

Exploring Physical Activity Commitment and Lapses:
A Comparison of Sport and Exercise Motives and Involvement Opportunities

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Abstract

This thesis aimed to determine which psychological factors enable adults to remain committed and to avoid lapses in physical activity (PA), and explored whether factors differed between sportspersons and exercisers. Three studies explored the importance of individual participatory motives (Markland & Ingledew, 1997), the total number of reasons motivating PA (Kruglanski et al., 2013) and the accommodation of involvement opportunities (Young & Medic, 2011), respectively. 252 ($M_{Age} = 47.2$, $SD = 6.0$) active adults completed online questionnaires and self-identified as either being sportspersons or exercisers. Results show that greater number of motives, greater affordance of involvement opportunities, and three motives (enjoyment, stress relief, and social affiliation), facilitate commitment and lapse avoidance for sportspersons and exercisers alike. Sportspersons may also benefit from personal goals/challenges, but not from appearance motives. Overall, results indicated more similarities than differences between organized sport and exercise contexts for how motivational factors associated with adherence outcomes.

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CHAPTER 1: INTRODUCTION

Physical inactivity can be viewed as the single greatest modifiable risk factor for the onset of obesity and its comorbidities amongst all Canadians (Warburton, Nicol & Bredin, 2006). Furthermore, achieving sufficient levels of moderate to vigorous levels of physical activity (PA) is associated with age-related increases in functional health and reductions in morbidity (Warburton et al., 2006). However, the state of physical inactivity is becoming increasingly troubling in Canada, as adults are not accumulating enough PA to achieve its related health benefits and protective effects against obesity. Approximately 85% of Canadians aged 18 and over are not meeting the levels of PA prescribed by guidelines (Statistics Canada, 2011a), and there are alarming decreases in PA levels with successive age cohorts (Statistics Canada, 2011b). Furthermore, common PA trends dictate that approximately half of the individuals who begin a PA program drop out within their first year of engagement (Dishman, Sallis, & Orenstein, 1985).

Areas meriting further attention for promoting PA adherence are the content and contexts of structured PA programming (Baker, Fraser-Thomas, Dionigi, & Horton, 2010; Glaros & Janelle, 2001). Structured PA programs often include activities that first require formal registration, enrollment or membership, which then allow individuals to pursue activities that are offered at a given location, facility or venue. These activities typically occur at advertised times or places and can include formal physical activity programs (i.e. spinning classes, swim club practice, etc.) but are not limited to formal programs as long as registration, enrollment or membership precede one's participation in the given activity. Researchers contend that there is a need for more effective tailoring of structured PA programming specifically to Canadian adults to promote greater adherence levels (Baker et al., 2010; Glaros & Janelle, 2001; Young & Medic, 2011a). To this end, it is imperative that the reasons for which adults participate in a

given mode of PA are better understood to inform the content of programmed activities. A key concern for tailored PA programming relates to the promotion of specific activity types that align with participants' motivational needs (Weiss & Amorose, 2008), because structured programs that accommodate personal preferences may be related to sustained participation. For example, variety in exercise programming caters to personal preferences which may promote greater levels of adherence in adults (Glaros & Janelle, 2001). In the same vein, more diverse structured activity programming may also be beneficial. For example, advocates contend that adult sport programming holds similar potential to exercise in promoting active lifestyles (Baker et al., 2010). Sport and exercise could cater to different subpopulations possessing very specific motivational profiles. However, a dearth in the literature exists comparing adult motives for participation between activity types, specifically between two common and highly beneficial forms of structured PA: sport and exercise (Kilpatrick, Hebert, & Bartholomew, 2005).

Older individuals who possess motivational profiles that may be best suited for sport participation, may have constrained opportunities for suitable programming because of a certain stigmatization against adult sport participation (Dionigi & O'Flynn, 2007). Common expectations for older people assume that they rest or partake in gentle exercise for therapeutic reasons, and that sports are allegedly inappropriate because of their overly demanding effects on an aging body. Furthermore, these individuals may not be afforded access to suitable programming because adult sport promotion shies in comparison to youth sport, exercise programs and unstructured leisure-time activity promotions, which are regularly targeted towards adult populations. For example, the Canadian Physical Activity Guidelines (CSEP, 2011) often recommend exercise or leisure activities as main conduits for attaining adequate levels of adult activity, whereas the promotion of sporting possibilities is largely neglected. Although health

benefits can result through leisurely forms of PA such as walking, the continued engagement in more rigorous forms of PA such as sport or exercise may result in greater physiological and psychosocial benefits (Ainsworth et al., 1993; Warburton et al., 2006). Thus, sport may serve as a rather promising yet untapped venue for PA programming, especially when specifically targeted to adults whose motivational profiles align with the regularly afforded outcomes of this PA context.

An important assumption made within the participation motivation literature is that goal-directed behaviour emanates from motivational forces and therefore salient motives for PA participation should be of primary focus (Kruglanski, 1996; Weiss & Amorose, 2008). Several studies have successfully catalogued the different reasons and the importance of these reasons for participation in both sport and exercise (Brodkin & Weiss, 1990; Hritz & Ramos 2008; Kolt, Driver, & Giles, 2004; Newson & Kems, 2007); however, few studies have attempted at providing valid differentiations between motives for sport and exercise engagement and even fewer studies have been able to do so within adult populations (Ebbeck, Gibbons, & Lokeen-Dahle, 1995; Gill, Williams, Dowd, Beaudoin, & Martin, 1996; Kilpatrick et al., 2005). In addition to focusing on adult participatory motives, research has revealed that adults possess other salient reasons for participation in their respective sport or exercise programs emanating from a host of involvement opportunities that are uniquely afforded through their continued involvement (Alexandris, Zahariadis, Tsorbatzoudis, & Grouios, 2002; Wilson et al., 2004; Young & Medic, 2011a, 2011b; Young, Starkes & Medic, 2011). Furthermore, the number of salient reasons for activity participation that an individual possesses may have an effect on PA adherence, in that having more diverse reasons for PA participation may result in a higher degree of commitment and uninterrupted participation than having fewer reasons (Kruglanski et al.,

2013). It is also possible that adult programming for each of exercise and sport contexts affords differentially-sized arrays of reasons to participate.

This study aimed to determine the different motives and involvement opportunities that sport and exercise modes of PA programming cater to, in efforts to facilitate the future tailoring of PA programs to match the motivational needs of their participants. Weick (1975) recognized that “*preferences for a particular activity might have a bearing on participation needs for specific groups*” (p.387), yet somehow such considerations remain unaddressed in public policy and programming. Therefore, the aim of this study was to differentiate the determinants of PA participation for sporting and exercise contexts, and to determine the predictive value of these reasons for involvement as they relate to measures of future commitment and lapses in participation. Thus, this study considered psychosocial aspects relating to contextual uniqueness in programming, with results having potential bearing on Canadian policy and funding decisions relating to the promotion and delivery of adult PA programming.

CHAPTER 2: REVIEW OF THE LITERATURE

Researchers have historically recognized the need to consider behavioural antecedents when aiming to design effective PA programs (Dishman et al., 1985). In the specific case of sustained participation in structured PA programs, motives for participation act as driving forces towards subsequent behaviour (Kruglanski, 1996; Weiss & Amorose, 2008). Though research on why people participate in different modes of PA stems back more than three decades, much of the earliest work focused primarily on youth sport participation. Findings indicated that youth participate in sport largely because of three common motives: physical competence, social acceptance and enjoyment (Weiss & Williams, 2004). However, research on participatory motives specific to adults within a variety of PA contexts has received far less attention. Adults may exhibit different or more varied motives for participation in PA because of developmental differences that may for example, relate to greater levels of autonomy or added financial resources (Hritz & Ramos, 2008). To better understand why adults initiate and sustain their PA participation, studies that specifically examine motives in adult populations are necessary to avoid overgeneralizations made from findings obtained within youth contexts. Furthermore, because of the strong influence of situational factors (Ebbeck et al., 2005), different adult motives may exist as a function of activity context, including differences between sport and exercise programming contexts.

Of the studies currently published that attempted to catalogue motives for sport and exercise participation, few effectively compared adult motives between contexts within the same study. As a testament to this dearth in literature, a systematic literature search was conducted to examine the nature of research within the participation motivation literature. Two extensive searches, each consisting of the same 27 search fields, were conducted in two separate databases:

the first housing articles relating to the field of human kinetics (SportDiscus) and the other focused primarily on psychosocial research (PsycInfo). Search terms included a particular focus on wording reflecting participation motives within adults, sport contexts, exercise contexts and a combination of all these terms. In attempts to gain additional results, further search fields included terms relating to the Participation Motivation Questionnaire (Dwyer, 1992) and the Exercise Motivation Inventory – 2 (Markland & Ingledew, 1997), both serving as common assessment tools. Finally, subsequent articles were leveraged through secondary references stemming from the original search results and from popular sport psychology textbooks (see Horn, 2002; 2008). After perusing abstracts and performing subsequent full-article reviews, the search only yielded four articles that descriptively captured the breadth of motives for older adults within PA contexts (see Brodtkin & Weiss, 1990, Hritz & Ramos, 2008; Newson & Kemps, 2007; Kolt, Driver & Giles, 2004), and three comparative studies between PA contexts of direct pertinence to this study (see Ebbeck et al., 1995; Gill et al., 1996; Kilpatrick et al., 2005). Due to the true lack of participation motivation literature relating to adult PA motives in different activity contexts, the current literature review first describes participation motivation studies in adults broadly, before focusing in depth on the three most relevant between-context comparative studies.

Participation Motivation: Within-Context Descriptive Studies in Adults

Of the few studies that described motives within sport and exercise adult populations, gender and age comparisons were often the primary foci. Brodtkin and Weiss (1990) found that 100 adult competitive swimmers between 23-74 years old rated motives for competitive reasons relatively high. However, older adults (aged 60-74) rated competitive motives significantly lower than young adults (aged 23-39) and middle-aged adults (aged 40-59). Furthermore, older adults

rated health and fitness motives as more important than achieving a favourable social status through sport, and reported 'having fun' as a particularly salient sport motive to sport participation. Similarly, Hritz and Ramos (2008) found that masters swimmers between 18-80 years old rated fitness and competition based motives as particularly salient and included being with other team members as an important reason for participation.

Newson and Kemps (2007) catalogued the motives of adult exercisers between 63-86 years of age. These adults rated improving and maintaining one's personal level of fitness as the most important reasons for exercise participation. Participants also stated enjoying having something to do and doing something that he or she was good at, as being particularly salient motives for exercise engagement. Kolt, Driver and Giles (2004), examined a sample of 815 sportspersons and exercisers (aged 55-93). Although participants were recruited from both sport and exercise contexts, no between activity type comparisons were made as both samples were collapsed. The most salient motives for these active adults were to improve and maintain one's health and fitness, to enjoy the activity and exercise, and to maintain joint mobility. Participants were also compared to determine any age effects on the strength of association of the reported motives. Age main effects were found significant where social motives were significantly more important for participants aged 55-64 compared to those aged 65-74. Challenge and fitness related motives were significantly more important for the 55-64 age group compared to those aged 75 and above. However, the 75 and above subsample rated motives relating to involvement and medical reasons as significantly more important than all other age subgroups.

On the whole, motives for adult sport and exercise participation seem to extend beyond those for youth sport participation. In addition to carrying-over motives for social acceptance and enjoyment stemming from youth sport participation, competitive and health oriented reasons for

participation emerge as new motives for adult exercise and sport participation. Additionally, participatory motives for both sportspersons and exercisers further differentiate with age, where social, challenge and fitness related motives become less important, and medically related motives become more important for older adults (Kolt et al., 2004). Not only are age-effects evident but adults also display a certain degree of breadth in salient motives for participation in PA programming. Adults show that depending on personal (age) and situational (activity type) factors, particularly important reasons for their participation stem from health and fitness, enjoyment, challenge, medical and social motives. Furthermore, some degree of ambiguity appears in the particular importance of motives as they relate to particular PA contexts. Specifically, the highlighted studies suggest that health and fitness, and enjoyment related motives for participation are relatively important for adults who participate in structured exercise and also for adults who participate in sport. In other words, structured exercise may not appear to uniquely accommodate fitness and enjoyment related motives, as sport appears to do so as well while also affording competitive motives to its adult participants.

Participation Motivation: Between-Context Comparative Studies

A major gap in the participation motivation literature relates to the functional comparison of adults' motives between sport and exercise contexts, within the same study. Only three known studies have attempted to do so (Ebbeck et al., 1995; Gill et al., 1996; Kilpatrick et al., 2005). In one of the first studies, Ebbeck and colleagues (1995) recruited 422 participants from martial arts ($n = 62$), swimming ($n = 65$), tennis ($n = 78$), volleyball ($n = 68$), weight training ($n = 80$) and yoga programs ($n = 69$). This study comprised two main procedural waves, where the first wave consisted of qualitative analyses of common important reasons for participation. These reasons were coded and informed the development of a quantitative questionnaire that assessed

participants' motives on 19-items. Based on these 19-items, a factor analysis revealed 4-independent motivational factors: *interdependence*, *personal satisfaction*, *self-image* and *instrumental* reasons. Subsequent analyses yielded a significant gender by activity type interaction for the interdependence factor, encompassing motives relating to competition, winning, teamwork and social interaction. Male volleyball and tennis players were significantly higher on these ratings than yoga, martial arts and swimming participants, and weight trainers were also significantly higher than yoga and martial arts participants. Female volleyball and tennis players rated interdependent reasons significantly higher than yoga, weight training and swimming participants; these female volleyball players were also significantly more motivated by interdependence factors than martial arts participants. Furthermore, yoga participants were significantly less motivated by interdependent reasons when compared to all other groups. Overall, sport activities, namely volleyball and tennis, appeared to cater more to motives of interdependence when compared to exercise activities (weight lifting, yoga), which may indicate sport programming's unique ability to accommodate select motives.

With respect to limitations, although Ebbeck and colleagues (1995) focused on adult motives for PA participation, only 10% of participants were 30 years of age or older. Therefore, their results cannot directly apply to older populations. Furthermore, because the different program types within this study included activities that take place within both group and individual settings, one could have expected interdependence ratings to be strongest within the team-sport participant group of volleyball players. Therefore, future research needs to sample a representatively aged adult population and to control for the interdependent nature of program types.

Gill and colleagues (1996) described participation motives in four different adult sport and exercise programs. Specifically, 209 participants were sampled from a running club ($n = 43$), two exercise classes from a private fitness club ($n = 35$), a cardiac rehabilitation exercise program ($n = 44$), and a Senior Games event ($n = 87$). Researchers administered surveys that included Duda and Tappe's (1989) Personal Incentives for Exercise Questionnaire, comprising 48-items that load onto 10 factors reflecting motives of competition, social recognition and fitness, to name a few. Results indicated significant activity type main effects for motives relating to mental benefits and appearance, where descriptive results showed that rehabilitation exercise program participants scored lowest for mental health and appearance motives, and that Senior Games participants scored highest for competitive motives. Significant gender main-effects revealed that regardless of activity type, female participants rated fitness, affiliation, flexibility and appearance motives higher than did male participants. An integral finding from this study related to the diversity in highly ranked motives reported by study participants. All activity group samples within this study exhibited multiple highly ranked reasons for participation in PA, emphasizing the need for future survey inventories to reflect a wide breadth in motives for participation.

However, like all research, the Gill et al. (1996) study is limited in a few domains. Firstly, the authors acknowledged that these activity groups do not represent all possible media for adult sport or exercise and that the study aimed to provide initial groundwork on cataloguing and comparing motives between activity types. Secondly, although 10-individual factors resulted from this questionnaire, the authors failed to mention performing any factor analyses with these study participants and thus the validity of these factors may be called into question. This is an important consideration since this questionnaire was originally developed for application within

exercise contexts, meaning that it might not validly account for the breadth of sport participation motives. Thirdly, it is impossible to determine which specific groups reported significant differences in strengths of association for mental health and appearance related motives in the absence of rigorous post-hoc comparisons between activity types. Finally, data for Senior Games possibly lacked comparative validity as they were collected over a year later with different procedures and survey items. Such a limitation reinforces the need for administering the same questionnaire to both sport and exercise programming groups in order to draw valid comparisons.

More recently, Kilpatrick and colleagues (2005) sampled 233 college-aged adults ($M_{age} = 22.2$) and compared their motives for participating in sport and exercise. Two surveys were administered to all participants: one to measure motives for sport participation and the other to measure motives for exercise participation. Therefore, comparisons were made within one study group who participated in both activity types, but not between different groups of exercisers and sportspersons. Researchers utilized two modified versions of the Exercise Motivation Inventory-2 (EMI-2; Markland & Ingledew, 1997), a questionnaire that attempts to gather information on a breadth of reasons for participation, which investigators altered to apply individually to sport and exercise contexts. These questionnaires comprised 51 items, which pertained to 14 motivational factors. Kilpatrick et al. (2005) provided definitions of sport and exercise to participants prior to their subsequent evaluation of motives and analyses revealed significant activity type main effects, as well as an interaction of activity type and gender. Motives of affiliation, challenge, competition, social recognition and enjoyment were rated significantly higher for sport participation than for exercise participation. The inverse was true for motives of appearance, health pressures, ill-health avoidance, nimbleness, positive health, strength and endurance, stress

management and weight management. Significant activity type by gender interactions revealed that motives for sport participation relating to enjoyment, revitalization and affiliation were higher for males than for females. Furthermore, the exercise specific motive of nimbleness was significantly more important for males. Contrarily, motives for exercise participation relating to appearance, health pressures, ill-health avoidance, positive health, stress management and weight management were rated significantly higher by females.

Kilpatrick and colleagues' (2005) study was limited in that participants' levels of activity were not controlled for in the multivariate comparative analyses. This is an important consideration as levels of activity involvement are said to mediate motives for participation (Rough & Wall, 1987), and in the Kilpatrick et al. (2005) study, participants engaged in exercise more frequently and at greater intensity in comparison to their sport involvement. Secondly, the validity of the motivational questionnaire was established in previous literature (Markland & Ingledew, 1997) and not via factor analyses within the studied sample population that accounted for both sport and exercise contexts. Finally, analyses ended at comparing motives and the authors did not apply these motivational differences to any separable outcomes, such as measures of behavioural adherence. Rather, in the absence of empirical evidence of such links, the authors speculated that since sport participation seems to produce greater levels of enjoyment, it may produce more long-term activity participation. However, such claims lacked empirical support in relation to results from the EMI-2 questionnaire. Thus, there exists a need to determine the predictive power of EMI-2 motives in relation to measures of psychological commitment to PA, and to measures of PA adherence.

Involvement Opportunities

In addition to importance of documenting adults' participatory motives, adults have been shown to stay committed to their respective sport (Young & Medic, 2011a, 2011b; Young et al., 2011) and exercise activity (Alexandris et al., 2002) due to a host of involvement opportunities (IOs). Borrowing from Scanlan, Carpenter, Schimdt, Simons and Keeler's (1993) Sport Commitment Model, IOs are operationally defined as opportunities that are uniquely afforded to participants from their continued involvement in a given activity. Theoretically, the strength of the IOs construct, calculated as an average from multiple opportunity items, predicts sport and exercise participants' resolve to continue participation (Scanlan et al., 1993).

Alexandris and colleagues (2002) applied the Sport Commitment Model within an exercise context with a sample of 210 adults ($M_{age} = 33.6$) recruited from three private health clubs. Participants completed a modified version of the Sport Commitment Questionnaire (Scanlan et al., 1993) that applies within an exercise context. Of all the antecedents of the Sport Commitment Model that proved to significantly predict activity commitment, the involvement opportunity construct was the most powerful predictor (Alexandris et al., 2002). Therefore, it can be argued that individuals who feel that they will miss out on perceived social, physical and affective benefits relating to their continued involvement in exercise, are more likely to stay committed to such exercise programming. However, Wilson and colleagues (2004) failed to replicate similar results among young adults in their 20s, as the IOs construct did not significantly predict exercise commitment. The authors discussed that the predictive value of the involvement opportunity items may have been accounted for through other items, specifically relating to social and satisfaction constructs.

Within sporting contexts, Young and colleagues (Young & Medic, 2011a, 2011b; Young et al., 2011) have revealed that adult sportspersons (i.e., masters athletes) have numerous salient reasons for committing to a sport, that are afforded to participants only through their continued involvement. Specifically, a sample of international-level masters track and field participants ($n = 389$) and a sample of international-level masters swimmers ($n = 424$) completed a modified version of the Sport Commitment Questionnaire (Scanlan et al., 1993), consisting of 14 involvement opportunity factors (Young & Medic, 2011a, 2011b). The leveraging of these additional involvement opportunity items came from prior studies within exercise contexts (Wilson et al., 2004), adult elite athlete contexts (Scanlan, T. K., Russel, Beals, & Scanlan, 2003) and qualitative research specifically focused on masters athletes (Medic, Starkes, Young, Weir & Giajnorio, 2005). Interestingly, these masters athletes presented a great deal of heterogeneity in their highly rated IOs, as they reported being committed to their sport for unique reasons such as the opportunities to: improve their health and fitness, improve physical skills, do something exciting, have a good time and enjoy oneself, travel, relieve stress, achieve competitive goals, be with friends, and delay age-related effects (Young & Medic, 2011a, 2011b).

Therefore, the special physical, social and affective opportunities that adults perceive to result from continued involvement in a specific context (and that they feel are unique to that context and cannot be experienced elsewhere) are important to both sportspersons and exercisers. However, authors speculate that some of these IOs explaining the resolve to continue participation may be entirely unique to sport contexts (Young & Medic, 2011a, 2011b). For example, IOs of improving one's physical skills, traveling for PA events, and achieving competitive goals, which all appear to be highly important for masters athletes, may only be uniquely or more readily afforded through sporting means of PA. Furthermore, research on adult

sportspersons compared to adult exercisers within the commitment domain exhibits differences in the number of involvement items according to each PA context. For example, where asking masters athletes to judge the importance of 14 opportunity items results in nine highly important opportunities (Young & Medic, 2011a, 2011b), noticeably limited item pools are asked to exercisers (e.g., 4 from Alexandris et al., 2002; 6 from Wilson et al., 2004). However, since the questionnaires administered to exercisers generally reflect fewer opportunity items and lack broader reasons for activity commitment, comparisons about differences in IOs between sport and exercise remain merely speculative in nature. Therefore, future research should consider administering equitable pools of survey items for IOs to both exercisers and sportspersons in order to draw valid differentiations in relation to their psychological commitment to their respective activities.

Commitment

Scanlan and colleagues (1993), define the term sport commitment as “a psychological construct representing the desire and resolve to continue sport participation” (p. 7). Therefore, this construct speaks directly to being a psychological antecedent of PA adherence. Although this definition originally derived from the sports realm, it is important to note that research conducted by Alexandris and colleagues (2002) and Wilson and colleagues (2004) show that the commitment construct is applicable within an exercise programming setting. Notably, the standard protocol for predicting commitment consists of regressing the average of all IOs items, however it may also be looked at through a different lens. Specifically, possessing a wide variety of highly important reasons for PA participation may contribute to increasing one’s commitment to the goal of adhering to a PA program. This has particular bearing when considering that researchers speculate that sport programming may accommodate more diverse motives for its

participants than compartmentalized exercise programming (Young & Medic, 2011a). Thus, the potential for differential levels of goal commitment to sustain participation within sport and exercise activity types seems possible. That said, it appears that no known studies have attempted to differentially predict levels of activity commitment, between sportspersons and exercisers, based on motives, IOs, or the number of goals participants wish to fulfill through their PA participation.

Multifinality

It is now evident that sportspersons and exercisers both possess a variety of reasons for their pursuit of being active, and as such their PA participation may be motivated by more than one reason at a time. Historically, research focusing on adult PA motives (Weiss & Amorose, 2008) commonly studied the effects of individual reasons for activity participation in isolation from one-another. As such, the majority of participation motivation research focuses on the *content* (Dwyer, 1992) and *quality* (Ryan & Deci, 2002) of individual motives. Using such frameworks, research findings demonstrate that participants who are active for particular reasons (e.g., stress relief), or participants who exemplify self-determined forms of motives (e.g., intrinsic motivation), may better adhere to PA programs (Cairney, Kwan, Veldhuizen, & Faulkner, 2013; Ryan & Deci, 2002). However, the combined effect of possessing multiple motives (or reasons) simultaneously remains largely unexplored and depicts a dearth within the PA motivation literature. By borrowing from the emerging theory on multifinality (Kruglanski et al., 2013), we sought to explore the following question: *Are individuals who participate in PA for numerous distinct and highly personally important reasons, more likely to adhere to their PA programs, regardless of motive content or quality?*

According to the multifinality theory, when individuals possess numerous contextually similar, yet conceptually distinct “goals”, they are more likely to attribute *greater* value to a given “means” that may help satisfy all these goals at the same time (Chun, Kruglanski, Friedman, & Sleeth-Keppler, 2011; Kruglanski & Orzech, 2009). Conversely, when individuals possess only one contextually relevant “goal,” they are more likely to attribute *lesser* value to a given “means” that may help satisfy this one goal (Chun et al., 2011; Kruglanski & Orzech, 2009). To effectively borrow from the multifinality theory, we acknowledge two integral assumptions that guided this study. Firstly, *motives* serve as PA specific “goals.” Within the participation motivation literature, *motives* reflect personally important benefits, perceived to result from PA participation (Dwyer, 1992). Similarly, “goals” represent objectives that individuals desire to fulfill (Kruglanski, 1996). Secondly, a *PA program* can serve as a specific “means.” “Means” represent behavioural throughputs that allow for the effective pursuit of “goals” (Kruglanski et al., 2013). Similarly, participating in a *PA program* denotes a specific activity that allows participants to strive towards fulfilling their PA specific *motives*. Through these assumptions, and in accordance with the tenets of the multifinality theory, we expect that adults will attribute greater value to their PA programs when they are motivated by numerous highly personally important reasons (Chun et al., 2011; Kruglanski & Orzech, 2009). In the current investigation, we expected this consideration of value attributed to adults’ PA programs to be further reflected in our participants’ levels of program commitment and adherence.

