Examining how specific involvement opportunities influence the sport commitment type of Masters swimmers: Differences in number, strength, and direction of associations to functional and obligatory commitment

Angela Bennett

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School of Human Kinetics

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University of Ottawa

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Abstract

This thesis aimed to: (a) design a factorially valid survey to assess sub-themes relating to 'involvement opportunities' (IOs), which are an antecedent variable in the sport commitment model (Wilson et al., 2004); (b) examine the placement of enjoyment alongside IOs in the sport commitment model; (c) determine the pathways (i.e., direct and/or indirect) by which specific IOs sub-themes affect functional and obligatory commitment and if they differ in number, strength and direction of association (Choosakul et al., 2009); and (d) examine differences between recent initiates compared to those who have been more continuously involved (Chu & Wang, 2012) in Masters swimming. Based on exploratory and confirmatory factor analyses of survey data from 725 swimmers (260 males, 465 females, *M* age = 50.5, range = 25-92), results confirmed a 10 factor solution of IOs sub-themes. Structural equation modeling demonstrated that the number, direction, and strength of associations between specific IOs sub-themes and commitment vary depending on commitment type, as do the nature of direct and indirect pathways affecting commitment. Invariance testing showed recent initiates and continuously-involved swimmers to be invariant across measurement and structural models. Overall, results support the need to measure and assess IOs at the level of the sub-theme and to consider a bi-dimensional (Santi et al., 2014; Wilson et al., 2004) sport commitment model.

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CHAPTER 1: INTRODUCTION

Physical activity has been identified as a crucial mediator in population health for the prevention and management of leading chronic diseases (e.g., Camões, Oliveira, & Lopes, 2011) and for the promotion of successful aging (Baker, Meisner, Logan, Kungl, & Weir, 2009). It is thereby deeply disconcerting that 45.2% of Canadians (Statistics Canada, 2012) and 43.2% of Americans (WHO, 2008) are considered inactive. Even when controlling for health status, physical activity has been shown to gradually decline across the lifespan with the greatest dropout occurring between adolescence and early adulthood (Tischer, Hartmann-Tews, & Combrink, 2011). Another concern is that nearly half of the participants who start a physical activity program are likely to dropout within the first three to six months in the absence of an appropriately tailored intervention (Dishman, 2001). The low activity levels and non-adherence trends draw attention to the need to understand what factors influence an individual's commitment to remain physically active throughout the lifespan.

Sport has been identified as a means to promote successful aging. Individuals who have participated in sport throughout the lifespan reported greater physical and psychological health, engagement in life, happiness, and overall well-being (Baker, Fraser-Thomas, Dionigi, & Horton, 2010). These benefits from sport participation are encouraging for successful aging and support the need to promote sport participation and adherence across the lifespan. There is one unique cohort of sport participants that counter the declining trend of participation across the lifespan – they are called Masters athletes. Masters athletes are individuals who are usually aged 35 and older, excluding swimming which starts at the age of 25, who understand that a regular pattern of engagement in physical activity or training is necessary to compete in competitive sport (Young & Medic, 2011a). Our understanding of sport participation continuity may be

further developed by examining the motives for sport participation and sources of sport commitment in this unique cohort.

The sport commitment model (SCM) provides a suitable framework to explore factors that attract adults to sport as it frames the conditions that facilitate "the desire and resolve to persist in a sport endeavour over time" (Scanlan, Russell, Beals, & Scanlan, 2003, p. 377). In addition, the model provides a holistic perspective to an individual's decision to or not to participate in a sport when there are a variety of alternative activities available (Weiss, Weiss, & Amorose, 2010; Young & Medic, 2011b). The model is unique as it was developed from social exchange and investment models as they pertain to the sport context, which particularly emphasize the benefits, costs, and satisfaction an individual experiences through his/her participation in sport (Carpenter & Scanlan, 1998; Weiss & Amorose, 2008). The model seeks to identify how six antecedent variables – enjoyment, involvement opportunities (IOs), personal investments, attractiveness of involvement alternatives, social constraints, and social support, predict an individual's commitment. In particular, we aimed to explore the predictive utility of IOs for fostering sport commitment in Masters swimmers (MSs) between the ages of 30 and 60. MSs were the target sample as the majority of research conducted with Masters athletes, in particular with a bi-dimensional sport commitment model, has been with swimmers.

In general, research has shown that the contribution of IOs to athletes' commitment has been inconsistent and that the assessment of IOs has sometimes been problematic (Carpenter & Scanlan, 1998; Weiss, Kimmel, & Smith, 2001; Wilson et al., 2004; Young, Piamonte, Grove, & Medic, 2011). There is however preliminary evidence that finding significant associations between IOs and commitment may depend on dividing opportunities into sub-themes and determining the relationships that various sub-themes have with commitment (Carpenter &

Coleman, 1998; Choosakul, Vongjaturapat, Li, & Harmer, 2009). In order to examine associations between IOs and sport commitment in this thesis, it was first necessary to develop a survey instrument that assesses opportunities at the thematic level instead of a collective grouping as has been traditionally done within the sport commitment research (e.g., Carpenter & Scanlan, 1998; Casper, Gray, & Babkes Stellino, 2007).

A major goal of this thesis was to develop a measurement instrument for IOs sub-themes in MSs and to understand the structure of measures that underlay broad and various opportunity sub-themes. The valid assessment of multiple IOs sub-themes is important especially because broader research on Masters athletes shows that they have wide and varied motives for remaining involved, that they see many benefits arising from their participation, and anticipate rewarding conditions from remaining involved over time (e.g., Dionigi, Baker, & Horton, 2011; Kolt, Driver, & Giles, 2004; Vallerand & Young, 2014). Measuring opportunities at the thematic level would permit us to identify which opportunities are most resilient with MSs so that the sub-themes and their measures could then be carried forward into subsequent research with this population to explore potential differences in the strength and direction of association of specific sub-themes to sport commitment and how they may vary by a broad range of demographics. Using extensive literature on sport commitment and participatory motives of Masters athletes as a guide, we first sought to divide an array of identified IOs by sub-theme and to explore and confirm the structure of these IOs sub-themes in Masters swimmers. Second, once the structure of IOs had been confirmed, we sought to examine the direction and strength of the association of specific opportunity sub-themes to sport commitment.

Although much research has effectively described why individuals choose to initiate or discontinue physical activity, less research has focused on differences in motives that drive the

adoption of sport participation, compared to those driving the retention of already-active athletes (Green, 2005; Salin, Virtuoso, Nepomuceno, Weiers, & Mazo, 2013). This is unfortunate especially because different mechanisms and criteria may underlie peoples' decisions to initiate sport participation versus others' decisions to maintain the activity (Green, 2005; Rothman, 2000; Rothman, Baldwin, & Hertel, 2004). Thus, we were also interested in determining whether the IOs that facilitate adult sport commitment in recent initiates are different than those that encourage commitment in adult sportspersons who have been more continuously involved. Knowing which IOs sub-themes promote commitment, as a function of participation status, might help practitioners tailor strategies to attract new athletes differently than they would promote and design programs to retain already active athletes.

CHAPTER 2: REVIEW OF THE LITERATURE

The Sport Commitment Model

The SCM was adapted from Rusbult and Farrell's (1983) investment model of commitment to explain an individual's desire and resolve to continue sport participation over time (Scanlan, Carpenter, Schmidt, Simons, & Keeler, 1993; Scanlan., Russell, Beals, & Scanlan, 2003). The theory proposes three forces that influence an individual's resolve to continue their sport participation: those that attract them to participate in an activity, those attracting them towards alternative activities, and those restraining (i.e., keeping) them within an activity (Scanlan, Carpenter, Schmidt et al., 1993). Attraction is represented by the determinant of *enjoyment*, activities attracting them away from an activity are referred to as *involvement alternatives*, and those restraining individuals within an activity are represented by *personal investments*, *social constraints*, and *IOs*. A more recent addition to the model (Carpenter, 1993) is the construct of *social support*, which acts as an attracting force and facilitates an individual's participation in an activity. Higher commitment is hypothesized to arise when there are greater levels of enjoyment, personal investments, social constraints, social support, and IOs, and lower levels of involvement alternatives.

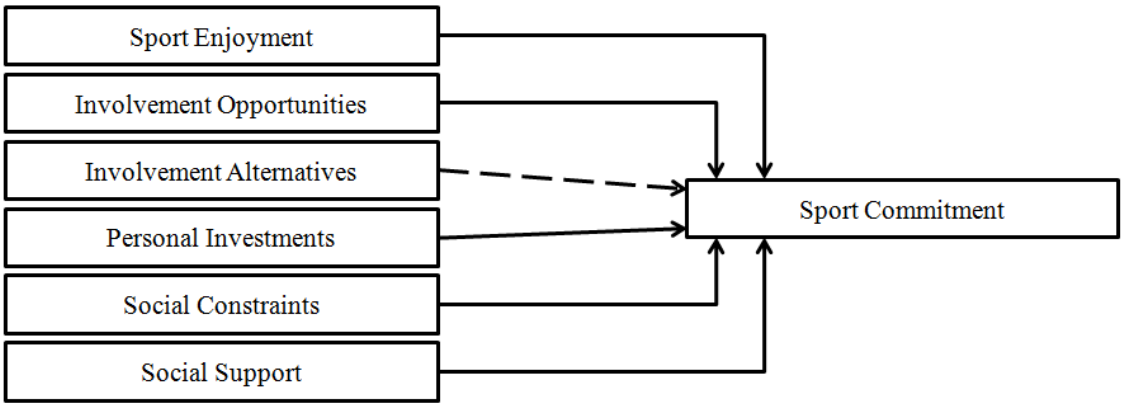

Figure 2.1. The sport commitment model hypothesizes six antecedents effecting an individual's sport commitment. Dashed lines represent hypothesized negative relationships.

Six antecedent variables are purported to explain sport commitment (see Figure 2.1). *Enjoyment* is consistently the strongest predictor of sport commitment and it refers to the positive affect and generalized feelings such as liking and fun (Scanlan, Carpenter, Lobel, & Simons, 1993). *Involvement alternatives* represent the attractiveness of alternative activities that are perceived to be more valuable or meaningful than continued participation in their current sporting activity. *Personal investments* are the resources invested in sport participation that are irretrievable upon discontinuation of the activity. *Social constraints* are the norm referenced feelings of expectation from others that foster a sense of obligation to continue participation. *Social support* is the "support and encouragement an athlete perceives significant others provide for his/her involvement in sport" (Scanlan, Russell, Beals et al., 2003, p. 379). *IOs*, which are a main focus of the current thesis, are the real or anticipated, valued opportunities which are afforded to an individual through continued participation in sport (Scanlan, Carpenter, Schmidt et al., 1993; Young & Medic, 2011a). IOs are expected to have a positive association with sport commitment.

Scanlan, Carpenter, Schmidt et al. (1993) originally theorized sport commitment as a single psychological construct that represents an individual's attachment to sport or his/her motivational force to continue sport participation over time. Past literature has on occasion demonstrated conflicting findings for antecedent variables where their relationships have been non-existent or opposite to the theorized direction of association (e.g., Choosakul et al., 2009; Weiss et al., 2010). Drawing from the broader motivational research, Wilson et al. (2004) tried to resolve these conflicting findings by proposing two distinct dimensions of commitment instead of a uni-dimensional commitment construct. Functional commitment (FC) is focused on an individual's enjoyment of the activity and the motivation to continue sport participation that arises when choices and the desire to continue are perceived as volitional and within an internal

locus of control – 'wanting to'. FC is thought to be a more adaptive and intrinsically motivating commitment type that may promote long-term commitment to participation in sport. Obligatory commitment (OC) arises when an individual experiences a sense of obligation that is derived from an external source of control or external rewards that propagates a 'have to' form of commitment. It is considered to be a less adaptive commitment type that, when not paired with higher levels of FC, may increase the risk of dropout from sport.

The model has some parallels to the self-determination theory (Ryan & Deci, 2000) as FC and OC are similar conceptually to intrinsic and extrinsic motivation (Gabriele, Gill, & Adams, 2011). Like intrinsic motivation, FC is centered on the volitional desire to participate that stems from the inherent enjoyment and interest of an activity while OC, like extrinsic motivation, is associated with non-autonomous behaviours that are propagated from the sense of obligation derived from external sources or rewards (Weiss & Amorose, 2008). Whereas self-determination theory focuses on the quality of an individual's motivation, the bi-dimensional SCM looks at the content of motivation. The two dimensions may provide a more complete picture of the motives underlying adult sport commitment and may aid in explaining inconsistent findings with respect to uni-dimensional commitment, as the antecedents may differ as a function of commitment type (Gabriele et al., 2011; Wigglesworth, Young, Medic, & Grove, 2012). Moreover, although increases in uni-dimensional commitment (which is almost the same as FC) fosters a long-term commitment orientation, the independent contributions of FC and OC have yet to been proven to link to perseverance and drop-out (withdrawal) behaviours, respectively, as might be predicted by parallel literature from self-determination theory.

Involvement Opportunities and Commitment

IOs are attraction forces that are hypothesized to be positively associated with sport commitment. Scanlan, Carpenter, Schmidt et al. (1993) originally defined IOs as "valued

opportunities that are present only through continued involvement" (p. 8). They have also been defined as "real or anticipated valued opportunities and benefits that are present only through continued sport involvement, such as the opportunity to be with friends, to travel, to become more skilled, or to achieve personal goals" (Young & Medic, 2011a, p. 168-169) and as "anticipated or expected benefits afforded from continued participation such as friendships, positive interactions with adults, skill mastery, travel, and physical conditioning" (Weiss & Amorose, 2008, p. 148).

IOs refer to a wide range of opportunities that are afforded to individuals through their sport participation. For example, in a series of interviews with Masters athletes, Dionigi, Baker and Horton (2011) identified opportunities relating to personal challenges, competing, winning, health and fitness, skill development, social comparison, travel, and companionship. Similarly, Kolt, Driver, and Giles (2004) identified social opportunities, fitness, recognition, challenge/benefits, medical (i.e. health), and involvement as motives for older adults to remain involved in sport. Hritz and Ramos (2008) also explored participatory motives in MSs and highlighted opportunities to travel (for stimulation, escape, and novelty) and to compete (social development, winning, and fitness) as primary motivators for participation in competitive sport. A possibly unique opportunity emphasized by Masters athletes is the opportunity to delay and negotiate aging. Dionigi (2006) conducted several interviews with older Masters athletes and found that sport was an outlet that permitted these individuals to differentiate themselves from stereotypes associated with aging. These athletes expressed a sense of pride that developed from maintaining health and physical activity levels in addition to remaining socially engaged in life.

Although broader literature on Masters athletes shows many unique opportunities, the IOs construct has almost exclusively been studied collectively (Casper & Andrew, 2008; Casper et al., 2007; Chu & Wang, 2012; Wigglesworth et al., 2012; Young & Medic, 2011a; Young et

al., 2011), meaning that a broad range of opportunities afforded through sport participation are measured and used as a collective average. When commitment is regressed upon as a collective average, however, it is possible that the potentially significant contributions of certain opportunity sub-themes (e.g., to travel through sport, to master skills) may be negatively suppressed or negated and rendered non-significant because they have been collated alongside less influential sub-themes (e.g., to achieve job-related benefits, to spend time with a spouse). Furthermore, it does not permit the identification of specific sub-themes that may best predict commitment, nor possible differences in direction of association.

Literature on Masters athletes has shown participatory motives to be broad and varied, and advocates for the need to consider IOs as constituent sub-themes. Recently, preliminary research explored the breadth of these motives and their associations to commitment. For example, Vallerand (2013) examined various IOs, using a combination of sport commitment and Exercise Motivation Inventory-2 (Markland & Ingledew, 1997) items, in a sample of Master athletes. Using an exploratory factor analysis, nine constituent sub-themes were identified – enjoyment, personal goals/challenges, strength and flexibility, health related, weight control, competition, social affiliation, stress relief, and appearance.

To better understand the breadth and variety of involvement opportunities, it was imperative to first conduct a review of the literature to identify published works that were related to sport commitment, sport commitment and Masters athletes, or participatory motives in Masters sport. Using PsychInfo and SportDiscus databases, an initial literature search was conducted for 'sport commitment', irrespective of the age of sport participants, which yielded 56 articles, published abstracts, and chapters. In addition, searches were performed using key words that included 'Masters', 'Masters athletes', 'Masters sport', 'adult', 'adult sport' in concert with various permutations of words such as 'commitment', 'sport commitment', 'involvement

Table 1.1

IOs Items, Examples, and Definitions Taken from Previous Sport Commitment Research by Theme

IOs sub-themes	IOs items examples	Studies
Enjoyment	good times; enjoyment; excitement; having fun; like; sensory/movement experiences/sensations	Carpenter & Coleman, 1998; Casper & Andrew, 2008; Casper et al., 2007; Casper & Scanlan, 1998; Medic, 2009; Newman, 2008; Scanlan, Carpenter, Lobel et al., 1993; Scanlan et al., 2003; Scanlan, Simons et al., 1993; Weiss & Amorose, 2008; Wigglesworth et al., 2012; Young et al., 2011
Recognition from Others	gaining recognition from significant others; winning/receiving trophies/awards	Carpenter & Coleman, 1998; Newman, 2008; Medic, 2009; Weiss, & Amorose, 2008; Scanlan, Carpenter, Lobel et al., 1993; Scanlan et al., 2003; Scanlan et al., 2009; Wigglesworth et al., 2012; Young et al., 2011
Establish and Develop Relationships	being with friends; friendships; making new friends; miss being considered/known as a (sport player); missing peers upon discontinuation; social interaction	Casper & Andrew, 2008; Casper et al., 2007; Casper & Scanlan, 1998; Carpenter & Coleman, 1998; Chu & Wang, 2012; Medic, 2009; Newman, 2008; Scanlan, Carpenter, Lobel et al., 1993; Scanlan, Carpenter, Schmidt et al., 1993; Scanlan et al., 2003; Scanlan et al., 2009; Scanlan, Simons et al., 1993; Waldron & Troupe, 2008; Weiss, & Amorose, 2008; Weiss & Weiss, 2007; Weiss et al., 2010; Young & Medic, 2011a; Young et al., 2011
Test and Assess Oneself	effort; goal achievement; personal accomplishment; personal challenge; skill mastery	Casper & Andrew, 2008; Chu & Wang, 2012; Dionigi et al., 2011; Medic, 2009; Newman, 2008; Scanlan, Carpenter, Lobel et al., 1993; Scanlan et al., 2003; Weiss, & Amorose, 2008; Weiss et al., 2010; Young & Medic, 2011a; Young et al., 2011
Health and Fitness	Fitness; physical appearance	Casper & Andrew, 2008; Medic, 2009; Scanlan, Carpenter, Lobel et al., 1993; Weiss, & Amorose, 2008; Young et al., 2011
Competition	challenge and competition; competitive achievement; winning	Carpenter & Coleman, 1998; Medic, 2009; Newman, 2008; Scanlan et al., 2003; Scanlan et al., 2009; Wigglesworth et al., 2012; Young et al., 2011
Team Attachment	affiliation; being on a team	Carpenter & Coleman, 1998; Scanlan, Carpenter, Lobel et al., 1993; Weiss et al., 2010
Stress Relief	psychological well-being; stress relief; tension release; to feel better	Medic, 2009; Young et al., 2011
Travel	tour/travel; unique experiences	Casper & Andrew, 2008; Casper et al., 2007; Scanlan, Carpenter, Lobel et al., 1993; Scanlan et al., 2003; Scanlan et al., 2009; Weiss & Weiss, 2007; Weiss et al., 2010; Wigglesworth et al., 2012; Young & Medic, 2011a; Young et al., 2011
Delay and Negotiate Aging	Health; physical appearance; staying in shape/fit; to delay the effects of aging	Medic, 2009; Scanlan, Carpenter, Lobel et al., 1993; Weiss, & Amorose, 2008; Young et al., 2011
Professional Prospects	career/job opportunities; commercial/financial	Scanlan et al., 2003; Scanlan et al., 2009; Wigglesworth et al., 2012; Young et al., 2011

opportunities', 'bi-dimensional commitment', 'want to commitment', 'have to commitment', 'functional commitment', 'obligatory commitment', 'motives', 'participatory motives', 'sport motives', 'participation', 'sport participation', 'long-term', 'short-term', 'drop-out', 'persistence', 'exercise', and 'longitudinal'. All returned items were inspected and secondary iterative searches were pursued after identifying suitable references. On the whole, the content of about 75 articles was inspected and appraised in terms of whether it contained information about identifiable opportunities that are afforded through Masters sport participation.

