_\_
3. Help me manage my stress/Prevents burnout \_\_\_\_\_
4. Makes me feel good (e.g., happy, positive, confident) \_\_\_\_\_
5. Takes time away from other obligations (e.g., work, family) \_\_\_\_\_
6. Be a hassle/inconvenience \_\_\_\_\_
7. Improve my physical fitness \_\_\_\_\_
8. Help me live a more balanced life (e.g. mental, emotional, environmental) \_\_\_\_\_
9. Help me build connections/relationships with others \_\_\_\_\_
10. Make me look good (e.g., fit, trim, healthy weight) \_\_\_\_\_

## Social Aspects About Regular Physical Activity

The following questions ask you about what other important individuals or groups in your social network (e.g., family, co-workers, clubs) think about you engaging in regular physical activity over the next month. We define regular physical activity as accumulating at least 30 minutes of moderate (e.g., slight perspiration) or vigorous (e.g., heavy breathing, heavy perspiration) 4 times per week. Pay careful attention to the words at each end of the scales. Please circle the best response that applies to you.

1. Most people who are important to me would want me to engage in regular physical activity over the next month.
 

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree	neutral	Slightly Agree	Moderately Agree	Strongly Agree
2. Most people whose opinions I value would approve of me engaging in regular physical activity over the next month.
 

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree	neutral	Slightly Agree	Moderately Agree	Strongly Agree
3. Most people who are important to me will engage in regular physical activity themselves over the next month.
 

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree	neutral	Slightly Agree	Moderately Agree	Strongly Agree
4. I feel pressure to be physically active over the next month from people who are important to me.
 

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree	neutral	Slightly Agree	Moderately Agree	Strongly Agree
5. Most people important to me, whose opinions I value, are physically active on a regular basis.
 

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree	neutral	Slightly Agree	Moderately Agree	Strongly Agree

These questions ask you specifically what other people in your social network think about regular physical activity. Please answer the questions by writing the number that best represents your belief in each space provided. Please use the following numerical scale as a yardstick. **Remember: We define regular physical activity as accumulating at least 30 minutes of moderate (e.g., slight perspiration) or vigorous (e.g., heavy breathing, heavy perspiration) 4 times per week.**

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree	neutral	Slightly Agree	Moderately Agree	Strongly Agree

1. My **spouse** would approve of me engaging in regular physical activity... \_\_\_\_\_
2. My **family** would approve of me engaging in regular physical activity... \_\_\_\_\_
3. My **colleagues** would approve of me engaging in regular physical activity... \_\_\_\_\_
4. My **child(ren)** would approve of me engaging in regular physical activity... \_\_\_\_\_
5. My **supervisor/boss** would approve of me engaging in regular physical activity ... \_\_\_\_\_
6. My **friends** would approve of me engaging in regular physical activity ... \_\_\_\_\_

## Factors Influencing Regular Physical Activity

The following questions ask you about how much control you believe you have over participating in regular physical activity over the next month. Remember, We define regular physical activity as accumulating at least 30 minutes of moderate (e.g., slight perspiration) or vigorous (e.g., heavy breathing, heavy perspiration) 4 times per week. Pay careful attention to the wording of the questions and please circle the number that best represents your beliefs.

1. **If you really wanted to**, engaging in regular physical activity over the next month is entirely up to you.

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree	neutral	Slightly Agree	Moderately Agree	Strongly Agree

2. **If you really wanted to**, how difficult or easy would it be for you to engage in regular physical activity over the next month?

Extremely Difficult	Moderately Difficult	Slightly Difficult	Neutral	Slightly Easy	Moderately Easy	Extremely Easy
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3. **If you really wanted to**, how **controllable** would it be for you to engage in regular physical activity over the next month?

1	2	3	4	5	6	7
Extremely Uncontrollable	Moderately Uncontrollable	Slightly Uncontrollable	Neutral	Slightly Controllable	Moderately Controllable	Extremely Controllable

4. **If you really wanted to**, how **confident** do you feel that you could engage in regular physical activity over the next month?

1	2	3	4	5	6	7
Extremely Unconfident	Moderately Unconfident	Slightly Unconfident	Neutral	Slightly Confident	Moderately Confident	Extremely Confident

The following questions concern how much control over **specific barriers and obstacles** you believe you have when doing physical activity. Please answer the questions by writing the number that best represents your control in each space provided. Please use the following numerical scale as a yardstick:

1	2	3	4	5	6	7
Extremely unconfident	Moderately unconfident	Slightly unconfident	Neutral	Slightly confident	Moderately confident	Extremely confident

**If you really wanted to be physically active, how confident are you that you could overcome the following barriers....**

1. Having a lack of free time... \_\_\_\_\_
2. Not having a consistent work schedule (e.g., no 9-5, work weekends, no lunch, disruptions)... \_\_\_\_\_
3. Heavy work demands/responsibilities (e.g., marking, course planning, meetings) \_\_\_\_\_
4. Having previous Injuries/health issues \_\_\_\_\_
5. Pressure to reach other professional aims (e.g. aiming for tenure, publications, conferences, service) \_\_\_\_\_
6. Not feeling like it (e.g., no energy, want to do something more relaxing) \_\_\_\_\_
7. No social support (e.g., friends, exercise buddy, colleagues model PA) \_\_\_\_\_
8. Going through other life transitions/changes \_\_\_\_\_
9. No close proximity of facilities \_\_\_\_\_
10. Having no faculty-only programs/shower facilities \_\_\_\_\_
11. Lack of affordable/available childcare \_\_\_\_\_
12. Other (please specify): \_\_\_\_\_

## Motivation to Engage in Regular Physical Activity

The following questions ask you about your motivation to engage in regular physical activity over the next month. Remember, We define regular physical activity as accumulating at least 30 minutes of moderate (e.g., slight perspiration) or vigorous (e.g., heavy breathing, heavy perspiration) 4 times per week. Pay careful attention to the wording of the questions and please circle the number that best represents your beliefs.

1. How **motivated** are you to engage in regular physical activity over the next month?

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

2. I plan to do everything I can to engage in regular physical activity over the next month?

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Strongly Agree

3. I **intend** to engage in regular physical activity over the next month.

1	2	3	4	5	6	7
Strongly Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Strongly Agree

4. I **intend** to engage in regular physical activity \_\_\_\_\_ **times per week** over the next month.

**Thank you for taking the time to complete the online survey!  
Your responses are greatly appreciated!**