Ultimately, the multifinality research has given rise to the consideration that perhaps motives do not operate in isolation from one another when attempting to promote activity engagement. Rather, one can posit that having more reasons or more variety in top-rated reasons to participate in PA, and the compounded value of all these independent reasons, enables people

to sustain commitment, sustain behaviour and avoid lapses. Furthermore, based on the prior literature review on participation motivation and commitment, it is possible that sport and exercise activity modes offer different numbers of individual reasons for activity participation. The current investigation intended to measure and contrast the number of reasons motivating sportspersons and exercisers to determine whether varying numbers of motives further relate to differences in commitment and susceptibility to lapses in participation. However, to properly capture the full scope of possible reasons for PA (motives), we first sought to analyze and capture a certain degree of breadth in reasons for participation – to this end, analyses of a wide range of motives and IO items was warranted.

Summary of Literature Review

It appears that sport and exercise may cater to different motivational needs (Ebbeck et al., 1995; Kilpatrick et al., 2005). Furthermore, IOs may serve as additional salient reasons for participation in both sport and exercise, and breadth and types of opportunities may vary as a function of PA context (Alexandris et al., 2002; Young & Medic, 2011a, 2011b). The review of the participation motivation literature revealed that the potential confounding effects of participants' age, gender, and levels of activity involvement are important to consider when designing methodologies and performing analyses (Ebbeck et al.; Gill et al., 1996; Kilpatrick et al., 2005; Raugh & Wall, 1987). Additionally, a potentially significant and new area of study relates to the number of salient individual and different reasons for participating in sport or exercise, and how they may influence measures of activity commitment and/or adherence (Kruglanski et al., 2013).

In the present study, we chose to measure the number of participatory lapses as actual measures of activity adherence. Lapses are not an indication of complete activity adherence

failure but rather are indicators of greater susceptibility to becoming physically inactive (Baumeister & Heatherton, 1996; Larimer, Palmer, & Marlatt, 1999). Measures of the number of times a person lapses have also been used to capture temporary failures in self-regulated behaviours and have been operationally defined as 1-week periods in which a regularly active individual does not actively participate in PA (Simkin & Gross, 1994). It is possible that this interruption only signifies a temporary period of sedentariness and may actually occur readily, even to the most rigorous adherers (Baumeister & Heatherton, 1996; Larimer et al., 1999). However, from a theoretical perspective, lapses may follow spiralling patterns of distress often leading to longer-termed disruptions in established healthy routines and thus may indicate more significant problems in adhering to PA programs (Baumeister & Heatherton, 1996).

CHAPTER 3: OVERVIEW OF THE STUDIES

Purpose

The overall scope of this thesis is two-fold: firstly, to explore what psychological factors enable active adults to remain physically active through committing and adhering to PA, and secondly, to explore if differences exist between sportspersons & exercisers. As such, the importance of individual participatory motives, the total number of reasons motivating individuals' PA participation and the accommodation of IOs were of primary interest. To explore the scope of this thesis, the investigation was divided into three separate studies. Participants for these three studies completed an online questionnaire that captured participants' PA motives (Markland & Ingledew, 1997), IOs (Young & Medic, 2011a), commitment (Scanlan et al., 1993) and lapses (Simkin & Gross, 1994), and forced them to self-identify as being either sportspersons or exercisers.

Study 1 covered four primary purposes that explored the importance of individual participatory motives. The first purpose was to determine the number and structures of valid and independent motive factors for our adult sportsperson and exerciser populations. For each of the remaining three purposes, we began by analyzing relationships within sportspersons and exercisers contexts separately, before comparing these relationships between sportspersons and exercisers groups. The second purpose was to analyze which motives were rated as the most important for sportspersons and exercisers. The third purpose was to explore if certain motives differentially predicted levels of commitment for sportspersons and exercisers. The final purpose was to examine how these motives were differentially associated with odds of lapsing for sportspersons and exercisers.

Study 2 explored the total number of reasons motivating individuals' PA participation and had three purposes. The first purpose was to compare whether sportspersons or exercisers possessed different numbers of personally important motives. The second purpose was to determine if the number of highly personally important motives participants possessed was associated with levels of PA commitment, and if these associations differed for sportspersons and exercisers. The final purpose was to examine whether the number of highly personally important motives participants possessed was associated with a reduced odds of lapsing, and if these associations further differed between PA contexts.

Study 3 explored the accommodation of IOs and had three primary aims. The first purpose was to explore the structure of an expanded IO inventory for sportspersons and exercisers. The second purpose was to verify the relationship between an expanded (i.e., included a greater number of constituent survey items) IO factor and levels of PA commitment for sportspersons and exercisers. The final purpose was to determine if IOs served as better predictors of commitment for sportspersons or exercisers.

Hypotheses

We expected differences in the strength of motives to exist between activity types (Ebbeck et al., 1995; Gill et al., 1996; Kilpatrick et al., 2005). Specifically, we expected that sportspersons would rate motives relating to competition, skill building and enjoyment significantly higher than exercisers (Kilpatrick et al., 2005). Conversely, exercisers were expected to rate a greater strength of association to health and fitness related reasons for participation than sportspersons (Kilpatrick et al., 2005). Due to the fact that the number of unique motives to which sport and exercise programming differentially cater had not previously been examined, no hypotheses were advanced in this regard.

In terms of commitment, individual motive were expected to differ in predictive strength as a function of activity type. Based on research on multifinality, we posited that the number of highly-rated motives would be a significant positive predictor of activity commitment (Kruglanski et al., 2013). Specifically, levels of commitment were expected to be greater for the activity context demonstrating a wider array of personally salient motives. Furthermore, it was expected that the verification of an expanded IO inventory would significantly predict PA commitment for sportspersons and exercisers. In terms of lapses, we expected individual motive predictors to differ in strength between activity types. Furthermore, we expected that reported lapses would be lower for the activity context demonstrating a wider array of personally salient motives.

Significance of the Studies

We proposed that the collective findings for all three studies could empirically suggest the differential utility of sport and exercise programming as they relate to promoting greater PA adherence for active Canadian adults. To this end, this study empirically aimed to determine the reasons for participation that differ between sport and exercise programming, so that results could potentially inform strategies to more effectively tailor PA programs to Canadian adults, in a manner that better accommodates and aligns with participants' motivational needs.

Since PA prescriptions often take the form of recommendations for adults to participate in exercise programming (see CSEP, 2012; Canadian Physical Activity Guidelines for Adults), results which show how sport programming aligns with different reasons for participation than exercise would have great applied value. For example, an alignment in reasons for participation between the sport participant and his/her sport programming context could result in greater levels of activity adherence and could potentially inform efforts to recruit more sport participants who

would otherwise be more sedentary, than if they had only been given opportunities for exercise programming. Such a case for adult sport programming may ultimately have bearing on Canadian adult PA rates and rates of attrition in PA programming. Thus, this consideration of uniqueness in and tailoring of programming may have bearing to influence Canadian policy and funding decisions relating to adult PA programming, as needs for adult programming might be better established.

The current research also aimed to contribute to the participation motivation literature through the further study of adults' differential reasons for participation in sport and exercise contexts. Previous research has yet to truly differentiate these motives based on activity types and also relate these multifaceted motives to secondary outcomes of significant bearing on participants' PA participation. Additionally, this study examined the effects of possessing a diverse set of numerous highly important reasons for participation, as it relates to activity commitment and lapses. The current research also had the potential to contribute to the sport commitment literature by exploring the structure of an expanded IO inventory and testing its ability to predict levels of commitment for sportspersons and exercisers. This has potential bearing on future research in the field as it has been argued that the current four-item inventory of IOs remains too narrow, and as a result may account for an underrepresentation of its predictive power in relation to participants' commitment.

Methodology

Participants

Ethical approval for this study from the University of Ottawa's Research and Ethics Board and informed consent from pertinent organization representatives across Canada were obtained. This study employed a cross-sectional design. Eligible and interested participants (N =

368) registered to take part in an online web-based survey and were recruited either in person at sport and exercise venues or online through organisational representatives. Participants who did not provide information on their age, sex and self-identified affiliation with either sport or exercise, were initially excluded from the dataset as these variables provided important descriptive information for subsequent analyses. Participants reporting weeks of no PA due to Christmas holidays ($n = 5$), illness or injuries ($n = 7$), and discontinuation of structured PA programs ($n = 7$) were also excluded from the dataset. All remaining participants that fully completed the questionnaire ($N = 252$; $M_{Age} = 47.20$, $SD = 6.00$; range: 35-57 years) self-identified as either exercisers ($n = 144$) or sportspersons ($n = 108$). A chi-square analysis showed a difference in gender distribution between sportsperson and exerciser groups ($X^2 = 11.85$, $p = .001$). Of the 144 exercisers ($M_{Age} = 47.28$, $SD = 6.03$), 94 were female and 50 were male. Of the 108 sportspersons ($M_{Age} = 47.10$, $SD = 5.99$), 47 were female and 61 were male.

Online Survey Measures

To determine if participants predominantly identified as sportspersons or exercisers, participants were asked: *“Based on the structured/organized physical activities in which you have participated during the past 8 weeks, please finish the following statement. I primarily consider myself to be a (select one).”* Participants had the choice of identifying as either a *sporty-type* or an *exercising-type* individual but could not select both (see Appendix K). Unlike previous studies where investigators asked questions about sport and exercise separately, and have segregated participants into respective activity groups based on investigator supplied definitions of sport/exercise (Kilpatrick et al., 2005), this question verified how participants personally affiliated with a specific PA context.

After self-identifying, participants completed an online questionnaire comprised of four instruments: the Short Questionnaire to Assess Health Enhancing Physical Activity (SQUASH; Wendel-Vos, Schuit, Saris, & Kromhout, 2003), the Exercise Motivation Inventory 2 (EMI-2; Markland & Ingledew, 1997), a commitment scale (Scanlan et al., 1993), and PA Lapses (Simkin & Gross, 1994). All survey items were prefaced to apply to both sportspersons and exercisers by using stems that were worded to represent a 'PA' contextual level, rather than specifically 'sport' or 'exercise' type activities. The EMI-2 and commitment survey items were all prefaced by asking participants to consider their structured/organized PAs and primary activity context when rating statements (e.g., *"If you are primarily a sportsperson, please consider your structured/organized sport and sport training activities"*).

Levels of PA Involvement. Participants completed the SQUASH (Wendel-Vos et al., 2003; see Appendix H), which factors PA measures of frequency, intensity and activity-type coefficients stemming from a PA compendium (Ainsworth et al, 1993), to yield an average level of PA involvement interpreted as a MET score. The SQUASH has been shown to produce valid and reliable indices for active adults aged within their 40s, and was chosen because it has shown satisfactory reliability in capturing both exercise and sport activity in adults (Wendel-Vos et al., 2003).

Exercise Motivation Inventory-2. To determine different reasons for PA involvement, participants completed the EMI-2 (Markland & Ingledew, 1997; see Appendix L). The EMI-2 is typically used to capture how personally important a wide array of reasons are for PA in currently active individuals, and is comprised of 51 items. A 5-point scale ranging from 1 (Not true for me at all) to 5 (Very true for me), was used for consistency purposes across all questionnaires in the present study. Participants were first asked to consider their

structured/organized PAs and primary activity context. All survey items were prefaced by “*Personally, I do physical activity...*” and a sample item is “*To give me space to think.*”

Involvement Opportunities. Participants completed scales on 14 items from the Sport Commitment Model’s (SCM) IO subscale that have been found to be especially salient amongst masters athletes (Young & Medic, 2011a, 2011b). A definition of IOs was provided relating to “opportunities that individuals might get only from their involvement in their respective structured/organized physical activities that they cannot obtain elsewhere.” Participants were instructed: “We want to know whether you personally obtain certain opportunities from involvement in your structured/organized physical activities.” All survey items were prefaced by: “My physical activity involvement...” and ended with sample statement such as: “gives me the opportunity to enjoy myself.” These 14 items (see Appendix M) were rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Activity Commitment. Participants rated their level of PA commitment by responding to four questions about their degree of dedication and determination to continue, and difficulty in quitting (Scanlan et al., 1993; see Appendix N). For example, respondents responded to “*How hard would it be for you to quit your activity within the next 3-months?*” on a 5-point Likert scale ranging from 1 (not at all), to 5 (very hard).

Physical Activity Lapses. Participants reported the number of weeks of zero attendance for their primary structured/organized PA within the past 8-weeks. To ensure that lapses were accounted through motivational deficits and not extenuating circumstances, we posed two open-ended exit questions (see Appendix J): “*If you had recorded experiencing week(s) of no attendance in your structured/organized program, did anything out of the ordinary contribute to*

this?” and “Please describe if any weeks of no attendance in your structured/organized program occurred due to injury or illness.”

Planned Data Analyses

The face validity of motive, involvement opportunity and activity commitment questionnaire items was grounded in past studies using adult samples (Alexandris et al., 2002; Dwyer, 1992; Marklkand & Ingledew, 1997; Young & Medic, 2011b). However, to specifically and confidently determine the number and structures of valid and independent motive and IO factors for our adult study population, we submitted participants’ responses to exploratory factor analyses (EFA). The resulting factors were used for all subsequent planned analyses. Furthermore, Cronbach alpha calculations ensured internal consistency reliability for all motive and IO factors.

Subsequent analyses were divided amongst the three studies. Study 1 first described the importance of individual motives stemming from the EMI-2 questionnaire within each of sport and exercise contexts, and then contrasted the importance of motives between-contexts. Secondly, these individual motives were related to the commitment outcome within each PA context. The predictive strengths of these individual motives in relation to commitment were then compared between-contexts. Thirdly, the individual participatory motives were related to participants’ odds of lapsing on a within-context basis, and the predictive strengths of these motives in relation to odds of lapsing were subsequently compared between-contexts.

Study 2 first determined the number of personally important motives guiding sportspersons’ and exercisers’ PA participation, and compared the number of motives between-contexts. Secondly, it examined the effect that possessing numerous important motives had on participants’ levels of commitment for sportspersons and exercisers separately, followed by a

between-context comparison of predictive strength. Finally, the number of motives for sportspersons and exercisers was related to participants' odds of lapsing separately for sportspersons and exercisers, and then we examined whether number of motives was differentially related to participants' odds of lapsing between-contexts.

Study 3 first explored the relationship between IOs and levels of PA commitment for sportspersons and exercisers on a within-context basis. The predictive strength of IOs in relation to commitment was then compared between sportspersons and exercisers. Similar analyses were also performed on a within- and then between-context basis in relation to lapses as well.

We conducted analyses of covariance (ANCOVAs) in all analyses where mean averaged motive scores were compared between PA contexts. Furthermore, we performed simultaneous regression analyses to examine the associations between motivational variables of interest and outcome measures (commitment and lapses). Finally, hierarchical regressions were used in cases where we wished to examine an interactive term to determine whether such associations differed as a function of PA context.

Presentation of the Studies

To address the purposed research questions in Study 1 and 2, two journal articles entitled: *Predicting Physical Activity Commitment and Lapses: Exploring the Motives of Adult Sportspersons and Exercisers*, and *Exploring Simultaneous Motives for Sportspersons and Exercisers: The Multifinal Properties of Physical Activity*, are presented.

Subsequently, Study 3 is discussed in *Chapter 4: How Involvement Opportunities Relate to Levels of Commitment for Sportspersons and Exercisers* to address the additionally proposed purpose of exploring IOs for sportspersons and exercisers.

MANUSCRIPT FOR STUDY 1: *Predicting Physical Activity Commitment and Lapses:*

Exploring the Motives of Adult Sportspersons and Exercisers

Predicting Physical Activity Commitment and Lapses: Exploring the Motives of Adult
Sportspersons and Exercisers

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Abstract

Physical activity (PA) programs that accommodate personally important motives may promote sustained participation (Weiss & Amorose, 2008). The purpose of this study was to determine which PA motives are most important to sportspersons and exercisers, and how they relate to levels of PA commitment and frequency of lapses as a function of context. Participants ($N = 252$) completed a survey capturing their PA motives, levels of commitment and frequency of lapses, and their self-identification as either sportspersons ($n = 108$) or exercisers ($n = 144$). *Enjoyment* and *health related* motives were most important for sportspersons and exercisers alike, though sportspersons rated *competition* and *social affiliation* higher than exercisers. *Enjoyment*, *stress relief*, and *social affiliation* motives predicted commitment for sportspersons and exercisers alike. Sportspersons' commitment was additionally negatively related to *appearance* and positively related to *personal goals and challenges*. Only *stress relief* buffered against the odds of lapsing for both sportspersons and exercisers. Of participants attributing more importance to the *health related* motive, exercisers reported lower odds of lapsing, whereas sportspersons had higher odds. It is recommended that programmers tailor PA programs to promote and align with motives that foster commitment and buffer against lapses, so that participants' PA adherence may be optimized.

Key words: adherence, motivation, sport, exercise, EMI-2

Predicting Physical Activity Commitment and Lapses: Exploring Motives of Adult Sportspersons and Exercisers

Achieving sufficient levels of moderate to vigorous levels of physical activity (PA) is associated with age-related functional health and reductions in morbidity (Warburton, Nicol & Bredin, 2006). Furthermore, physical inactivity is the single greatest modifiable risk factor for the onset of obesity and its comorbidities amongst all Canadians (Warburton et al., 2006). However, half of all individuals who begin a PA program drop out within their first year of engagement (Dishman, Sallis, & Orenstein, 1985). To counteract such trends, as well as progressively declining rates of PA during middle adulthood years (Statistics Canada, 2011a, 2011b), researchers have argued for more effective tailoring of structured PA programming to Canadian adults, so that greater adherence levels may be reached (Baker, Fraser-Thomas, Dionigi, & Horton, 2010; Glaros & Janelle, 2001; Young & Medic, 2011a). Specifically, it is imperative that the reasons for which adults participate in a given PA context become better understood to inform the content of programmed activities, because the accommodation of personal preferences via programming may be related to sustained participation (Baker et al., 2010; Glaros & Janelle, 2001; Weiss & Amorose, 2008). Sport and exercise could cater to different subpopulations possessing very specific and potentially unique motivational profiles. However, very little literature has compared adult motives for participation between activity types, specifically between two common and highly beneficial forms of structured PA: sport and exercise (Kilpatrick, Hebert, & Bartholomew, 2005). For the purpose of this experiment, structured PA programs are defined as activities that often first require formal registration, enrollment or membership, which then allow individuals to pursue activities that are offered at a given location, facility or venue. These activities typically occur at advertised times or places and

can include formal physical activity programs (i.e. spinning classes, swim club practice, etc.) but are not limited to formal programs as long as registration, enrollment or membership precede one's participation in the given activity.

Several studies have successfully catalogued the different reasons and the importance of these reasons for participation in both sport and exercise (Brodin & Weiss, 1990; Hritz & Ramos, 2008; Kolt, Driver, & Giles, 2004; Newson & Kemps, 2007); however, few studies have attempted to provide valid differentiations between motives for sport and exercise engagement and even fewer studies have been able to do so within adult populations (Ebbeck, Gibbons, & Lokeen-Dahle, 1995; Gill, Williams, Dowd, Beaudoin, & Martin, 1996; Kilpatrick et al., 2005). Ebbeck and colleagues (1995) recruited participants from martial arts, swimming, tennis, volleyball, weight training and yoga programs. Participants' "interdependence," "personal satisfaction," "self-image" and "instrumental" motives for PA were assessed using a 19-item survey developed by the authors. Sport activities, namely volleyball and tennis, appeared to cater more to motives of "interdependence" when compared to exercise activities (weight lifting, yoga), which may indicate that sport programming better accommodates this motive. Although this study focused on adult motives for PA participation, only 10% of participants were 30 years of age or older and as such, these results cannot directly apply to older populations. Gill and colleagues (1996) surveyed participation motives in four different adult sport and exercise programs: running club, private exercise classes, cardiac rehabilitation exercise program, and Senior Games (sport) participants. Researchers measured levels of importance attributed to 10 unique PA motive factors. Rehabilitation exercise participants scored lowest for "mental health" and "appearance" motives, and the Senior Games participants scored highest for "competitive" motives. An integral finding from this study related to the diversity in highly ranked motives

reported by study participants. All activity group samples within this study exhibited multiple highly ranked reasons for participation in PA, emphasizing the need for motive inventory surveys to capture a wide breadth in motives for participation. However, this study is limited since data for Senior Games participants lacked comparative validity as they were collected over a year later with different procedures and survey items.

More recently, Kilpatrick and colleagues (2005) compared sport and exercise motives within the same college-aged adult sample ($M_{age} = 22.2$) that participated in both PA contexts. Two modified versions of the Exercise Motivation Inventory-2 (EMI-2; Markland & Ingledew, 1997) were administered to all participants: one to measure motives for sport participation and the other with identical survey items to measure motives for exercise participation. These questionnaires captured 14 independent motive factors (Markland & Ingledew, 1997). Analyses revealed significant activity type main effects, where participants rated motives for “social affiliation,” “challenge,” “competition,” “social recognition” and “enjoyment” significantly higher for their sport participation than for their exercise participation. The inverse was true of motives for “appearance,” “health pressures,” “ill-health avoidance,” “nimbleness,” “positive health,” “strength & endurance,” “stress relief” and “weight management.”

Kilpatrick and colleagues’ (2005) study was limited in several respects. First, participants’ levels of PA involvement were not controlled for in the multivariate comparative analyses; an oversight considering that levels of activity involvement can mediate motives for participation (Rough & Wall, 1987), and that participants in this study engaged in exercise more frequently and at greater intensity compared to their sport involvement. Secondly, the validity of the motivational questionnaire was assumed based on previous literature (Markland & Ingledew, 1997) and not via factor analyses to determine sporting and exercising factor structures for the

studied sample population. Thirdly, this study fell short in validly segregating participants into respective activity groups because investigators prefaced their questions with confounding definitions for sport and exercise contexts. In particular, the definitions may have contaminated participants' responses (see Kilpatrick et al., 2005, p. 89), leading sportspersons and exercisers to more strongly rate motives for competition and fitness, respectively. The present study aims to address these prior limitations by controlling for participants' average levels of PA involvement, subjecting questionnaire responses to separate EFAs for sport and exercise, and by having participants self-identify as being sportspersons or exercisers without providing definitions of the two PA contexts.

The prior research that has considered between-context differences for motives has been very descriptive in nature. It has been limited because motives were not examined in terms of their relationships to separable outcomes, such as behavioural adherence or commitment. Thus, the present remedies this by comparing the predictive power of EMI-2 motives for sportspersons versus exercisers in relation to measures of psychological commitment to PA, and to measures of PA adherence. Studies of commitment have examined adults' desire and resolve to continue participation, in sport (e.g., Scanlan, Russell, Beals, & Scanlan, 2003; Wigglesworth, Young, Medic, & Grove, 2012; Young & Medic, 2011a, 2011b), and in exercise (Alexandris, Zahariadis, Tsorbatzoudis, & Grouios, 2002; Wilson et al., 2004). Conceptually, the commitment construct is a psychological antecedent of PA adherence. We also chose to measure behavioural lapses in the current study. Lapses indicate temporary failures in self-regulated behaviours (Baumeister & Heatherton, 1996; Larimer, Palmer, & Marlatt, 1999), and also suggest greater susceptibility to becoming physically inactive. Simkin and Goss (1994) asked participants to self-report lapses, which were defined as one-week periods in which a regularly physically active individual did not

participate in PA. Frequent lapses may be associated with spiralling patterns of distress often leading to longer-termed disruptions in healthy routines; thus, lapses may signal more significant problems in adhering to PA programs (Baumeister & Heatherton, 1996).

The purpose of this study was three-fold. Firstly, we aimed to explore which PA motives were rated more highly by sportspersons and exercisers, and wished to compare if certain motives were more important for a given PA context. Secondly, we explored which PA motives were most associated with PA commitment for sportspersons and exercisers, and wished to compare the predictive strengths of certain motives between-contexts. Finally, we examined whether certain PA motives were associated with reduced odds of lapsing, and wished to compare the predictive strengths of certain motives between-contexts.

Method

Participants

Ethical approval for this study from the University of Ottawa's Research and Ethics Board and informed consent from pertinent organization representatives across Canada were obtained. This study employed a cross-sectional design. Eligible and interested participants ($N = 368$) who were recruited either in person at sport and exercise venues, or online via organization representatives, registered to take part in an online web-based survey. Participants who did not provide information on their age, sex and self-identified affiliation with either sport or exercise, were initially excluded from the dataset as these variables provided important descriptive information for subsequent analyses. Participants reporting weeks of no PA due to Christmas holidays ($n=5$), illness or injuries ($n=7$), and discontinuation of structured PA programs ($n=7$) were also excluded. All remaining participants that fully completed the questionnaire ($N = 252$; $M_{Age} = 47.20$, $SD = 6.00$; range: 35-57 years) self-identified as either exercisers ($n=144$) or

sportspersons ($n = 108$). Of the 144 exercisers ($M_{Age} = 47.28$, $SD = 6.03$), 94 were female and 50 were male. Of the 108 sportspersons ($M_{Age} = 47.10$, $SD = 5.99$), 47 were female and 61 were male.