Based on this appraisal, we identified 11 IOs sub-themes that we believed captured broad and varied opportunities that are afforded through Masters sport participation (see Table 1.1 for the sub-themes and pertinent citations). To authenticate the sub-themes, the master's student researcher vetted the categories with an in-house, convenient expert (the thesis supervisor) on sport commitment and Masters' sport motivation, and further authenticated the categories by vetting them with two other master's student researchers who were also working on Masters sport commitment and participatory motivation. With these 11 sub-themes, we aimed to assess how well-defined and distinct these constituent IOs sub-themes were in relation to each other. Pending the establishment of factorial validity, we also sought to examine which specific sub-themes would be related to commitment.

Inconsistent Support for the Predictive Utility of Involvement Opportunities

Although IOs are expected to be positively related to commitment, research evidence supporting this association has been inconsistent. In some cases where IOs have been studied collectively, IOs have indeed emerged as a significant positive predictor of uni-dimensional sport commitment across a range of demographics (e.g., Alexandris, Tsorbatzondia, & Grouios, 2002; Casper & Andrew, 2008; Carpenter & Coleman, 1998; Casper & Babkes Stellino, 2008; Casper, Gray, & Babkes Stellino, 2007; Carpenter & Scanlan, 1998; Scanlan, Carpenter, Lobel et al.,

1993; Weiss et al., 2010). However, there have also been instances where the association between IOs and sport commitment has been non-significant (e.g., Zaharidas, Tsorbatzoudis, & Alexandris, 2006), or the inclusion of IOs has proven problematic. For example, Scanlan, Carpenter, Schmidt et al. (1993) found IOs to be a non-significant variable in a stepwise regression model predicting commitment, speculating that it was non-significant because of conceptual overlap with enjoyment.

In addition, there have been five instances where investigators dropped the IOs construct altogether from the study (Gabriele et al., 2011; Sousa, Torregrosa, Viladrich, Villamarín, & Cruz, 2007; Weiss et al., 2001; Weiss & Weiss 2007; Wilson et al., 2004). In an examination of the six antecedent variables of the sport commitment of fairly active exercisers recruited from various fitness clubs and campuses (M_{age} = 26.3 yrs; *SD* = 13.3; age range = 18-79), Gabrielle et al. (2011) stated that "due to the difficulties with the factor structure of the involvement opportunities construct, this construct was not used in subsequent analyses" (p. 421). Wilson et al. (2004) who studied the SCM with exercisers recruited from university campuses (M_{age} = 32.9 yrs; *SD* = 11.5; age range = 18-69) noted the "factorially complex and ambiguous" nature of IOs and suggested that these findings are due to:

> …the lack of item content clarity expressed in the Involvement Opportunity items which included aspects of social experience (e.g., "exercising gives me the opportunity to be with my friends") and positive feelings (e.g., "exercising gives me the opportunity to do something exciting") that conceptually overlap with both social support and satisfaction. (p. 416)

In light of this, Wilson et al. (2004) withheld the IOs variable from their ultimate analyses.

Weiss et al. (2001) examined youth tennis players and reiterated this idea, proposing that sport enjoyment may suppress IOs. Young and Medic (2011a) also addressed the possibility of

enjoyment washing out contributions of IOs in studies of MSs (M_{age} = 54 yrs; *SD* = 11.5; age range = 35-90), stating:

> …the real/anticipated opportunities that arise from sport involvement did not significantly predict functional commitment… after controlling for shared variance that might also be attributed to enjoyment or other predictors…. Contributions from involvement opportunities might be negated when participants respond strongly to items related to the perceived enjoyment determinants. (p. 174)

Weiss and Weiss (2007) studied youth female gymnasts and reported high collinearity between IOs and enjoyment and Sousa et al.'s (2007) study of young soccer players showed the IOs scale to have poor internal consistency reliability (alpha), leading to the IOs construct being dropped from these studies. Overall, difficulties encountered in previous research show the difficulties in isolating and examining the direct contribution of IOs collective contribution to sport commitment.

The inconsistent contribution of IOs to commitment may also relate to the fact that some important opportunity sub-themes items that may influence commitment have been averaged as part of a collective scale measure that includes items pertaining to less influential opportunity sub-themes. Preliminary evidence shows significant associations between IOs and commitment when different IOs are measured at the sub-theme level. Only two studies (Carpenter & Coleman, 1998; Choosakul et al., 2009) to date have explicitly examined the influence of specific sub-themes of IOs. Carpenter and Coleman (1998) examined how changes in the level of all the determinants of sport commitment over time affected scores on (uni-dimensional) sport commitment. The participants for the study were elite youth cricketers aged 9-17 years. The IOs determinant was divided into two sub-themes – social and recognition opportunities. Using change scores in a simultaneous multiple regression, recognition opportunities ($\beta = .40$, $p<.001$),

social opportunities (β=.25, *p*=.02), and enjoyment (β=.26, *p*=.008) were positively associated with changes in sport commitment over time. Interestingly, in a direct regression model, both IOs were stronger contributors than enjoyment, showing that enjoyment did not wash out the influence of IOs when they were assessed at the level of the opportunity sub-theme.

Findings also indicate that there are significant contributions of IOs when they are measured at the sub-theme level, but that the specific contributions depend on how enjoyment is placed in a model explaining commitment. Choosakul et al. (2009) examined the structural relationships among antecedent constructs, enjoyment, and (uni-dimensional) sport commitment in a youth sample (aged 12-18 years) participating at the Thai National Student Games. There were eight possible antecedents of commitment, including five of the established antecedents, perceived ability, and two specific IO sub-themes - social and recognition opportunities. They explored three different SCM configurations: the original (Scanlan et al., L.A., 2003), a mediational, and a direct/indirect model (Choosakul et al., 2009). The original model was a simultaneous multiple regression that attempted to predict how the level of sport commitment changes as a result of each antecedent of sport commitment when all other independent variables remain fixed (see Figure 2.2a). The mediational model attempted to explain the relationship between the independent variables (the antecedents of sport commitment, excluding enjoyment) and the dependent variable (sport commitment) through a third explanatory variable known as the mediator (enjoyment) (see Figure 2.2b). In the latter model (see Figure 2.2c), both direct and indirect pathways existed thereby attempting to independently explain variance in both enjoyment and sport commitment. In the direct pathway, all of the independent variables (the antecedents of sport commitment, excluding enjoyment) were tested for their direct association to the dependent variable (sport commitment), while the indirect pathway tested the indirect

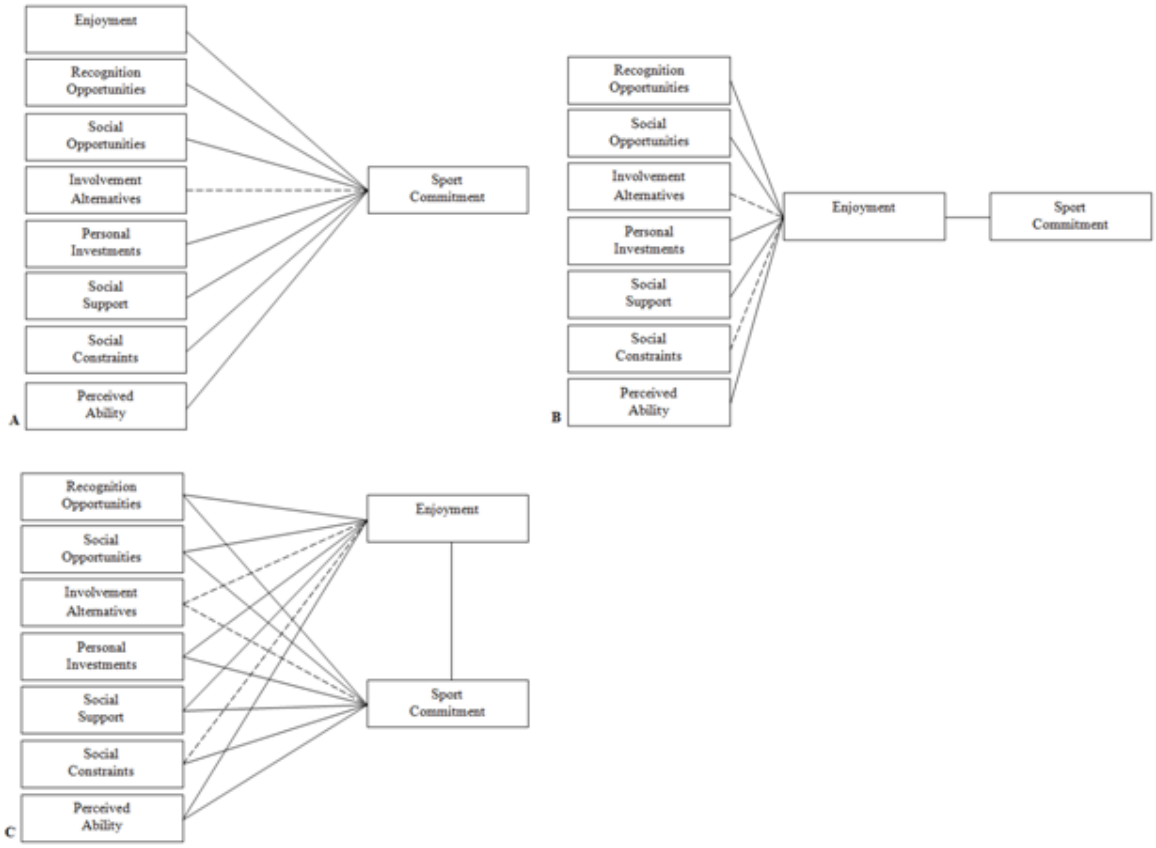

Figure 2. Three models explored by Choosakul et al. (2009): A) direct (original) model, B) indirect (mediational) model, and C) direct/indirect model. Solid lines represent a positive relationships dashed lines represent a negative relationship.

association of all the independent variables (the antecedents, excluding enjoyment) to sport commitment through a mediating variable (enjoyment).

The mediational and direct/indirect models were not found to be statistically superior to the original model; nevertheless, they provided an interesting insight into the relationships amongst SCM constructs. In the original model, enjoyment (*B*=.27) and recognition opportunities (*B*=.16) were each significantly associated with sport commitment, but social opportunities were non-significantly related. It is interesting to note that the results from the

mediational and indirect pathway differed from the original model. For the mediational model, social opportunities (*B*=.27) were significantly and indirectly associated with sport commitment through enjoyment (*B*=.65), while recognition opportunities were not. For the direct/indirect model, social opportunities were indirectly associated with sport commitment, while recognition opportunities were directly associated. Findings suggested that certain IOs sub-themes may explain unique variance in sport commitment, but that some sub-themes may do so independently of enjoyment of an activity, while other IOs may rely more strongly on the enjoyment of an activity to indirectly enhance sport commitment.

Previous Studies

Although helpful in understanding how IOs relate commitment, either directly, or indirectly through enjoyment, these studies did have some limitations. Firstly, the authors provided no examples or definitions to define the social and recognition opportunities constructs. It is necessary for each construct to be clearly and concisely defined in order to compare findings across studies. Secondly, these studies employed only two IOs sub-themes, yet the catalogue of possible IOs sub-themes that could be explored is likely to be far greater. Moreover, these studies only looked at youth populations and it would be expected that associations between opportunities and commitment may vary as a function of age (Young et al., 2011).

In sum, although IOs have been measured as a collective, the opportunities that attract adults to sport likely are diverse and comprise many sub-themes; these sub-themes may differ as a function of the sample and how they explain variance in sport commitment. The contribution of IOs to commitment has been somewhat inconsistent possibly because the content of prior IOs constructs has overlapped with items from other antecedents of the SCM, which may have ultimately weakened the direct associative strength of IOs to commitment. In particular, the enjoyment variable has been mentioned on several occasions as suppressing the influence of

either collective or constituent IOs sub-themes in a simultaneous regression to explain commitment. Finally, the contribution of IOs to commitment may be better exacted if analyses consider: (a) contributions from clearly identified IOs sub-themes; and (b) both direct and indirect (i.e., mediated) routes to explain commitment, as the contribution of certain IOs sub-themes may work indirectly through enjoyment.

Several researchers have advocated for the use of a direct/indirect SCM (Casper et al., 2007; Choosakul et al., 2009; Wilson et al., 2001). Moreover, the use of a direct/indirect model to understand the contribution of IOs has also been supported in a study of adult tennis players (Casper et al., 2007). Although they used a collective measure, the IOs construct was associated both directly ($\beta = .44$) and indirectly through enjoyment ($\beta = .49$) to sport commitment. Like prior researchers, we planned to use a direct, an indirect, and a direct/indirect model to examine which IOs sub-themes may be partially mediated by enjoyment and those that may be directly associated with sport commitment. Gaining a better knowledge of which IOs heighten enjoyment is important because enjoyment has repeatedly been the most significant predictor of commitment at all ages (Carpenter & Coleman, 1998; Choosakul et al., 2009; Scanlan, Carpenter, Schmidt, et al., 1993; Weiss et al., 2001; Wigglesworth et al., 2012; Young & Medic, 2011a; Young et al., 2011).

The typical guideline given to adult sport programmers and sport recruiters is to try to maximize levels of enjoyment in your offerings to adult participants. Although likely correct, this guideline is somewhat abstract and unhelpful because it does not specify the opportunities, occasions, or anticipated rewarding conditions that will maximize enjoyment (Young, Callary, & Niedre, 2014). In order to understand how to maximize enjoyment (and commitment), it is important to look at the salient IOs sub-themes – testing an indirect and a direct/indirect model for sport commitment becomes important in this regard. Unlike the concept of enjoyment,

knowing about specific IOs sub-themes may more tangibly help inform programming and recruitment strategies for adult sport (Young et al., 2014). IOs are something within the control of an organization through program design and implementation to the general adult athletic community (Young et al., 2014) and are aspects that can be advertised (Gallagher & Updegraff, 2012; Latimer et al., 2010) to both existing and new adult sport recruits (Lithopoulos, Rathwell, Mathews, & Young, 2013).

Involvement opportunities and types of commitment. When testing and clarifying the strength and direction of association of IOs sub-themes, it is important to consider the type of commitment (FC or OC) that is being predicted. Proponents of the bi-dimensional model contend that antecedent variables such as IOs should have different relationships with each commitment type, either in direction or strength of association (Wilson et al., 2004; Wigglesworth et al., 2012). Associations between IOs (studied collectively) and bi-dimensional commitment types have been equivocal. IOs have on occasion been positively associated with OC, thereby suggesting that participants feel that they have to continue their sport participation or they would foreclose these opportunities (Wigglesworth et al., 2012; Young & Medic, 2011a) and in other instances have shown no relationship at all (Young et al., 2011). IOs have also been positively associated with FC (Wigglesworth et al., 2012), except amongst the oldest Masters athletes where there was an inverse association (Young et al., 2011), and even at times have had no significant association (Wigglesworth et al., 2012; Young & Medic, 2011a). The inconsistent findings may be related to how IOs were measured collectively and that enjoyment was not considered as a possible mediator for commitment.

Research has not specifically explored the relationship between IOs sub-themes and the two commitment types. This thesis intended to remedy this by exploring how various IOs sub-themes relate to each of FC and OC, and the role of enjoyment in these relationships. It was

reasonable to expect that specific IOs sub-themes may differ in the strength and direction of association dependent upon commitment type and that enjoyment of IOs may be a necessary precursor to increase FC as it is centered on the inherent enjoyment or wanting to continue an activity (Pelletier, Fortier, Vallerand, & Brière, 2001; Wilson et al., 2004). Using a bi-dimensional commitment model affords the possibility that certain associations may be mediated by enjoyment differently, depending on the commitment type, and therefore the bi-dimensional model was particularly pertinent for this thesis.

Involvement Opportunities and Length of Sport Participation

Although much research on physical activity has effectively described why individuals are motivated to participate in sport (e.g., Dionigi et al., 2011), less research has adequately explained the process of initiating (Stevenson, 2002) and sustaining (Chalip & Green, 1998) participation over time (Green, 2005). Understanding psycho-social conditions that sustain activity or continued commitment is important, especially because different mechanisms and criteria may underlie peoples' decisions to initiate sport participation versus others' decisions to maintain the activity (Rothman, 2000; Rothman et al., 2004). Therefore, it is reasonable to expect that the motives for participation in sport may also vary as one progresses through stages of activity, or as a function of length of participation in sport (Green, 2005). In general, little research has focused on differences between choices and motives that drive adoption of sport participation, and those that relate to retention of already-involved athletes. However, Green (2005) discussed differences in participant motivation between the recruitment (enlistment or registration to a sport) and retention (participation in the sport) stages of participation. Athletes who recently began their participation often began engaging in sport from sponsored recruitment (i.e., support and encouragement from significant others) or for the anticipated new relationships they may develop (Stevenson, 2002). Alternatively, athletes who were in the retention phase

often continued their participation for exhilaration, skill development, team affiliation, and fitness (Green, 2005). These findings suggest that opportunities that are afforded through sport participation may differ in value and importance as an individual's length of participation in a sport progresses. It would thereby seem feasible that programs could specifically tailor the promotion and content of their programs to attract new adult athletes differently than how they might tailor promotional content and programming to retain already-active athletes. The current study thus sought to explore whether the associations between certain opportunities sub-themes and commitment differ between people with a shorter length of participation and those with a longer length of participation through the framework of the SCM.

Past sport commitment research has either had large length of participation ranges (e.g., 6.7 - 22.4 years in Scanlan, Russell, Magya, & Scanlan, 2009) amongst participants or in some instances it has failed to document prior sport involvement (e.g., Wigglesworth et al., 2012) making it difficult to compare across studies and to compare psychosocial antecedents of commitment as a function of length of participation in sport. To our knowledge, only one study has investigated potential differences as a function of experience in the SCM. Chu and Wang (2012) conducted a study with university students who were participating in a Taiwan national college level dance sport competition. Athletes were divided into four groups of varying prior lengths of participation: < 1 year, 1-3 years, 3-5 years, and 6-10 years, and inspected their mean levels for all constructs of the SCM. With the exception of social constraints, group differences existed on all variables. As expected, those with 6-10 years of dance sport participation also reported higher levels of commitment than those with less than a year of participation. Enjoyment and IOs were significantly higher for participants with 1-3 years of participation than those with < 1 year. Counter-intuitively, no differences were identified between those with 3 or more years of participation compared to those with < 1 year or 1-3 years. One major limitation

to the study was that they used multivariate analyses of variance that utilize means instead of regression analyses to draw conclusions about the associations between each antecedent (especially IOs) and sport commitment for the respective participation duration groups. Additionally, the authors did not report scale measurements and failed to report mean values for each participation duration group. Further research with complete reported details on the population, the instruments, and appropriate statistical analyses is necessary to clarify the effect of length of participation. Despite the limitations, Chu and Wang (2012) preliminarily established that differences do exist between athletes with different durations (in years) of sport participation.

On the whole, there is insufficient research to understand how IOs relate to commitment as a function of current length of participation in sport. Therefore, what we hoped to identify through this study is if there are any differences in relationships between certain IOs sub-themes and sport commitment (e.g., Choosakul et al., 2009), as a function of participation duration. We were specifically interested in identifying whether differences exist in the IOs that predict commitment between recent initiates (MSs with less than one year of participation) and continuously-involved athletes (MSs who have been involved for more than one consecutive year). In doing so, our results may possibly inform practice by identifying IOs sub-themes that are essential for attracting recent initiates and retaining continuously-involved athletes in Masters sport.

Summary

The assessment of broad and varied IOs sub-themes was of particular interest in this study because traditional examinations of IOs as a collective have been difficult and findings inconsistent. The lack of discriminate validity has resulted in many studies dropping the IOs construct altogether. Thus, this thesis focused on the initial development and refinement of a

survey instrument assessing a full repertoire of IOs sub-themes in a sample of MSs. It also attempted to examine which of these IOs sub-themes were related to FC and OC, and whether enjoyment was a mediator of such relationships. Finally, we were interested in examining whether these relationships were any different for recent initiates to Masters swimming compared to more continuously-involved swimmers. The decision was taken to examine these relationships with analyses that did not involve the four other determinant variables in the SCM (i.e., social support, social constraints, personal investments, and involvement alternatives). As such, greater scrutiny could be focused on the interplay between IOs and enjoyment which was an important first-step in clarifying pathways by which IOs influence commitment. Once these pathways have been identified in an isolated model (i.e., IOs, enjoyment, FC, and OC), future research might consider how these pathways are altered by the inclusion of other determinants in a fuller SCM.

CHAPTER 3: OVERVIEW OF THE STUDY

Research Objectives

This thesis had three over-riding aims. First, we attempted to develop a survey instrument to assess multiple IOs sub-themes in MSs, to examine the initial validity of the factor structure of the instrument, and to confirm its factorial validity in a second sample of MSs. Initial items were created based on an extensive review of IOs items in prior sport commitment research as well as a review of content from Masters sport literature that related to IOs. Second, this thesis aimed to determine which of these valid IOs sub-themes associated most strongly with FC and OC and to determine whether these associations were direct in nature or whether they were mediated by enjoyment. Third, this thesis sought to examine differences in the significant contributions of specific IOs sub-themes as a function of length of participation by comparing recent initiates (< 1 year of continuous participation) and continuously-involved (> 1 year of continuous participation) swimmers.

Hypotheses

First, we expected to identify a minimum of eight IOs sub-themes that demonstrated construct validity through exploratory and confirmatory factor analysis. Second, we expected our structural equation modeling analyses to show that different IOs sub-themes will vary in the strength, direction, and pathway of association (i.e. direct and/or indirect) to different commitment types. As the research was exploratory in nature, and because no prior research had looked at IOs at the sub-theme level with a bi-dimensional model of commitment, specific hypotheses pertaining to the IOs sub-themes were not advanced. We did however predict that certain IOs sub-themes associated with FC (i.e., "wanting to") would be mediated by enjoyment, whereas this was not expected to be the case with OC (i.e., "having to"). Third, we expected the direct/indirect model to be the best fitting model that concurrently explained variance in

enjoyment and commitment. Finally, we expected that the associations of certain IOs sub-themes with each commitment type would vary depending on whether the swimmers are recent initiates or continuously-involved athletes.

Significance of the Study

The study was expected to be an important first-step in developing and refining measures for the sub-themes encompassed within the IOs construct in the SCM that may be carried forward into future research with Masters athletes in order to address past measurement difficulties. The regression and mediational analyses were expected to help clarify the pathway (i.e., direct and/or indirect through enjoyment) and the direction of associations, if any, between each IOs sub-theme and FC and/or OC. If the number, strength, and direction of association of IOs opportunities varied by commitment type, it would help explain past equivocal findings in the sport commitment literature. If results were to demonstrate differences in the pathway/associations between certain IOs sub-themes and FC, compared to those for OC, this might have implications for the utility of the bi-dimensional commitment model. Finally, by comparing the number, strength, and type of IOs sub-themes that are associated with each commitment type as a function of an individual's length of participation in sport, we may be able to infer which IOs best increase commitment for recent initiates and continuously-involved athletes, respectively. These differences could then be emphasized in sport programs to encourage athletes to commit (i.e., to attract) and to heighten the commitment (i.e., to retain) already active MSs.

CHAPTER 4: METHODOLOGY

Participant Recruitment

Organizing committees and governing bodies were contacted to gain consent prior to data collection (see Appendices A-D). Athletes were recruited online by e-mail or through social media by club and organization representatives of the Fédération Internationale de Natation, Masters Swimming Canada, United States Masters Swimming, and local swimming clubs. Participants who approached our booth at the 2013 European Masters Championships were also invited to participate in our study. All participants voluntarily participated and the study protocol was granted ethics by the University of Ottawa's Research and Ethics Board (see Appendix E). A total of 892 Masters athletes, aged 25-92 years, completed the survey.

Participants were screened for several inclusion criteria: (a) they must have been formally registered in a swimming club or event within the past 12 months; (b) they must have recognized to at least a moderate degree that training or practicing is necessary in order to compete (Young & Medic, 2011a); (c) been at least 25 years of age; and (d) had identified swimming as their current primary sport. Following initial screening, a total of 725 participants (260 males, 465 females, M_{age} = 50.53 years, *SD* = 13.08, age range: 25-92 years) were retained.

For Manuscript 1 (this thesis), we planned to conduct exploratory and confirmatory factor analyses. These analyses require large sample sizes with at least five participants per survey item (total items = 65; total required participants per analysis = 325; Costello & Osborne, 2005; Polit, 1996). Recommendations call for larger sample sizes for exploratory processes associated with factor structure, thus, four hundred participants were randomly used for the exploratory factor analysis, while only 325 were randomly retained as a hold-back sample for the confirmatory factor analysis. All participants from 25-92 years of age were used in analyses

pertaining to factor structure in Manuscript 1, with the goal of maximizing our sample sizes for purposes of conducting exploratory and confirmatory steps.

For Manuscript 2 (this thesis), where we planned to test pathways between IOs, enjoyment, and types of commitment, we employed the same sample as in Manuscript 1, but elected to only use participants aged 30-60 years of age. This decision to constrain the sample to this age range was taken to best reduce the possible effect of age (Young et al., 2011) while still being conscientious of the minimum number of participants necessary to perform structural equation analyses. After screening for age, a total of 534 participants remained (175 males, 359 females, Mage = 46.99 years, SD = 8.61, age range: 30-60 years). Finally, the participants used for invariance analyses in Chapter 5 (this thesis) were the same as in Manuscript 2.

Survey Measures

Participants were asked to complete an online questionnaire about demographic information pertaining to sex, age, nationality, marital status, family, ethnicity, employment, and education (see Appendix G). Next, they were asked to respond to questions pertaining to their sport involvement, time spent preparing/practicing/training, and current primary sport. Athletes were asked to identify their length of participation as a Masters athlete and the length of time since their most recent interruption to participation that they had been continuously involved in sport and ultimately used this information to determine their status as recent initiates and continuously-involved athletes. The preparation/practice/training measure was used to assess the degree to which MSs acknowledged that their routine of physical activity was explicitly preparing them for upcoming competitions and the extent to which they recognized that a regular pattern of engagement is necessary for them to compete (see Appendix H). These two facets have been described as defining characteristics of Masters athletes (Young, 2011).

Sport commitment items. Measures were taken from the Elsevier Online Repository of Supplemental Materials from the Young and Medic (2011a) study of sport commitment on MSs. Fifteen items specifically assessed sport enjoyment (4 items), FC (6 items) and OC (5 items) (see Appendix J). *Sport enjoyment* (items 1-4) items assessed an individual's positive affective responses to sport (e.g., "I really like participating in my sport"). *FC* (see items 23-28) items assessed an individual's volitional desire to continue participation over time (e.g., "I am dedicated to keep doing my sport"). *OC* (see items 29-33) items assessed an individual's sense of obligation that they feel to continue their participation (e.g., "I feel forced to continue my sport involvement"). These items have demonstrated validity by confirmatory factor analysis by Wilson et al. (2004) and reliability and validity from the initial SCM research by Scanlan, Carpenter, Schmidt et al. (1993) and Scanlan, Carpenter, Schmidt et al. (1993). All items were measured on a scale from '1' *not at all true for me* to '7' *very true for me*, with a middle anchor '4' *somewhat true for me*, in order to compensate for possible ceiling effects observed in previous literature.

Involvement opportunities items. In reviewing the sport commitment literature from our literature review (see Chapter 2, this thesis), in both texts and journals, we pulled IOs items, statements, and examples from 18 different sources pertaining to youth and adults, recreational and elite athletes, and a variety of team and individual sports. Moreover, these items were complemented by items and themes from 12 studies on participation motivation literature on Masters sport and Masters athletes. This literature was also reviewed to inform the variety of anticipated opportunities and benefits that adult sportspersons, and swimmers, might possibly expect to be derived from sport participation. In keeping with recommendations for exploratory factor analyses, three items at minimum were used to assess each IOs sub-theme (Tabachnick & Fidell, 2013). As a result of this literature search and synthesis of IOs sub-themes, we arrived at

an original survey with 65 IOs items representing 11 sub-themes (see Appendix K). These items were vetted by an in-house, convenient expert on Masters sport motivation and sport commitment, and before a panel of three graduate student researchers currently working in the field of Masters sport motivation. The section of questions on IOs was prefaced to have MSs consider opportunities that arose from their continued participation that they personally valued (see Appendix I). Participants responded to each statement on a 7-point Likert scale that ranges from '1' *not at all true for me* to '7' *very true for me*, along with middle anchor '4' *somewhat true for me*.

The opportunity for enjoyment included four items (see items 16-20) meant to assess the prospect of good times (Carpenter & Coleman, 1998; Casper & Andrew, 2008; Casper et al., 2007; Scanlan, Carpenter, Lobel et al., 1993; Weiss, & Amorose, 2008; Young et al., 2011), excitement (Newman, 2008; Weiss & Amorose, 2008; Young et al., 2011), enjoying oneself (Medic, 2009; Scanlan, Carpenter, Lobel et al., 1193; Scanlan et al., 2003; Vallerand, 2013; Wigglesworth et al., 2012; Young et al., 2011), and having fun (Medic, 2009; Scanlan, Carpenter, Lobel et al., 1993). The opportunity for enjoyment is intended to differ from the construct of enjoyment as items refer to the *anticipated* chance to experience sentiments of enjoyment from partaking in sport, while enjoyment typically is seen as the inherent feelings of liking that occurs while participating in or having participated in sport.

The opportunity for recognition from others included eight items (see items 21-28) intended to assess the possibility of a third party's acknowledgement of an individual's achievements, ability, and success compared to others. It is usually referred to as gaining recognition from significant others (Carpenter & Coleman, 1998; Hodge, Allen, and Smellie, 2008; Medic, 2009; Newman, 2008; Scanlan, Carpenter, Schmidt et al., 1993; Scanlan et al., 2003; Scanlan et al., 2009; Weiss & Amorose, 2008; Wigglesworth et al., 2012; Young et al.,

2011) or as receiving awards or trophies (Carpenter & Coleman; Scanlan, Russell, Wilson, & Scanlan, 1993).

The opportunity to establish and develop relationships comprised six items (see items 29-34) designed to assess opportunities to interact with others as well as acquisitions of these opportunities. Opportunities to interact with peers are usually described as the opportunity to be with friends (Carpenter & Coleman, 1998; Scanlan, Carpenter, Lobel et al., 1993; Young & Medic, 2011a; Young et al., 2011), for the development of friendships (Casper & Andrew, 2008; Casper & Scanlan, 1998; Medic, 2009; Newman, 2008; Scanlan et al., 2003; Scanlan et al., 2009; Weiss, & Amorose, 2008), for social interaction with others (not limited to friends) (Casper & Andrew, 2008; Chu & Wang, 2012; Henderson, Casper, Wilson, & Dern, 2012; Medic, 2009; Waldron & Troupe, 2008; Weiss, & Amorose, 2008), to spend time with family or significant others (Young & Medic, 2011a), being considered or known as a (sport) player (Casper et al., 2007; Medic, 2009; Scanlan, Carpenter, Lobel et al., 1993; Weiss, & Weiss, 2007; Weiss et al., 2010), and to miss peers upon discontinuation of participation (Casper & Andrew, 2008; Casper et al., 2007; Scanlan, Carpenter, Schmidt et al., 1993). The acquisition of these opportunities is usually identified as the opportunity to make new friends (Carpenter & Coleman, 1998; Henderson et al., 2012; Scanlan, Carpenter, Lobel et al., 1993; Scanlan, Carpenter, Schmidt et al., 1993; Weiss, W. M. & Weiss, M. R., 2008). The items encompassed within social opportunities are similar to the construct 'the need for relatedness' from the self-determination theory as individuals will seek out opportunities to interact and feel connected to others (Ryan & Deci, 2000).

The opportunity to test and assess oneself included eight statements (see items 35-42) that centered on self-referenced and mastery oriented opportunities. These opportunities have been described as effort (Newman, 2008; Scanlan, Carpenter, Lobel et al., 1993; Weiss, &

Amorose, 2008), personal goal achievement (Medic, 2009; Weiss et al., 2010; Young & Medic, 2011a), personal accomplishments (Chu & Wang, 2012), personal challenges (Dionigi et al., 2011; Newman, 2008; Scanlan, Stein, & Ravizza, 1989), and skill mastery (Casper & Andrew, 2008; Chu & Wang, 2012; Medic, 2011; Newman, 2008; Scanlan, Carpenter, Lobel et al., 1993; Scanlan et al., 2003; Weiss, & Amorose, 2008; Young & Medic, 2011a; Young et al., 2011).

The opportunity for health and fitness included six items (see items 43-48) meant to measure the perceived prospective impact that one's participation in sport has on one's physical and psychological well-being. It has been most commonly termed fitness (Casper & Andrew, 2008; Kolt, Driver, and Giles, 2004; Medic, 2009; Scanlan, Carpenter, Lobel et al., 1993; Young et al., 2011), physical appearance (Medic, 2009; Vallerand, 2013; Weiss & Amorose, 2008), and subjective health (Medic, 2009).

The opportunity for competition comprised seven statements (see items 49-55) that encompassed opportunities relating to goals that are other-referenced and that focus on outperforming others. In the literature, competitive themes have been described as challenge and competition (Carpenter & Coleman, 1998; Medic, 2009; Newman, 2008), competitive achievement (Medic, 2009; Scanlan et al., 2003; Scanlan et al., 2009; Wigglesworth et al., 2012; Young et al., 2011), and winning (Carpenter & Coleman, 1998; Medic, 2009; Newman, 2008).

The opportunity for team attachment included five items (see items 56-60) intended to capture the opportunity for social affiliation (Scanlan, Carpenter, Lobel et al., 1993; Weiss et al., 2010) and the sense of belonging to a team (Carpenter & Coleman, 1998). These items were intended to be different from social opportunities in that they were supposed to assess the unique social experience that arises from the team setting. Constituent items related to opportunities for the expression/experience of loyalty, devotion, and empathy that an individual has towards their team.

The opportunity for stress relief included six statements (see items 61-66) meant to assess the opportunity to reduce physical, mental, or emotional strain, tension, or anxiety through sport participation. It has been referred to as stress relief (Funk, Jordan, Ridinger, and Kaplanidou, 2011; Young et al., 2011), tension release (Medic, 2009), as well as the opportunity to feel better (Iwasaki & Schneider, 2003; Medic, 2009).

The opportunity to see new things or places and to experience new things (Casper & Andrew, 2008; Casper et al., 2007) in these places was embodied in four items meant to represent *the opportunity to travel* (see items 67-70) (Hritz & Ramos, 2008; Scanlan, Carpenter, Lobel et al., 1993; Scanlan et al., 2003; Scanlan et al., 2009; Weiss, W. M. & Weiss, M. R., 2007; Weiss et al., 2010; Wigglesworth et al., 2012; Young & Medic, 2011a; Young et al., 2011).

The opportunity to delay and negotiate aging included six statements (see items 71-76) that focused on the opportunity to look younger (Medic, 2009), to feel younger (Young et al., 2011), to delay the effects of aging, to defeat aging stereotypes (Baker et al., 2009; Dionigi, 2006; Horton, Baker, & Deakin, 2007; Young et al., 2011), and to be a good role model for aging (Medic, 2009; Stevenson, 2002).