Online Survey Measures

To determine if participants predominantly identified as sportspersons or exercisers, participants were asked: “*Based on the structured/organized physical activities in which you have participated during the past 8 weeks, please finish the following statement. I primarily consider myself to be a (select one).*” Participants had the choice of identifying as either a *sporty-type* or an *exercising-type* individual but could not select both. Unlike previous studies where investigators asked questions about sport and exercise separately, and have segregated participants into respective activity groups based on investigator supplied definitions of sport/exercise (Kilpatrick et al., 2005), this question verified how participants personally affiliated with a specific PA context.

After self-identifying, participants completed an online questionnaire comprising four instruments: the Short Questionnaire to Assess Health Enhancing Physical Activity (SQUASH; Wendel-Vos, Schuit, Saris, & Kromhout, 2003), the Exercise Motivation Inventory-2 (EMI-2; Markland & Ingledew, 1997), a commitment scale (Scanlan et al., 1993), and PA Lapses (Simkin & Gross, 1994). All survey items applied to both sportspersons and exercisers by using stems that were worded to represent a ‘PA,’ however prefaces to each section of the survey asked participants to respond according to their primary PA context.

Levels of PA involvement. Participants completed the SQUASH (Wendel-Vos et al., 2003), which was prefaced by having participants consider their physical activities for an average week within an average month. The SQUASH factors PA measures of frequency,

intensity and activity-type coefficients stemming from a PA compendium (Ainsworth et al, 1993), to yield an average level of PA involvement interpreted as a MET score. The SQUASH has been shown to produce valid and reliable indices for active adults aged within their 40s, and was chosen because it has shown satisfactory reliability in capturing both exercise and sport activity in adults (Wendel-Vos et al., 2003).

Exercise Motivation Inventory-2. To determine different reasons for PA involvement, participants completed the EMI-2 (Markland & Ingledew, 1997). The EMI-2 is typically used to capture how personally important a wide array of reasons are for PA in currently active individuals, and is comprised of 51 items. Participants were first asked to consider their structured/organized PAs and primary activity context. All survey items were prefaced by “*Personally, I do physical activity...*” and a sample item is “*To give me space to think.*” Responses were on a 5-point scale ranging from 1 (Not true for me at all) to 5 (Very true for me).

PA commitment. Participants rated their level of PA commitment by responding to four questions about their degree of dedication and determination to continue, and difficulty in quitting (Scanlan et al., 1993). For example, respondents responded to “*How hard would it be for you to quit your activity within the next 3-months?*” on a 5-point Likert scale ranging from 1 (not at all), to 5 (very hard).

PA lapses. Participants reported the number of weeks of zero attendance for their primary structured/organized PA within the past 8-weeks. To ensure that lapses were accounted through motivational deficits and not extenuating circumstances, we posed two open-ended exit questions for those who had reported a lapse: “*Did anything out of the ordinary contribute to this?*” and “*Describe if this occurred due to injury or illness.*”

Planned Data Analyses

We were satisfied with the face validity of motive and commitment items because they were grounded in previous studies using adult samples (Alexandris et al., 2002; Dwyer, 1992; Markland & Ingledew, 1997). However, to specifically and confidently determine the number and structure of valid and independent motive factors for our adult study population, we submitted sportspersons and exercisers' responses to separate exploratory factor analyses (EFA) in Analysis 1. Furthermore, we calculated Cronbach alpha values to ensure internal consistency reliability for all motive factors. Thus, after first ensuring confidence in these reliable and structurally valid factors, we planned to employ the resultant factors in all subsequently planned analyses.

Subsequent analyses were conducted in three overarching analysis sections. Each section begins by analyzing relationships of motives to commitment/lapses for sportspersons and exercisers on a within-context basis, and follows by comparing these relationships between sportspersons and exercisers groups. In Analysis 2, we analyzed which motives were rated as the most important for sportspersons and exercisers. In Analysis 3, we explored if certain motives predicted levels of commitment for sportspersons and exercisers. In Analysis 4, we examined how these motives were associated with odds of lapsing for sportspersons and exercisers.

Preliminary Analyses

Prior to conducting subsequent analyses, we conducted a two-tailed *t*-test on SQUASH scores. Sportspersons ($M = 11689.95$, $SD = 6294.11$) reported significantly higher PA involvement levels than exercisers ($M = 9993.85$, $SD = 5645.22$), $t(214.1) = 2.20$, $p = .03$, *Cohen's d* = .28. Therefore, SQUASH scores were treated as a covariate in all subsequent analyses of covariance (ANCOVAs), and for all subsequent regression analyses, it was entered

as an independent variable to control for variance it may have shared with motivational factors analyses.

Analysis 1: Exploring EMI-2 Motive Factor Structures

We submitted responses to the 51 EMI-2 items to EFAs separately for sportspersons and exercisers. In line with recommendations from Polit (1996), and Tabachnick and Fidell (2012), Varimax orthogonal rotation was used to more easily describe conceptually unique factors and to ensure that resulting motivational factors were distinct from one another. We set factor loading criteria to include items with primary loadings of 0.40 or greater, and with differences between primary factor loadings and cross-loaded values exceeding 0.10 (Polit, 1996; Tabachnick & Fidell, 2012). Furthermore, resultant factors were required to be composed of at least two items and possess Cronbach alphas greater than .70 (Tabachnick & Fidell, 2012).

Sportspersons

Results revealed a nine-factor solution, Kaiser-Meyer-Olkin Measure of Sampling Adequacy = .77, Bartlett's Test of Sphericity, $X^2(1081) = 3809.39, p < .001$. Based on our EFA criteria, six items were removed on successive runs through an iterative process. Firstly, the item "To help recover from an illness/injury" was removed as its primary loading was below .40. Next, "To have a good body", "To recharge my batteries", and "To increase my endurance", were removed due to problematic cross-loadings (all values were within .05 of the primary loading). Finally, "To help recover from an illness/injury" and "Because my doctor advised me to be physically active" were clearly not internally consistent with their pertinent factor and were thus removed. "Because I like trying to win in physical activities" and "To improve my appearance" had cross-loading values within .10 of their primary loading, however, we retained them for parsimonious reasons (Polit, 1996). Primary loadings of items on factors, percentages of

explained variance and Cronbach's alphas for the final sportspersons' nine-factor solution are shown in Table 1. The final solution explained 65.64% of the total variance and comprised motivational factors entitled: *Enjoyment, Personal Goals & Challenges, Strength & Flexibility, Health Related, Weight Control, Competition, Social Affiliation, Stress Relief, and Appearance.*

Insert Table 1 about here

Exercisers

A ten-factor solution for exercisers resulted, Kaiser-Meyer-Olkin Measure of Sampling Adequacy = .84, Bartlett's Test of Sphericity, $X^2(990) = 4603.27$, $p < .001$. Based on our EFA criteria, six items were removed in successive runs through an iterative process. "To help recover from an illness/injury," "To help prevent an illness that runs in my family," "Because my doctor advised me to be physically active," "To develop personal skills," and "To increase my endurance" were all removed due to low primary loadings. We removed "To measure myself against personal standards" for having a problematic cross-loading (.01 difference from primary loading). "To look more attractive" and "To recharge my batteries" had cross-loading values within .10 of the primary loading, yet were allowed to remain in the final solution for parsimonious reasons (Polit, 1996). Primary factor loadings, percentages of explained variance and Cronbach's alphas are shown in Table 2. The final solution explained 66.09% of the total variance and comprised motivational factors entitled: *Enjoyment, Weight Control & Appearance, Competition, Health Related, Strength & Flexibility, Stress Relief, Social Affiliation, Look Younger & Social Worth, Develop Muscles, and Personal Goals & Challenges.*

Insert Table 2 about here

Discussion

As a first step in the data analysis process, we explored the factor structure of the EMI-2 survey within each of our adult sportsperson and exerciser samples. Although our purpose was to derive reliable and sound motive factor structures that we could employ in subsequent analyses, our results offer new information about the EMI-2. Although Markland and Ingledew (1997)'s original work confirmed a 14 motive factor structure within a sample of adult exercisers, neither of our EFAs yielded their expected structure.

Certain items appeared to be problematic in both of our samples. Markland and Ingledew's (1997) three items for "health pressures" were particularly problematic in both of our samples, being omitted from the final factor structures for violating factor loading criteria. Furthermore, the item "to increase my endurance," stemming from the EMI-2's "strength and endurance" factor was problematic in both of our samples. The problematic loadings of these factors can likely be explained by the uniqueness of these survey items. For example, it is possible that the endurance item failed to load adequately because it was the only item capturing motives for improving or maintaining one's stamina. If more potential items addressing a prospective stamina motive were to be incorporated in the future (e.g., to have more energy, to prevent oneself from tiring easily, or to maintain energy levels), these items may coalesce and form a unique stamina PA motive. Additionally, factors that we had expected to remain distinct converged with others in both our sportsperson and exerciser groups. Items from the initial "ill-health avoidance" and "positive health" factors grouped together to form our *health related* factor. Items from the initial "enjoyment" and "revitalisation" factors merged to form our *enjoyment* factor. The grouping of these factors illustrates conceptual similarities of the original factor structures that warrant further consideration prior to treating these four original motives

factors (ill-health avoidance, positive health, enjoyment, and revitalisation) as conceptually unique factors in subsequent analyses.

Sportsperson EFA. Of the nine total resulting motivational factors, the *weight management*, *competition*, *affiliation* and *stress management* factors proved to be consistent with the EMI-2's initial factor structure. Unexpectedly, initial EMI-2 factors converged to form new motivational factors. In particular, items from the initial "social recognition" and "challenge" factors became our *personal goals & challenges* factor. Items from the initial "strength & endurance" and "nimbleness" factors grouped together to form our *strength & flexibility* factor.

Exerciser EFA. Of the ten total resulting motivational factors, the *affiliation* factor proved to be the only factor consistent with the EMI-2's initial factor structure. Items from the initial "weight management" and "appearance" factors merged together in our *weight management & appearance* factor. Items from the initial "nimbleness" factor converged with an added item from "strength & endurance" (i.e., "to build up my strength"), to create our *strength & flexibility* factor. Remaining items from the initial "strength & endurance" factor grouped together to form our *develop muscles* factor. Items from the initial "social recognition" factor grouped together with an additional "appearance" item to form our *look younger & social worth* factor. One initial "social recognition" item (i.e., "to compare my abilities with other people") loaded with items from the initial "competition" factor, in our *competition* factor.

Overall, it is possible that conceptual overlap of original EMI-2 factors may occur between different factors for different study populations. It is important to note that Markland and Ingledew (1997) EMI-2 factor structure was derived via confirmatory factor analyses performed within a large sample size, whereas our analyses were exploratory. Still, our EFAs indicate that EMI-2 structures display a degree of malleability depending on the study

population. In our case, the resultant motives in the exercise sample proved to fluctuate more from the expected structure than did the motives for our sport sample. Furthermore, only one other instance documented subjecting the EMI-2 to factor analyses (Ingledeu & Markland, 2008). In this case, scores from the 14 EMI-2 factors were entered into an EFA to determine its concurrent validity with the BREQ-2 (an instrument used within the Self Determination Theory literature), and therefore does not provide additional validated support to the initial EMI-2 factor structure (Ingledeu & Markland, 2008). Therefore, future research using the EMI-2 should aim to incorporate EFAs to ensure factor structures are valid for the study populations in question.

Analysis 2: Importance of Individual Motives

Exploring the Importance of Individual Motives for Sportspersons and Exercisers

After establishing reliable factor structures for the various motives of sportspersons (9 motives) and exercisers (10 motives), we were concerned with determining which motives are the most important for sportspersons and exercisers. Mean averaged motive scores stemming from the EMI-2 questionnaire were subjected to ANCOVAs for Analysis 2.

Sportspersons. *Enjoyment* and *health related* motives were the most highly rated, and the *appearance* motive was rated the least important (Figure 1A). We conducted a one-way ANCOVA, where average motive scores were compared to each other. A significant main effect was reported, $F(8, 955) = 4.67, p < .001$, Partial Eta Squared = .03. Post hoc analyses using Bonferonni adjustments ($p < .006$) revealed that the *enjoyment* motive was rated significantly more important than all other motives except for the *health related* motive. The *health related* motive was rated significantly more important than all other motives except the *enjoyment*, and *strength & flexibility* motives. The *strength & flexibility*, *competition*, and *stress relief* motives were rated significantly higher than both the *personal goals & challenges*, and *appearance*

motives. The *social affiliation* motive was rated significantly higher than the motive to improve one's *appearance*.

Insert Figures 1A and 1B about here

Exercisers. *Enjoyment* and *health related* motives were the most highly rated, whereas the motive to *look younger & achieve social worth* was rated the least important by exercisers (Figure 1B). A one-way ANCOVA revealed a significant main effect, $F(9, 1417) = 76.38, p < .001$, Partial Eta Squared = .32. Post hoc analyses using Bonferonni adjustments ($p < .006$) revealed that the *enjoyment* motive was rated significantly more important than all other motives except for the *health related* motive. The *health related* motive was rated significantly more important than all other motives except for the *develop muscles* motives. Motives for *developing muscles, strength & flexibility, stress relief, personal goals & challenges, and weight control & appearance*, were all rated significantly higher than motives for *social affiliation, competition, and looking younger & social worth*. The motive for *social affiliation* was rated significantly higher than the motive for *looking younger & social worth*.

Comparing the Importance of Individual Motives between Sportspersons and Exercisers

Matching motive structures between-contexts. Though differences between the motive structures were reported for sportspersons and exercisers (see Tables 1 & 2), several conceptual similarities existed between PA motives for sportspersons and exercisers, and these motive factor structures possessed similar constituent items. Specifically, five motives were conceptually-matched between PA contexts: *enjoyment, health related, competition, social affiliation* and *stress relief*. The factor structures for the enjoyment and health related motives were identical for sportspersons and exercisers, when examined on an item-by-item basis. Exercisers' competition and stress relief motives each had one additional item ("To compare my abilities with other

peoples” and “to recharge my batteries,” respectively) when compared to the sportspersons’ motive factor structures. These additional constituent items were dropped and new ‘item-by-item matched’ motive factor scores were re-calculated.

Comparing motive importance between-contexts. Using the item-by-item matched motive scores, we were able to directly compare the levels of importance attributed to the five matched motives between sportspersons and exercisers. We ran a two-way ANCOVA with motivational factor (five levels, indicating the five different item-by-item matched motives) and PA context (sport, exercise) as the between-subjects factors. Significant main effects existed for motive factors, $F(4, 1245) = 86.61, p < .001$, Partial Eta Squared = .219, and PA context, $F(1, 1249) = 6.03, p = .01$, Partial Eta Squared = .005. A significant motive-by-status interaction was reported, $F(4, 1245) = 15.27, p < .001$, Partial Eta Squared = .04. Post-hoc analyses (Figure 2) revealed that sportspersons reported motives for *competition* ($p < .001$) and *social affiliation* ($p = .02$) as being more important than exercisers.

Insert Figure 2 about here

Analysis 3: How Motives Relate to Commitment

Though determining which motives are the most personally important to sportspersons and exercisers is quite important for PA programmers, perhaps more important is determining which of these motives are associated with greater commitment to structured PA programming.

Preliminary Analyses

We first verified that the structure and reliability of the 4-item commitment scale was sound. Separate forced one-factor principal axis factoring EFAs for sportspersons and exercisers indicated that all items should be retained (all loadings $> .40$), and high Cronbach alphas ($> .70$) were revealed for both contexts. Next, we performed a one-way ANCOVA to determine if

sportspersons and exercisers reported significantly different commitment levels. Sportspersons ($M = 4.26$, $SD = .83$) and exercisers ($M = 4.20$, $SD = .80$) reported being similarly committed, $F(1, 243) = .01$, $p = .91$.

Linear Regression Models Predicting PA Commitment

Simultaneous linear regression analyses were used to predict participants' commitment. Independent variables included the EMI-2 motivational factors stemming from EFAs, and SQUASH scores. Analyses were run separately for sportspersons (nine motive factors) and exercisers (10 motive factors). We calculated Bartlett factor scores to serve as standardized motive factor scores, as they helped guard against violations of multicollinearity by ensuring orthogonality of factors (DiStefano, Zhu & Mindrila, 2009). Within each context, SQUASH, commitment, and the Bartlett motivational scores were standardized on a listwise basis prior to entry (Holmbeck, 2002).

Sportspersons. A significant model resulted, $R^2 = .28$ ($R^2_{Adj} = .20$), $F(10, 92) = 3.57$, $p = .001$. Results (Table 3A) indicated significant effects associated with *enjoyment*, *stress relief*, *appearance*, and marginal effect for *personal goals & challenges*¹. Relationships for *enjoyment*, *stress relief*, and *personal goals & challenges* were all in the positive direction in that as individuals reported greater levels of importance associated with these motives, their level of PA commitment was higher. Contrarily, the significant relationship between levels for the *appearance* motive and commitment were in a negative direction.

Exercisers. A significant model resulted, $R^2 = .31$ ($R^2_{Adj} = .25$), $F(11, 125) = 5.01$, $p < .001$, with significant effects associated with *enjoyment* and *stress relief* (Table 3B)². All significant relationships were in the positive direction.

Insert Tables 3A and 3B about here

Comparing Motive & Commitment Relationships Between-Contexts

Using Confidence Intervals to Contrast Motives that have been Conceptually-Matched across PA Contexts. A method to compare the predictive strengths of motives for sportspersons and exercisers is to examine the 95% confidence intervals (CI) of conceptually matched motives between separate simultaneous regressions performed for each PA context (Tabachnick & Fidell, 2012). Though this method does not serve as a direct comparison of the predictive strengths of motives, it yet possesses merit. This type of comparison allows for the consideration of all other pertinent motives within the motivational profiles of sportspersons (four other pertinent motives) and exercisers (five other pertinent motives), while specifically contrasting and making interpretations about the five motives that are of most interest to us because they have been conceptually-matched across contexts.. Thus, when attributing predictive strengths to the conceptually-matched motives that are being compared between contexts, we have ensured that our analyses have more broadly and simultaneously considered sources of shared variance from other motives within a particular PA context. Thus, our analyses accommodate a more ‘real-world’ depiction for sportspersons and exercisers.

Inspection of the 95% CI comparisons in Tables 3A and 3B showed overlap for each of *enjoyment, health related, competition, social affiliation* and *stress relief*. Therefore, the predictive strengths of all the conceptually-matched motives on measures of commitment were equitable for sportspersons and exercisers.

Hierarchical Regression Analyses Using Item-by-Item Matched Motives to Predict Commitment. Since the 95% CI comparison methodology did not account for a direct comparison between motives for sportspersons and exercisers, we used an alternative method to further explore motivational differences (Tabachnick & Fidell, 2012). Using the same item-by-

item matched motives that were used in Analysis 1, we performed a hierarchical regression. By integrating a categorical interaction variable for PA context (two levels: sportspersons, exercisers), we were able to directly compare the predictive strength of matched motives.

Though this methodology does not consider all motives describing PA motives for sportspersons and exercisers, it allows for a more rigorous and direct comparison of the predictive strength of item-by-item matched motives.

For the hierarchical linear regression, independent variables included a categorical interaction variable of activity type (sportspersons = 0, exercisers = 1), the average scores of the five item-by-item matched motive factors, and SQUASH scores. Prior to computing interaction terms for the hierarchical regression, scores for commitment, the five motive factors and SQUASH were standardized on a listwise basis (Holmbeck, 2002). Product terms for the potential interaction were created by multiplying the motive factors by the activity type variable. Variables were entered into each of the regression models in four blocks. Standardized SQUASH scores were entered at block 1. The five standardized motive factors and standardized SQUASH scores were entered at block 2. Alongside all components from block 2, the activity type categorical variable was entered at block 3. Finally, in addition to all components from block 3, product terms of the five standardized motivational factors multiplied by the activity type categorical variable were entered at block 4.

The model at block 1 was significant, $R^2 = .06$ ($R^2_{Adj} = .06$), $F(1, 242) = 15.9$, $p < .001$. The model and step at block 2 were significant, $R^2 = .20$ ($R^2_{Adj} = .18$), $F(6, 237) = 8.2$, $p < .001$; $R^2\Delta = .14$, p of $R^2\Delta < .001$. Given that the third model did not significantly predict more variance than block 2 ($F\Delta = .01$, $p = .92$), results are interpreted up to the second model. Therefore, no significant motive by activity type interactions existed. Results based on the second model

indicate main effects for individuals' *enjoyment* ($B = .20, p = .009$) and *social affiliation* ($B = .13, p = .05$), and a marginally significant main effect for *stress relief* ($B = .12, p = .08$).

Analysis 4: How Motives Relate to Odds of Lapsing

Seeing that Analysis 3 unveiled relationships pertaining to a psychological precursor to PA adherence, we were interested in further exploring relationships between motive factors and a behavioural measure - lapses. Lapses may be considered a self-reported behavioural proxy indicator for susceptibility to non-adherence (Baumeister & Heatherton, 1996; Larimer, et al., 1999).

Preliminary Analysis

We first performed a chi-square analysis to determine if sportspersons and exercisers reported significantly different frequencies of lapsing. PA context (sportspersons or exercisers) served as the between group factor, and participants' odds of lapsing was the between-subjects factor (no lapses = 0, one or more lapses in the past eight weeks = 1). There was a significant difference, $\chi^2(1, 199) = 4.53, p = .03$, with exercisers reported greater odds of lapsing (43% of exercisers had lapsed at least once) than sportspersons (28% of sportspersons had lapsed at least once).

Logistic Regression Models Predicting PA Lapses

Separate simultaneous logistic regression analyses were used to predict participants' odds of lapsing in each PA context. Independent variables included the EMI-2 motivational factors from our EFAs (nine for sport, ten for exercise), and SQUASH scores. Within each context, SQUASH scores and the Bartlett motive factor scores were standardized on a listwise basis prior to entry (Holmbeck, 2002). The model for lapses was significant for sportspersons, $R^2 = .22$, $\chi^2(10, 90) = 22.32, p = .01$. Specifically, when individuals reported greater importance attributed

to the *stress relief* ($B = -.64$, $OR = .53$, $p = .03$) motive, their odds of lapsing was lower. No other motive was significantly related to odds of lapsing (all $ps > .08$)³. For exercisers, the model was non-significant, $R^2 = .09$, $X^2(11, 109) = 11.01$, $p = .44$. Since the model predicting lapses did not reach significance for exercisers, we could not make comparisons of conceptually matched motives between contexts using 95% CIs.

Hierarchical Logistic Regression Analyses Using Item-by-Item Matched Motives to Predict Odds of Lapsing

We used similar steps in this hierarchical regression with a categorical interactive term as those described in Analysis 2. Again, interpretations of interactions by context could be made if block 4 proved significant. The model at block 1 was significant, $R^2 = .04$, $X^2(1, 200) = 8.14$, $p = .004$. Block 2 did not predict significantly more variance and yielded a non-significant model $R^2 = .04$, $X^2(6, 200) = 9.84$, $p = .13$; p of $X^2_{Step} = .89$. Block 3 yielded a model and step that were not significant, $R^2 = .05$, $X^2(7, 200) = 11.87$, $p = .11$; p of $X^2_{Step} = .16$. Finally, block 4 resulted in a significant model and step, $R^2 = .12$, $X^2(12, 200) = 24.33$, $p = .01$; p of $X^2_{Step} = .02$ (see Table 4). Results indicate that when individuals reported greater importance attributed to the *stress relief* motive, their odds of lapsing were lower ($p = .05$), regardless of activity type. A significant conditional effect for the *health related* motive existed; regardless of activity type, as individuals more strongly reported being active for health related reasons, the more likely they were to report lapses. However, this conditional effect should be interpreted with caution as a significant self-identified PA context interaction was shown. Post hoc analyses of simple slopes reveal non-significant slopes (sport $p = .21$, exercise $p = .19$), however trends depict that as health related motives were rated as being more personally important, the odds of lapsing were lower for exercisers, but greater for sportspersons (see Figure 3).

Insert Table 4 & Figure 3 about here

General Discussion

The overriding purpose of this study was to derive new knowledge that may allow programmers to more effectively develop and administer tailored PA programs that foster greater PA participation rates. As such, this study covered three specific objectives. Firstly, we explored the most important motives for sportspersons and exercisers, and compared their levels of importance between both PA contexts. Secondly, we determined which PA motives were associated with PA commitment levels for sportspersons and exercisers, and compared the predictive strengths of these motives between-contexts. Finally, we determined which motives were associated with reduced odds of lapsing and if these associations differed between both PA contexts. Importantly, this is the first known study that extends findings contrasting the diverse PA motives of sportspersons and exercisers, and differentially relating these motives to measures of psychological commitment and behavioural lapses, as a function of PA context. By testing relationships between motives, commitment and lapses, we were also able to identify which specific motives are most likely to keep participants engaged in PA programs, which may be especially important for PA programmers (Dishman et al., 1985).