The opportunity for professional prospects comprised four items (see items 77-80) designed to assess the economic and employment related gains stemming from participation in sport. These opportunities are usually referred to as career/job benefits (Scanlan, Russell, Beals et al., 2003; Scanlan et al., 2009; Wigglesworth et al., 2012; Young et al., 2011) and commercial/financial opportunities (Scanlan, Russell, Beals et al., 1993; Wigglesworth et al., 2012; Young et al., 2011).

Planned Analyses

Manuscript 1: Exploring and confirming the factor structure of the involvement opportunity sub-themes. We planned to first inspect the collected data for extreme values in kurtosis and skewness, multivariate kurtosis, outliers, and extreme values using Mahalanobis distance. We planned to proceed in three stages following recommendation by Garson (2010). The first stage consisted of an exploratory factor analysis (principal axis factoring; $N = 400$; SPSS v. 22) with a direct oblimin rotation using the 65 IOs survey items to identify distinct and parsimonious sub-themes. Principal axis factoring was expected to account for shared variance amongst the variables (IOs items) while identifying the minimal number of factors (IOs sub-themes) that explain the most variance within the greater latent construct of IOs. An oblique, obliminal rotation was used as it allows for factors to correlate which is expected as the factors (IOs sub-themes) are encompassed within the latent variable IOs. Additionally, an oblique rotation is considered to provide a more real-life solution and it does not artificially inflate values to ensure they are uncorrelated (Polit, 1996). If no distinct sub-themes could be identified through the exploratory factor analysis, then we would be able to assume that the IOs are highly related and should be measured collectively or that the measure developed to assess IOs needs to be revisited and refined. We planned to calculate Cronbach alpha scores to ensure that there was an acceptable level of internal consistency for each IOs sub-theme factor. After establishing sound structure and reliability of the various IOs sub-themes, the resultant sub-theme factors could be carried forward as variables for measurement model testing using structural equation modeling.

The second stage consisted of measurement model testing using structural equation modeling (AMOS v. 21; $N = 325$) to more rigorously test and refine the factor structures identified from the prior EFA (principal axis factoring). We planned to first inspect all data for

uni-variate and multi-variate skewness and kurtosis in AMOS. If non-normal data were evident, we planned to use bootstrapping and robust fit indices (Byrne, 2010). For the measurement model fitting, we intended to randomly divide the sample into two groups – a calibration sample and a cross-validation sample. Model fitting and model re-specification was expected to proceed with the first (calibration) group to further refine the factor structure of the IOs sub-themes. Model addition and trimming was guided by statistical fit indices (e.g., MIs and parameter change estimates) as well as conceptual considerations (Byrne, 2010; Garson, 2010). Once adequate fit could be demonstrated across multiple fit indices, we planned to forward the refined measurement model to a third stage for confirmatory factor analysis in the second independent (cross-validation) sample. Once the measurement model had been confirmed, we planned to conduct measurement model group invariance testing to ensure that the constructs are being measured the same across the calibration and cross-validation samples.

Manuscript 2: Structural equation modeling to test the relationships between IOs sub-themes, enjoyment, and commitment. The next set of planned analyses pertained to the structural paths between IOs sub-themes, enjoyment, and commitment. The independent variables were the IOs sub-themes (from the confirmed measurement model), the mediating variable was enjoyment, and the dependent variable was either FC or OC. For each commitment type separately, we intended to test three models: (1) a direct model where all IOs sub-themes and enjoyment directly predicted commitment, (2) an indirect model where the IOs sub-themes predicted commitment indirectly through the mediator enjoyment, and (3) a direct/indirect model where IOs sub-themes could directly and/or indirectly predict FC or OC, separately. We also planned to test a fourth model where IOs sub-themes concurrently could directly and/or indirectly predict FC and OC.

Chapter 5: Structural equation modeling to test for differences in relationships between recent initiates and continuously-involved swimmers. Finally, using structural equation modeling, we planned to perform tests for group invariance following recommendations by Byrne (2010) in order to identify any possible group (‘recent initiates’ vs. ‘continuously-involved’ swimmers) differences in the measurement model or structural model as a function of length of participation in sport.

MANUSCRIPT FOR STUDY 1: EXAMINING THE STRUCTURE OF INVOLVEMENT OPPORTUNITIES IN MASTERS SWIMMING: AN EXPLORATORY AND CONFIRMATORY FACTOR ANALYSIS

Examining the structure of involvement opportunities in Masters swimming: An exploratory and confirmatory factor analysis

Angela Bennett

University of Ottawa

Ottawa, Ontario, Canada

Abstract

Involvement opportunities (IOs) are a broad range of valued opportunities that are afforded only through continued sport participation. They are hypothesized to be positively associated with sport commitment. The purpose of this study was to develop and test the factorial validity of an IOs survey in Masters swimming. Seven hundred and twenty-five Masters swimmers (260 males, 465 females, *M* age = 50.5, range = 25-92) completed a survey initially comprising 65 items representing 11 IOs sub-themes. Data were randomly assigned to calibration (N = 400) and cross-validation (*N* = 325) samples. Analyses followed a three stage process (Byrne, 2010), involving principal axis factoring (Stage 1) and exploratory factor analyses using structural equation modeling (Stage 2) on the calibration sample, followed by a confirmatory factor analysis on the cross-validation sample (Stage 3). The identified structure derived from the calibration sample in Stage 2 demonstrated adequate model fit, $\chi^2(986)=1998.1$; RMSEA=.051 (.048-.054); CFI=.90, which was confirmed in Stage 3 results for the cross-validation sample, $\chi^2(985)=1916.3$; RMSEA=.054 (.051-.057); CFI=.90. Results confirmed a valid survey comprising 47 items representing 10 IOs sub-themes paralleling past research titled the opportunity: for *Personal Pursuits;* for *Stress Relief;* to *Delay and Negotiate Aging;* for *Team Attachment*; for *Professional Prospects*; to *Travel*; for *Recognition from Others for Competitive Achievements*; to *Establish and Develop Friendships*; for *Health and Fitness*; and for *Enjoyment*.

Keywords: Sport Commitment, Involvement Opportunities, Masters Athletes

Examining the structure of involvement opportunities in Masters swimming: An exploratory and confirmatory factor analysis

Individuals may commit to an activity and may continue to remain invested in the activity because of special rewarding conditions, valued experiences, and expected benefits that they would forfeit should they cease participation (Rusbult, 1980; Rusbult & Farrell, 1983; Scanlan, Carpenter, Schmidt, Simons, & Keeler, 1993). The sport commitment model (SCM; Carpenter & Scanlan, 1998; Scanlan, T.K., Russell, Beals, & Scanlan, L.A., 2003) proposes that this is the case for sport participation, and the construct of involvement opportunities (IOs) has been consistently advanced as a variable attracting individuals to continue sport. The inclusion of an IOs variable in the SCM borrows from early non-sport studies of commitment where models sought to explain peoples' resolve to remain attached to a job or a romantic relationship. For example, Rusbult and Farrell (1983) spoke to IOs as rewards that may be afforded to individuals through their ongoing commitment to their employment, with opportunities to gain more autonomy, to achieve higher pay, and to experience more job task variety as rewarding conditions that would increase one's commitment to their current job position. In explaining commitment to romantic relationships, Rusbult (1980) described how individuals considered rewards derived from their relationships, and whether these rewards were in line with their highly valued, expected outcomes from being in a relationship. Similarly, in sport, IOs have been defined as the "valued opportunities that are present only through continued involvement" (Scanlan, Carpenter, Schmidt et al., 1993, p. 8) and as "anticipated or expected benefits afforded from continued participation such as friendships, positive interactions with adults, skill mastery, travel, and physical conditioning" (Weiss & Amorose, 2008, p. 148).

Discussion of the IOs construct often has related to a wide variety of activities or occasions that arise in sport. Various researchers in sport commitment have discussed this construct as encompassing a broad range of opportunities that may include, but are not limited to the opportunity to: enjoy oneself (e.g., Scanlan, Carpenter, Lobel, & Simons, 1993); relieve stress (e.g., Medic, 2009); spend time with friends (e.g., Casper & Andrew, 2008), a spouse, or family (e.g., Young & Medic, 2011a); improve one's skills (e.g., Weiss & Amorose, 2008); travel through sport (e.g., Scanlan, T.K., Russell, Magyar, & Scanlan, L.A., 2009); and to delay or negotiate the effects of aging through adult sport activity (Baker, Fraser-Thomas, Dionigi, & Horton, 2010; Baker, Meisner, Logan, Kungl, & Weir, 2009). Indeed, in many instances, the discussion of IOs appears synonymous in breadth with discussions of personally meaningful participatory sport motives (Dionigi, Baker, & Horton, 2011) that can only be fulfilled through continued sport participation. Weiss, W.M. and Weiss, M.R. (2003), for example, renamed these opportunities as 'benefits' associated with participation and specifically drew from literature on participation motivation to derive multiple survey items relating to all the "positive things about gymnastics that make gymnastics fun" (p. 234). IOs may also be examined within the SCM where it is one of six antecedent variables that are hypothesized to explain variance in an individual's sport commitment.

IOs in particular are expected to positively associate with a sport participant's commitment, or his/her "desire and resolve to persist in a sport endeavour over time" (Scanlan et al., 2003, p.377). Although other antecedent variables positively associate with commitment (i.e., enjoyment, personal investments, social support, and social constraints), and negatively associate with commitment (i.e., involvement alternatives) in the SCM (Scanlan, Carpenter, Schmidt et al.,

1993), and in recent bi-dimensional models of sport commitment (Wilson et al., 2002), the focus of the present study is on measurement issues pertaining to IOs alone.

The Unrealized Contribution of Involvement Opportunities toward Sport

Although discussion of IOs relates to varied sub-themes and a breadth of content, the measurement of IOs has been simplistic. IOs have traditionally been assessed collectively. Early studies (e.g., Scanlan, Carpenter, Schmidt et al., 1993; Carpenter & Scanlan, 1998), and some recent ones (e.g., Casper, Gray, & Babkes Stellino, 2007; Weiss, W.M., Weiss, M.R., & Amorose, 2010), have used four survey items, each posed as rewarding experiences that would be lost if one were to quit sport. For example, the experience of missing one's coach, friends, the good times, and being a player would be measured as four separate items then taken as a collective average to represent the IOs concept. Recently, there have been efforts by researchers to select greater numbers of survey items to reflect more opportunities afforded by sport or opportunities believed to be highly pertinent to the cohort under study, yet the scores for these items are still aggregated and used as a collective average in subsequent regression analyses. For example, Casper et al. (2007) asked about the opportunities individuals would miss if they discontinued their sport participation. Although questions related to the loss of an athletic identity, friends, good times, and unique experiences, scores were averaged. Weiss et al. (2010) posed IOs questions that were related to travel, team affiliation, athletic identity, and goal achievement. In research on Masters swimmers (MSs), Young, Piamonte, Grove and Medic (2011) posed 14 questions about opportunities, including delaying the effects of aging, travel, health and fitness, professional opportunities, stress relief, recognition opportunities, and opportunities to spend time with family, amongst others, yet scores were aggregated and

collapsed as a scale average. Once collapsed, researchers usually discuss IOs as a single entity without considering the variety of themes encompassed within the construct itself.

Collapsing across varied IOs sub-themes and treating them as a collective may be problematic and may particularly undermine the contribution of certain IOs toward commitment. For example, Wilson et al. (2004) asked questions about six different opportunities, treated the scores collectively, and as a result of the lack of content clarity and a factorially ambiguous structure, IOs were dropped from the study altogether. They explained that because a couple of their IO items asked about positive affect and time spent with social others, their IOs scale overlapped with and was suppressed by two other antecedent variables in the model – enjoyment and social support. Similar problems have been encountered in preliminary analyses of IOs in other sport commitment studies (Scanlan, Carpenter, Schmidt et al., 1993; Weiss, Kimmel, & Smith, 2001; Weiss, W. M. & Weiss, M. R., 2007).

Inconsistent selection and collective measurement of IOs items create difficulties in comparing findings across studies and may account for equivocal findings in past research. When IOs are studied collectively, findings show that they sometimes demonstrate positive and significant associations with commitment (e.g., Carpenter & Scanlan, 1998; Casper et al., 2007; Weiss et al., 2010), while at other times there is no association at all (e.g., Weiss et al., 2001; Weiss, W. M. & Weiss, M. R., 2007; Scanlan, Carpenter, Schmidt et al., 1993). In more recent studies of bi-dimensional sport commitment, IOs have been positively associated with obligatory commitment, suggesting that participants feel that they have to continue in sport otherwise they will lose these valued opportunities (Young & Medic, 2011a; Wigglesworth, Young, Medic & Grove, 2012), but in other instances have shown no relationship (Young et al., 2011). IOs have also demonstrated a positive association with functional commitment in MSs (Wigglesworth et

al., 2012; Young & Medic, 2011a) except amongst the oldest Masters cohorts (Young et al., 2011).

The collective measurement and generic discussion of IOs is limited because it does not permit the identification of specific IOs sub-themes that may best foster commitment. Although the potential catalogue of IOs sub-themes is quite large and varied, almost no studies have explicitly examined sub-themes as they relate to commitment. There are preliminary results however in two sport commitment studies that suggest how IOs, when measured at the level of sub-themes, may exact significant and identifiably unique relationships with sport commitment (Carpenter & Coleman, 1998; Choosakul, Vongjaturapat, & Harmer, 2009). Carpenter and Coleman (1998) examined how changes in the determinants of sport commitment influenced commitment in youth cricketers. The IOs construct was divided into two sub-themes titled 'social' and 'recognition' opportunities. Recognition ($\beta = 0.40$) and social opportunities ($\beta = 0.25$) were both significant positive predictors of commitment over time. Choosakul et al. (2009) also explored these same two sub-themes with Thai youth athletes, focusing on their pathways to sport commitment. Whereas recognition opportunities were directly and significantly associated with sport commitment, social opportunities were indirectly associated with sport commitment through the mediating variable for 'enjoyment'. These findings highlighted the need to explore IOs at the level of sub-themes as social opportunities were associated with the enjoyment of the activity, while recognition opportunities were relatively independent of enjoyment to increase overall sport commitment.

In sum, results derived from collective measures of IOs have not strongly confirmed the role of IOs towards sport commitment. The lack of factorial validity for IOs measures and the assessment of IOs collectively, rather than as sub-themes, may explain the underestimated

contribution of this construct to commitment models. To better understand the role of IOs, and to better exact its potential contribution towards commitment, there is a need to first develop an instrument that can validly measure IOs at the sub-theme level. Thus, this study sought to develop an instrument that captured the breadth of IOs available through sport participation, to explore their underlying factor structures in MSs, and to confirm them in a second sample of participants. The purpose of the current was to develop and refine a tool that may be used in future research to measure IOs at the level of the sub-theme and to explore the unique contribution of each sub-theme to sport commitment.

Why Study Involvement Opportunities in Masters Swimmers?

From a practical perspective, researchers in the domain of competitive adult sport have called for more attention towards IOs sub-themes and how they are measured. For example, knowledge of the most salient IOs sub-themes might inform specific aspects of adult sport program design and implementation, as well as coaching practice (Young, Callary, & Niedre, 2014), and specific IOs sub-themes may be effectively advertised to new adult sport recruits to increase sport registration (Lithopoulos & Young, 2013). Masters athletes, usually aged 35 and older, are a population of particular interest as they are one of the fastest growing sport populations, increasing in attendance and frequency of large scale sporting events (Baker et al., 2010). To date, most research in Masters sport with the sport commitment model has focused on Masters swimming, which starts at the age of 25, and thus, we have elected to use past literature on MSs as the foundation for this study. In order to capitalize on the potential of IOs for recruitment and retention of MSs, it is first necessary to develop a scale that validly assesses the breadth of IOs thereby providing researchers and stakeholders the opportunity to move the discussion of IOs from a generic perspective to a discussion of specific, constituent sub-themes.

Current Purpose

The purpose of this study was therefore to develop an instrument grounded in the sport commitment literature that may be used to measure IOs at the thematic level. Specifically, the goal was to explore the structure of a survey pertaining to various IOs sub-themes, and to then confirm its factorial validity using two samples of MSs.

Method

Participants

Initially, 892 individuals were recruited at the 2013 European Masters Aquatics Championships and electronically through clubs and national swimming associations in Canada and the United States of America. Letters of approval were provided to organizing committees and governing bodies to gain consent to contact participants. Participants were recruited via e-mail to club representatives, club newsletters, social media, and by those who approached a survey booth in-person at the 2013 European Masters Aquatics Championships in Eindhoven. All individuals voluntarily participated and protocol was approved by the ethics committee at the University of Ottawa.

Once individuals completed the survey, they were screened for several inclusion criteria: they must have identified swimming as their current primary sport, they were at least 25 years of age, and had been formally registered in a club or participated in a competitive event within the past year. Athletes also had to recognize to at least a moderate degree the need to regularly train/practice in order to compete. Following screening, a total of 722 participants (259 males, 463 females, M_{age} = 50.53 years, SD = 13.08, age range: 25-92 years) were retained for analytic purposes. A total of 60.6% of participants were from the United States, 21% were from Canada, with the remainder hailing predominantly from European countries, the United Kingdom, or

Australia. Participants were highly educated, with 83.1% of the sample reporting at least an undergraduate university degree and 12.6% acknowledging professional trade/technical vocational training. They represented various competition levels, with 44.9% acknowledging competing provincially, 43% nationally, and 27.4% internationally. Most swimmers reported five or more years of participation in Masters swimming (69.4 %), whereas 11.5% reported three to four years, and the remainder less than three years. Over the previous 12 months, participants reported an average of 5.7 (*SD* = 6.1) competitions or races and spent an average of 10.9 months (*SD* = 2.1) over the previous year involved in swimming. Of these months, an average of 7.3 months (*SD* = 3.3) were reported as heavy months of involvement and 3.8 months (*SD* = 3.0) were light involvement. In a heavy month, participants engaged in an average of 10.1 hours (*SD* = 6.5) of training and 6.9 hours (*SD* = 5.0) in a light month. Finally, swimmers reported high levels of necessity and importance with respect to sport training (*M* = 6.3, *SD* = 1.1). The initial dataset was randomly divided into two groups for subsequent analyses. The first group consisted of 400 participants (142 males, 258 females; M_{age} = 51.11, *SD* = 12.47, age range: 25-92) which we hereafter refer to as the *calibration sample*. The second group consisted of 322 participants (117 males, 205 females; M_{age} = 49.95, *SD* = 13.8, age range: 25-89), which we refer to as the *cross-validation sample*.

Survey Measures

Participants completed survey measures relating to demographics (e.g., age, sex, nationality, education level) and details of sport involvement (e.g., weekly and monthly involvement in both heavy and light months of training, years of participation, and competition level). Perceptions of the necessity and importance of training were assessed by asking participants to respond to three Likert-scale items pertaining to the maintenance of a consistent

training routine in order to prepare to compete in events (e.g., 'I need to regularly train to get myself ready for my sport competitions'; 'It is important for me to maintain a consistent training routine if I wish to attend Masters sport competitions'; 'I need to regularly train to get myself ready for competitions'). Each of these statements were anchored at '1' *not at all true*, '4' *somewhat true*, and '7' *very true*. To be included in our data, participants had to rate at least two of the items as a '4' or higher, which we believed satisfies one of the defining characteristics of a Masters athlete, that is, they understand that regular pattern of engagement and training is necessary in order to compete (Young & Medic, 2011).

Involvement opportunities scale. The IOs survey items were compiled from information relating to involvement opportunities derived from the sport commitment literature, sport commitment and Masters sport literature, and literature on participatory motives in Masters sport. Using PsychInfo and SportDiscus databases, an initial literature search was conducted for 'sport commitment', irrespective of the age of sport participants, which yielded 56 articles, published abstracts, and chapters. In addition, searches were performed using key words that included 'Masters athletes', 'Masters sport', 'adult sport' in concert with various permutations of words such as 'commitment', 'involvement opportunities', 'motives', 'sport motives', 'participation'. All returned items were inspected and secondary iterative searches were pursued after identifying suitable references. On the whole, the content of 75 articles was inspected and appraised by the principal investigator in terms of whether it contained information about identifiable opportunities that are afforded through Masters sport participation.

Based on these different studies, the principal investigator derived 11 distinct hypothesized sub-themes that represented opportunities (see Table 1 for the sub-themes and pertinent citations). These items were initially vetted for face validity with an in-house,

convenient expert (the current co-investigator) on research pertaining to Masters sport commitment and their sport motives. Next, the principal investigator catalogued existing survey items that have previously been used in sport commitment research to represent each sub-theme and, when necessary to ensure four items isolated on each sub-theme, created new survey items that borrow from themes and opportunities discussed in studies in the broader Master sport participatory motives literature. This process yielded an initial total of 65 items (see left-hand column in Table 2) across 11 distinct hypothesized sub-themes. To further authenticate the items and their respective categories, the principal investigator again vetted the content with the in-house convenient expert, and then further vetted the items with a panel of three master's student researchers who were also working in the domain of Masters sport commitment and motivation. The resultant items were to be used for subsequent exploration through a factorial analysis and structural equation modeling (SEM). As denoted in Table 2, 52 statements were prefaced with 'My sport involvement gives me the opportunity…' or 'Participating in my sport gives me the opportunity…' and 13 items statements had the preface 'If I discontinued/quit/stopped doing my sport, I would miss the chance/opportunity/occasion…'. Prior to responding, participants were given instructions to consider the opportunities that they personally valued and that could only be experienced through their continued involvement in their primary sport. All IOs items were measured on a 7-point scale anchored at '1' *not at all true for me*, '4' *somewhat true for me*, and '7' *very true for me*.

Planned Analyses

Analyses proceeded in three stages, following recommendations by Garson (2010) for establishing factorial validity. Using the calibration sample, Stage 1 consisted of an exploratory factor analysis (EFA; principal axis factoring with a direct obliminal rotation) in SPSS v.22 to

identify the minimal number of measured variables (IOs items) that explain the most total variance across parsimonious and distinct IOs sub-themes within the new instrument. Additionally, it permitted the identification and deletion of problematic items, identification of strongly loading items, and the conceptual splintering of IOs sub-themes that could be further explored in Stage 2. The purpose of Stage 2 was to rigorously test and refine the identified factor structure from Stage 1, for the same calibration sample, but this time as a measurement model using AMOS v.21. In Stage 3, data from the cross-validation sample were submitted to a confirmatory factor analysis (CFA) in an attempt to replicate the initial measurement model structure from Stage 2. A final additional analysis was conducted to test for measurement model group invariance between the calibration and cross-validation samples to ensure that the constructs were being measured the same across both groups.

Results

Preliminary Analyses and Descriptive Statistics

Each of the calibration and cross-validation datasets was inspected for missing values. Missing values analysis was shown to be negligible as no more than 1.7% (M = 0.35) of data was missing for any variable. As less than 5% of the data was missing (Tabachnick & Fidell, 2013), influences of missing data were not a concern. Missing values were thus imputed in each of the calibration and cross-validation samples using estimation maximization in SPSS v.22. Descriptive statistics of the observed variables for each of the calibration and cross-validation samples are presented in Table 2. Any value equal to or greater than 7 indicates departure from normality for univariate skewness and kurtosis (Byrne, 2010). Four items demonstrated instances of univariate kurtosis in total for both groups. Mardia's normalized coefficient (70.08)

also indicated that multivariate kurtosis was evident; thus, we followed Byrne's (2010) recommendation to use robust fit indices that are adjusted for kurtosis when inspecting model fit.

Stage 1: Exploratory Factor Analysis

Using the calibration sample, EFA (principal axis factoring) with oblique (direct obliminal) rotation was performed in SPSS v. 22 on the 65 initial items expected to represent 11 hypothesized sub-themes (see left-hand column in Table 2). Factor loading criteria included primary factor loadings of .40 or greater, no cross-loadings greater than .32, and a minimum difference of .20 between the primary loading and a cross-loaded value (Costello & Osbourne, 2005; Polit, 1996; Tabachnick & Fidell, 2013). Resultant factors were required to have a minimum of three items and possess Cronbach alphas of .70 or greater (Tabachnick & Fidell, 2013). We arrived at a final factor solution by applying these criteria on successive iterative analytic runs, and also retaining certain items for parsimonious reasons (Polit, 1996).

An iterative process of individually testing and removing item violations according to the factor loading criteria resulted in the removal of 11 items. Five items were removed due to cross-loading violations on two factors ('to give my best effort', 'to do something exciting', 'to improve my physical skills', 'to be considered an athlete', and 'to achieve my competitive goals'), while a sixth item was removed ('to feel better') because it cross-loaded on three factors: the opportunity to *Delay and Negotiate Aging,* for *Health and Fitness,* and for *Stress Relief.* The items 'to maintain my health' and 'to maintain my fitness', to 'compare myself against my peers in competition', 'to spend time with family', and 'to spend time with significant others' were removed as they loaded on independent factors with ultimately less than three items. The items 'to identify areas for personal improvement', 'to learn new things', 'to compete against others', 'to move to a higher level of competition', and 'to feel relaxed' had cross-loading values that

were within .20 of their primary loading; however, they were retained for parsimonious reasons, knowing that they would be subjected to a second more rigorous stage of exploratory analysis. Likewise, the items 'to enjoy myself', 'I would miss the good times I have had', 'to interact with other like-minded individuals', and 'to make new friends' were retained to maintain a minimum of three items per factor (Polit, 1996).

With consideration of the scree plot and Eigenvalues greater than 1 (Polit, 1996) a final 10-factor solution resulted (54 items), explaining 61.25 % of the total variance and comprising opportunity factors entitled the opportunity: to *Test and Assess Oneself;* for *Stress Relief;* to *Delay and Negotiate Aging;* for *Team Attachment*; for *Professional Prospects*; to *Travel*; for *Recognition from Others for Competitive Achievements*; to *Establish and Develop Relationships*; for *Health and Fitness*; and for *Enjoyment*. The factor loadings, percentages of variance explained, and Cronbach alphas are shown in Table 3. Thus, Stage 1 enabled us to eliminate clearly problematic items, to reduce the number of parameters being carried forward to SEM, and to identify the strongest loading item for each factor which would be helpful in restricting regression pathways from each latent factor to their respective indicator variable in the measurement model of Stage 2.

Stage 2: Exploring the Factor Structure Using Structural Equation Modeling

The 54 items and 10 identified factors retained in Stage 1 (Table 3) were carried forward into a second exploratory analysis and submitted as a measurement model in AMOS v.21 with the calibration sample. The measurement model allowed all observed items to load onto one latent factor, latent factors were permitted to co-vary, and one path from each latent variable to one observed variable (i.e., the strongest primary loading for that factor in the analysis in Stage 1) was constrained by assigning the value of '1'. The model was first estimated with maximum

likelihood estimation and model fit was determined using Chi-square (χ^2), Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), and Hoelter (.01) values.

Four outliers were removed based on Mahalanobis distance values (Byrne, 2010). The initial model fit was approaching good fit $\chi^2(1332, n = 396) = 3417.52$, $p < .001$, CFI = .855, RMSEA = .063 (.060-.065), $p < .001$, Hoelter .01 = 173. An iterative process was used to refine the measurement model by successively eliminating low loading estimates, adding error co-variances, and using a specification search to check for pathways to improve model fit. Model addition and trimming was guided by diagnostics (e.g., modification indices and parameter change estimates) as well as conceptual considerations (Garson, 2010). The measured variables 'to control my weight', 'to learn new things', 'for financial benefits', 'to feel relaxed', 'to receive attention from the media', 'to be a good role model for others on how to age gracefully or successfully', and 'to identify areas for personal improvement' were removed from the model as they had standardized estimates below .60, leaving 47 observed items. Modification indices were then used to successively add a total of three error co-variances between the measured variables 'to show my devotion to a team' and 'to be affiliated with a team', between 'to receive awards and trophies' and 'to be publicly recognized for my achievements', and between 'to delay the effects of aging' and 'to deter the effects of aging'. A specification search was performed and did not identify any further pathway modifications that would improve model fit.

After the aforementioned model re-specifications, we inspected model fit indices according to recommendations for three tests at minimum, including tests that consider diverse criteria suitable to the nature of our specific dataset (Garson, 2010). In particular, because Hoelter's statistic (.01 = 190) indicated that our sample size fell just shy of the preferred value of 200 (Garson, 2000), we inspected CFI and RMSEA fit indices because they are less sensitive to

smaller sample sizes (Byrne, 2010; Garson, 2010). The final model fit using maximum likelihood estimate was $\chi^2(1332, n = 396) = 2271.21$, $p < .001$, CFI = .902, RMSEA = .057 (.054 - .061), $p < .001$, Hoelter .01 = 190.

Although our χ^2 index was significant, it may be discounted should several other indices demonstrate adequate fit (Garson, 2010). Byrne (2010) instead recommended that a χ^2 to degrees of freedom ratio be inspected: the present model demonstrated a ratio of 2.03:1, meeting guidelines where fit is adequately demonstrated by a ratio that is between 2:1 and 3:1 (Garson, 2010). The CFI index surpassed the criterion (.90) for adequate fit (Byrne; Garson, 2010; Tabachnick & Fidell, 2013). The RMSEA value met criterion whereby values should be less than .08 to indicate adequate fit and less than .06 to indicate good fit (Tabachnick & Fidell, 2013). Moreover, our RMSEA value exhibited a tight confidence interval (Byrne; Garson, 2010; Tabachnick & Fidell, 2013), which is important because RMSEA tends to indicate poor fit when samples are small and to have wide confidence intervals when the sample size relative to the number of parameters is small (Byrne; Tabachnick & Fidell, 2013).

Finally, because of evidence for univariate and multivariate kurtosis, and in consideration of our smaller sample size, a maximum likelihood bootstrap analysis was performed along with complementary robust fit indices that were adjusted for the kurtotic distribution of the data (Byrne, 2010). Results were similar to findings obtained using standard maximum likelihood estimation. However, the Bollen-Stine bootstrap output in AMOS indicated that the model fit better in 1000 bootstrap samples, thereby indicating that the population data would fit the model better (Arbuckle, 2012; Garson, 2010). Robust fit indices were calculated for the final model using the lavaan statistical software package R (Rosseel, 2012). The final model Satorra-Bentler robust fit indices were $\chi^2(986, n = 396) = 1998.18$, $p < .001$, CFI = .908, RMSEA = .051 (.048 -

.054), $p = .30$. A non-significant *p*-close value for RMSEA indicates that the model is close fitting (Kenny, 2014). All standardized regressions and standard errors for the calibration sample are reported in Table 4. All inter-factor correlations were below .70 (see Table 5), with the exception of the opportunity to *Establish and Develop Friendships* and for *Team Affiliation* (.74).

We renamed the latent factor representing to *Test and Assess Oneself* as *Personal Pursuits* to better represent the items that remained after model refinements. Specifically, items focusing on the identification of areas to improve skills and to learn new things had been removed with the remaining items focused on the pursuit of self-related challenges and their accomplishment. In sum, the exploratory SEM in Stage 2 resulted in a total of 47 items and 10 latent factors that adequately fit the calibration sample data.

Stage 3: Confirming the Factor Structure of Involvement Opportunities

The final measurement model from the analysis in Stage 2 was used next in a CFA that employed the cross-validation sample. Inspection of Mahalanobis distance values indicated three outlying cases which were removed (Byrne, 2010). As in Stage 2, we inspected loading estimates, modification indices and parameter change estimates. The previous model from Stage 2 was confirmed in all instances, with one minor re-specification: modification indices suggested that an error covariance should be added to the model between 'to delay the effects of aging' and 'to defeat aging stereotypes' to reduce conceptual redundancy. This final model is shown in Figure 1. Standardized regressions and standard errors are reported in Table 4. To account for a small sample size (non-robust Hoelter .01 = 160) and to accommodate kurtosis, a maximum likelihood bootstrap analysis was performed (Byrne, 2010). The Bollen-Stine bootstrap indicated that the model fit better in all 1000 bootstrap samples, thereby indicating that the

population data would fit the model better (Garson, 2010). The final model Satorra-Bentler robust fit indices were $\chi^2(985, n = 322) = 1916.39$, $p < .001$, CFI = .906, RMSEA = .054 (.051 - .057), $p = .02$. All indices demonstrated adequate fit and the findings from Stage 2 were replicated. All inter-factor correlations, with the exception of the opportunity to *Establish and Develop Friendships* and for *Team Affiliation* (.73), were below .70 (see Table 5).

Measurement model invariance. The measurement model from Stage 3 was forwarded to test for group invariance simultaneously between the calibration and cross-validation samples using SEM. In invariance testing, the configural model represents the baseline model in which no parameters are constrained, that is to say that all parameters in the model are free to be estimated for each group independently. All subsequent comparisons are made in contrast to the configural model using maximum likelihood estimation techniques, to identify whether constraining sets of parameters to be equal across groups makes the model fit significantly worse (Byrne, 2010). Our configural model was systematically and increasingly constrained to be invariant across groups. Parameter constraints were accrued in the following order: 1) no constraints; 2) measurement pathways between latent factors and indicator variables; 3) error covariances; and 4) factor covariances (see Table 6). Significant group differences (i.e., between the calibration and cross-validation samples) are denoted by a significance level of $p < .05$ or when the change in CFI is greater than .01 (Byrne, 2010). These criteria were not reached at any step (i.e., for any group of parameters), thus, there were no significant group differences and thus the calibration and cross-validation samples may be considered invariant with respect to the final measurement model.

Discussion

The purpose of this study was to develop and validate an instrument grounded in the sport commitment literature that may be used to measure IOs sub-themes in the Masters swimming context. The findings of this study support the distinction of IOs at the level of the sub-theme in two separate samples of MSs.

Factorial Validity

The results of the EFAs and CFA provide preliminary support for the factor structure of IOs sub-themes with evidence of both convergent and divergent validity. It is necessary to establish convergent and divergent validity in assessments of factorial validity (Garson, 2010). Convergent validity is assessed by the degree to which indicator variables for a given scale are similarly and moderately to strongly associated or correlated with their respective latent variable, irrespective of the sample (Garson, 2010; Maroof, 2012). Both samples had evidence of convergent validity as all items loaded on a single factor with moderate, significant standardized regression weights above .63 and .60 for the calibration and cross-validation samples, respectively. Items pertaining to the opportunity sub-themes for *Team Attachment*, *Professional Prospects*, and to *Travel* demonstrated the strongest associations on their latent factor. The sub-themes for *Personal Pursuits*, *Recognition from Others for Competitive Achievements*, and *Enjoyment* opportunities were three latent factors demonstrating instances of somewhat weaker loading items (< .70) across both calibration and cross-validation samples. Although items representing *Delaying and Negotiating Aging* loaded adequately, error-covariance values, which suggest possible redundancy between observed items (Byrne, 2010), suggested that future work should examine the content overlap of two to three items.

Divergent validity is "demonstrated by showing that the indicator variables are better associated with their respective latent variables than they are with other latent variables" (Garson, 2010, p. 46). More specifically, discriminant validity is when there are acceptable inter-factor correlations and there are no cross-loadings between indicator items from latent variables other than their own (Garson, 2010). Results for both samples demonstrated divergent validity as there were no items in the final measurement models that cross-loaded on latent factors other than their own. In Stage 2, after performing all initial model re-specifications that were theoretically driven and guided statistically by modification indices, a purely statistically driven specification search was conducted in AMOS to ensure that no addition of cross-loaded pathways could be added to further improve the model. Furthermore, all inter-factor correlations in Stage 2 and Stage 3 were below .70 (Byrne, 2010), with the exception of the opportunity to *Establish and Develop Friendships* and for *Team Affiliation* opportunities that were correlated at .74 and .73 for the calibration and cross-validation samples, respectively. Although the two sub-themes surpass the recommended criterion of .70 (Byrne, 2010), it is not such a severe violation as to necessitate the merging of the two themes. Opportunities to *Establish and Develop Friendships* and for *team attachment* would be expected to correlate more strongly than other themes as they both consider the role of social agents, yet they can still be distinguished as distinct constructs both conceptually and statistically.

The measurement model also demonstrated measurement invariance across the calibration and cross-validation sample. This was important as measurement invariance provided evidence that the same constructs were being measured the same way, irrespective of the sample. This finding gave us further confidence in the factorial validity of the scale as it ensures that sub-themes are being measured the same way and that differences in participants'

responses are representative of population differences. In sum, the new instrument which we hereafter refer to as the Involvement Opportunities Scale (IOS) has demonstrated adequate factorial validity in two independent samples of MSs and has provided preliminary support for an instrument that is able to discriminately assess many IOs sub-themes. Finally, in terms of internal consistency reliability, nearly all latent factor scales demonstrated high Cronbach alphas of at least .81, with the one lower value for *Health and Fitness* opportunities still surpassing Nunally's (1978) criterion (>.70) for acceptance.

Capturing the Breadth of Involvement Opportunities Sub-themes

One of the justifications for this measurement study was to validate a survey instrument that might be useful in extending previous literature in the SCM to encompass a broader range of opportunities, assessed as distinctive sub-themes. Although sport commitment researchers have recently encouraged the assessment of sub-themes, only two prior studies had discriminated between identifiable IOs sub-themes at all, and even then, had only identified two sub-themes (Carpenter & Coleman, 1998; Choosakul et al. 2009) pertaining to youth sport. Our three-stage examination of a new IOS confirmed the factorial validity of the assessment of 10 IOs sub-themes, including the two sub-themes (the opportunity to *Establish and Develop Friendships* and for *recognition from others* for competitive achievements) paralleling those assessed previously (Carpenter & Coleman, 1998; Choosakul et al., 2009).