Importance of Individual Motives

Sportspersons and exercisers alike were highly motivated for *enjoyment* and *health related* reasons. Within the sport context, participants rated the *appearance* motive as least important, whereas exercisers were least motivated to *look younger & achieve social worth* in their respective context. When comparing between-contexts, *competition* and *social affiliation* motives were rated as being more personally important for sportspersons than exercisers. This latter finding was expected and is consistent with findings from the participation motivation

literature (Ebbeck et al., 1995; Gill et al., 1996; Kilpatrick et al., 2005). However, prior research also led us to expect that motives of *enjoyment* would be rated significantly higher for sportspersons and that *appearance, health related, strength & flexibility, stress management* and *weight control* motives would be rated significantly higher for exercisers (Kilpatrick et al., 2005), yet these findings did not emerge within our study. One reason for fewer instances of differences in motive importance in the current study may relate to study design. Our study employed a between-participant comparison whereas Kilpatrick and colleagues' participants rated importance levels for sport *and* exercise motives, with contextual differences determined on a *within-participant* basis. As such, it is possible that their participants used different activity types to fulfill different motivational needs. For example, if someone who primarily identifies as a sportsperson, is highly competitive and fulfills his or her need for competition more often through sporting activities, he or she is likely to attribute low levels of importance to competitive motives when referring to exercising contexts because this motivational need has already been satisfied and becomes deactivated (Forster, Liberman, & Higgins, 2005). As a result, an exaggeration of motivational differences for sport and exercise may have occurred in prior research employing a within-participant approach. Two additional methodological differences need to be highlighted that are extensions beyond prior work, which may also explain why we were unable to confirm prior findings from Kilpatrick et al (2005). Firstly, when comparing between motives, we added rigour to our analyses by controlling for participants' levels of PA involvement (factoring activity types, frequencies and intensities), which could influence ratings of importance attributed to motives (Bartlett et al., 2011; Raugh & Wall, 1987). Secondly, we accounted for differences in motivational factor structures between PA contexts by first performing separate EFAs for sportspersons and exercisers and then directly comparing motives

that exhibited conceptual similarities, whereas prior work assumed structural similarity of factors across contexts.

Predicting Commitment

On the whole, our findings indicated that motives for enjoyment and stress relief foster commitment significantly but equitably in both sportspersons and exercisers. These results were evident in between-context analyses and within-context replication. *Enjoyment's* positive predictive relationship with participants' levels of activity commitment has been supported in both sporting (Young & Medic, 2011a, 2011b) and exercising (Alexandris et al., 2002; Wilson et al., 2004) contexts. Young and Medic (2011b) found that the motive of *enjoyment* was the strongest predictor of functional commitment in a large sample of masters swimmers, and Alexandris and colleagues (2002) and Wilson and colleagues (2004) mirrored these results in a sample of adult exercisers. Participants who view PA involvement as a means of feeling good, may feel more committed to their PA programs simply because they wish to continue to experience these positive feelings. Supporting this notion is that adults often report greater positive affect resulting from their PA participation (Hagberg, Lindahl, Nyberg, & Hellénus, 2009; Raedeke, 2007). Similarly, the *enjoyment* motive presents strong links to components of the Self Determination Theory, specifically to autonomous and intrinsic forms of motivation (Ingledeu & Markland, 2008; Ryan & Deci, 2002) which typically promotes greater persistence in PA (e.g., Pelletier, Fortier, Vallerand, & Briere, 2001; Fortier & Kowal, 2007).

Our results demonstrated that motives relating to *stress relief* foster greater commitment for sportspersons and exercisers alike. This finding is understandable considering mounting research supporting PA's as a buffering or coping mechanism against rising stress levels (Kimball & Freysinger, 2003; Nguyen-Michel, Unger, Hamilton, & Spruijt-Metz, 2006).

Interestingly, as many as 40% of Canadians use PA as a source to better cope with daily stressors (Cairney, Kwan, Veldhuizen, & Faulkner, 2013), shedding light on the widespread importance of the *stress relief* motive. Given that individuals seek to employ coping strategies that are situation-specific and may take the form of either psychological or behavioural strategies (Iwasaki & Schneider, 2003), stressed individuals may seek PA participation to distract them from their stressors and direct their energy into participating in a constructive activity (PA). Borrowing from this logic, stressed individuals would need to be aware of the capability of PA for buffering stress levels in order to recruit the stress relief strategy for being physically active. Therefore, it is recommended that PA programmers disseminate this knowledge to the participants within their PA programs to foster participants' program commitment. The promotional effects of *stress relief* motives remain relatively unexplored as they relate specifically to commitment. Rather, *stress relief* motives are usually integrated in PA commitment studies as items within larger 'involvement opportunity' constructs that capture a wide variety of opportunities that are only afforded through continued PA participation (Young & Medic, 2011a, 2011b). Therefore, the unique contribution of *stress relief* items to measures of commitment can often be masked by items relating to other desirable PA outcomes. Further research is warranted to explore the beneficial relationship between stress relief motives and levels of commitment, especially within adult samples that may be faced with additional daily-life stressors.

Although not replicated in the within-context analyses, our between-context analysis showed that the *social affiliation* motive was associated with higher levels of commitment equally for sportspersons and exercisers. Previous research similarly identifies social motives as an important factor in predicting PA (McNeill, Kreuter, & Subramanian, 2006; Warner,

Ziegelmann, Schuz, Wurm & Schwarzer, 2011) and socializing with friends or having an exercise/sport partner is a highly effective motivator for initiating and maintaining PA participation (Orsega-Smith, Payne, Mowen, Ho, & Godbey, 2007; Resnick, Orwig, Magaziner, & Wynne, 2002).

Unique explanations for commitment within the sport context. Although our between-group regression analyses did not show differences as a function of context, a couple of unique explanations emerged to explain commitment to sport programs in the within-context results. Increased importance attributed to accomplishing one's *personal goals & challenges* was associated with heightened levels of commitment. The fulfillment of goals has been linked with further pursuit of self-determined goals over which participants have a sense of ownership, and improved adherence to PA programs over time (Sebire, Standage, & Vansteenkiste, 2009; Smith, Ntoumanis, & Duda, 2007). The unique contribution of goal fulfillment to sportspersons' commitment might relate to the possibility that information about goal-striving, attainment, and challenge fulfillment is quite explicit in a sport contexts. For example, sport participants are commonly surrounded by environments in training and in competition that invite them to strive for and realize perpetually evolving goals. Whether these explanations account for greater commitment in sportspersons than they do among exercisers could not be gleaned from the present findings, because the same clear and independent personal goals & challenges factor did not emerge among exercisers and thus could not be submitted to comparative analyses.

The finding that higher levels of importance towards *appearance* related to lower commitment levels in sportspersons is interesting. Physically active individuals all report using *appearance* imagery to some extent (Hall, Rodgers, Wilson, & Norman, 2006), where appearance imagery involves imagining a leaner, healthier physique (Milne, Rodgers, Hall, &

Wilson, 2008). Though appearance imagery can motivate short-term PA participation, it is ineffective at producing enduring adherence (Rodgers, Hall, Blanchard, & Munroe, 2001). In particular, the specific goal of improving one's appearance can be perceived as extremely stressful (Sherwood & Jeffery, 2000). When individuals' current physical appearance is largely discrepant from their imagined ideal appearance, this discrepancy may be so large that individuals feel their ideal level of appearance is unattainable, leading to avoidance and withdrawal from PA (Hart, Leary, & Rejeski, 1989; Sabiston et al., 2007), which may be reflected in substantially decreased commitment. Appearance or bodily aesthetic goals may also be interpreted in a controlling manner, that is, as an extrinsic goal that may undermine personal autonomy and one's self-determination to further commit to sport (Ingledeu & Markland, 2008). Future studies examining the relationship between *appearance* motives and PA commitment may wish to account for the potential influencing effects of appearance discrepancy, and a possible underlying mechanism involving negative affect or anxiety.

Predicting Odds of Lapsing

When comparing between PA contexts, we found that the *stress relief* motive was related to lower odds of lapsing for sportspersons and exercisers alike. Adulthood is generally considered a life period characterized by an increased number of life demands (i.e., work, family), thus a greater potential for heightened stress levels exists. Even minor increases in stress levels have shown to significantly disrupt exercise adherence (Stetson, Rahn, Dubbert, Wilner & Mercury, 1997). Thus, our finding that sportspersons and exercisers who are motivated to participate for stress management reasons are less likely to lapse possibly suggests that PA may serve a buffering or coping role in their lives. As such, the ability for *stress relief* motives to

further buffer against lapses, while promoting greater commitment to PA programs depicts an ideal motivational scenario for PA programmers.

Our result showing the emergence of a significant interaction relating to the *health related* motive and PA lapses is of interest. Higher ratings for the personal importance of the health related motive were associated with greater odds of lapsing among sportspersons, whereas exercisers had lower odds. This is a particularly interesting result because both sportspersons and exercisers equally recognized the health related motive as one of their most important PA motives. Furthermore, health related motives have been shown to relate to more self-determined forms of motivation for adults and have been linked to increased PA rates (Ingledeu & Markland, 2008), and such a relationship was expected to be consistent for participants in both PA contexts. However, it is possible that this interaction may relate to differences in contextual expectations as they relate to health benefits. Although PA related health benefits can result within any PA context (Warburton et al., 2006), exercisers possibly recognize the positive health outcomes resulting from their PA participation more readily (Marteau, 1995), than do sportspersons. Exercise has long been explicitly prescribed as the means of improving one's health through PA participation (e.g., CSEP, 2011) and it is plausible that contextual norms or stereotypes are biased in favour of exercise as a health-enriching context. Thus, exercisers may attribute health benefits to their exercise participation with greater ease than sportspersons because beneficial health outcomes are expected to result from their activity context. The sense that exercise participation fulfills personally important health related needs may reinforce exercisers' PA participation and promote greater adherence. Contrarily, contextual norms in sport may less readily invite sportspersons to attribute their health to their PA participation in that context because participants may not see their sport participation as an instrumental means

to achieving their highly desired health outcomes and instead more readily view adult sport participation as a means to fulfill competitive and social needs (Dionigi & O’Flynn, 2007). To speculate, perhaps too great a focus on health-related benefits may preclude sportspersons from readily appraising other simultaneously relevant goal-oriented needs that may be more important, thereby decreasing commitment.

Limitations and Future Research

The findings from this study are subject to four main limitations. Firstly, this study employed a cross sectional design. Therefore, this study was unable to measure the causal relationships that motives have in relation to PA commitment and lapses. Although we related motives to separable outcome measures that reflect PA adherence, our psychological (commitment) variable asked participants to consider future states and our behavioural (lapses) measure was retrospective in nature. Future research may consider exploring the relationship between participants’ commitment going forward and their actual PA participation or attendance prospectively. This may shed light as to commitment’s intermediary role as a psychological antecedent to adherence. Secondly, not all of the factor structures resulting from EMI-2 EFAs were consistent when examined between PA contexts. Thus, between-context comparisons were limited to five conceptually matched motives. Although this methodology was critical in determining valid motive factor structures for sportspersons and exercisers, our subsequent comparative analyses did not account for all motives in each respective PA context and thus all explained variances in each context. As we did, we recommend that future studies first explore factor structures in each context separately before performing comparative analyses across PA contexts. However, if larger sample sizes were recruited, confirmatory factor analyses may be possible and help to resolve issues with conflicting factor structures, resulting in a greater

number of conceptually-matched motives for comparative purposes. Thirdly, although our forced-choice self-identification methodology ensured that participants' responses to the EMI-2 questionnaire were specific to one context and not influenced by leading definitions of PA contexts, future research should more rigorously verify that participants' self-identified PA context matches their actual PA participation. Finally, the gender distribution was uneven between sportsperson and exerciser groups. As such, potential gender interactions could have occurred and future studies should seek to recruit larger sample populations to statistically account for gender influences.

In conclusion, our findings suggest that adult sportspersons and exercisers are highly motivated to participate in PA for enjoyment and health related reasons alike, yet sportspersons place greater importance on competition and social affiliation. Importantly, we found that certain motives were significantly associated with commitment and lapses. Such information is particularly important for PA programmers aiming to tailor PA programs to be administered to sportspersons and exercisers. Not only is it recommended that PA programs pay particular attention to promoting motives that promote PA commitment and buffer against lapses, but they should also be designed to ensure the fulfillment of these motivational needs through one's PA participation. Special consideration to the enjoyment, social affiliation and stress relief motives for promoting heightened PA commitment for both sportspersons and exercisers is warranted. Furthermore, sportspersons' motive to fulfill personal goals and challenges fostered their commitment, whereas their motive to improve their appearance hindered their commitment. The stress relief motive served as a buffer against participants' odds of lapsing for both PA contexts. Finally, our results suggest that participatory motives relating to health help to buffer exercisers against the odds of lapsing, yet a similar benefit is not evident for sportspersons – instead, overly

explicit and excessive importance on health motives may slightly increase sportspersons' likelihood of lapsing.

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Footnotes

Simultaneous regressions were supported by ancillary forward stepwise regressions to verify results and help guard against potential inflations and Type 1 errors (Tabachnick & Fidell, 2012). Given that the SPSS' (IBM Corp., 2013) pre-set criteria for variable entry and removal can be overly conservative, we used criteria for variable entry and removal set at 0.15 and 0.25, respectively (Tabachnick & Fidell, 2012). Results for the forward stepwise regression demonstrated a significant model, $p < .001$, comprising the same significant motivational factors, all $p < .02$, except *personal goals & challenges*, which only approached significance, $p = .07$.

² The same results were replicated using a forward stepwise regression, $p < .001$, as the two variables remained significant, both $p < .02$, in a positive direction.

³ The same significant relationship, $p = .001$, for *stress relief*, $p = .04$, was replicated using a forward stepwise LR logistic regression.

Table 1

Factor Loadings for Exploratory Factor Analysis of EMI-2 items for Sportspersons

EMI-2 Items	Factors								
	1	2	3	4	5	6	7	8	9
I find physical activity invigorating	.84								
I find being physically active satisfying in and of itself	.78								
It makes me feel good	.69								
I enjoy the feeling of exerting myself	.66								
For enjoyment of the experience	.66								
I feel at my best when physically active	.63								
To accomplish things that others are incapable of		.68							
To measure myself against personal standards		.67							
To compare my abilities with other peoples'		.67							
To gain recognition for my accomplishments		.66							
To show my worth to others		.61							
To give me personal challenges to face		.53							
To give me goals to work towards		.49							
To stay/become flexible			.82						
To maintain flexibility			.69						
To develop my muscles			.67						
To get stronger			.62						
To build up my strength			.58						
To stay/become more agile			.51						
To develop personal skills			.47						
To prevent health problems				.75					
To avoid ill-health				.71					
I want to maintain good health				.69					
To have a healthy body				.55					
To avoid heart disease				.52					
To feel more healthy				.51					
To help control my weight					.87				
To lose weight					.81				
Being physically active helps me to burn calories					.75				
To stay slim					.60				
I find physical activities fun when competition is involved						.90			
I enjoy physical competition						.86			
I enjoy competing						.84			
I like trying to win in physical activities						.55			
To have fun being active with other people							.87		
To enjoy the social aspects of being physically active							.86		
To spend time with friends							.78		
To make new friends							.65		
it helps to reduce tension								.77	
To release tension								.73	
To help manage stress								.69	
To give me space to think								.66	
To look more attractive									.72
To help me look younger									.66
To improve my appearance									.55
Cronbach alpha	.88	.85	.86	.84	.89	.91	.89	.90	.87
Percent of Variance	9.55	7.86	7.76	7.34	7.16	6.91	6.37	6.09	4.13
Total Percent of Variance									65.64

Note. All primary factor loadings are shown. Factor 1 = *Enjoyment*; Factor 2 = *Personal Goals & Challenges*; Factor 3 = *Strength & Flexibility*; Factor 4 = *Health Related*; Factor 5 = *Weight Control*; Factor 6 = *Competition*; Factor 7 = *Social Affiliation*; Factor 8 = *Stress Relief*; Factor 9 = *Appearance*.

Table 2

Factor Loadings for Exploratory Factor Analysis of EMI-2 items for Exercisers

EMI-2 Items	Factors									
	1	2	3	4	5	6	7	8	9	10
I find being physically active satisfying in and of itself	.83									
I find physical activity invigorating	.80									
For enjoyment of the experience	.78									
It makes me feel good	.67									
I enjoy the feeling of exerting myself	.66									
I feel at my best when physically active	.64									
To help control my weight		.90								
Being physically active helps me to burn calories		.83								
To lose weight		.80								
To stay slim		.72								
To improve my appearance		.64								
To look more attractive		.54								
To have a good body		.40								
I enjoy physical competition			.87							
I enjoy competing			.86							
I find physical activities fun when competition is involved			.75							
I like trying to win in physical activities			.73							
To compare my abilities with other peoples'			.65							
To prevent health problems				.80						
To feel more healthy				.67						
I want to maintain good health				.65						
To avoid ill-health				.61						
To avoid heart disease				.59						
To have a healthy body				.50						
To maintain flexibility					.86					
To stay/become flexible					.79					
To stay/become more agile					.66					
To build up my strength					.53					
To release tension						.84				
To help manage stress						.76				
It helps to reduce tension						.75				
To recharge my batteries						.52				
To give me space to think						.40				
To have fun being active with other people							.81			
To enjoy the social aspects of being physically active							.80			
To spend time with friends							.80			
To make new friends							.68			
To show my worth to others								.80		
To gain recognition for my accomplishments								.69		
To accomplish things that others are incapable of								.52		
To help me look younger								.40		
To develop my muscles									.63	
To get stronger									.42	
To give me personal challenges to face										.65
To give me goals to work towards										.59
Cronbach alpha	.91	.91	.91	.84	.86	.85	.88	.75	.81	.79
Percent of Variance	10.28	9.85	8.58	7.60	6.41	6.36	6.19	5.04	3.24	2.53
Total Percent of Variance										66.09

Note. All primary factor loadings are shown. Factor 1 = *Enjoyment*; Factor 2 = *Weight Control & Appearance*; Factor 3 = *Competition*; Factor 4 = *Health Related*; Factor 5 = *Strength & Flexibility*; Factor 6 = *Stress Relief*; Factor 7 = *Social Affiliation*; Factor 8 = *Look Younger & Social Worth*; Factor 9 = *Develop Muscles*; Factor 10 = *Personal Goals & Challenges*.

Table 3a

Motives Simultaneously Predicting PA Commitment for Sportspersons

Predictors	<i>B</i>	<i>SE</i>	β	<i>p</i>	95% CI	
					LL	UL
Enjoyment	.28	.08	.31	.002	.11	.46
Personal Goals & Challenges	.16	.08	.18	.04	.003	.33
Strength & Flexibility	.11	.08	.12	.19	-.05	.27
Health Related	.06	.08	.07	.41	-.09	.23
Weight Management	.02	.08	.03	.73	-.13	.19
Competition	.13	.08	.14	.11	-.03	.29
Social Affiliation	.12	.08	.13	.12	-.03	.29
Stress Relief	.23	.08	.25	.006	.07	.39
Appearance	-.22	.08	-.24	.008	-.38	-.06
Level of Activity Involvement	-.02	.09	-.02	.77	-.20	.15

Note. *n*= 102. *B* = unstandardized beta; β = standardized beta; CI= confidence interval; LL= lower limit; UL= upper limit.

Table 3b

Motives Simultaneously Predicting PA Commitment for Exercisers

Predictors	<i>B</i>	<i>SE</i>	β	<i>p</i>	95% CI	
					LL	UL
Enjoyment	.35	.06	.40	< .001	.21	.48
Weight Management & Appearance	.02	.06	.02	.72	-.10	.15
Competition	.05	.06	.06	.40	-.07	.19
Health Related	.10	.06	.11	.11	-.02	.23
Strength & Flexibility	.11	.06	.12	.09	-.01	.24
Stress Relief	.18	.06	.21	.006	.05	.31
Social Affiliation	.08	.06	.09	.19	-.04	.21
Look Younger & Social Worth	-.01	.06	-.02	.78	-.14	.11
Develop Muscles	.03	.06	.03	.62	-.09	.16
Personal Goals & Challenges	.05	.06	.06	.38	-.07	.19
Level of Activity Involvement	.16	.07	.18	.02	.01	.30

Note. *n*= 136. *B* = unstandardized beta; β = standardized beta; CI= confidence interval; LL= lower limit; UL= upper limit.

Table 4

Final Step of Hierarchical Regression Predicting Odds of Lapsing Between Sportspersons and Exercisers

Predictors	<i>B</i>	Wald X^2	<i>p</i>	<i>OR</i>	95% CI	
					LL	UL
PA Context	.50	1.89	.16	1.66	.80	3.41
Enjoyment	-.22	.43	.51	.80	.40	1.57
Health Related	.68	4.53	.03	1.98	1.05	3.70
Competition	-.05	.032	.85	.95	.53	1.69
Social Affiliation	.46	2.17	.14	1.59	.85	2.93
Stress Relief	-.61	3.59	.05	.54	.28	1.02
PA Context X Enjoyment	.51	1.37	.24	1.68	.70	4.00
PA Context X Health Related	-1.15	7.88	.005	.31	.14	.70
PA Context X Competition	-.30	.58	.44	.74	.33	1.61
PA Context X Social Affiliation	-.62	2.69	.10	.53	.25	1.13
PA Context X Stress Relief	.70	2.87	.09	2.03	.89	4.60
Level of Activity Involvement	-.34	3.38	.06	.71	.49	1.02

Note. *n*= 200. *B* = unstandardized beta; CI= confidence interval; LL= lower limit; UL= upper limit.

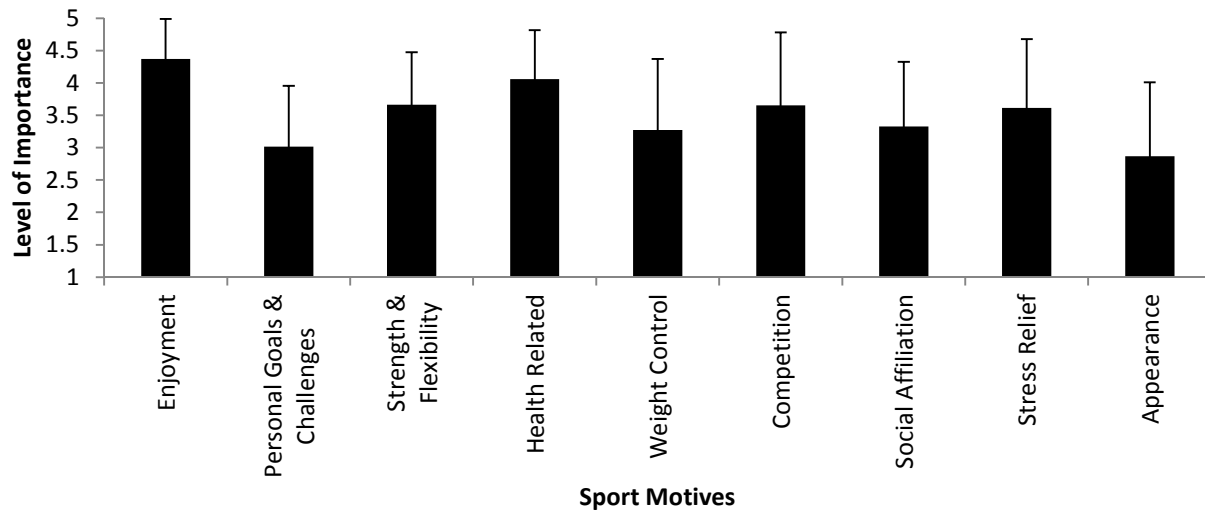


Figure 1a. Mean scores for sportspersons' nine motivational factors. Standard deviations are represented in the figure by the whisker bars.

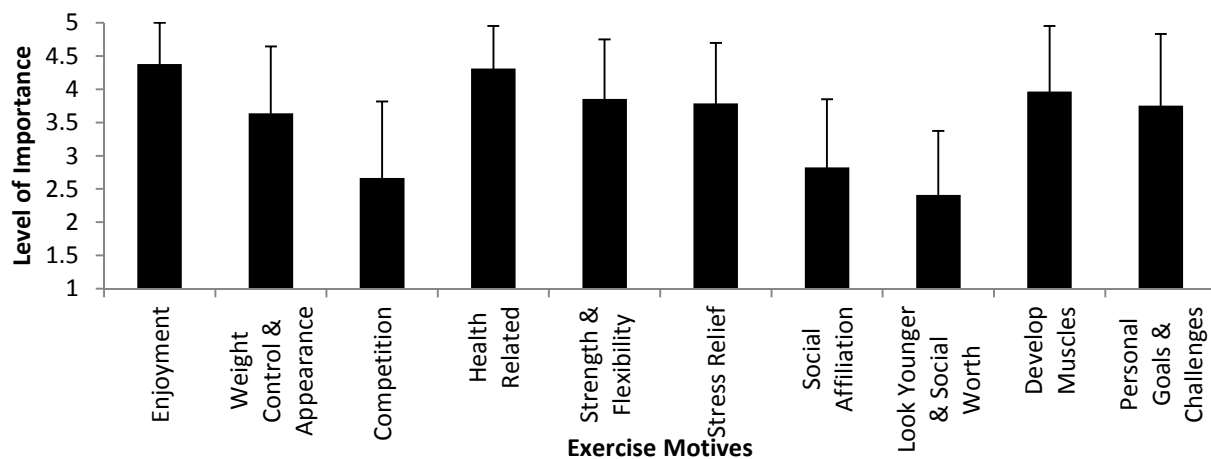


Figure 1b. Mean scores for exercisers' ten motivational factors. Standard deviations are represented in the figure by the whisker bars.