The 10 identified sub-themes correspond with dominant themes within motivation and sport commitment literature on Masters athletes. The opportunity to *Establish and Develop Friendships*, which are the opportunities to interact with others as well as the acquisition of these opportunities, and for *Recognition from Others for Competitive Achievements*, which refers to a third party's acknowledgement of an individual's competitive achievements, ability, and

successes compared to others, parallel themes that prior research has shown to be important to some Masters athletes (Dionigi et al., 2011; Gillett & Kelly, 2006; Henderson, Casper, Wilson, & Dern, 2012). *Personal Pursuits*, (i.e., the pursuit of personal challenges and goals and self-recognition of these accomplishments), *Travel* (i.e., the opportunity to see new things or places and to experience new things in these places), and *Team Attachment* (i.e., to be part of a team and for fellowship amongst teammates) were all opportunities sub-themes that were described by competitors at the World Masters Games (Dionigi et al., 2011). Opportunities for *Enjoyment* have previously been described with respect to anticipated benefits and valued outcomes that Masters athletes seek in their sport participation (Young & Medic, 2011b). *Professional Prospects* (i.e., economic and employment related gains) opportunities have been identified by young adult professional All-Black rugby players (Scanlan et al., 2003) and they appear to constitute a distinct sub-theme that can be validly assessed amongst Masters athletes. *Stress Relief* (i.e., the relief or reduction of tension; e.g., Răsădean, 2013), *Health and Fitness* (i.e., to improve health and fitness and how one looks and feels; e.g., Kolt, Driver, & Giles, 2004), and *Delay and Negotiate Aging* (i.e., to change the way in which an individual perceives he/she is aging; e.g., Baker et al., 2010; Dionigi, 2006) all represent opportunities that have been especially referred to as benefits or as valued expected outcomes sought through adult sport. Our validated measurement tool in the Masters swimming context supports calls for research (e.g., Young & Medic, 2011b) to consider more sub-themes in sport research on IOs, that is cohort-specific. The confirmation of the structure of these sub-themes enables the IOS to be utilized in future research to capture the breadth of IOs encompassed within the IOs construct of the SCM and to assess the contribution of each sub-theme on other important outcomes.

Limitations and Future Research

In the process of exploring the structure of IOs, many original items and possible sub-themes were lost that may warrant consideration in future research. Firstly, the items 'to improve my physical skills', 'to learn new things', 'to identify areas for personal improvement' and 'to give my best effort' that were all centered on learning or self-improvement were not retained beyond Stage 1, and thus did not appear in the eventual latent factor sub-theme entitled *Personal Pursuits*. The measurement of these themes warrant further investigation as they have been previously established as themes that are relevant to Masters athletes (Dionigi et al., 2011; Medic, 2009). Secondly, the opportunity 'to spend time with family' and 'to spend time with significant others' loaded together as an independent factor in Stage 1, yet lacked a third adjoining item to be treated as a sub-theme. This suggests that more personal relationships may be differentiated from opportunities to *Establish and Develop Friendships* in terms of the opportunities provided through sport participation. Young and Medic (2011a) found that the influence of social support on Masters swimmers' commitment could be distinguished depending on the proximity/intimacy of social agents, and future work may prove this to be the case for perceived social opportunities as well.

Thirdly, original items pertaining to opportunities to 'maintain' health and fitness failed to appear in the final model, yet appear to be differentiated from the concept of opportunities to improve health and fitness. The separation of these two themes may be related to the different wording of the items. The two maintenance items were loss framed, asking athletes if they would miss these opportunities if they discontinued their sport, while the improvement items were gain framed, asking if their sport participation afforded them these opportunities. Future research should consider re-examining the maintenance and improvement of health and fitness

while considering a balance between the framing of the questions in order to ensure that the two concepts are in fact distinct. Although a select few sub-themes may not have been captured in their fullest essence within the scope of this study, overall, the survey appeared to effectively capture a breadth of pertinent IOs sub-themes in the MSs cohort.

Our research provides an instrument that we believe captures a snapshot of the opportunities afforded to MSs as a whole. That said, we recognize that our initial inspection of the breadth and variety of sub-themes was based on an in-house review and vetting of information from what we believed to be pertinent studies. Although this process was thorough, it was limited in that an external panel was not used to authenticate the initial item pool, and other investigators in the domain of sport commitment and/or Masters sport may wish to suggest content (sub-themes) that were omitted. As the analyses used in the current study required a large sample size, we were not able to treat different age ranges in the sample, nor split the sample to examine moderators effectively. It would be naïve to assume that the IOs that are pertinent to MSs would be consistent across all demographics and as such, future research should consider investigating potential differences in the factorial structure of IOs as a function of age (e.g., Young et al., 2011), sex (Wigglesworth et al., 2012), and length of participation in sport (e.g., Chu & Wang, 2012). The next step would be to test the predictive validity of IOs for explaining sport commitment. In doing so, it would permit the identification of the variance in sport commitment that may be explained by IOs. Furthermore, one would be able to identify *which IOs sub-themes* are most strongly associated with commitment and those that continue to be significant predictors of sport commitment when entered alongside the remaining antecedents (i.e., social support, social constraints, enjoyment, personal investments, involvement alternatives) of sport commitment. It would also be prudent to test the pathway of IOs to

commitment while considering enjoyment as a potential mediator for some IOs sub-themes as past research has suggested that IOs may be washed out by an enjoyment determinant (e.g., Wilson et al., 2004). In addition, it would be necessary to test the predictive validity of IOs in a bi-dimensional SCM (e.g., Young & Medic, 2011a) as the strength and direction of associations may vary depending on functional or obligatory commitment. Although IOs conceptually are drawn from the SCM, there is the possibility that the IOS scale may have utility as an assessment tool beyond theoretically-grounded commitment studies. For example, future research may wish to use this survey instrument for marketing, advertising, and messaging (Lithopoulos & Young, 2013; Young, Bennett, & Séguin, in press). By identifying the opportunities that are most highly valued and rated, organizations could use this information to guide programming and marketing decisions to increase the attraction/commitment of athletes to their sport programs. Initial exploration into the branding of large scale sporting events yielded responses from participants that were similar to the IOs sub-themes identified in this study (Young et al., in press). Market research may be interested in exploring and defining the brand from the perspective of the various stakeholders involved which may provide novel insights and opportunities for investors. Another avenue of interest would be to explore differences between recent initiates, re-engagers, and continuously-involved adult athletes to better understand their preferred IOs, and to tailor promotional/recruitment programs according to these opportunities.

To conclude, our results confirmed the factorial validity of our survey instrument and showed its measurement invariance across two independent samples of MSs. The findings from this study confirmed that IOs could be divided at the level of the sub-themes and assessed distinctively. With the validation of the IOS, future studies may continue to explore opportunity

sub-themes within the sport commitment framework and identify potential differences in the perceived opportunities afforded through sport participation to different populations.

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Table 1

IOs Items and Examples Taken from Previous Sport Commitment Research by Theme

IOs sub-themes	IOs items examples	Studies
Enjoyment	good times; enjoyment; excitement; having fun; like; sensory/movement experiences/sensations	Carpenter & Coleman, 1998; Casper & Andrew, 2008; Casper et al., 2007; Casper & Scanlan, 1998; Medic, 2009; Newman, 2008; Scanlan, Carpenter, Lobel et al., 1993; Scanlan, T.K. et al., 2003; Scanlan, Simons et al., 1993; Weiss & Amorose, 2008; Wigglesworth et al., 2012; Young et al., 2011
Establish and Develop Friendships	gaining recognition from significant others; winning/receiving trophies/awards	Carpenter & Coleman, 1998; Newman, 2008; Medic, 2009; Weiss, & Amorose, 2008; Scanlan, Carpenter, Lobel et al., 1993; Scanlan et al., 2003; Scanlan et al., 2009; Wigglesworth et al., 2012; Young et al., 2011
Social Opportunities	being with friends; friendships; making new friends; miss being considered/known as a (sport player); missing peers upon discontinuation; social interaction	Casper & Andrew, 2008; Casper et al., 2007; Casper & Scanlan, 1998; Carpenter & Coleman, 1998; Chu & Wang, 2012; Medic, 2009; Newman, 2008; Scanlan, Carpenter, Lobel et al., 1993; Scanlan, Carpenter, Schmidt et al., 1993; Scanlan et al., 2003; Scanlan et al., 2009; Scanlan, Simons et al., 1993; Weiss, & Amorose, 2008; Weiss & Weiss, 2007; Weiss et al., 2010; Young & Medic, 2011a; Young et al., 2011
Test and Assess Oneself	effort; goal achievement; personal accomplishment; personal challenge; skill mastery	Casper & Andrew, 2008; Chu & Wang, 2012; Dionigi et al., 2011; Medic, 2009; Newman, 2008; Scanlan, Carpenter, Lobel et al., 1993; Scanlan, T.K. et al., 2003; Weiss, & Amorose, 2008; Weiss et al., 2010; Young & Medic, 2011a; Young et al., 2011
Health and Fitness	Fitness; physical appearance	Casper & Andrew, 2008; Medic, 2009; Scanlan, Carpenter, Lobel et al., 1993; Weiss, & Amorose, 2008; Young et al., 2011
Competition	challenge and competition; competitive achievement; winning	Carpenter & Coleman, 1998; Medic, 2009; Newman, 2008; Scanlan, T.K. et al., 2003; Scanlan et al., 2009; Wigglesworth et al., 2012; Young et al., 2011
Team Attachment	affiliation; being on a team	Carpenter & Coleman, 1998; Scanlan, Carpenter, Lobel et al., 1993; Weiss et al., 2010
Stress Relief	psychological well-being; stress relief; tension release; to feel better	Medic, 2009; Young et al., 2011
Travel	tour/travel; unique experiences	Casper & Andrew, 2008; Casper et al., 2007; Scanlan, Carpenter, Lobel et al., 1993; Scanlan, T.K. et al., 2003; Scanlan et al., 2009; Weiss & Weiss, 2007; Weiss et al., 2010; Wigglesworth et al., 2012; Young & Medic, 2011a; Young et al., 2011
Delay and Negotiate Aging	Health; physical appearance; staying in shape/fit; to delay the effects of aging	Medic, 2009; Scanlan, Carpenter, Lobel et al., 1993; Weiss, & Amorose, 2008; Young et al., 2011
Professional Prospects	career/job opportunities; commercial/financial	Scanlan, T.K. et al., 2003; Scanlan et al., 2009; Wigglesworth et al., 2012; Young et al., 2011

Table 2

Descriptive Statistics for 65 IOs Items along with Hypothesized Sub-themes for the Calibration and Cross-validation Samples

	Calibration sample (n = 396)				Cross-validation sample (n = 322)			
Items	*M*	*SD*	Skewness	Kurtosis	*M*	*SD*	Skewness	Kurtosis
Test and Assess Oneself								
I would miss the opportunity to challenge my personal best.[a]	5.77	1.60	-1.31	0.97	5.91	1.45	-1.39	1.28
To improve my physical skills.	6.48	0.83	-2.21	7.29	-	-	-	-
To identify areas for personal improvement.	5.16	1.65	-0.74	-0.15	-	-	-	-
To identify personal accomplishments.	5.75	1.40	-1.19	0.98	5.70	1.38	-1.07	0.66
To achieve personal goals.	5.96	1.29	-1.37	1.67	5.91	1.22	-1.07	0.73
To pursue personal challenges.	5.73	1.48	-1.31	1.25	5.72	1.42	-1.18	1.17
To learn new things.	5.18	1.73	-0.84	-0.08	-	-	-	-
To give my best effort.	6.30	1.00	-1.80	4.12	-	-	-	-
Stress Relief								
I would miss the chance to feel relaxed.[a]	4.95	2.05	-0.67	-0.85	-	-	-	-
To clear my mind.	6.29	1.13	-2.04	4.85	6.27	1.15	-2.13	5.56
To relieve stress I am feeling.	5.92	1.46	-1.49	1.72	6.00	1.40	-1.58	2.10
To put myself in a better state of mind.	6.24	1.10	-1.84	3.90	6.28	1.08	-2.02	5.07
To feel better.	6.33	1.01	-2.07	5.47	-	-	-	-
To release any tension I am feeling.	5.75	1.55	-1.36	1.23	5.86	1.46	-1.47	1.71
Delay and Negotiate Aging								
I would miss the opportunity to deter the effects of aging.[a]	5.52	1.75	-1.22	0.55	5.65	1.55	-1.18	0.81
To defeat aging stereotypes.	5.08	1.92	-0.84	-0.45	5.16	1.90	-0.87	-0.39
To be a good role model for others on how to age gracefully and successfully.	4.90	1.96	-0.66	-0.71	-	-	-	-
To delay the effects of aging.	5.46	1.71	-1.11	0.39	5.49	1.60	-0.97	0.22
To feel younger.	5.27	1.70	-0.94	0.07	5.27	1.63	-0.90	0.13
To look younger.	4.81	1.91	-0.54	-0.79	4.87	1.80	-0.53	-0.71
Team Attachment								
I would miss the chance to belong to a team.[a]	4.77	2.00	-0.57	-0.83	4.94	1.92	-0.64	-0.74
To feel like I am part of a team.	4.85	1.87	-0.52	-0.77	5.08	1.78	-0.69	-0.51
To show my devotion to a team.	3.94	1.92	0.05	-1.03	4.14	1.92	-0.11	-1.09
To be affiliated with a team.	4.34	1.92	-0.28	-1.01	4.60	1.93	-0.37	-1.01
For fellowship with teammates.	5.06	1.82	-0.69	-0.56	5.20	1.77	-0.85	-0.19
Professional Prospects								
I would miss the career/job opportunities afforded by my sport involvement.[a]	1.97	1.68	1.86	2.45	1.98	1.60	1.60	1.52

For financial benefits.	1.38	1.09	3.41	12.19	-	-	-	-
For career opportunities.	1.77	1.58	2.22	3.94	1.76	1.44	2.12	3.33
For job-related benefits.	1.66	1.42	2.60	6.22	1.70	1.48	2.33	4.60
Travel								
I would miss the occasion for unique travel experiences.[a]	3.79	2.17	0.12	-1.38	3.79	2.19	0.13	-1.39
To travel.	3.90	2.19	0.08	-1.38	3.92	2.16	0.07	-1.38
To tour new sites.	3.47	2.12	0.33	-1.24	3.32	2.08	0.42	-1.17
To visit new places.	3.80	2.18	0.14	-1.37	3.61	2.18	0.23	-1.37
Recognition from Others								
To be considered an athlete.	4.83	2.03	-0.57	-0.96	-	-	-	-
I would miss the occasion to be recognized for my accomplishments.[a]	4.29	1.90	-0.15	-1.05	4.18	1.96	-0.02	-1.19
To be known as a good athlete.	4.74	1.84	-0.53	-0.64	4.69	1.82	-0.42	-0.76
To demonstrate my ability to others.	4.38	1.87	-0.23	-0.98	4.39	1.93	-0.19	-1.14
To receive attention from the media.					-	-	-	-
To have my ability viewed favourably compared to other participants.	3.73	1.97	0.08	-1.10	3.76	2.07	0.11	-1.25
To receive awards and trophies.	3.23	1.99	0.41	-1.05	3.33	2.11	0.39	-1.21
To get publicly recognized for my achievements.	2.42	1.78	1.16	0.29	2.82	1.98	0.82	-0.57
Competition								
I would miss the chance to compare myself against my peers in competition.[a]	4.70	1.93	-0.44	-0.92	-	-	-	-
To compete against others.	4.81	1.83	-0.60	-0.54	4.78	1.88	-0.55	-0.76
To be a winner.	4.53	1.89	-0.31	-0.89	4.52	1.93	-0.27	-1.02
To establish new records relative to my peers in competition.	3.61	2.17	0.22	-1.33	3.81	2.23	0.11	-1.43
To achieve my competitive goals.	5.42	1.71	-1.01	-0.20	-	-	-	-
To move to a higher level of competition.	4.01	2.17	-0.10	-1.40	4.00	2.19	-0.05	-1.33
To surpass the expected level of competitive performance for my age group.	4.43	2.09	-0.36	-1.16	4.34	2.14	-0.29	-1.28
Establish and Develop Relationships								
I would miss my friends.	5.50	1.68	-1.04	0.14	5.58	1.63	-1.01	0.07
To interact with other like-minded individuals.[a]	5.83	1.40	-1.41	1.70	5.96	1.22	-1.13	0.57
To be with friends.	5.50	1.58	-0.95	0.11	5.57	1.54	-1.02	0.32
To spend time with family.	2.73	1.95	0.89	-0.38	-	-	-	-
To spend time with significant others.	2.84	2.15	0.78	-0.87	-	-	-	-
To make new friends.	5.30	1.53	-0.74	0.04	5.48	1.55	-0.94	0.23
Health and Fitness								
I would miss the opportunity to maintain my fitness.[a]	6.34	1.26	-2.56	6.79	-	-	-	-
I would miss the chance to maintain my health.[a]	6.16	1.38	-2.07	3.97	-	-	-	-
To improve my health.	6.49	0.85	-1.82	3.08	6.47	0.81	-2.11	7.14

To control my weight.					-	-	-	-
To improve my fitness.	6.58	0.82	-3.21	14.53	6.61	0.68	-1.85	3.24
To look and feel healthy.	6.42	0.94	-2.37	7.54	6.52	0.75	-2.21	7.29
Enjoyment								
I would miss the good times I have had.[a]	6.03	1.27	-1.60	2.82	6.07	1.29	-1.62	2.42
To do something exciting.	5.55	1.48	-0.93	0.36	-	-	-	-
To have a good time.	6.12	1.09	-1.46	2.47	6.20	1.01	-1.40	2.44
To have fun.	6.31	0.98	-1.72	3.97	6.26	0.97	-1.32	1.44
To enjoy myself.	6.44	0.82	-1.63	2.94	6.39	0.90	-1.62	2.75
Multivariate				545.02				428.23

Note. All items were preceded with 'My sport involvement/participation gives me the opportunity…' except [a] items were preceded with 'If I stopped/quit/discontinued my sport participation/involvement…'. Items that do not have a cross-validation sample value were removed in Stages 1 and 2 and were not used in Stage 3.