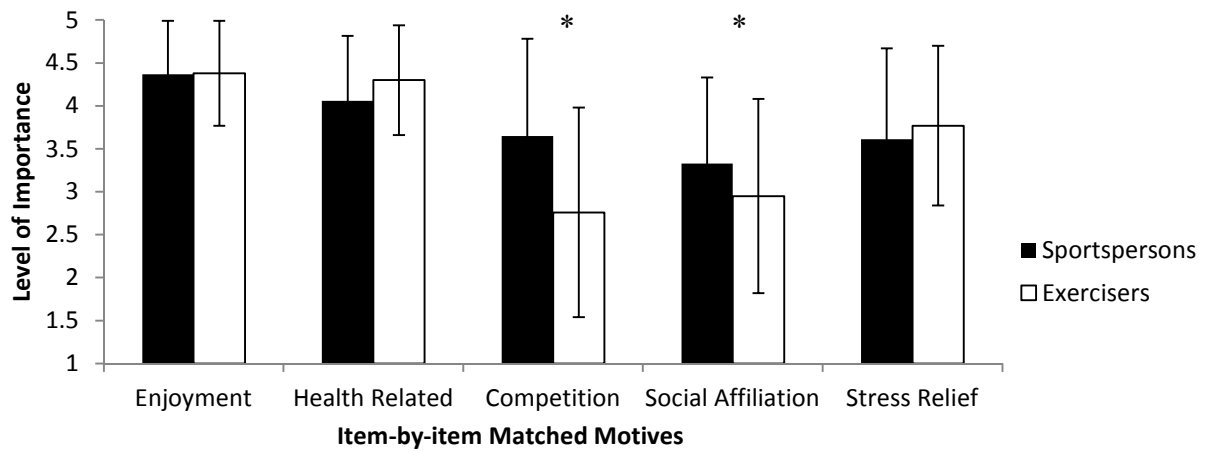


Figure 2. Means scores of item-by-item matched motives. Standard deviations are represented in the figure by the whisker bars. Significant differences between contexts are indicated by asterisks representing $p < .05$.

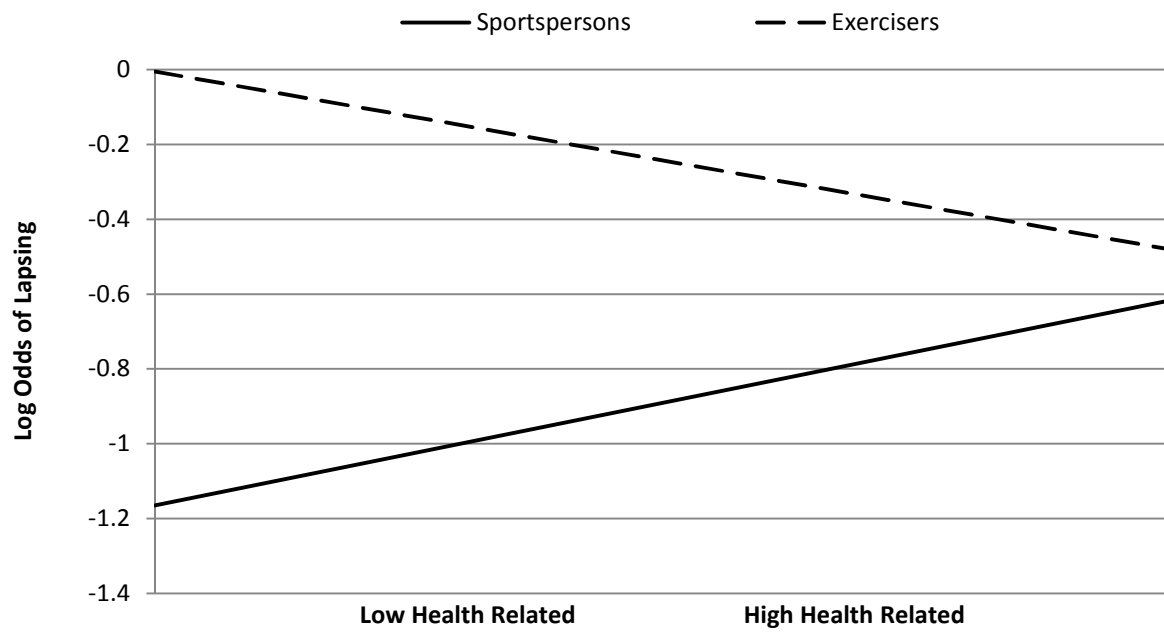


Figure 3. Log odds representing the odds of lapsing in relation to low and high levels of the *health related* motive ($\pm 1 SD$) for each of the sport and exercise samples.

MANUSCRIPT FOR STUDY 2: *Exploring Simultaneous Motives for Sportspersons and Exercisers: The Multifinal Properties of Physical Activity*

Exploring Simultaneous Motives for Sportspersons and Exercisers: The Multifinal Properties of
Physical Activity

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Abstract

The majority of research focusing on physical activity (PA) motivation attempts to foster adherence by analyzing the content (Dwyer, 1992) and quality (Ryan & Deci, 2002) of singular reasons for activity involvement. However, possessing numerous personally important motives, without the explicit consideration of their content or quality, may foster greater PA adherence (Kruglanski et al., 2013). This study explored the relationship between the number of personally important motives held by participants and measures for PA commitment and lapses. 252 ($M_{Age} = 47.20$; range = 35-57 yrs) self-identified sportspersons ($n = 108$) and exercisers ($n = 144$) completed online questionnaires for PA motives (EMI-2; Markland & Ingledew, 1997), commitment (Scanlan, Carpenter, Schmidt, Simons, & Keeler, 1993) and lapses (Simkin & Gross, 1994). Using the EMI-2 responses, we determined the number of personally important and distinct motives held by individual sportspersons and exercisers for their respective context. Sportspersons and exercisers reported a similar number of important motives. A hierarchical regression showed that the number of personally important motives ($B = .27, p < .001$) predicted commitment ($R^2 = .15, p < .001$) equally in sport and exercise contexts, and more strongly than past activity involvement ($B = .13, p = .009$). In a separate regression, number of motives showed no association with lapses ($X^2 = 4.0, p = .14$). We discuss how our results relate to the value focus tenet of multifinality theory (Kruglanski et al., 2013) and participatory reward structures (Wiltermuth & Gino, 2013). In conclusion, programmers should seek to promote at least three distinct motives to prospective participants to heighten commitment to PA programs.

Key words: adherence, motivation, sport, exercise, adults

Exploring Simultaneous Motives for Sportspersons and Exercisers: The Multifinal Properties of Physical Activity

Participating in regular physical activity (PA) can delay the effects of aging and promote greater overall well-being (Elavsky et al., 2005; Warbuton, Nicol, & Bredin, 2006). However, only 15% of Canadian adults meet baseline recommended levels of PA, and alarming decreases in PA levels are noted at each successive age cohort (Statistics Canada, 2011a, 2011b). Therefore, a need exists for determining how PA programs may be tailored to foster greater PA uptake and more importantly, PA retention (Dishman, Sallis, & Orenstein, 1985).

Although human behaviour is historically recognized as serving multiple motives (Neisser, 1963), research focusing on adult PA motives (Weiss & Amorose, 2008) commonly studies the effects of individual reasons for activity participation in isolation from one-another. As such, the majority of participation motivation research focuses on the content (Dwyer, 1992) and quality (Ryan & Deci, 2002) of individual motives. Through these lenses, findings demonstrate that adults who are active for particular reasons (e.g., enjoyment, or stress relief; Vallerand & Young, 2013), or participants who exemplify self-determined forms of motives (e.g., intrinsic motivation), may better adhere to PA programs (Ingledeu & Markland, 2008). However, the combined effect of possessing multiple motives, and an understanding of the influence of simultaneously holding numerous but distinct motives, remains largely unexamined within the PA motivation literature. In the current study, therefore, we borrow from emerging theory on multifinality (Kruglanski et al., 2013) to explore the following question: Are individuals who participate in PA for numerous distinct and highly personally important reasons, more likely to adhere to their PA programs, regardless of motive content or quality?

According to multifinality theory, when individuals possess numerous contextually similar, yet conceptually distinct “goals,” they are more likely to attribute *greater* value to a given “means” that may help satisfy all these goals at the same time (Chun, Kruglanski, Friedman, & Sleeth-Keppler, 2011; Kruglanski & Orzech, 2009). Conversely, when individuals possess only one contextually relevant “goal,” they are more likely to attribute *lesser* value to a given “means” that may help satisfy this one goal (Chun et al., 2011; Kruglanski & Orzech, 2009). To effectively draw from multifinality theory, we acknowledge two integral assumptions guiding this study. Firstly, *motives* serve as PA specific “goals.” Within the participation motivation literature, *motives* reflect goal-oriented states concerned with personally important benefits that individuals perceive may result from their PA participation (Dwyer, 1992). Similarly, “goals” represent objectives that individuals desire to fulfill (Kruglanski, 1996). Secondly, a *PA program* can serve as a specific “means.” “Means” represent behavioural throughputs that allow for the effective pursuit of “goals” (Kruglanski et al., 2013). Similarly, participating in a *PA program* denotes a specific activity that allows participants to strive towards fulfilling their PA specific “goals” or *motives*. Through these assumptions, tenets of multifinality theory lead us to expect that adults who participate in a given PA program because they are motivated by numerous highly personally important motives, will attribute greater value to their PA programs than those who are motivated only by few personally important motives (Chun et al., 2011; Kruglanski & Orzech, 2009). This consideration of value attributed to participants’ PA programs may reflect their levels of program commitment, where adults reporting more numerous personally important motives might be expected to also report higher commitment to future PA.

The commitment construct is often used to reflect adults' desire and resolve to continue in a given activity, either in sport (e.g., Scanlan, Russell, Beals, & Scanlan, 2003; Wigglesworth, Young, Medic, & Grove, 2012; Young & Medic, 2011a, 2011b), or in exercise (Alexandris, Zahariadis, Tsorbatzoudis, & Grouios, 2002; Wilson et al., 2004). As such, the commitment construct is a psychological antecedent to PA adherence. Similarly, measures of PA lapses indicate temporary failures in self-regulated behaviours (Larimer, Palmer, & Marlatt, 1999), and the accumulation of frequent lapses may lead to longer-termed disruptions in adhering to PA programs (Baumeister & Heatherton, 1996). Therefore, by relating these psychological and behavioural self-report measures to the number of reasons motivating participants' PA engagement, we may better inform recommendations on future PA programming conducive to promoting greater adherence.

To provide contextually valid recommendations to tailor PA programs, it is important to consider potential differences between two common and highly beneficial forms of structured PA: sport and exercise. Prior comparative research has revealed several motivational differences between these two contexts (Ebbeck, Gibbons, & Lokeen-Dahle, 1995; Gill, Williams, Dowd, Beaudoin, & Martin, 1996; Kilpatrick, Hebert & Bartholomew, 2005), and emerging evidence suggests that such motivational differences are further associated with contextual differences in participants' commitment and lapses (Vallerand & Young, 2013). The current study is thus guided by the possibility that sport and exercise programs cater to contextually unique participatory motive profiles, and may also offer a different *number* of distinct individual motives for activity participation. Furthermore, the strength of the association between the number of distinct individual motives and participants' commitment (or lapses), may vary as a function of whether people are sportspersons or exercisers.

The purpose of this study was three-fold. Firstly, we compared if sportspersons or exercisers possessed different numbers of highly personally important, distinct motives. Secondly, we determined if the number of highly personally important motives that participants possessed was associated with levels of PA commitment, and if these associations differed for sportspersons and exercisers. Finally, we examined whether the number of highly personally important motives that participants possessed was associated with a reduced odds of lapsing, and if these associations varied in strength between PA contexts.

Method

Participants

Ethical approval and informed consent from pertinent organization representatives and all participants across Canada were obtained. This study employed a cross-sectional design. Eligible and interested participants ($N = 368$) were recruited either in person at sport and exercise venues, or online through organisational representatives. Individual participants registered to take part in an online web-based survey. Individuals who did not provide information on their age, sex and self-identified affiliation with either exercise or sport, were initially excluded from the dataset. Furthermore, participants reporting weeks of no PA due to Christmas holidays ($n = 5$), illness or injuries ($n = 7$), and discontinuation of structured PA programs ($n = 7$) were also excluded from the dataset. Participants ($N = 252$) who completed the online questionnaire self-identified as being either sportspersons ($n = 108$) or exercisers ($n = 144$). Participants were aged between 35 and 57 ($M = 47.20$, $SD = 6.00$). Of the 144 exercisers ($M_{Age} = 47.28$, $SD = 6.03$), 94 were female and 50 were male. Of the 108 sportspersons ($M_{Age} = 47.10$, $SD = 5.99$), 47 were female and 61 were male.

Online Survey Measures

To determine if participants predominantly identified as sportspersons or exercisers, participants were asked: “*Based on the structured/organized physical activities in which you have participated during the past 8 weeks, please finish the following statement. I primarily consider myself to be a (select one).*” Participants had the choice of identifying as either a sporty-type or an exercising-type individual but could not select both. This methodology allowed for participants to personally affiliate with a specific PA context without being grouped based on investigator supplied definitions of PA contexts or pre-existing motivational differences. After self-identifying, participants completed an online questionnaire comprised of six survey instruments: the Short Questionnaire to Assess Health Enhancing Physical Activity (SQUASH; Wendel-Vos, Schuit, Saris, & Kromhout, 2003), the Exercise Motivation Inventory 2 (EMI-2; Markland & Ingledew, 1997), a commitment scale (Scanlan, Carpenter, Schmidt, Simons, & Keeler, 1993), and PA Lapses (Simkin & Gross, 1994). All survey items were prefaced to apply to both sportspersons and exercisers by using stems that were worded to represent a ‘*physical activity*’ contextual level, rather than specifically ‘*sport*’ or ‘*exercise*’ type activities, however, EMI-2 and commitment items asked participants to consider a structured/organized program in their primary activity context before responding. Participants were informed that structured PA programs often include activities (sport or exercise) that first require formal registration, enrollment or membership, and commonly occur at advertised times or places.

Levels of PA involvement. To determine levels of PA involvement, participants completed the SQUASH (Wendel-Vos et al., 2003). The SQUASH asks participants to consider their average PA participation during an average week within an average month, and factors

measures of frequency, intensity and activity-type coefficients stemming from a PA compendium (Ainsworth et al, 1993), to yield an overall assessment of participants' levels of PA involvement interpreted as a MET score. The SQUASH has produced valid and reliable indices for active adults aged within their 40s (Wendel-Vos et al., 2003).

Exercise Motivation Inventory-2. To determine individuals' self-reported levels for different participatory motives for PA, respondents completed the EMI-2 (Markland & Ingledew, 1997). The EMI-2 is typically used to capture how personally important a wide array of reasons are for PA in currently active individuals, and is comprised of 51 items. Participants were first asked to consider their structured/organized PAs in their primary activity context. All survey items were prefaced by "*Personally, I do physical activity...*" and were complemented by each of the 51 pertinent motive items, such as "*To give me space to think.*" Responses to all items were on a 5-point scale ranging from 1 (Not true for me at all) to 5 (Very true for me).

PA commitment. Participants rated their level of PA commitment by responding to four questions about their degree of dedication and determination to continue, and difficulty in quitting their organized PA program (Scanlan et al., 1993). For example, participants responded to "*How hard would it be for you to quit your activity within the next 3-months?*" on a 5-point Likert scale anchored at 1 (not at all), 3 (sort of hard), and 5 (very hard). Participants responded to "*What would you be willing to do to keep participating in your PA program?*" on a scale ranging from 1 (nothing at all), to 3 (some things), to 5 (a lot of things). Responses to other items were on a scale anchored at 1 (not at all dedicated/determined), 3 (sort of dedicated/determined), and 5 (very dedicated/determined).

PA lapses. Participants reported the number of weeks of zero attendance for any structured/organized PA within the past 8-weeks. Responses could range from 0 – 8 lapses, and

were coded to form a categorical variable (two levels: no lapses = 0, one or more lapses = 1). To ensure that participants' lapses were accounted through motivational deficits and not extenuating circumstances, we posed two open-ended exit questions: *"If you had recorded experiencing week(s) of no attendance in your structured/organized physical activity program, did anything out of the ordinary contribute to this?"* and *"Please describe if any weeks of no attendance in your structured/organized physical activity program occurred due to injury or illness."*

Planned Data Analyses

The face validity of motive and activity commitment questionnaire items was grounded in previous studies using adult samples (Alexandris et al., 2002; Markland & Ingledew, 1997; Scanlan et al., 1993). In prior work, we had submitted the same pool of participants' responses to the 51 items on the EMI-2 to exploratory factor analyses (EFA) and tests of internal consistency reliability; this enabled us to specifically and confidently determine the number of valid and independent motive factors for the current adult study population (interested readers are referred to Vallerand & Young, 2013 for further information and details on these EFAs) Results revealed a nine-factor solution for sportspersons and a 10-factor solution for exercisers. Motivational factors for sportspersons included: enjoyment, personal goals & challenges, strength & flexibility, health related, weight control, competition, social affiliation, stress relief, and appearance. For exercisers, they comprised: enjoyment, weight control & appearance, competition, health related, strength & flexibility, stress relief, social affiliation, look younger & social worth, develop muscles, and personal goals & challenges.

The prior derivation of these motive factors for each context is important with respect to the current investigation. First, these analyses ensured that we understood the structure of distinct motives, and because the EFAs were performed on a within-context basis, we were certain that

these motives, while distinct, were all contextually-related. Secondly, we used these motive factors to determine the number of personally important motives that each participant held and thus, values associated with these motive factors were instrumental in subsequently planned analyses related to commitment.

Subsequent analyses were conducted in three overarching analysis sections. Firstly, we explored if sportspersons and exercisers reported different totals for the number of personally important reasons for being active within their motive sets. Secondly, we explored if the number of personally important motives held by participants was associated with levels of commitment and if the associative strength differed for sportspersons and exercisers. Finally, we explored if the number of personally important motives held by participants was related to odds of lapsing for sportspersons and exercisers, and if this relationship differed as a function of PA context.

Preliminary Analyses

Levels of PA Involvement

Prior to conducting subsequent analyses, we determined if sportspersons and exercisers reported different levels of PA involvement by conducting a two-tailed *t*-test on SQUASH scores. Sportspersons ($M = 11689.95$) reported significantly higher mean levels of PA involvement than exercisers ($M = 9993.85$), $t(214.1) = 2.20$, $p = .03$. Therefore, levels of PA involvement was entered as a covariate in ANCOVAs and as an independent variable in all subsequent regression analyses to account for any shared variance it may share with motive variables.

Commitment and Lapses

We also performed an ANCOVA and chi-square analysis to determine if sportspersons and exercisers reported different levels of commitment and odds of lapsing respectively. Results

from our one-way ANCOVA demonstrated that sportspersons and exercisers were similarly committed to their respective PA programs, $F(1, 243) = .01, p = .91$. Our chi-square analysis revealed a significant difference for reported lapses in the past eight weeks between sportspersons and exercisers, $X^2(1, 199) = 4.53, p = .03$, where exercisers reported greater odds of lapsing (43% of exercisers had lapsed at least once) than sportspersons (28% of sportspersons had lapsed at least once).

Determining the Number of Personally Important Motives

To determine the number of personally important yet distinct motives held by participants, a number of steps were pursued, all on a within-context basis. First, we calculated motive factor scores based on factor structures derived from our separate within-context EFAs for sportspersons and exercisers (see Vallerand & Young, 2013). These factor scores represented the perceived value participants attributed to each motive. Then, we collapsed all motive factor scores to derive separate distributions of motivational ratings towards all factors combined in each of the sport and exercise samples. Next, we chose a normative criterion equalling the 70th percentile in the respective distributions for sport (criterion = 4.25 out of 5), and exercise (criterion = 4.33 out of 5; Harwood, Cumming, & Fletcher, 2004; Hodge & Petlichkoff, 2000; Hodge, Allen, & Smellie, 2008). The 70th percentile criterion was chosen to establish an objective reference point above which we could quantify the inclusion of motives that were highly personally important, but that would also allow for some variability in the total number of motives participants could report. Using this criterion, for each individual sportsperson, for example, we tallied the number of motives each sportsperson had that met or exceeded the '4.25' criterion on a case-wise basis. Based on the factor structure of the sportspersons' EFA, the number of personally important motives held by any sport participant could range from zero to

nine. Using this same protocol, we also tallied the number of motives for each individual exerciser that met or exceeded the '4.33' criterion on a case-wise basis. Based on the factor structure of the exercisers' EFA, the number of personally important motives held by any exercise participant could range from zero to ten. The frequencies for the number of personally important motives held by participants in each of the sport and exercise distributions can be seen in Figures 1a and 1b, respectively. Though this methodology categorizes motives as highly important relative to the importance levels of all motives for all participants within each group (sport/exercise), the absolute values translated from this relative 70th percentile cut-off are required to be quite high for sportspersons and exercisers respectively (each > 4.0 out of 5.0). Therefore, each motive that is categorized as being *relatively* highly personally important is also highly important on an *absolute* level.

Insert Figures 1a & 1b about here

Results

Comparing Participants' Number of Personally Important Motives

Though sportspersons and exercisers reported different ranges in the possible number of personally important motives (nine and ten respectively), we were interested in determining if sportspersons and exercisers reported a significantly different number of personally important motives within their motive sets. A one-way ANCOVA with level of PA involvement entered as a covariate revealed that sportspersons ($M = 2.76$ out of 9, $SD = 2.12$, Skewness = .57, Kurtosis = -.38) and exercisers ($M = 3.15$ out of 10, $SD = 2.27$, Skewness = .50, Kurtosis = -.51) reported a similar number of personally important motives, $F(1, 249) = 3.28, p = .07, \text{Cohen's } d = .17$. Therefore, on average, participants in both PA contexts reported valuing a similar amount of

personally important motives (approximately 3 motives), or being motivated for a similar number of distinct goal-oriented reasons.

How does the Number of Motives Relate to Commitment?

To determine if the number of personally important motives held by participants predicted levels of commitment and if they were more important predictors for sportspersons or exercisers, we subjected participants' number of highly important motives to a hierarchical linear regression analysis. Participants' level of PA involvement was entered as an independent variable to account for any shared variance with the number of personally important motives held by participants. The independent variables included a categorical interaction variable (or product term) for self-identified PA context (two levels: sportsperson = 0; exerciser = 1) by participants' number of important motives (Holmbeck, 2002; Polit, 1996; Tabachnick & Fidell, 2013). Since sportspersons and exercisers had different ranges of possible motives (sportspersons: 0-9, exercisers: 0-10), participants' number of motives were first standardized for sportspersons and exercisers separately, and then collapsed together and re-standardized. Prior to computing interaction terms and subsequent entry of variables in the regression models, levels of PA involvement and commitment scores were also standardized on a listwise basis (Holmbeck, 2002). Variables were entered into the regression analysis in four hierarchical blocks. Level of PA involvement was entered at block 1. Participants' number of motives and the levels of PA involvement were entered at block 2. Alongside all components from block 2, the PA context categorical variable was entered at block 3. Alongside all components from block 3, the product term for number of motives by self-identified PA context was entered at block 4.

The model at block 1 was significant, $R^2 = .06$ ($R^2_{Adj} = .06$), $F(1, 242) = 16.9, p < .001$. The model and step at block 2 were significant, $R^2 = .15$ ($R^2_{Adj} = .14$), $F(2, 241) = 21.1, p < .001$;

$R^2\Delta = .15$, p of $F\Delta < .001$. Given that the third model did not significantly predict more variance than model two ($F\Delta = .19$, $p = .67$), results are interpreted up to the second model. Results from the model in block 2 indicate a significant main effect for participants' level of PA involvement ($B = .13$, $p = .009$) and number of personally important motives on commitment ($B = .27$, $p < .001$). Therefore, the more motives participants possessed, the more committed they were to their PA program. Since the third model and fourth models, which included the categorical variable of self-identified PA context and its interaction, did not contribute any significant additional variance explaining levels of commitment, the predictive strength of participants' number of motives was equitable for sportspersons and exercisers.

How does the Number of Motives Relate to Lapses?

To determine if participants' number of motives predicted their odds of lapsing, and if they were more important predictors for sportspersons or exercisers, we subjected participants' number of motives to a hierarchical logistic regression analysis. This analysis followed the same methodological steps as our commitment analysis. The model at block 1 with only participants' levels of PA involvement entered ($B = -.45$, $OR = .63$, $p = .007$) was significant, $R^2 = .04$, $X^2(1, 200) = 8.14$, $p = .004$. Models at all subsequent blocks were also significant (all $p < .02$), but they did not contribute significantly more variance than previous steps (all p of $X^2_{Step} > .09$). At block 2 ($R^2 = .04$, $X^2(1, 200) = 8.20$, $p = .01$), levels of PA involvement remained significant ($B = -.45$, $OR = .63$, $p = .008$) but the number of personally important motives did not approach significance ($B = -.04$, $OR = .96$, $p = .79$), and therefore did not predict odds of lapsing for either PA context.

Discussion

The overall purpose of the current research was to explore the relatively novel concept that without the explicit consideration of motive content or quality, the *number* of personally important motives guiding sportspersons' and exercisers' PA participation may influence their commitment and susceptibility to lapsing. As such, this study covered three specific objectives. Firstly, we compared if sportspersons or exercisers possessed a different number of personally important motives in relation to their specific PA contexts. Secondly, we explored if participants' number of important motives was associated with levels of PA commitment, and if the strength of this relationship differed for sportspersons and exercisers. Finally, we explored if participants' number of important motives was associated with odds of lapsing, and if this relationship differed between PA contexts. To our knowledge, this is the first study that effectively compared participants' number of personally important PA motives between sport and exercise contexts, and differentially related participants' number of motives to commitment and lapses measures, as a function of PA context.

Our findings demonstrated that sportspersons and exercisers report being motivated for a similar number of distinct and important reasons. Furthermore, participants possessing more numerous personally important motives report higher levels of commitment, yet this relationship was equitable for sportspersons and exercisers. Additionally, the number of personally important motives appears to hold no significant influence over participants' odds of lapsing for sportspersons and exercisers over and above the influence of average levels of activity involvement.

Kilpatrick and colleagues (2005) offer support for the finding that sportspersons and exercisers within our sample reported being motivated for a similar number of personally

important, distinct reasons. Using a within-participant design, wherein the same participants reported motives for sport and for exercise, participants reported on average ten highly important motivating reasons (> 3.0 ; answers ranging from 0-5) for their participation in each of sport and exercise contexts (Kilpatrick et al., 2005). In the present study, personally important motives were defined more rigorously – the determination of a person's personally-important motives depended on whether their motivational ratings fell within the top 30th percentile for all motivational ratings derived from all the individuals within their similar (sport or exercise) context. Using this criterion, we found no between-context differences. Our findings did suggest however, that, on average, individuals in both PA contexts demonstrate approximately three highly personally important motives. As such, sport and exercise programmers might recognize that on average, participants in their PA programs expect to fulfill three motivational needs and should seek to tailor their programs accordingly to promote the fulfillment of these motives. Furthermore, though the number of personally important motives held by participants was equally related to higher levels of commitment for sportspersons and exercisers, the important message to extend to PA programmers is the novel consideration that promoting more motives to their participants may improve their participants' levels of commitment towards their program.

Multifinality theory can be used to understand the relationship between participants' number of personally important motives and their levels of PA commitment. According to the *value focus* tenet this theory, all motives hold a degree of personal value (Kruglanski et al., 2013). When participants perceive that many of their distinct yet contextually-related motives can be satisfied simultaneously through their participation in one activity, the values attributed to each motive become compounded, resulting in an additive value attributed to the activity in question (Chun et al., 2011; Kruglanski & Orzech, 2009). For example, an activity perceived to

satisfy three motives is expected to hold greater value than an activity perceived to satisfy only one motive (Chun et al., 2011; Kruglanski & Orzech, 2009). Although increased values towards participatory goals were not explicitly measured in the current study, this explanation may account for why participants with more personally important motives were more committed to their respective sport or exercise activities.

Another possible explanation considers that motive fulfillment serves as a personally rewarding experience. Research focusing on reward structure has shown that the separation of rewards into multiple categories can effectively increase participants' motivation and commitment to complete a required task to earn these rewards (Wiltermuth & Gino, 2013). Borrowing on this concept, we posit that the attainment of multiple conceptually unique motives (i.e., differently categorized motives) could also promote greater commitment to a specific PA, if this PA was to be perceived as a facilitator of motive attainment. To illustrate this proposed mechanism, consider the following example. If an exerciser reported being motivated by three personally important motives, and felt that these motives could be realized through his or her participation in an exercise program, this individual would be motivated to achieve three separate rewards. As a result, we would expect that this exerciser would report greater commitment to his or her exercising activities. When participants realize that numerous rewards may result through their participation in a given activity, they may be more likely to commit to this activity for fear of missing out on some of these potential rewards, since they may not be afforded through the participation in alternative activities (Heath, 1995; Rutherford, 2001; Tracey, 2003; Wiltermuth & Gino, 2013). Notably, this explanation remains speculative, especially considering that levels of motive fulfillment or goal attainment were not explicitly measured in the current study. Future research examining the association between number of motives and PA outcomes might seek to

measure motive fulfillment, or fear of missing opportunities for motive fulfillment, to better understand how multifinal tenets may relate to reward structures.

Interestingly, the number of personally important motives held by participants positively predicted sportspersons and exercisers' levels of commitment but was unrelated to participants' odds of lapsing. A possible explanation for the null relationship for lapses is that the number of different reasons for being active serves little importance in relation to behavioural measures. It is possible that behavioural measures are more influenced by goal content or quality of goals rather than the discrete number of personally important active goals/motives that participants hold (Dwyer, 1992; Kilpatrick et al., 2005; Ryan & Deci, 2002). Moreover, participants' average PA involvement in the past served as a better predictor of their odds of lapsing than their number of important motives, where people who have been more active in the past are less likely to lapse. Therefore, participants' mastery in PA may be more conducive to promoting their PA adherence than their number of highly important goal-oriented motives (Bandura, 1997). Overall, the fact that main effects arose for commitment but not lapses may suggest an intermediary or alternate step bridges the gap between motivational set size and behavioural constructs for PA adherence, and future research may wish to explore this further.

The current study aimed to distinguish contextual differences relating to the effects of participants' number of personally important motives. The absence of contextual differences is of interest in relation to participants' commitment. Research comparing the associations of various motives with adult participants' commitment has shown that sportspersons' commitment is influenced by more individual motives than that of exercisers (Vallerand & Young, 2013). For example, sportspersons' commitment was influenced by enjoyment, stress relief, social affiliation, goals and challenges, and appearance motives, whereas exercisers' commitment

seemed to only be influenced by enjoyment, stress relief and social motives. As such, it was expected that sportspersons' commitment would be more significantly influenced by their number of personally important motives (in a collective sense as conceptualized by multifinality; Kruglanski et al., 2013) than exercisers. However, it is possible that since these additional motives that predicted commitment for sportspersons were not highly rated on average (i.e., not subjected to the 70th percentile inclusion criterion in the current study), their influence on participants' commitment was not included using the current methodology.

Limitations and Future Research

The findings from this study are subject to four main limitations. Firstly, this study employed a cross sectional design. Therefore, this study was unable to experimentally manipulate and measure the direct compounding effects that the number of personally important motives held by participants were proposed to have in relation to participants' PA commitment and lapses. Secondly, the motives or "goals" associated with commitment and lapses in the current study were explicit – participants were explicitly presented all pertinent motives in the EMI-2 and were explicitly instructed to judge these motives. Though multifinality theory is still in its infancy, the majority of research in this field has focused on the relationship between a primary (focal) goal and alternative goals that are implicit (because they are subliminally primed in experimental rather than survey designs) or referred to as "background" goals (see Kruglanski et al., 2013, p.24). However, some evidence has shown that multifinality theory remains consistent when participants are presented with numerous explicit goals simultaneously (e.g., Chun et al., 2011; Lafrenière, Bélanger, Kruglanski, & Vallerand, 2011). However, future research is still needed to support the tenets of multifinality theory when multiple explicit goals are used as was the case in our study. Thirdly, our analyses pertained to tenets of multifinality

theory where considerations of value were privileged over considerations of attainability (e.g., goal attainment, expectancies for goal attainment), and these considerations were directed towards only one PA context (i.e., sport or exercise as a fixed “means”). Questions relating to multiple goals as they relate to attainability and expectancy invite more complex analyses of multifinality, and these analyses become far more complex when more than one “means” or activity is considered (see Kruglanski et al., 2013), as would be the case should adults weigh aspects of multifinal goals in choosing sport activity over exercise activity. Such complexities would necessitate the use of moderators, examination of multiple mediators, and designs that accommodate between-context differences while considering within-person processes. Fourthly, although this study revealed the benefits of possessing multiple motives irrespective of motive content, future research need analyze potential interactions between the discrete number of personally important motives participants possess and the content of these important motives, and determine how such an interplay affects participants’ ability to sustain levels of PA.

Finally, though our findings suggest that promoting a greater number of reasons for being active may have positive bearings towards participants’ commitment levels, we were unable to specifically determine what critical number of personally important PA motives foster the greatest levels of commitment, and if this relationship remains linear. It is possible that this relationship may meet saturation and taper off at a critical number of important motives, or that too many motives may serve as “too much of a good thing” (Pierce & Aguinis, 2013). Therefore, future research may wish to experimentally manipulate the number of perceived important motives through priming scripts, dialogues or situations (Kruglanski et al., 2013). Still, multifinality research leads us to suggest that PA programmers consider the promotion of at least the average number of motives reported by our adult sportspersons and exercisers or greater.

Although several of our limitations have been acknowledged, the present study has merit because it demonstrates the importance of possessing numerous personally important motives/goals within PA contexts. Furthermore, our findings suggest that possessing a greater number of personally important motives has greater bearing on participants' commitment than their prior level of participation. As such, these two major findings provide new insight for PA practitioners, while also contributing to fill a major gap within the participation motivation literature. Additionally, to our knowledge no other studies have applied the multifinality theory to examine adherence within PA contexts, and thus the current investigation provides grounds for subsequent multifinality research to be conducted within PA contexts.

In conclusion, the present findings suggest that sportspersons and exercisers are motivated to be active based on a similar number of motives. Furthermore, findings suggest that increases in the number of explicit reasons that sportspersons and exercisers hold for being active yield are associated with higher levels of PA commitment. Such information is of particular importance for PA programmers aiming to tailor PA programs to be administered to sportspersons and exercisers alike. We recommended that PA programs promote additional reasons for being active to their participants and to specifically aim to ensure that participants are motivated by at least three motives.

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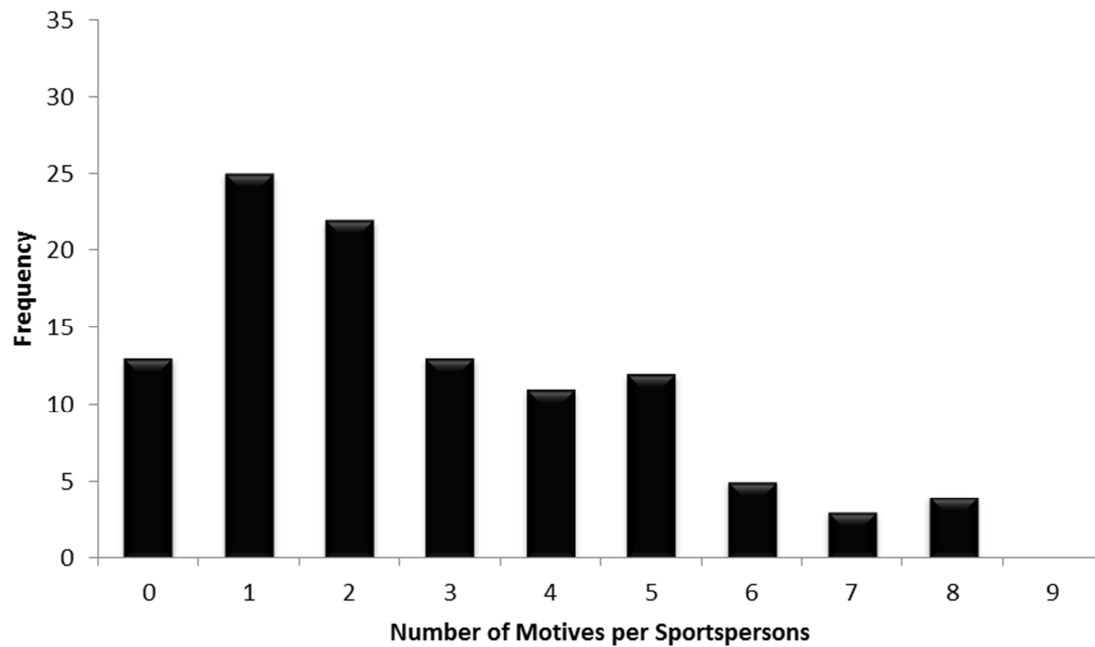


Figure 1a. Frequency distribution of the number of personally important motives held by sportspersons.

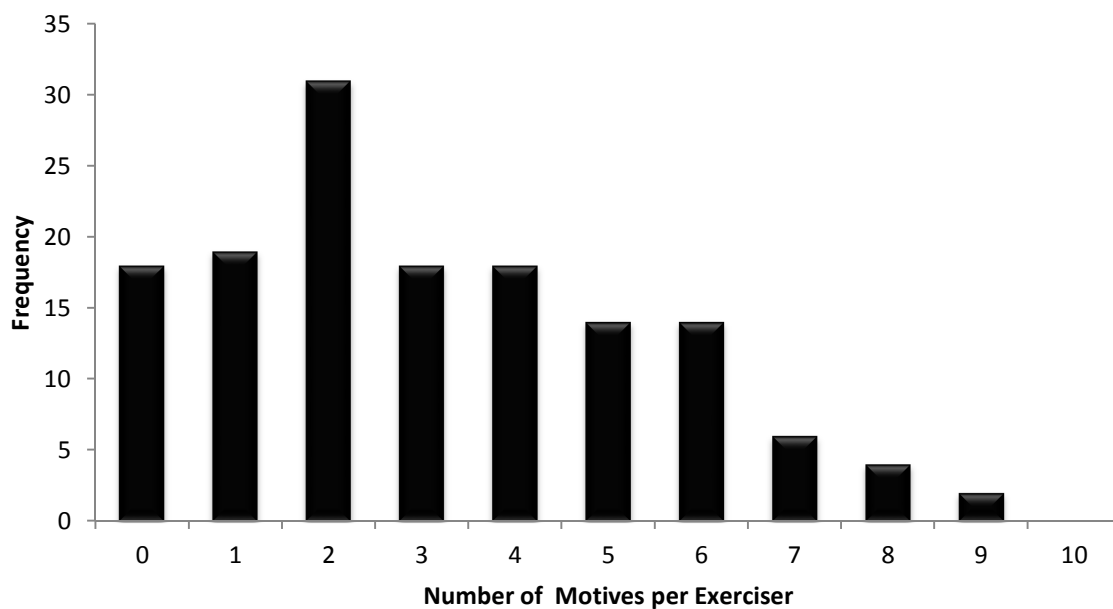


Figure 1b. Frequency distribution of the number of personally important motives held by exercisers.

CHAPTER 4: HOW INVOLVEMENT OPPORTUNITIES RELATE TO LEVELS OF COMMITMENT FOR SPORTSPERSONS AND EXERCISERS

According to the Sport Commitment Model, the commitment construct reflects participants' desire and resolve to continue their activity involvement (Scanlan, et al., 1993, 2003). As such, commitment serves as a psychological antecedent of physical activity (PA) adherence (Scanlan et al., 1993). Adults can be committed to their respective sport (Young & Medic, 2011a, 2011b) and exercise activity (Alexandris et al., 2002) due to a host of involvement opportunities (IO). IOs represent specific opportunities that are afforded to participants only through their continued involvement in a given activity, and that are uniquely affiliated with the given activity because they cannot be found to the same degree elsewhere (Scanlan et al., 2003). By exploring the relationship linking participants' IOs to their levels of commitment, we may further our understanding of how participants adhere to their structured PA programs.

This chapter discusses the Sport Commitment Model's involvement opportunities (IO) construct, as it relates to sport and exercise contexts. This thesis dissertation originally proposed using IOs in parallel with the participatory motives found in Manuscript 1: *Predicting Physical Activity Commitment and Lapses: Exploring the Motives of Adult Sportspersons and Exercisers*, to predict measures of commitment and lapses. However, due to the theoretical coherency of IOs with commitment measures (conceptually, as articulated in the sport commitment model, they should have a closer association with commitment than participatory motives derived from Markland & Ingledew's Exercise Motivation Inventory-2; 1997), and the consideration of ensuring parsimonious motive factor structures in prior analyses, the decision was made to present findings on IOs in the following stand-alone chapter.

Theoretically, the strength of the IO construct is calculated using a questionnaire scale comprising four survey items (Alexandris et al., 2002; Carpenter, Scanlan, Simons, & Lobel, 1993; Casper & Stellino, 2008; W. M. Weiss, Weiss, & Amorose, 2010). Recently, researchers have argued that the limited number of survey items on prior IO scales may not have accounted for all pertinent reasons for which adult sportspersons and exercisers are active (Young & Medic, 2011a, 2011b), and may have led to an underrepresentation of IO's influence on commitment. For example, Young and Medic (2011a, 2011b) hypothesized that adult sportspersons' PA participation may revolve around as many as 14 independent IOs. These additional IOs were leveraged from prior studies within exercise contexts (Wilson et al., 2004), adult elite athlete contexts (Scanlan, et al., 2003) and qualitative research specifically focused on masters athletes (Medic, Starkes, Young, Weir & Giajnorio, 2005). When explored in a sample of masters athletes, participants presented a great deal of heterogeneity in their highly rated IOs, as they reported being committed to their sport for unique reasons such as the opportunities to: *improve their health and fitness, improve physical skills, do something exciting, have a good time and enjoy oneself, travel, relieve stress, achieve competitive goals, be with friends, and delay age-related effects* (Young & Medic, 2011a, 2011b), amongst others. However, authors speculate that some of these IOs explaining the resolve to continue PA participation may be entirely unique to sport contexts (Young & Medic, 2011a, 2011b). For example, IOs of traveling for PA events and achieving competitive goals, which both appear to be highly important for masters athletes, may only be uniquely or more readily afforded through sporting means of PA. As such, the use of a 14-item IO subscale remains in its infancy and additional research is required to explore if sportspersons and exercisers, similarly or differentially recognize the availability and instrumentality of these additional IOs. Furthermore, research is required to determine whether a

more comprehensive IO subscale is differentially related to levels of activity commitment, as a function of PA context (sport or exercise).

The current study of IOs was guided by three main purposes. Firstly, we explored the structure of an expanded IO inventory for each of sportspersons and exercisers. Secondly, we aimed to verify an expected positive relationship between the expanded IO factor and levels of PA commitment for sportspersons and exercisers. Finally, we wished to determine if IOs were more strongly associated with commitment for sportspersons or exercisers.

Methods

Analyses described herein related to the same cross-sectional design, and the same participant pool as described in Manuscript 1 (see pp. 35 in this thesis dissertation). Analyses in this chapter are based on the same online survey and ethics procedures described in Chapter 3 (see pp. 23-26). Like Manuscript 1, 252 participants fully completed the on-line ($M_{Age} = 47.20$, $SD = 6.00$; range: 35-57 years) – 144 self-identified as exercisers and 108 self-identified as sportspersons. Of the 144 exercisers ($M_{Age} = 47.28$, $SD = 6.03$), 94 were female and 50 were male. Of the 108 sportspersons ($M_{Age} = 47.10$, $SD = 5.99$), 47 were female and 61 were male.

On-line survey measures included a forced-choice question for self-identification of PA context (sportsperson or exerciser), the Short Questionnaire to Assess Health Enhancing Physical Activity (SQUASH; Wendel-Vos, Schuit, Saris, & Kromhout, 2003), activity commitment (Scanlan et al., 1993), and an involvement opportunities scale (Young & Medic, 2011a, 2011b). Respondents were instructed to consider their structured/organized PAs in their primary activity context when rating statements. For example: *“If you are primarily a sportsperson, please consider your structured/organized sport and sport training activities.”* Furthermore, structured/organized PA programs were described often including activities that first require

formal registration, enrollment or membership, which then allow individuals to pursue activities that typically occur at advertised times or places. Structured/organized programs can include formal physical activity programs (i.e. spinning classes, swim club practice, etc.) but are not limited to formal programs as long as registration, enrollment or membership precede one's participation in the given activity.

With respect to IOs, participants responded to 14 items from an IO subscale that was found to be especially salient amongst masters athletes (Young & Medic, 2011a, 2011b; see Appendix M). Prior to responding, instructions asked participants to consider IOs as *“Opportunities that individuals might get only from their involvement in their respective structured/organized physical activities that they cannot obtain elsewhere.”* Participants were further instructed: *“We want to know whether you personally obtain certain opportunities from involvement in your structured/organized physical activities.”* All survey items were statements that began with: *“My physical activity involvement...”* and finished with the pertinent opportunity theme, such as: *“gives me the opportunity to enjoy myself.”* These 14 items were rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

The face validity of IO and commitment questionnaire items was grounded in studies using adult samples (Alexandris et al., 2002; Carpenter et al., 1993; Young & Medic, 2011a, 2011b). However, to specifically and confidently determine the structure of an IO factor for our adult populations, we submitted participants' responses to exploratory factor analyses (EFA), separately for sportspersons and exercisers. Cronbach alpha calculations ensured internal consistency reliability for the IO factor. (The structure and the reliability of the 4-item commitment scale have been articulated in Manuscript 1; see pp. 45.) In subsequent analyses, we first examined the predictive strength of sport and exercise IOs in relation to levels of PA

commitment by performing separate simultaneous regressions for sportspersons and exercisers. Then, we used a hierarchical regression with an interactive contextual variable to explore if IOs were differentially related to levels of commitment for sportspersons and exercisers.

Results

Determining IO Factor Structures

To ensure the uni-dimensional structure of the IOs, the 14 items were entered into separate forced one factor EFAs for sportspersons and exercisers, using principal axis factor analyses. Factor loading criteria for both EFAs was set to include items with loadings of 0.40 or greater and the resulting set of items required a Cronbach alpha greater than 0.70 to ensure internal reliability consistency (Polit, 1996; Tabachnick & Fidell, 2012).

An 11 item solution resulted for sportspersons. Based on our EFA criteria, 3 items were removed through an iterative process. Items reflecting opportunities “*To spend time with my family,*” “*To spend time with my spouse*” and “*To gain commercial or job related benefits*” were all sequentially removed. The item “*To be with my friends*” loaded below the 0.40 threshold (factor loading = .38) but was retained in the factor structure for parsimonious reasons (Polit, 1996). A seven-item solution resulted for exercisers. Based on our EFA criteria, seven items were removed through an iterative process, where all removed items failed to load at or above the 0.40 threshold. Items reflecting opportunities “*To gain commercial or job related benefits,*” “*To spend time with my family,*” “*To get publicly recognized for my achievements,*” “*To improve my health and fitness,*” “*To relieve any stress I am feeling,*” “*To delay the effects of aging,*” and “*To spend time with my spouse,*” were all removed sequentially. The item “*Gives me the opportunity to achieve my competitive goals*” loaded below the 0.40 threshold (factor loading = .39) but was retained in the factor structure for parsimonious reasons (Polit, 1996). Loadings of

items on factors, percentages of variance and Cronbach alphas for both factor structures are shown in Table 1.

Table 1.

Factor Loadings for the Forced One-Factor Solution from the Exploratory Factor Analysis of Involvement Opportunity items for Sportspersons and Exercisers

Involvement Opportunities Items	Sportspersons Factor	M	SD	Exercisers Factor	M	SD
To improve my physical skills	.79	4.16	1.01	.55	3.96	1.06
To achieve my competitive goals	.70	3.76	1.33	.39	3.02	1.40
To do something exciting	.68	3.77	1.19	.77	3.50	1.22
To enjoy myself	.62	4.21	.89	.73	4.20	.84
To have a good time	.61	4.14	.94	.81	3.86	1.07
To travel	.53	2.79	1.44	.51	2.34	1.48
To be with my friends	.38	3.35	1.14	.51	2.94	1.38
To improve my health and fitness	.50	4.27	.84	--	4.56	.68
To get publicly recognized for my achievements	.44	1.97	1.16	--	1.72	1.05
To relieve any stress I am feeling	.42	3.58	1.16	--	3.75	1.13
To delay the effects of aging	.41	3.35	1.25	--	3.63	1.27
Cronbach alpha	.825			.787		
Percent of Variance	9.55			9.55		

Note. All items are prefaced with the stem “Gives me the opportunity...” Factor structure for exercisers is presented at the far right of the table. Directly adjacent to this column is the factor structure for sportspersons. Dashes indicate instances where IO items did not adequately load onto the exercisers’ IO factor structure. Three items did not load on either IO factor and are not displayed.

How do IOs Relate to Commitment? Within-Context Analyses

Simultaneous linear regression analyses were used to determine whether individuals’ levels of PA commitment depended on their levels for IOs. SQUASH levels were entered as an additional independent variable to control for levels of PA involvement. These analyses were run separately for sportspersons and exercisers. Prior to being entered into the regression, levels

of PA involvement, commitment scores and the IO factor scores were standardized on a listwise basis (Tabachnick & Fidell, 2012). To determine differential effects for the IO variable as a function of context, we were interested in identifying significant beta weights for the IO variable in each of the within-analyses, and determining whether 95% confidence intervals were distinct or overlapping when inspecting across the contexts.

A significant model resulted for sportspersons, $R^2 = .13$ ($R^2_{Adj} = .11$), $F(2, 91) = 6.97$, $p = .002$. Results indicated a significant and positive relationship between sportspersons' IOs ($B = .20$, 95% CI = .07, .33, $p = .002$) and commitment, however, the association between average activity in the past (SQUASH) and commitment was non-significant, $p = .22$. A significant model also resulted for exercisers, $R^2 = .16$ ($R^2_{Adj} = .15$), $F(2, 129) = 12.22$, $p < .001$. Results indicated a significant and positive association between exercisers' IOs ($B = .28$, 95% CI = .12, .39, $p < .001$) and commitment, and between past PA involvement ($B = .15$, 95% CI = .01, .28, $p = .03$) and commitment. By comparing 95% confidence intervals between sportspersons' and exercisers' IO betas, no significant between-context differences are noted.

How do IOs Differentially Relate to Commitment in Sport and Exercise? Between-Context Analysis

We wished to explore differences in the associative strength of IOs in relation to commitment between sportspersons and exercisers however, the number of constituent items in the respective IO structure differed for sportspersons and exercisers. In order to examine whether there would be contextual differences when the exact same IO items were considered, we needed to match IOs on an item-by-item basis. We elected therefore to use the seven items in the exerciser IO solution, culling four extraneous items from the sport solution, so that the

constituent items matched. Using these seven matched-items, we re-calculated IO factor scores for sportspersons and exercisers.