Table 3

Factor Loadings and Cronbach Alphas based on a Principal Axis Factoring Analysis with Oblimin Rotation for 54 Retained IOs Items

	Test and Assess Oneself	Stress Relief	Delay and Negotiate Aging	Team Attachment	Professional Prospects	Travel	Recognition from Others for Competitive Achievements	Establish and Develop Friendships	Health and Fitness	Enjoyment
% Variance Explained	23.29	33.60	40.71	45.79	50.41	53.65	56.32	58.30	60.09	61.25
To pursue personal challenges.	**.73**	.17	.14	-.12	.11	-.30	.39	-.02	.21	.22
To achieve personal goals.	**.72**	.13	.24	-.16	.16	-.24	.38	.00	.29	.30
I would miss the opportunity to challenge my personal best.	**.66**	.11	.22	-.14	.10	-.18	.36	-.10	.06	.24
To identify personal accomplishments.	**.61**	.18	.25	-.24	.15	-.24	.40	-.13	.34	.25
To identify areas for personal improvement.	**.58**	.29	.24	-.26	.21	-.39	.16	-.17	.34	.28
To learn new things.	**.50**	.22	.22	-.23	.25	-.28	.14	-.18	.22	.31
To relieve stress I am feeling.	.09	**.90**	.16	-.17	.10	-.12	-.02	-.23	.32	.37
To release any tension I am feeling.	.17	**.89**	.16	-.15	.11	-.12	.02	-.22	.34	.34
To put myself in a better state of mind.	.13	**.78**	.23	-.21	.12	-.12	.02	-.12	.39	.52
To clear my mind.	.18	**.69**	.14	-.12	.12	-.09	-.15	-.08	.24	.41
I would miss the chance to feel relaxed.	.14	**.54**	.32	-.04	.07	-.22	-.05	-.22	.18	.38
To delay the effects of aging.	.18	.17	**.87**	-.07	.15	-.08	.15	-.05	.45	.03
To look younger.	.14	.16	**.78**	-.14	.21	-.15	.34	-.12	.36	.02
To defeat aging stereotypes.	.18	.12	**.77**	-.22	.20	-.18	.18	-.13	.31	.14
To feel younger.	.28	.22	**.76**	-.20	.24	-.15	.34	-.17	.39	.16
I would miss the opportunity to deter the effects of aging.	.14	.21	**.72**	.02	.09	-.08	.07	-.08	.30	.12
To be a good role model for others on how to age gracefully and successfully.	.25	.17	**.58**	-.24	.24	-.19	.27	-.00	.22	.15
To be affiliated with a team.	.15	.10	.12	**-.92**	.22	-.19	.21	-.30	.10	.29
To feel like I am part of a team.	.16	.15	.10	**-.89**	.19	-.20	.12	-.40	.12	.36
To show my devotion to a team.	.20	.20	.18	**-.83**	.23	-.21	.20	-.29	.19	.26
I would miss the chance to belong to a team.	.15	.15	.13	**-.81**	.15	-.12	.11	-.42	.05	.30
For fellowship with teammates.	.10	.21	.09	**-.80**	.14	-.17	.08	-.59	.15	.42
For job-related benefits.	.09	.10	.14	-.13	**.91**	-.25	.18	-.06	.11	.12
Career opportunities.	.15	.13	.15	-.15	**.89**	-.28	.20	-.13	.08	.18

I would miss the career/job opportunities afforded by my sport involvement.	.16	.11	.23	-.23	**.83**	-.35	.20	-.09	.07	.10
For financial benefits.	.01	.03	.11	-.17	**.57**	-.19	.17	.08	.12	-.02
To visit new places.	.25	.13	.12	-.16	.32	**-.94**	.36	-.20	.12	.22
To travel.	.30	.16	.12	-.20	.30	**-.91**	.34	-.09	.13	.18
I would miss the occasion for unique travel experiences.	.26	.14	.18	-.20	.30	**-.87**	.39	-.20	.04	.20
To tour new sites.	.23	.10	.13	-.20	.35	**-.84**	.34	-.17	.10	.19
To have my ability viewed favourably compared to other participants.	.33	-.07	.15	-.18	.17	-.27	**.81**	-.03	.00	.04
To establish new records relative to my peers in competition.	.36	-.10	.17	-.20	.16	-.31	**.74**	-.04	-.04	-.00
To get publicly recognized for my achievements.	.20	.05	.21	-.07	.25	-.40	**.74**	-.09	.10	.01
To be a winner.	.34	-.08	.25	-.18	.17	-.26	**.72**	-.08	-.01	.05
To receive awards and trophies.	.19	.00	.13	-.16	.17	-.38	**.69**	-.04	.05	.08
To demonstrate my ability to others.	.41	.11	.21	-.23	.25	-.20	**.69**	-.14	.23	.15
To be known as a good athlete.	.39	.06	.38	-.20	.24	-.17	**.68**	-.14	.14	.18
To surpass the expected level of competitive performance for my age group.	.39	-.06	.18	-.12	.12	-.28	**.67**	.03	.08	-.01
I would miss the occasion to be recognized for my accomplishments.	.36	.09	.28	-.30	.23	-.30	**.65**	-.18	.02	.21
To compete against others.	.50	.03	.15	-.24	.19	-.37	**.63**	-.06	.16	.11
To move to a higher level of competition.	.46	.01	.13	-.19	.17	-.39	**.62**	.02	.04	.01
To receive attention from the media.	.07	.01	.15	-.08	.31	-.34	**.62**	-.07	.07	-.04
I would miss my friends.	.04	.23	.15	-.46	.14	-.19	.09	**-.86**	.15	.40
To be with friends.	.15	.28	.09	-.59	.10	-.23	.12	**-.83**	.20	.50
To make new friends.	.33	.34	.08	-.49	.20	-.34	.28	**-.64**	.24	.43
To interact with other like-minded individuals.	.25	.24	.33	-.48	.17	-.30	.14	**-.51**	.29	.32
To improve my fitness.	.19	.35	.27	-.11	.11	-.10	.02	-.12	**.75**	.28
To look and feel healthy.	.28	.33	.32	-.06	.08	-.10	.03	-.19	**.69**	.24
To improve my health.	.19	.24	.40	-.11	.13	-.06	.01	-.08	**.69**	.19
To control my weight.	.09	.26	.33	-.16	.09	-.12	.10	-.11	**.55**	.08
To have fun.	.30	.44	.10	-.33	.13	-.24	.10	-.34	.26	**.79**
To have a good time.	.26	.41	.12	-.33	.20	-.30	.09	-.29	.27	**.70**
I would miss the good times I have had.	.17	.30	.18	-.33	.12	-.21	.08	-.51	.13	**.70**
To enjoy myself.	.38	.45	.12	-.28	.13	-.18	.09	-.17	.26	**.63**
α	.82	.84	.88	.93	.88	.94	.92	.86	.71	.81

Table 4

Factor Loading and Error Variance Values from the Final Measurement Models of 10 IOs Sub-themes for the Calibration Sample in Stage 2 and the Cross-validation Sample in Stage 3

	Calibration Sample (n = 396)		Cross-Validation Sample (n = 322)	
Items	Factor Loading (β)	Error Variance	Factor Loading (β)	Error Variance
Personal Pursuits				
To pursue personal challenges.	.75	-	.83	-
To achieve personal goals.[1]	.80	.06	.86	.05
I would miss the opportunity to challenge my personal best.	.63	.08	.63	.07
To identify personal accomplishments.	.67	.07	.71	.06
Stress Relief				
To relieve stress I am feeling.[1]	.91	-	.88	-
To release any tension I am feeling.	.89	.04	.89	.05
To put myself in a better state of mind.	.78	.03	.76	.04
To clear my mind.	.68	.04	.80	.04
Delay and Negotiate Aging				
To delay the effects of aging.[1]	.87	-	.88	-
To look younger.	.81	.05	.76	.07
To defeat aging stereotypes.	.76	.05	.81	.06
To feel younger.	.79	.05	.78	.06
I would miss the opportunity to deter the effects of aging.	.69	.05	.70	.05
Team Affiliation				
To be affiliated with a team.	.89	-	.85	-
To feel like I am part of a team.[1]	.91	.04	.89	.05
To show my devotion to a team.	.82	.04	.78	.05
I would miss the chance to belong to a team.	.85	.04	.84	.05
For fellowship with teammates.	.83	.04	.85	.05
Professional Prospects				
For job-related benefits.	.90	-	.88	-
Career opportunities.[1]	.92	.04	.94	.05
I would miss the career/job opportunities afforded by my sport involvement.	.83	.05	.77	.06
Travel				
To visit new places.[1]	.96	-	.95	-
Me the opportunity to travel.	.89	.03	.89	.03
I would miss the occasion for unique travel experiences.	.87	.03	.87	.04
To tour new sites.	.88	.03	.87	.03
Recognition from Others for Competitive Achievements				
To have my ability viewed favourably compared to other participants.[1]	.80	-	.79	-
To establish new records relative to my peers in competition.	.76	.06	.81	.07
To get publicly recognized for my achievements.	.71	.05	.67	.06
To be a winner.	.74	.06	.78	
To receive awards and trophies.	.67	.06	.71	.07
To demonstrate my ability to others.	.69	.06	.67	.06

To be known as a good athlete.	.69	.06	.69	.06
To surpass the expected level of competitive performance for my age group.	.69	.06	.75	.07
I would miss the occasion to be recognized for my accomplishments.	.68	.06	.60	.07
To compete against others.	.68	.06	.62	.06
To move to a higher level of competition.	.67	.07	.74	.07
Establish and Develop Friendships				
I would miss my friends.	.81	-	.83	-
To be with friends.[1]	.92	.05	.90	.05
To make new friends.	.74	.05	.79	.06
To interact with other like-minded individuals.	.65	.05	.70	.05
Health and Fitness				
To improve my fitness.	.77	-	.81	-
To look and feel healthy.[1]	.80	.08	.70	.09
To improve my health.	.71	.07	.77	.08
Enjoyment				
To have fun.[1]	.81	-	.83	-
To have a good time.	.76	.07	.78	.07
I would miss the good times I have had.	.68	.08	.65	.09
To enjoy myself.	.67	.05	.67	.06

Note. All standardized regressions are significant at $p < .001$. Items with an error variance denoted by a dash were constrained to 1. [1] denotes items that were constrained to '1'.

Table 5

Latent Factor Correlations between IOs Sub-themes in Each of the Calibration (Stage 2) and Cross-validation (Stage 3) Samples

	Personal Pursuits	Stress Relief	Delay and Negotiate Aging	Team Attachment	Professional Prospects	Travel	Recognition from Others for Competitive Achievements	Establish and Develop Relationships	Health and Fitness
Calibration Sample (N = 396)									
Personal Pursuits	-								
Stress Relief	.21	-							
Delay and Negotiate Aging	.33	.23	-						
Team Attachment	.21	.25	.18	-					
Professional	.21	.18	.24	.21	-				
Travel	.37	.15	.19	.22	.34	-			
Recognition from Others for Competitive Achievements	.65	.01	.38	.22	.29	.46	-		
Social	.27	.36	.22	.74	.22	.33	.24	-	
Health and Fitness	.39	.45	.52	.17	.12	.10	.10	.27	-
Enjoyment	.46	.60	.20	.48	.24	.36	.20	.67	.46
Cross-validation Sample (N = 322)									
Personal Pursuits	-								
Stress Relief	.20	-							
Delay and Negotiate Aging	.44	.27	-						
Team Attachment	.25	.33	.12	-					
Professional	.17	.21	.14	.11	-				
Travel	.38	.04	.29	.23	.29	-			
Recognition from Others for Competitive Achievements	.69	.11	.45	.17	.27	.50	-		
Social	.29	.38	.29	.73	.18	.29	.25	-	
Health and Fitness	.38	.52	.56	.19	.09	.17	.22	.35	-
Enjoyment	.39	.52	.26	.45	.20	.31	.29	.64	.54

Table 6

Measurement Model Comparisons for Invariance between the Calibration and Cross-validation Samples

Model	χ^2	$\Delta\chi^2$	df	Δdf	CFI	ΔCFI	Sig.
1) Configural	4480.78	-	1970	-	.896	-	-
2) Factor loadings constrained	4520.77	39.99	2007	37	.895	.001	.339
3) Regressions and error covariances constrained	4533.90	53.12	2011	41	.895	.001	.097
4) Regressions, error covariances, and factor covariances constrained	4578.17	97.39	2056	189	.895	.001	.189

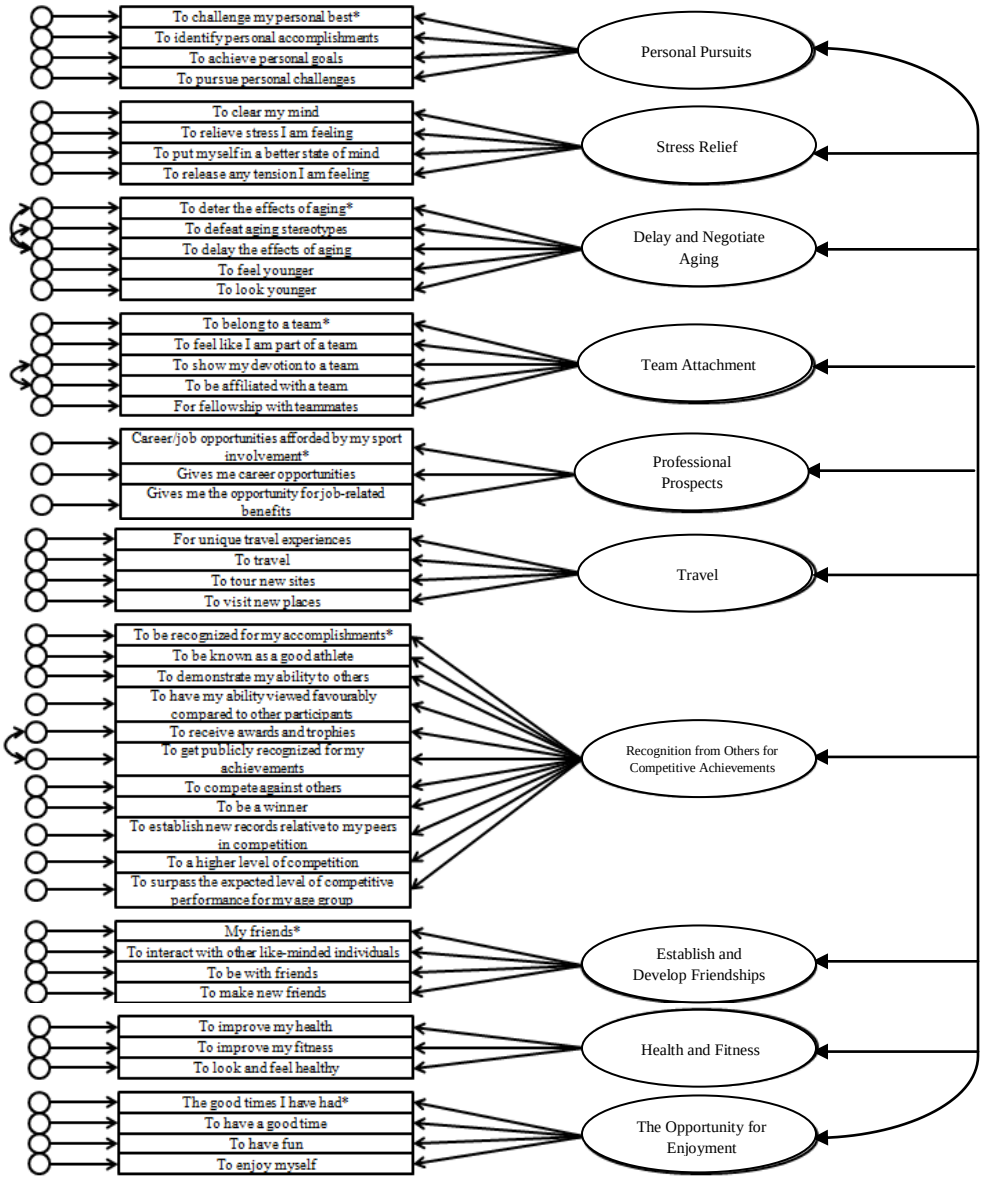

Figure 1. Finalized structural model from Stage 3 analysis representing the 10 IOs sub-themes in the cross-validation sample. Note: ovals signify latent variables, rectangles signify observed variables, circles signify errors, single headed-arrows represent 'causal' relationships, and double-headed arrows represent covariances.

MANUSCRIPT FOR STUDY 2: A STRUCTURAL EXAMINATION OF HOW INVOLVEMENT OPPORTUNITIES AND ENJOYMENT INFLUENCE SPORT COMMITMENT

A structural examination of how involvement opportunities and enjoyment influence sport commitment

Angela Bennett

University of Ottawa

Ottawa, Ontario, Canada

Abstract

The purpose of this study was to identify the pathways by which nine involvement opportunity (IOs; Manuscript 1, this thesis) sub-themes predicted functional (FC) and obligatory (OC) commitment and how these paths related to enjoyment. Masters swimmers' (*N* = 534, 175 males, 359 females, *M* age = 46.9 years, *SD* = 8.6, age range = 30-60) responses on the Involvement Opportunities Scale (Manuscript 1, this thesis), and for enjoyment, FC, and OC items were submitted to structural equation modeling. Tests of different model configurations showed a concurrent direct/indirect model to be the most representative model, with many paths between IOs and FC mediated by enjoyment. There were no indirect associations between IOs sub-themes and OC. Health and fitness was both a direct and indirect positive predictor of FC. Indirect positive effects on FC were evident for personal pursuits, stress relief, and to establish and develop friendships, while delaying and negotiating aging had a negative indirect effect. For OC, recognition from others for competitive achievements, team attachment, personal pursuits, stress relief, and delaying and negotiating aging had positive direct effects, while the opportunity to establish and develop friendships had a negative direct effect. Findings support the need to utilize a bi-dimensional commitment model to consider IOs at the thematic level.

Keywords: Sport Commitment, Involvement Opportunities, Masters Athletes, Sub-themes, Structural Model Testing

A structural examination of how involvement opportunities and enjoyment influence sport commitment

Adult sport has been identified as a way to promote health, engagement in life, happiness, general well-being, and successful aging (Baker, Fraser-Thomas, Dionigi, & Horton, 2010). It is therefore disconcerting that physical activity and sport in particular continues to decline at each successive age group beyond adolescence (Tischer, Hartmann-Tews, & Combrink, 2011), with 45.2% of adults not meeting the physical activity guidelines (Statistics Canada, 2012). In a multi-faceted approach to encourage more adults to be physically active, one strategy might be to attract more people to adult sport, or to help adults better maintain their connection to sport across the lifespan. A first step in the development of such strategies is research that seeks to better understand conditions contributing to the commitment of current adult sportspersons. The sport commitment model (SCM) is a suitable theoretical framework to explore sport adherence as it is interested in framing the conditions that facilitate an individual's "desire and resolve to persist in a sport endeavour over time" (Scanlan, Russell, Beals, & Scanlan, 2003, p.377).