We conducted a hierarchical linear regression analysis to explain levels of PA commitment. Prior to entry and prior to computing the interaction term, levels of PA involvement, IO, and commitment scores were standardized on a listwise basis (Tabachnick & Fidell, 2012). Variables were entered into the regression analysis in four blocks. Levels of PA involvement (SQUASH scores) were entered at block 1. The IO variable was added at block 2. Alongside all components from block 2, the PA context categorical variable (0 = sportsperson; 1 = exerciser) was entered at block 3. Finally, in addition to all components from block 3, the product term representing the IO by PA context interaction was entered at block 4. Results showed that the model at block 1 was significant, $R^2 = .06$ ($R^2_{Adj} = .06$), $F(1, 232) = 17.24$, $p < .001$. The model and step at block 2 were also significant, $R^2 = .17$ ($R^2_{Adj} = .17$), $F(2, 231) = 24.29$, $p < .001$; $R^2\Delta = .11$, p of $F\Delta < .001$. Given that the model at block 3 did not significantly predict more variance than block 2 ($F\Delta = .15$, $p = .70$), results are interpreted up to the second model. Neither the third nor fourth model contributed any significant additional variance explaining levels of commitment, thus we can conclude that the relationship between IOs and commitment were significant but equitable for sportspersons and exercisers. Results based on the model at block 2 indicate significant main effects for IOs ($B = .30$, $p < .001$) and levels of past activity involvement ($B = .13$, $p = .01$) in a positive direction. Therefore, regardless of self-identified PA context, as participants attributed greater importance to their IOs, the more they were committed to their respective PAs.

Discussion

The current research was guided by three main purposes. Firstly, we verified the structure of an expanded IO inventory for each of sportspersons and exercisers. Secondly, we determined if positive relationships between the expanded IO factors and levels of PA commitment existed as expected for sportspersons and exercisers. Finally, we examined whether IOs were equitably or differentially associated with commitment for sportspersons or exercisers.

Different IO factor structures resulted for sportspersons and exercisers. Sportspersons' IO factor structures included eleven in total, and four additional IOs than that for exercisers. In relation to commitment, as sportspersons and exercisers acknowledged greater agreement with the presence of opportunities that were uniquely afforded through their continued involvement in PA, their commitment to PA was higher. A comparison of 95% confidence intervals revealed no significant differences between the predictive strengths of IOs in relation to commitment for sportspersons and exercisers. Furthermore, when comparing the associative strengths between IOs and commitment for sportspersons and exercisers using an item-by-item matched IO score, equitable strengths were reported for sportspersons and exercisers. As such, no between-context differences were noted when using IO factor structures that were validated within each respective PA context, and when using a matched-item between-context factor structure. Therefore, results suggest that the predictive strengths of IOs are truly equitable for sportspersons and exercisers.

When verifying the IO structures within each PA context, our EFAs showed that three items for sportspersons and seven items for exercisers appeared problematic, respectively and were removed from the final factor structures. The three IO items removed for sportspersons related to opportunities to spend time with one's *spouse* and *family* through sport, and the

opportunity for adult sportspersons to use their activity to *gain job related benefits*. These same three IOs did not prove to be pertinent for the exercisers in our current study. The additional IO items removed for exercisers related to opportunities to *delay the effects of aging, relieve stress, improve health & fitness, and seek public recognition for achievements*. It is important to note that these involvement opportunities were not dropped within their respective contexts because they were not seen as being afforded through PA participation (participants had been asked to personally confer whether these opportunities existed in their PA context). Rather, they did not statistically coalesce when placed alongside the other IO items, alluding to their conceptual uniqueness in relation to the other items. In fact, in ancillary EFAs in which the factorial solution was not forced at one solution but allowed to vary, two to three possible factors emerged in subsequent solutions. Thus, it appears that a one-factor IO may be too broad and as such, may not be able to capture all relevant individual IOs that may be afforded through one's PA participation.

Since IOs speak to anticipated outcomes afforded through PA participation (e.g., the outcome of experiencing stress relief), this construct conceptually resembles participatory motives. Research on participatory motives has recognized that motives exist within different and specific themes (e.g., Dwyer, 1992; Markland & Ingledew, 1997), and when motives are related to separable outcomes, each theme is often considered separately (as depicted in Manuscript 1), instead of collapsed as one large motive factor. It is possible that different themes of opportunities afforded through PA exist, and that each theme relates differently to participants' commitment. For example, a health-related IO theme may be able to capture the *delay the effects of aging, relieve stress, and improve health & fitness* IO items. Similarly, a family-related IO theme may capture the *spend time with one's spouse and family* items.

Therefore, it appears that the inclusion of multiple IO themes may capture more individual IOs and shed light on the potential differential effects of IO themes on participants' commitment. However, should researchers wish to pursue such an approach, two areas of caution must be considered. Firstly, by dividing the IO construct into distinct themes, it is recommended that each theme have at least three constituent IO items to ensure the robustness of the theme. Secondly, previous validation work on expanded participatory motives inventories (51 items in the EMI-2; Markland & Ingledew, 1997) has revealed difficulties in yielding parsimonious factor structures for exercisers specifically (see Manuscript 1). This suggests that individual motives have unique meanings in different PA contexts. As such, further qualitative work may be needed to support the development of IO inventories for their use in different PA contexts (see Dionigi, Baker, & Horton, 2011).

The resulting factor structures for each PA context not only retained the constituent items commonly found to relate to commitment in youth (Carpenter et al., 1993; Weiss et al., 2010) and adult sport (Casper & Stellino, 2008) samples, but our EFAs also verified the presence of additional IO items for adult sportspersons and exercisers. At the very least, we suggest that the opportunities to improve personal health and fitness, to get publicly recognized for personal achievements, to relieve any stress, and to delay the effects of aging, should be represented in future measurement of opportunities in adult sport. Future research might determine whether these four opportunities do not exist in exercise contexts and are therefore not applicable, or whether they indeed are also afforded in exercise contexts and are simply not validly accounted for in the present self-report items.

Future research should aim to incorporate expanded inventories of IOs in their analyses, as this may help ensure that the predictive strengths of some individual opportunities are not lost.

Since different factor structures were derived for sportspersons and exercisers, and these factors were composed of a different number of constituent items, it appears that participants may acknowledge the existence of characteristically different IOs, and different numbers of IOs, depending on their activity context. Finally, if researchers wish to subject IO scores to subsequent analyses to explain separable outcomes (as we did), it is suggested that they seek to initially validate IO factor structures within their participant groups, to account for any contextual variances.

Not only were IO factor structures determined for sportspersons and exercisers, but their utility in predicting commitment was demonstrated. Similar results have been found in sport (Carpenter et al., 1993; Casper & Stellino, 2008; Weiss et al., 2010; Young & Medic, 2011a, 2011b) and exercise contexts (Alexandris et al., 2002), however this study serves as the first case where an expanded IO inventory was applied for both sportspersons and exercisers. Given the verified utility of the expanded IO inventories in predicting commitment, the adoption of expanded IO inventories merits further consideration. In the current study, we found that sportspersons' and exercisers' IOs were significantly but equally related to their commitment. Therefore, these findings add to the emerging evidence that the Sport Commitment Model holds applicability in exercise contexts (Alexandris et al., 2002; Wilson et al., 2004), certainly with respect to the IO construct. Importantly, participants' anticipated opportunities emerged as a more powerful predictor of future commitment than did measures of their prior PA involvement. As such, it appears that the *pulling* effect of anticipated outcomes is associated with greater commitment than a *continuance* effect of prior PA participation. Overall, since the commitment construct serves as a readily testable psychological antecedent to PA adherence, its practicality in future research on exercise programs is warranted.

Given the exploratory nature of the current research, it is subjected to a few limitations. Firstly, we performed EFAs to determine IO factor structures for sportspersons and exercisers. A more rigorous analysis would constitute a confirmatory factor analyses and would require drastically larger sample sizes. Since the expansion of IO inventories remains in its infancy, our methodology should be deemed as an adequate initial step. Secondly, when comparing predictive strengths of IOs between PA contexts using the hierarchical regression analysis, we used item-by-item matched IO structures. Since exercisers had fewer IO items contributing to their IO factor, the matched equivalent for sportspersons did not reflect the total possible scope of sport-specific IOs, which may explain the null findings between-contexts. This limitation also suggests the importance of contrasting 95% confidence intervals across contexts as a preliminary comparative step, which also showed no significant differences. In spite of certain limitations, the current research served as the first known instance where the predictive strengths of IOs were contrasted between sportspersons and exercisers, in relation to their levels of commitment.

In conclusion, this study provided initial support for an expanded IO factor structure for active adults. These factor structures showed structural differences for sportspersons and exercisers and thus place emphasis for future studies to validate IO factor structures within each study population. The utility of these expanded IO factors in predicting commitment for sportspersons and exercisers was verified and provides ground for the use of expanded IO factors in future Sport Commitment research.

CHAPTER 5: DISCUSSION

Overall, this investigation used an exploratory approach to determine which motivating factors foster participants' commitment to and adherence in PAs, and if differences existed between sportspersons and exercisers. The importance of individual participatory motives (Study 1), the total number of reasons motivating PA participation (Study 2) and the accommodation of IOs (Chapter 4) were of primary interest in the current research. Findings were pursued in efforts to advance the fields of participation motivation and sport commitment, and in the hope of informing sound and evidence-based recommendations to PA practitioners, programmers and policy-makers. As such, the following chapter begins by providing a summary of the findings from all three empirical studies of the current research. Secondly, a discussion of empirical strengths, limitations and future directions is provided. Finally, this chapter concludes by highlighting the potential impact and practical implications of the current research.

Summary of Studies

Study 1 focused on the levels of importance of independent motives and the relationships between these motives and participants' commitment and lapses, for both sportspersons and exercisers. Results documented that sportspersons and exercisers alike were highly motivated to be active for enjoyment and health related purposes. When compared between-contexts, sportspersons reported being more motivated for social and competitive reasons than did exercisers. Additionally, enjoyment, stress relief and social affiliation motives were associated with heightened levels of commitment for both sportspersons and exercisers. Furthermore, motives pertaining to personal goals and challenges positively predicted commitment for sportspersons, whereas appearance motives were inversely associated with sportspersons' levels of commitment. Finally, the stress relief motive demonstrated buffering capabilities against

participants' odds of lapsing, for both sportspersons and exercisers. Interestingly, the health related motive was differentially related to participants' odds of lapsing, depending on PA context. Exercisers who were highly motivated for health related reasons experienced lower odds of lapsing, whereas higher importance attributed to health related motives associated with higher odds of lapsing amongst sportspersons.

Study 2 similarly provided an unprecedented examination of the effects of the number of personally important yet distinct motives in relation to participants' adherence. Using a normative reference point set at the 70th percentile to calculate the number of personally important reasons motivating individuals' PA participation, sportspersons and exercisers both reported being motivated for approximately three personally important reasons. Furthermore, this study related participants' number of motives to their levels of commitment, and found that participants with greater numbers of distinct reasons motivating their PA participation had heightened levels of commitment. This relationship was equitable for participants in sport and exercise contexts. A similar relationship between number of motives and odds of lapsing was expected, however, this relationship was not present in either PA context.

Findings from Chapter 4 provided initial support for an expanded IO factor structure that can be used in studies with active adults. Compared to former IO scales that employed four generic IO items (Alexandris et al., 2002; Scanlan et al., 1993), the present analyses demonstrated how many survey items characterizing different opportunity themes loaded on a single factor solution. Results also showed structural differences in the constituent items making up a single IO factor for sportspersons (11 items) and exercisers (7 items). Such differences may allude to the fact that more of expanded IO items are readily interpreted or acknowledged by sportspersons in their present wording, or to the possibility that more specific opportunities are

readily available to adult sport participants than exercisers. When the corresponding expanded IO factors were applied within their respective contexts, and when an item-by-item matched factor (7 items) was employed, results showed that IOs consistently predicted both sportspersons' and exercisers' levels of commitment. The predictive strength of the IO factor was equitable for sportspersons and exercisers.

Strengths, Limitations, and Future Directions

The current research has novel findings and certain methodological merits that may advance future research. Study 1 revealed that the commitment construct can be effectively used in fields other than the SCM. Specifically, Study 1 demonstrated that commitment can be predicted by diverse independent motives. Study 2 introduced a novel approach to the consideration of motivated PA behaviour, in that the number of motives possessed by participants can influence their commitment to PA programs. As such leverage has been provided for future research to consider the cumulative effects of independent motives simultaneously rather than in isolation and to test the tenets of multifinality in PA contexts. Chapter 4 provided initial support for the expansion of the IO construct to accommodate the numerous possible opportunities that may be afforded through individuals' participation in PA programs. As such, support for the use of expanded IO inventories in future research was provided and may result in a better representation of all possible opportunities available to PA participants.

Furthermore, the current investigation served as the first known instance where participants' PA motives were differentially related to separable outcomes (commitment and lapses), between two distinct PA contexts (sport and exercise). Thus, the current research addresses a major gap in the participation motivation literature. Additionally, in Studies 1 and 2,

and in Chapter 4, participants' level of PA involvement was treated as a covariate in all subsequent analyses to control for its potential influence on motives and IOs. This consideration of added rigour (Bartlett et al., 2011; Raugh & Wall, 1987) has seldom been reported in prior participation motivation literature and its application in the current investigation provides grounds for future research to pay particular attention to this covariate.

When exploring the impact of individual PA motives on measures relating to adherence, the use of questionnaires that capture the greatest amount of breadth in reasons of PA participation is critical to avoid an underrepresentation of motives. However, a dearth in the participation motivation literature exists in relation to studies that provide contextual comparisons by utilizing expansive motivational inventories. Thus, upon performing an extensive search of the literature, we selected the EMI-2 questionnaire (Markland & Ingledew, 1997) because it appeared to capture the greatest number of possible motives when compared to other motivational questionnaires (e.g., PMQ; Dwyer, 1992; PIEQ; Duda & Tappe, 1989).

Since this motivation questionnaire is still largely in its infancy, an additional strength of the current research is that we provided preliminary validation of EMI-2 factor structures within sport and exerciser contexts. However, the exploratory factor analyses of the EMI-2 relating to the current adult sportsperson and exerciser samples demonstrated resulting factor structures that appeared more problematic than the original structures outlined by the creators of the questionnaire (Markland & Ingledew, 1997). This presented a challenge for us to directly contrast conceptually-similar motivational factors between sport and exercise and we elected to pursue a two-step comparative approach. We first compared 95% CIs of conceptually similar motives derived via separate within-context regression analyses, between sportspersons and exercisers to retain the richness representativeness of all motives within each PA context. Since

this first step did not reveal any between-context differences that were expected to exist based on prior research (Ebbeck et al., 1995; Gill et al., 1996; Kilpatrick et al., 2005), we proceeded with the second comparative step: subjecting item-by-item matched motives to hierarchical regression analyses with a categorical ‘context’ interaction term. Though these comparisons did not account for all motive items and all potential sources of explained variances (in commitment, and lapses) within each context, this more rigorous methodology was critical to make valid between-context comparisons. Given these complexities, it is recommended that additional research validate factor structures within adult sport and exercise populations through more rigorous confirmatory factor analyses, so that valid between-context comparisons may be further explored across a greater number of motivational factors.

With respect to the EMI-2, it is also recommended that researchers explore the potential benefits of incorporating additional motive items to the 51-item questionnaire. As discussed in Study 1, the conceptual uniqueness of certain motive items contributed to the complexities of the resultant factor structures. For example, motive items focused on *improving endurance* and *doctor’s advice* needed to be removed from both sportspersons’ and exercisers’ factor structures as they failed to adequately load on any motive factor. There were also concerns that certain items that we had expected to coalesce on one particular motivational reason/theme instead splintered and loaded on several other alternative themes. This does not mean that the survey items were not personally important for sportspersons or exercisers, but rather that these items were conceptually dissimilar to all other motive items. As such, researchers may wish to include additional items that build around such problematic motive items, so that they may group together and form additional unique motive factors. The result of an expanded motive inventory

is likely to capture a greater proportion of explained variance in relation to adherence-related outcome measures.

Our novel approach of having participants self-identify as being either sportspersons or exercisers was a critical addition to the participation motivation literature and particularly for studies comparing PA contexts. This methodology ensured that participants were not exposed to researcher-provided and potentially biasing definitions of PA contexts (e.g., Kilpatrick et al., 2005), and enabled more rigorous between-context comparisons. Given the novelty of this approach, the self-identification methodology has yet to be validated in prior research. Future research might continue to use such a forced-choice and definition-free self-identification process in adult populations, however, researchers should also aim to cross-validate self-identified PA context with participants' actual contextual PA participation and determine a score of methodological accuracy. However, we would be amiss without recognizing that some individuals may be both sportspersons and exercisers. To further explore the motives of PA participants who identify equally with sport and exercise contexts, future research may benefit from within-person comparisons of motives.

Study 2 provided preliminary support for the application of the multifinality theory (Kruglanski et al., 2013) in PA contexts, and gives rise to the consideration of motivated behaviour through a new lens. To the author's best knowledge, no other studies have applied or partially applied multifinality to PA contexts and no participation motivation studies have considered the impact of the number of motives possessed by participants, regardless of goal content. However, our conclusions from Study 2 remain tentative because we did not explicitly explore mediators of relationships. We discussed how more distinct motives are associated with higher levels of PA commitment. Yet, multifinality theory suggests that this relationship may be

mediated by a value oriented mechanism (Chun et al., 2011; Kruglanski et al., 2013), and future research may wish to explicitly address this to more fully to support the tenets of multifinality theory.

Also with regards to Study 2, a unique methodological procedure was developed to objectively and statistically determine the number of personally important motives possessed by sportspersons and exercisers separately. This methodology served as an important first step to the quantitative exploration of multifinality theory within PA contexts, however future research is warranted to refine such procedures. For example, an arbitrary normative reference was grounded in prior research (Hodge, Allen, & Smellie, 2008), and was set at the 70th percentile where motives exceeding this cut-off point were deemed as being highly personally important. Future research may discover new rationales for the use of alternate criteria, which may involve linking quantitative rankings with qualitative valuing of motives. As such, researchers may be in a position to concurrently inspect whether motives meeting criteria for personal importance are truly highly valued. Additionally, although this study revealed the benefits of possessing multiple motives irrespective of motive content, future research is needed to analyze potential interactions between the number of personally important motives participants possess and the content of these motives, and determine how they relate to participants' ability to sustain levels of PA. Researchers are advised to explore on a person-by-person basis, which motives are ranked highly and how this relates to participants' PA adherence. To this end,, researchers may wish to use cluster analyses (Hodge et al., 2008) to determine which grouping of highly ranked motives best predict participants' commitment to PA programs.

Given the exploratory nature of the current research, a few limitations merit discussion to inform future research. Firstly, more females self-identified as exercisers, whereas the inverse

was true for sportspersons in our study. As such, potential gender interactions could have occurred and future studies should seek to recruit equally distributed sample populations, or recruit larger samples to statistically control for gender differences. Secondly, although Study 2 suggested that promoting a greater number of reasons for being active may have positive bearings towards participants' commitment levels, number of motives has no relation to participants' PA self-reported behaviour (lapses). Researchers may wish to explore explanations for the divide between these psychological (commitment) and behavioural outcomes (lapses). Thirdly, Study 1 revealed that social motives relate to heightened levels of commitment for sportspersons and exercisers alike. It is possible that this relationship could be mediated by the discrete number and nature of participants' social agents. Future research may wish to explore the relationship between participants' social relationships and the level of importance they attribute to social motives for being physically active. The fact that a retrospective lapse measure was used in the Study 2 may have some bearing and future researchers may find significant relationships between participants' number of personally important motives and lapses going forward in a longitudinal study design. Moreover, the use of different behavioural outcome measures may be practical (e.g., PA log book, or frequency of program attendance). A final possibility may be that the number of motives participants possess simply has no bearing on their PA adherence without the added consideration of motive content, as seen in Study 1 where only specific motives (i.e., stress relief and health related motives) were related to participants' odds of lapsing. Finally, a cross sectional design was used for Studies 1 and 2, and for Chapter 4. This design is limited in that it was unable to measure the direct relationships that motives have in relation to PA adherence throughout a temporal continuum. As such, future research may wish to

identify the impacts that motives and IOs have on participants' sustained PA adherence going forward.

Practical Implications

The summation of work presented in this thesis aligns well with the Government of Canada Priorities for "Healthy Living." This National Strategy entitled "Integrated Pan-Canadian Healthy Living Strategy," is led by Public Health Agency Canada (PHAC; 2010) on behalf of a "Whole of Government" effort. This strategic initiative noted the dramatic increase in rates of overweight and obesity, and recognized that *healthy living* needed to serve as the source of change. According to PHAC, *healthy living* is composed of the efforts required to maintain healthy body weights and as such, the need for the Canadian population to *stay physically active* is a cornerstone of the initiative. To this end, the PHAC supported the Canadian Society for Exercise Physiology (CSEP) in reviewing the latest science on PA and in developing new PA guidelines for adults 18-64 years of age (PHAC, 2010). The value of the development of such guidelines is that they describe what Canadians need to do to achieve PA related health benefits (i.e., how much PA is required) and provide recommendations on how to initiate PA participation. Findings from Studies 1 and 2 provide tangible and evidence-based recommendations that might better inform how structured PA activities be programmed and in particular, which motivational themes they should be oriented towards to help adults within sport and exercise contexts stay committed and resilient against lapses. Such information about how to specifically tailor the motivational climate of programmed, organized PA to each of sport and exercise contexts may facilitate adherence (Baker et al., 2010; Glaros & Janelle, 2001; Young & Medic, 2011a) and therefore the achievement of PA guidelines for more Canadian adults.

Studies 1 and 2 also provided tangible recommendations for PA practitioners to integrate into their PA programming efforts via program curricula, tailored advertisements and personal counseling. The current findings suggest that sportspersons and exercisers are motivated to be active for a similar number of personally important reasons. When considering the content of reasons for being active, findings revealed that sportspersons and exercisers are primarily motivated to seek enjoyment and health related outcomes, but sportspersons hold motives of competition and social affiliation in greater regard than exercisers. Therefore, PA programmers should seek to afford these motivational needs to their participants and sports programmers should give added consideration to their participants' competitive and social motives.

In terms of promoting commitment, Study 2 findings revealed that participants with more distinct reasons motivating their PA participation hold heightened levels of PA commitment. Therefore, PA practitioners should program in order to strategically accommodate (or afford the attainment of) additional reasons for participants to be active. Although Study 2 results suggested a positive influence of additional distinct motives, they did not indicate the specific the content of these reasons. However, findings from Study 1 may provide some indication in relation to the content of these additional reasons; they revealed that sportspersons' and exercisers' enjoyment, social affiliation, and stress relief motives were all linked to heightened levels of commitment for both PA contexts. These specific motives should therefore be brought to the forefront for sportspersons and exercisers alike by promoting them within each PA programs. Sportspersons' commitment was also positively associated with the motive to achieve personal goals and challenges, and negatively associated with their motive to improve their appearance. Therefore, it appears that sport programmers have the additional resource of promoting participants'

commitment through the personal goals & challenges motive, but need to be aware of the potential negative effects of appearance motives within sport contexts.

The current research also revealed the particular instrumentality of the stress relief motive in promoting commitment while preventing lapses for sportspersons and exercisers.

Programmers should therefore seek to incorporate this motive when tailoring PA programs, especially when delivering programming to adult populations. Furthermore, the health related motive emerged as a differential contributor to participants' odds of lapsing, depending on the PA context, where exercisers who reported being highly motivated to achieve positive health outcomes had lower odds of lapsing, whereas sportspersons reporting more importance towards health outcomes had higher odds of lapsing. Therefore, exercise programmers should take full advantage of the beneficial effects of participants' stress relief and health related motives to keep exercisers active. Sport programmers should also leverage the stress relief motive to foster participants' adherence but should be aware of the potential detrimental effects associated with too great of a focus on sportspersons' desired health related outcomes.

In conclusion, the total body of work from the current research has demonstrated novel findings relating to participants' motives, IOs, commitment and lapses in both sport and exercise contexts. Furthermore, these findings have contributed to the participation motivation and sport commitment literature, while still providing tangible recommendations for PA programmers and practitioners to consider when designing and tailoring their PA programs for sportspersons and exercisers. Finally, the current research's scope served directly in line with federal strategic priorities outlined by the Public Health Agency of Canada and in turn, findings can be used to leverage greater health outcomes for the Canadian adult population by helping them stay active.

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STATEMENT OF CONTRIBUTIONS

As the primary investigator, I was responsible for the conceptualization of the research project, and for submitting and obtaining ethical approval from the University of Ottawa's Research and Ethics Board. I also designed the web-based questionnaire, pilot-tested the questionnaire ($n = 20$), and recruited over 350 additional participants to complete the online questionnaire to serve the three independent studies. Finally, I performed the data analyses and was the primary author of the two primary manuscripts, one supportive chapter and thesis document.

My thesis supervisor challenged me to clarify and refine my conceptualization of the project, offered the infrastructure for building the electronic survey, provided mentoring and feedback for the data analyses, and edited various versions of my text throughout the process.

APPENDICES

Appendix A: Letter of Permission for Recruitment from Community Organizations

Dear *(insert name of contact person of community organization)*,

I am contacting you in the hope that you will consider endorsing a research project and grant permission to recruit participants from your organization.

This study is a Master's level thesis project with the School of Human Kinetics at the University of Ottawa. The purpose of the research is to examine the effectiveness of tailored physical activity programming for adults aged 35-54. More specifically, this study will aim to determine if aligning the specific type of activity in which one participates, with his or her motivational needs, will result in greater levels of physical activity program adherence.

The survey will take approximately 20 minutes to complete and will gather participants' measures on their various reasons for participation, their levels of activity commitment and the numbers of weeks in which they have had their structured physical activity participation interrupted in the past three months. With your permission, researchers would like to recruit participants either on-site at your organization's venue, and/or through email invitations, and to invite potential participants to visit a website URL that will link them to our safe and secure online survey.

In accordance with the ethical procedures at the University of Ottawa, all the information that participants provide will remain confidential and all steps will be taken to ensure the anonymity of participants during the data analyses and reporting of results. Participation in the study is entirely voluntary. If at any time a participant wishes to withdraw from the study, he or she may do so freely without penalty of any kind.

This study has the potential to illustrate the effectiveness of promoting physical activity adherence by matching physical activity programs to participants' motives. This information could be useful in designing programs and interventions to help keep middle-aged adults physically active. Given the potential health benefits of having a more active older population, I ask you to consider granting permission to recruit adults from your organization to participate in this study. I also ask you to grant permission for the researcher to maintain a booth on-site allowing for the distribution of recruitment flyers. The location and functioning of such a booth would be subject to your preferences, respectful of the surrounding events and would be entirely non-disruptive. Adults would have to approach the booth to express interest in participating in the study. I also ask you to consider consenting to electronically recruit adults from your organization via email. In this case, I would ask you to forward our short recruitment letter via email to your members. Alternatively, if it is your preference, I ask you to consider posting our short recruitment letter on your organization's website for your members to see. The same information would be provided in the recruitment email as on the organization's website.

As an organizational representative, I ask for your consent to permit this research by reading and signing the letter below and returning it to the investigator. If you do consent, please indicate whether you prefer the researcher to recruit on-site or by email, or both.

To whom it may concern,

My name is _____, and I represent an organizational group called _____. I have been contacted by James Vallerand, a Master's student at the University of Ottawa working with Dr. Bradley Young on research relating to physical activity in middle-aged adults. I endorse this research and James has my permission to recruit participants who are between 35 and 54 years of age and who are affiliated with my organization. I understand that participants will be required to complete a 20 minute online survey. I understand that all research procedures conform to ethical procedures at the University of Ottawa and that participation in the study is voluntary and at any time it is possible for participants to withdraw freely from the study without penalty of any kind. I agree to provide (please check all boxes that you agree to):

- ☐ Access so that James may maintain an on-site table/booth on my organization's premises, which will be subject to my preferences, respectful of surrounding events and participants, and entirely non-disruptive. I understand that all interested participants will have to approach the table to discuss the research and that they will not be solicited in undesignated areas on-site. I will allow James to distribute flyers to members of my organization from the designated table/booth on-site.
- ☐ Access to the electronic recruitment of members by forwarding a recruitment email to invite individuals to take part in this study. I attest that I have permission as my organization's representative to forward a recruitment email to members' email

addresses. I understand that all emailed individuals can ignore/delete this email freely without any penalty of any kind.

- ☐ Access to the electronic recruitment of members by emailing an attached recruitment PDF file to invite individuals to take part in this study. I attest that I have permission as my organization's representative to email an attached recruitment PDF file to members' email addresses. I understand that all emailed individuals can ignore/delete this email freely without any penalty of any kind.
- ☐ Access to the electronic recruitment of members by posting a recruitment PDF file on the organization's website to invite individuals to take part in this study. I attest that I have permission as my organization's representative to post recruitment information on the organization's website. I understand that all individuals visiting this website can ignore/delete this email freely without any penalty of any kind.

Signature: _____ Date: _____

Appendix B: Recruitment Flyer

Are you interested in helping improve physical activity rates in Canada?

Want to find out what drives you to be physically active?

The University of Ottawa is currently seeking adults aged 35-54 who would like to participate in a study that examines their motives for being physically active.

Your participation would take approximately **20 minutes** and all information you provide will remain completely anonymous. Also, with your participation, you can request a summary of the findings.

If you would like to participate, please follow the secure web-link below:

[secure weblink to complete survey will be inserted here]

Appendix C: Recruitment Email Script

Dear participant,

We have received permission from your sport/exercise organization to ask you to consider taking part in a research study and we thank you for your interest in this research. This study is looking at the effectiveness of aligning specific types of activity with participants' motivational needs. Upon completion of the study, you will have the opportunity to request a summary of the findings.

This survey will require you to complete the following online questionnaire that will take approximately 20 minutes to complete and will ask questions relating to your various reasons for physical activity participation. This online survey is certified safe and secure and only the investigators will have access to your information.

The study is being conducted in accordance with research ethics procedures at the University of Ottawa. It is important for you to understand that your involvement in the research is entirely voluntary. You are not required to participate and there will be no negative consequences if you choose not to do so. If you agree to participate, all of the information that you provide will remain completely confidential. We may publish the findings from this research in the future, but all publications will pertain to data at the group level and will not include any personally identifiable information. If you have any questions about the survey or the nature of the study, please feel free to contact either of the investigators below. If you have concerns about the content of the questionnaire or the ethical conduct of the study, you may contact the Protocol Officer for Ethics in Research as indicated below.

To complete the survey, you can click on the first link provided below. By clicking this link, you are acknowledging that you have read and understood the purpose of the research and that you have volunteered to participate.

[secure weblink to complete survey will be inserted here]

Thank you for your interest in the research, your participation is appreciated.

Appendix D: Letter of Information for Participants

Dear participant,

We have received permission from your sport/exercise organization to ask you to consider taking part in a research study and we thank you for your interest in this research. This study is a Master's level thesis project with the School of Human Kinetics at the University of Ottawa looking at the effectiveness of aligning specific types of activity with participants' motivational needs. Upon completion of the study, you will have the opportunity to request a summary of the findings.

This survey will require you to complete the following online questionnaire that will take approximately 20 minutes to complete and will ask questions relating to your various reasons for physical activity participation. This online survey is certified safe and secure and only the investigators will have access to your information.

In accordance with the ethical procedures at the University of Ottawa, all the information you provide will remain confidential and all steps will be taken to ensure that only the researchers have access to your personal information. When the final report is written, it will be done in such a way as to conceal the identity of all participants. Inferences will be based on information collected from group data and not from individual cases. Collected data will be used for analyses in the present study and will be kept on file for a period of ten years, after which it will be destroyed. Please note that the data collected is subject to the US Patriot Act because it is housed on a US-based web-survey provider.

There is the possibility that certain questions about lapses may cause you to feel emotionally uncomfortable. In this case, you may contact the researchers below to request information for appropriate resources to help with such discomfort.

You must be between the ages of 35 and 54 to participate in this study. Your participation is entirely voluntary and if at any time you wish to withdraw from the study, you may do so freely without penalty of any kind. **By clicking the 'Next Page' button, you indicate that you freely consent to participate in this study.** This means that you have been informed of the requirements of the research, understand that you have the opportunity to ask questions and discuss this study, and have been assured that your information will remain confidential. If you wish to withdraw from the study after submitting the questionnaire, please indicate to the researcher your intention to withdraw via email.

Your participation would be extremely helpful and greatly appreciated. If you have any questions about the survey or the nature of the study, please feel free to contact either of the investigators below. If you have concerns about the content of the questionnaire or the ethical conduct of the study, you may contact the Protocol Officer for Ethics in Research as indicated below.

Appendix E: Certificate of Ethical Approval

File Number: H06-12-01		Date (mm/dd/yyyy): 08/17/2012	
Université d'Ottawa Bureau d'éthique et d'intégrité de la recherche	University of Ottawa Office of Research Ethics and Integrity		
Ethics Approval Notice Health Sciences and Science REB			
Principal Investigator / Supervisor / Co-investigator(s) / Student(s)			
<u>First Name</u>	<u>Last Name</u>	<u>Affiliation</u>	<u>Role</u>
Bradley	Young	Health Sciences / Physiotherapy	Supervisor
James R.	Vallerand	Health Sciences / Human Kinetics	Student Researcher
File Number: H06-12-01			
Type of Project: Master's Thesis			
Title: Predicting Physical Activity Commitment and Lapses: A Comparison of Sport and Exercise Motives and Involvement Opportunities			
Approval Date (mm/dd/yyyy)	Expiry Date (mm/dd/yyyy)	Approval Type	
08/17/2012	08/16/2013	1a	
(1a: Approval, 1b: Approval for initial stage only)			
Special Conditions / Comments: N/A			
1 550, rue Cumberland 550 Cumberland Street Ottawa (Ontario) K1N 6N5 Canada Ottawa, Ontario K1N 6N5 Canada (613) 562-5387 • Téléc./Fax (613) 562-5338 http://www.research.uottawa.ca/ethics/index.html http://www.recherche.uottawa.ca/deontologie/index.html			

Appendix F: Online Questionnaire: Introductory Page

1. THANK YOU FOR YOUR INTEREST IN OUR RESEARCH	
Exit this survey	
	
Dear participant, We have received permission from your sport/exercise organization to ask you to consider taking part in a research study and we thank you for your interest in this research. This study is a Master's level thesis project with the School of Human Kinetics at the University of Ottawa looking at the effectiveness of aligning specific types of activity with participants' motivational needs. Upon completion of the study, you will have the opportunity to request a summary of the findings. The following online questionnaire will take approximately 20 minutes to complete and will ask questions relating to your various reasons for physical activity participation. This online survey is certified safe and secure and only the investigators will have access to your information. In accordance with the ethical procedures at the University of Ottawa, all the information you provide will remain confidential. When the final report is written, it will be done in such a way as to conceal the identity of all participants. Inferences will be based on information collected from group data and not from individual cases. Collected data will be used for analyses in the present study and will be kept on file for a period of ten years, after which it will be destroyed. Please note that the data collected is subject to the US Patriot Act. There is the possibility that certain questions about lapses in your exercise or sport routines may cause you to feel emotionally uncomfortable. In this case, you may contact the researchers below to request information for appropriate resources to help with such discomfort. You must be between the ages of 35 and 54 to participate in this study. Your participation is entirely voluntary and if at any time you wish to withdraw from the study, you may do so freely without penalty of any kind. By clicking the 'Next' button, you indicate that you freely consent to participate. This means that you have been informed of the requirements of the research, understand that you have the opportunity to ask questions and discuss this study, and have been assured that your information will remain confidential. If you wish to withdraw from the study after submitting the questionnaire, please indicate to the researcher your intention to withdraw by email. Your information will be removed from the study upon your request and destroyed. Your participation would be extremely helpful and greatly appreciated. If you have any questions about the survey or the nature of the study, please feel free to contact either of the investigators below via email. If you have concerns about the content of the questionnaire or the ethical conduct of the study, you may contact the Protocol Officer for Ethics in Research as indicated below. Thank you,	

Appendix G: Online Questionnaire: Demographic Information

2. Demographic Information

Exit this survey

1. Please indicate your sex:

☐ Male ☐ Female

2. Please indicate your date of birth:

MM DD YYYY

Date of birth: / /

3. Please indicate your area of residency:

City:

Province/State:

Postal/Zip Code:

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Appendix H: Online Questionnaire: SQUASH

3. Activity Involvement
Exit this survey



The following questions aim to determine your level of activity involvement for both sport and exercise purposes during an AVERAGE WEEK in the past months.

In column one(1), indicate the types of activities in which you regularly participated during an AVERAGE WEEK (e.g., running, weight lifting, hockey, aerobics, swimming, aqua-fit, yoga, etc.).

In column two(2), indicate whether you participated in each activity for sport and sport training purposes; or for exercise and exercise training purposes.

In column three(3), indicate the number of days per week you participated in each of the activities.

In column four(4), please indicate the average time per session you spent participating in these activities.

In column five(5), indicate your perceived level of effort/exertion for each of these activities as light, moderate or intense.

In column six(6), indicate the number of people with whom you typically did this activity, whom you considered to be a regular co-participant.

1. Name of activity	2. Type of activity	3. Days per week	4. Average time per session	5. Level of effort	6. Number of co-participants
	Activity type	# days/week	Hours Minutes	Effort level	
A)	A)	A)	A)	A)	A)
B)	B)	B)	B)	B)	B)
C)	C)	C)	C)	C)	C)
D)	D)	D)	D)	D)	D)
E)	E)	E)	E)	E)	E)

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Appendix I: Online Questionnaire: Formal Activity Participation Verification

4. Physical Activity

Exit this survey

We would now like you to specifically consider **STRUCTURED** or **ORGANIZED** physical activities.

Structured/organized activities often first require formal registration, enrollment or membership, which then allows individuals to pursue the sport, exercise, or active leisure activities that are offered at a given location, facility or venue.

These activities typically occur at advertised times or places and can include formal physical activity programs (i.e. spinning classes, swim club practice, etc.) but are not limited to formal programs as long as registration, enrollment or membership precede one's participation in the given activity.

1. What types of structured/organized physical activities are you currently registered for, enrolled in, or a member of?

☐ Sport Activities ☐ Exercise Activities ☐ Both (Sport & Exercise Activities) ☐ No Activities

2. Have you been registered for, enrolled in, or a member of a structured/organized physical activity for at least the past 8 weeks consecutively?

☐ Yes ☐ No

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Appendix J: Online Questionnaire: Lapses

5. Structured/Organized Physical Activities
Exit this survey

The following questions ask you to consider the STRUCTURED/ORGANIZED physical activities in which you have participated DURING THE PAST 8 WEEKS.

In column one(1), name the structured/organized physical activities in which you were registered, enrolled, or a member.
 In column two(2), indicate where each of these structured/organized physical activities have taken place (i.e., name of facility, venue or location of participation).
 In column three(3), indicate the average number of days per week in which you participated in each of these structured/organized physical activities within the past 8 weeks.
 In column four(4), indicate the number of weeks, within the past 8 weeks, in which your participation in each structured/organized physical activity was below the average days per week you have just indicated in column three(3).
 In column five(5), indicate the number of weeks within the past 8 weeks, in which you participated in zero(0) days of structured/organized physical activity per week.
 In column six(6), indicate if you are still currently registered for, enrolled in, or a member of each of these structured/organized physical activities.

1. Name of physical activities requiring registration, enrollment or membership:	2. Location, facility or venue of participation for each of these physical activities:	3. Average number of DAYS PER WEEK of participation: # of days/week	4. Number of weeks of BELOW AVERAGE PARTICIPATION within past 8 weeks: # of weeks	5. Number of weeks of ZERO days of participation within past 8 weeks: # of weeks	6. Are you still currently registered, enrolled, or a member? Status
A)	A)	A)	A)	A)	A)
B)	B)	B)	B)	B)	B)
C)	C)	C)	C)	C)	C)
D)	D)	D)	D)	D)	D)
E)	E)	E)	E)	E)	E)

For the following questions, consider all of the physical activities you listed in column one(1) above.

7. How much of an impact did your PERSONAL MOTIVATION have on these weeks of BELOW AVERAGE participation?

1 (No impact)

2

3

4 (Moderate impact)

5

6

7 (Complete impact)

8. How much of an impact did PERSONAL INJURIES or ILLNESSES have on these weeks of BELOW AVERAGE participation?

1 (No impact)

2

3

4 (Moderate impact)

5

6

7 (Complete impact)

9. In the past 8 weeks, identify the number of weeks where you did not participate in any days of structured/organized physical activity at all (i.e. complete weeks with no participation):

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Appendix K: Online Questionnaire: Self-Identification

6. Sporting and Exercising Identities
Exit this survey

1. To what extent is regular participation in physical activity a personal goal for you?

1 (Not at all a personal goal)	2	3 (Somewhat of a personal goal)	4	5 (Absolutely a personal goal)
☐	☐	☐	☐	☐

2. To what extent does regular participation in physical activity define you as a person?

1 (Does not define me at all)	2	3 (Somewhat defines me)	4	5 (Absolutely defines me)
☐	☐	☐	☐	☐

3. Do you generally consider yourself to be a sportsperson (i.e., someone who participates in sports)?

1 (Not at all)	2	3 (Somewhat)	4	5 (Absolutely yes)
☐	☐	☐	☐	☐

4. Do you generally consider yourself to be an exerciser (i.e., someone who participates in exercise)?

1 (Not at all)	2	3 (Somewhat)	4	5 (Absolutely yes)
☐	☐	☐	☐	☐

5. Based on the structured/organized physical activities in which you have participated during the past 8 weeks, please finish the following statement. I primarily consider myself to be a (select one):

☐ Sporting-type person
☐ Exercising-type person

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Appendix L: Online Questionnaire: Participatory Motives

7. Reasons for Participation in Physical Activities
Exit this survey

On the following pages are a number of statements concerning the reasons people often give when asked why they participate in structured/organized physically activities. Whether or not you are currently registered for, enrolled in, or a member of a structured/organized physical activity, please read each statement carefully and select the appropriate response for you personally.

We want to know why you personally choose to be physically active or might choose to be physically active, not whether you think the statements are good reasons for anybody to be active.

Please answer the following questions based on your primary activity context. If you are primarily a sportsperson, please consider your structured/organized sport and sport training activities. If you are primarily an exerciser, please consider your structured/organized exercise and exercise training activities.

1. Personally, I do physical activity ...

	1 (Not at all true for me)	2	3 (Somewhat true for me)	4	5 (Absolutely true for me)
To help me look younger	☐	☐	☐	☐	☐
Because I like trying to win in physical activities	☐	☐	☐	☐	☐
Because it makes me feel good	☐	☐	☐	☐	☐
To show my worth to others	☐	☐	☐	☐	☐
To give me goals to work towards	☐	☐	☐	☐	☐
Because my doctor advised me to be physically active	☐	☐	☐	☐	☐
To stay slim	☐	☐	☐	☐	☐
To have a healthy body	☐	☐	☐	☐	☐
To build up my strength	☐	☐	☐	☐	☐
To spend time with friends	☐	☐	☐	☐	☐
To stay/become more agile	☐	☐	☐	☐	☐
To avoid ill-health	☐	☐	☐	☐	☐
To give me space to think	☐	☐	☐	☐	☐
Because I enjoy the feeling of exerting myself	☐	☐	☐	☐	☐

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8. Reasons for Participation in Physical Activities
Exit this survey

Please answer the following questions based on your primary activity context. If you are primarily a sportsperson, please consider your sport and sport training activities. If you are primarily an exerciser, please consider your exercise and exercise training activities.

1. Personally, I do physical activity ...

	1 (Not at all true for me)	2	3 (Somewhat true for me)	4	5 (Absolutely true for me)
To help manage stress	☐	☐	☐	☐	☐
To improve my appearance	☐	☐	☐	☐	☐
To prevent health problems	☐	☐	☐	☐	☐
To compare my abilities with other peoples'	☐	☐	☐	☐	☐
To give me personal challenges to face	☐	☐	☐	☐	☐
To lose weight	☐	☐	☐	☐	☐
Because it helps to reduce tension	☐	☐	☐	☐	☐
To increase my endurance	☐	☐	☐	☐	☐
Because I find being physically active satisfying in and of itself	☐	☐	☐	☐	☐
Because I enjoy competing	☐	☐	☐	☐	☐
To help prevent an illness that runs in my family	☐	☐	☐	☐	☐
To help control my weight	☐	☐	☐	☐	☐
To have a good body	☐	☐	☐	☐	☐
To maintain flexibility	☐	☐	☐	☐	☐
To enjoy the social aspects of being physically active	☐	☐	☐	☐	☐
To avoid heart disease	☐	☐	☐	☐	☐
To recharge my batteries	☐	☐	☐	☐	☐
Because I find physical activity invigorating	☐	☐	☐	☐	☐
To gain recognition for my accomplishments	☐	☐	☐	☐	☐
Because I want to maintain good health	☐	☐	☐	☐	☐

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9. Reasons for Participation in Physical Activities
Exit this survey

Please answer the following questions based on your primary activity context. If you are primarily a sportsperson, please consider your sport and sport training activities. If you are primarily an exerciser, please consider your exercise and exercise training activities.

1. Personally, I do physical activity ...

	1 (Not at all true for me)	2	3 (Somewhat true for me)	4	5 (Absolutely true for me)
To help recover from an illness/injury	☐	☐	☐	☐	☐
To make new friends	☐	☐	☐	☐	☐
To stay/become flexible	☐	☐	☐	☐	☐
To feel more healthy	☐	☐	☐	☐	☐
To get stronger	☐	☐	☐	☐	☐
To develop personal skills	☐	☐	☐	☐	☐
To measure myself against personal standards	☐	☐	☐	☐	☐
To look more attractive	☐	☐	☐	☐	☐
Because I feel at my best when physically active	☐	☐	☐	☐	☐
Because I enjoy physical competition	☐	☐	☐	☐	☐
Because being physically active helps me to burn calories	☐	☐	☐	☐	☐
Because I find physical activities fun, especially when competition is involved	☐	☐	☐	☐	☐
To accomplish things that others are incapable of	☐	☐	☐	☐	☐
To release tension	☐	☐	☐	☐	☐
To have fun being active with other people	☐	☐	☐	☐	☐
For enjoyment of the experience of being physically active	☐	☐	☐	☐	☐
To develop my muscles	☐	☐	☐	☐	☐

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10. Reasons for Participation in Physical ActivitiesExit this survey

Please answer the following questions based on your primary activity context. If you are primarily a sportsperson, please consider your sport and sport training activities. If you are primarily an exerciser, please consider your exercise and exercise training activities.

1. Personally, I participate in physical activity because...

	1 (Not at all true for me)	2	3 (Somewhat true for me)	4	5 (Absolutely true for me)
I like to have something to do	☐	☐	☐	☐	☐
I want to be popular	☐	☐	☐	☐	☐
I like the coaches or instructors	☐	☐	☐	☐	☐
My parents or close friends want me to play	☐	☐	☐	☐	☐
I like to use the equipment or facilities	☐	☐	☐	☐	☐
I like the action	☐	☐	☐	☐	☐
I like to get out of the house	☐	☐	☐	☐	☐
I want to get rid of energy	☐	☐	☐	☐	☐

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Appendix M: Online Questionnaire: Involvement Opportunities

11. Involvement Opportunities
Exit this survey

The following statements are concerned with opportunities that individuals might get only from their involvement in their respective structured/organized physical activities that they cannot obtain elsewhere. Please read each statement carefully and indicate the extent to which you agree or do not agree with each statement.

We want to know whether you personally obtain certain opportunities from involvement in your structured/organized physical activities, not whether you think the statements are good opportunities for anybody to be involved.

Please answer the following questions based on your primary activity context. If you are primarily a sportsperson, please consider your sport and sport training activities. If you are an exerciser, please consider your exercise and exercise training activities.

1. My physical activity involvement...

	1 (Not at all true for me)	2	3 (Somewhat true for me)	4	5 (Absolutely true for me)
Gives me the opportunity to improve my physical skills	☐	☐	☐	☐	☐
Gives me the opportunity to gain commercial or job related benefits	☐	☐	☐	☐	☐
Gives me the opportunity to spend time with my spouse	☐	☐	☐	☐	☐
Gives me the opportunity to get publicly recognized for my achievements	☐	☐	☐	☐	☐
Gives me the opportunity to enjoy myself	☐	☐	☐	☐	☐
Gives me the opportunity to improve my health and fitness	☐	☐	☐	☐	☐
Gives me the opportunity to travel	☐	☐	☐	☐	☐
Gives me the opportunity to have a good time	☐	☐	☐	☐	☐
Gives me the opportunity to relieve any stress I am feeling	☐	☐	☐	☐	☐
Gives me the opportunity to be with my friends	☐	☐	☐	☐	☐
Gives me the opportunity to delay the effects of aging	☐	☐	☐	☐	☐
Gives me the opportunity to achieve my competitive goals	☐	☐	☐	☐	☐
Gives me the opportunity to spend time with my family	☐	☐	☐	☐	☐
Gives me the opportunity to do something exciting	☐	☐	☐	☐	☐

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Appendix N: Online Questionnaire: Commitment

12. Physical Activity Commitment
Exit this survey



The following questions are concerned with the levels of commitment people feel towards their involvement in their respective structured/organized physical activities. Please read each statement carefully and indicate whether or not you agree with each statement.

Please answer the following questions based on your primary activity context. If you are primarily a sportsperson, please consider your sport and sport training activities. If you are an exerciser, please consider your exercise and exercise training activities.

1. How dedicated are you to participating in your structured/organized physical activities?

1 (Not at all dedicated)	2 (A little dedicated)	3 (Sort of dedicated)	4 (Dedicated)	5 (Very dedicated)
☐	☐	☐	☐	☐

2. How hard would it be for you to quit participating in your structured/organized physical activities?

1 (Not at all hard)	2 (A little hard)	3 (Sort of hard)	4 (Hard)	5 (Very hard)
☐	☐	☐	☐	☐

3. How determined are you to keep participating in your structured/organized physical activities?

1 (Not at all determined)	2 (A little determined)	3 (Sort of determined)	4 (Determined)	5 (Very determined)
☐	☐	☐	☐	☐

4. What would you be willing to do to keep participating in your structured/organized physical activities?

1 (Nothing at all)	2 (A few things)	3 (Some things)	4 (Many things)	5 (Everything possible)
☐	☐	☐	☐	☐

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Appendix O: Online Questionnaire: Exiting Page

14. FINAL PAGE

Exit this survey

Thank you for participating.

1. Would you like to receive a summary of the results of this study once they are ready? Please answer yes or no.
(If yes, the summary will be sent directly to the email account that you provide to the researchers).

☐ Yes

☐ No

2. Our research at the University of Ottawa is ongoing. Would you be interested in being contacted to participate again at a later date? Please answer yes or no.

☐ Yes

☐ No

3. If you are interested in being contacted to receive a summary report and/or to participate in future research, please provide us with a valid email address in the box below. This email address will only be used for our research recruitment purposes and as such will remain confidential and will not be distributed to others.

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Done