The SCM is a holistic model that emphasizes the benefits, costs, and satisfaction an individual experiences in the sport context and how they are associated with sport commitment. There are three forces that are purported to affect commitment: a) those attracting an individual towards an activity, b) those attracting them towards alternative activities, and c) those restraining them within an activity (Scanlan, Carpenter, Schmidt, Simons, & Keeler, 1993). Attraction towards sport activity is represented by antecedent variables relating to *enjoyment* and *social support*, attraction towards alternative activities is captured by an antecedent called *involvement alternatives*, and those restraining an individual within an activity are represented by variables such as *personal investments*, *involvement opportunities* (IOs), and *social constraints* (Weiss & Amorose, 2008). Higher commitment is hypothesized to arise when there are higher

levels of enjoyment, IOs, personal investments, social support, and social constraints and a lower level of involvement alternatives. Of particular interest in this study are IOs and their unique contribution to sport commitment.

Involvement Opportunities and Commitment

IOs were first defined as "valued opportunities that are present only through continued involvement" (Scanlan, Carpenter, Schmidt et al., 1993, p. 8). Elsewhere, they have been defined as "anticipated or expected benefits afforded from continued participation such as friendships, positive interactions with adults, skill mastery, travel, and physical conditioning" (Weiss & Amorose, 2008, p. 148) and "real or anticipated valued opportunities and benefits that are present only through continued sport involvement, such as the opportunity to be with friends, to travel, to become more skilled, or to achieve personal goals" (Young & Medic, 2011a, p. 168-169). Although IOs are purported to be positively associated with commitment, past research has yielded equivocal findings. Research has found IOs to be, on occasion, positively associated with sport commitment (e.g., Alexandris, Tsorbatzondia, & Grouios, 2002; Casper & Babkes Stellino, 2008; Casper, Gray, & Babkes Stellino, 2007; Carpenter & Scanlan, 1998; Scanlan, Carpenter, Lobel, & Simons, 1993; Weiss, Weiss, & Amorose, 2008). However, there have also been instances where the relationship between IOs and commitment was non-existent (e.g., Scanlan, Carpenter, Schmidt et al., 1993; Zaharidas, Tsorbatzoudis, & Alexandris, 2006). In addition, five studies have excluded the IOs construct due to difficulties with the factor structure (Gabriele, Gill, & Adams, 2011; Wilson et al., 2004), content overlap with other determinants, such as enjoyment, (Weiss, Kimmel, & Smith, 2001; Wilson et al., 2004), high collinearity with enjoyment (Weiss & Weiss, 2007), and for reasons of poor internal consistency reliability (Sousa, Torregrosa, Viladrich, Villamarín, & Cruz, 2007).

Past difficulties with the IOs construct may be related to the breadth of the construct and how it is measured. The term 'IOs' is meant to capture several opportunity sub-themes, for example, it could relate to opportunities to use activities to relieve stress; to spend time with friends; to travel; to delay the effects of aging; and, to enjoy oneself (Carpenter & Coleman, 1998; Carpenter & Scanlan, 1998; Medic, 2009; Scanlan, Simons, Carpenter, Schmidt, & Keeler, 1993; Young & Medic, 2011a), however the contributions of these individual opportunity sub-themes are not known because they are studied collectively (i.e., a broad range of IOs are measured but are collapsed and treated as an average). Treating IOs as a collective does not permit the identification of possible differences in how specific IOs sub-themes contribute to commitment. This is problematic, especially considering the plethora of IOs that can be identified among Masters athletes (MAs). For example, Young, Piamonte, Grove and Medic (2011) posed 14 questions about various opportunities, ranging from occasions to delay the effects of aging to opportunities to spend time with family through sport. Vallerand and Young (2014) revealed that Masters sportspersons reported nine constituent participatory opportunity sub-themes. Most notably, Bennett (this thesis, Manuscript 1) determined adequate factorial validity for a survey instrument, called that Involvement Opportunities Scale (IOS), that measured 10 sub-themes relating to opportunities for personal pursuits, stress relief, team attachment, recognition from others for competitive achievements, health and fitness, enjoyment, professional prospects, to delaying and negotiating aging, travel, and establish and develop friendships. There is the possibility that more influential IOs sub-themes are diluted by less influential ones, explaining the null influence of IOs in some past research. Thus, researchers have called for the need to examine IOs: (a) at the level of sub-themes in order to clarify the strength and direction of their specific associations to sport commitment (Young & Medic,

2011b; Weiss et al., 2001), as well as (b) the pathways by which they are related to commitment through enjoyment.

Involvement opportunities sub-themes and their relationship to sport commitment. Despite the large and varied sub-themes encompassed within the IOs construct, only two studies have explicitly examined the influence of specific IOs sub-themes within the SCM. They have revealed partially contradictory, yet unique findings. In a sample of elite youth cricketers, Carpenter and Coleman (1998) found that both recognition and social opportunities were positively associated with changes in sport commitment over time, but their investigation was limited to these two opportunities. Examining these same two opportunities in a sample of Thai youth athletes, however, Choosakul, Vongjaturapat, Li, & Harmer (2009) found that their respective contributions depended on how the antecedent variable for enjoyment was placed in the model. In an unmediated model (i.e., when enjoyment was a direct antecedent like the opportunities variables), recognition opportunities were significantly associated with sport commitment, but social opportunities were not. In a mediated model (i.e., where the contribution of opportunities was necessarily based on a change in enjoyment), social opportunities were significantly associated with enjoyment, which in turn was significantly associated with sport commitment, while recognition opportunities were not. This study offered preliminary evidence that the contribution of specific IOs sub-themes may depend on the mediating pathways by which IOs are associated with sport commitment.

Enjoyment as a mediator of involvement opportunities. The influence of the placement of enjoyment in the SCM has also been recently discussed by several researchers (Choosakul et al., 2009; Weiss & Amorose, 2008; Weiss et al., 2001; Wilson et al., 2004). Several studies have examined different structural model configurations involving enjoyment as a direct determinant (i.e., unmediated) and as a mediator variable. Weiss et al. (2001) examined

the structural relationships of sport commitment by testing three different model configurations: an original direct model (i.e., five determinants had direct pathways to sport commitment), an indirect or mediational model (i.e., four determinants had direct pathways to enjoyment which in turn was associated with sport commitment), and a direct/indirect model (i.e., the four determinants were permitted to have direct and indirect (i.e., through enjoyment) pathways to sport commitment). Although no particular model demonstrated statistically superior fit to one another, the authors decided that the direct/indirect model was the most appropriate as it demonstrated good fit and conceptually explained variance in not only sport commitment, but also enjoyment. Weiss et al. also found evidence for different pathways by which antecedents influence sport commitment as involvement alternatives and personal investments were both directly and indirectly associated with commitment, but social opportunities were only directly associated with commitment.

Choosakul et al. (2009) also examined the structural relationship of the determinants to sport commitment by testing the same three different configurations for Thai youth athletes. Although the indirect and direct/indirect models were not statistically superior to the other models, they provided more nuanced insights into the structural relationships between IOs and commitment. Findings showed that social opportunities were indirectly associated with sport commitment through enjoyment as a mediating variable, while recognition opportunities were directly associated with sport commitment, suggesting that recognition opportunities are not dependent upon the enjoyment of an activity for increasing commitment. Choosakul et al. concluded that the direct/indirect model is preferable because it explains variance in both enjoyment and sport commitment. In sum, these two studies suggest that enjoyment may be a mediator of antecedents of sport commitment and this may particularly be the case in the study of IOs. Therefore, one major purpose of the current study was to clarify the unique contribution

of IOs by isolating and examining the mechanism and paths by which each IOs sub-theme affects sport commitment, and how these paths are related to enjoyment.

The pertinence of bi-dimensional sport commitment. When testing the associations of IOs sub-themes with sport commitment, the type of commitment that is being predicted should be considered. A bi-dimensional SCM has gained attention recently (e.g., Gabriele et al., 2011; Wilson et al., 2004; Young & Medic, 2011a) that proposes two distinct and co-existing commitment types – functional commitment (FC) and obligatory commitment (OC), instead of a uni-dimensional sport commitment construct (Scanlan, Carpenter, Schmidt, et al., 1993). FC is the motivation to continue participation when choices and the desire to continue are perceived as volitional – or 'wanting to', while OC arises from a sense of obligation derived from an external source of control that propagates a 'have to' form of commitment. The bi-dimensional commitment model may provide a more complete picture of an individual's motives for participating in sport as the antecedents for FC and OC may differ in number**,** as well as strength and direction of association (Santi, Bruton, Pietrantoni, & Mellalieu, 2014; Wigglesworth, Young, Medic, & Grove, 2012; Young & Medic, 2011a).

Research of bi-dimensional commitment and its relationship to IOs has been equivocal. IOs have on occasion been positively associated with OC, suggesting that participants feel that they have to continue their sport participation or they would foreclose these opportunities (Wigglesworth et al., 2012; Young & Medic, 2011a), and in other instances have shown no relationship at all (Young et al., 2011). IOs have also been positively with FC (Wigglesworth et al., 2012), except amongst the oldest Masters swimmers where there was a negative association (Young et al., 2011), and at times have had no significant relationship at all (Wigglesworth et al., 2012; Young & Medic, 2011a). The inconsistent findings may be related to how IOs were measured collectively and that enjoyment was not considered as a possibly necessary mediator

for commitment, thereby washing out contributions from IOs. The bi-dimensional model of sport commitment affords the possibility that structural paths will be mediated by enjoyment differentially, depending on the commitment type and therefore the bi-dimensional model is particularly pertinent for this investigation.

Current Purpose and Hypotheses

This investigation aimed to examine the contribution of IOs sub-themes in a sample of Masters swimmers (MSs), adults aged 30-60 years, who were formally enrolled in competitive swimming within the year prior to collecting data. To this end, the current study derives from recent research on the IOS survey, using valid measures for 10 distinct IOs sub-themes (see Manuscript 1, this thesis) to predict FC and OC. This study extends the prior factorial validity work on the IOS to examine predictive validity, and the degree to which specific sub-themes predict commitment in MSs. Furthermore, we planned to use structural equation modeling (SEM) to explore the placement of enjoyment and the pathways by which IOs directly or indirectly associate with FC and OC. In order to address past equivocal findings in research, it was necessary to examine IOs sub-themes and their relationships with enjoyment and commitment by conducting these analyses with a focus on IOs, in isolation of the remaining antecedents of the SCM. We hypothesized that the direct/indirect model of sport commitment would achieve acceptable fit and demonstrate conceptually superior explanations of relationships between IOs sub-themes and commitment type. We also expected different IOs sub-themes to differ in strength and direction of association as a function of commitment type, and that certain relationships to FC would depend upon enjoyment as a mediator.

Method

Participants

A total of 621 participants aged 30-60 were recruited electronically through local clubs and national swimming associations in several countries and in person at the 2013 European Masters Aquatic Championships. Organizing committees and governing bodies were provided letters of approval to gain consent to contact participants. Participants were recruited via e-mail to club representatives, club newsletters, social media, and by those who approached a survey booth at the 2013 European Masters Aquatic Championships. All individuals voluntarily participated and the study protocol was approved by the ethics committee for the University of Ottawa.

Participants were then screened for several inclusion criteria: they had to have identified swimming as their current primary sport, had been formally registered in a club or participated in a competitive event within the past year, and at least moderately recognized the need to regularly train/practice in order to compete. Using the same sample population as Manuscript 1 (this thesis) a total of 534 participants (175 males, 359 females, M_{age} = 46.99 years, SD = 8.61, age range: 30-60 years) aged 30-60 years were retained for analytic purposes following screening. A total of 57.3% of participants were from the United States, 23.2% were from Canada, with the remainder of the participants originating from Australia, the United Kingdom, and European Countries. Participants were highly educated, with 84.5% of the sample reporting at least an undergraduate university degree and 11% acknowledging professional trade/vocational training. The participants represented various competition levels, with 40.9% acknowledging competing provincially, 40.5% nationally, and 25.9% internationally. Most swimmers reported five or more years of participation in Masters swimming (67.6%), whereas 4.5% reported four to five years, 7.3% three to four years, and the remainder less than three years. On average, participants

reported 5.6 (*SD* = 6.8) competitions and spent 10.8 months (*SD* = 2.4) over the previous year in swimming; an average of 7.2 months (*SD* = 3.4) were reported as heavy months of involvement and 3.7 months (*SD* = 3.1) were light involvement. In a heavy month, participants engaged in an average of 9.8 hours (*SD* = 2.9) of training and 6.5 hours (*SD* = 3.0) in a light month.

Survey Measures

The survey asked participants to complete measures relating to demographics (e.g., age, sex, nationality, and education level) and details of sport involvement (e.g., weekly and monthly involvement in both heavy and light months of training, years of participation, and competition level). As a screening measure, participants' perceptions of the necessity and importance of training were assessed using three Likert-scale items relating to the maintenance of a consistent training routine in order to prepare to compete in events (e.g., 'I need to regularly train to get myself ready for my sport competitions.') as this is a key definition trait of MAs (Young & Medic, 2011a).

The IOS survey (see Manuscript 1, this thesis) that has previously demonstrated factorial validity in MSs was used to measure 10 IOs factors: the opportunity for *Personal Pursuits* (4 items), *Stress Relief* (4 items), *Team Attachment* (5 items), *Recognition from Others for Competitive Achievements* (11 items), *Professional Prospects* (3 items), *Health and Fitness* (3 items), to *Delay and Negotiate Aging* (5 items), *Travel* (4 items), *Establish and Develop Friendships* (4 items), and *the Opportunity for Enjoyment* (4 items). The factors *enjoyment* (4 items), *FC* (6 items), and *OC* (5 items) were borrowed from previous sport commitment literature (Young & Medic, 2011a; Young, et al., 2011; Wilson et al., 2004). All items were measured on a 7-point scale anchored at '1' *not at all true for me*, '4' *somewhat true for me*, and '7' *very true for me*. For a full list of items, see the left hand column of Table 1.

Planned Data Analyses

We planned to first conduct missing values analyses and then to perform descriptive statistics for all measures to identify variables demonstrating excessive skew or kurtosis. Preliminary analyses of factor structure were also conducted. First, we tested a measurement model to confirm that the FC and OC constructs were distinct commitment types. Second, it was necessary to verify that the factors representing *enjoyment* and *the opportunity for enjoyment* were distinct constructs. One of the purposes was to eventually test the positioning of *enjoyment* in subsequent models - if the two factors proved indistinguishable or highly related, it would suggest that they are measuring the same thing and as a result may compete against each other as well as negatively suppress other IOs. Thus, we preliminarily examined whether a distinct two-factor measurement model could be confirmed, or whether a merged one-factor solution would be required moving forward into the following stages of analyses.

To specifically answer our research questions, we planned to test a series of structural model analyses, separately for FC and OC, to determine which positioning of *enjoyment* produces the best fitting model. Prior to each structural path analysis, we identified and removed outlying cases using Mahalanobis distance values - in no instance were more than three outlying cases removed. Modification indices and parameter change estimate were inspected for each model and error covariances were added between items 'to demonstrate my ability to others' and 'to be known as a good athlete', between items 'to look younger' and 'to feel younger', and between items 'to receive awards and trophies' and 'to be publicly recognized for my achievements'. The first model in each series was a direct model in which the measured variables (i.e. IOs sub-themes) and *enjoyment* were specified to directly explain variance in commitment. The second model was an indirect model in which the measured variables (i.e. IOs sub-themes) were specified to predict commitment indirectly through a mediating variable (i.e.,

enjoyment). The third model was a direct/indirect model in which direct paths from IOs sub-themes to commitment as well as indirect paths from IOs sub-themes through *enjoyment* to commitment were specified. Finally, we conducted a path analysis using a direct/indirect model for both FC and OC *simultaneously*, with direct and indirect (i.e., mediated by *enjoyment*) paths being specified from the IOs sub-themes to both commitment types. This model was more rigorous as it accounted for shared explained variance between FC and OC.

All SEM used a maximum likelihood estimation technique. For each model, the exogenous factors were permitted to co-vary, one path from each latent variable to one observed variable was constrained by assigning the value of '1', and endogenous factors were given disturbance terms. Byrne (2010) recommends the use of multiple fit indices to determine model fit, including the chi-square index (χ^2), the Comparative Fit Index (CFI), the Root Mean Square Error of Approximation (RMSEA), and Hoelter (.01).

Results

Descriptive Statistics

Missing values were negligible as no more than 1.7% (M = 0.9) of the data was missing for any variable in the dataset. As less than 5% of the data was missing (Tabachnick & Fidell, 2013), influences of missing data were not a concern and missing values were imputed using estimation maximization in SPSS v.22. Descriptive statistics for all original survey items are shown in Table 1. Seven items demonstrated univariate kurtosis (i.e., with values > 7.0; Byrne, 2010) and Mardia's normalized coefficients (772.20 FC model; 597.57 OC model) also indicated that multivariate kurtosis was evident, though this is not a substantial concern in structural modeling as long as investigators consider additional fit indices such as a χ^2 to degrees of freedom ratio in the instance of kurtotic data (Byrne, 2010).

Preliminary Analyses of Factor Structure

Functional and obligatory commitment. Using SEM with the maximum likelihood estimation method, 11 items (six for FC; five for OC) were entered into a two-factor model. The measurement model allowed all observed items to load onto one only latent factor, latent factors were permitted to co-vary, and one path from each latent variable to one observed variable was constrained by assigning the value of '1'. Initial model fit was unacceptable $\chi^2(43, N = 534) = 313.79$, $p < .001$, CFI = .86, RMSEA = .10 (.09-.12), $p < .001$, so refinements were made to the model using modification indices and parameter estimates as guidelines. Two items that loaded poorly on OC, specifically, 'I feel forced to continue my sport involvement' ($\beta = .40$) and 'I feel that my sport involvement is a duty' ($\beta = .46$) were removed, thereby improving the model fit. The items 'I feel compelled to continue my sport involvement' and 'I feel obligated to continue my sport involvement' had somewhat low regressions weights, however, because these values were consistent with findings in past research (e.g., Wilson et al., 2004), they were ultimately retained to maintain a minimum of three items for the OC latent factor. 'I am willing to do almost anything to keep doing my sport' ($\beta = .61$) and 'It would be hard for me to quit my sport' ($\beta = .67$) loaded most poorly on FC and were removed from the model. The final model fit was significantly improved, $\chi^2(13, N = 531) = 40.59$, $p < .001$, CFI = .98, RMSEA = .06 (.04-.08), $p = .14$, meeting the CFI criterion (.90) and RMSEA criterion (< .06) indicating adequate fit (Byrne, 2010; Tabachnick & Fidell, 2013) (see Figure 1A). Cronbach alpha for the FC and OC scales were .85 and .67, respectively, and although the latter value is shy of Nunally's (1978) criterion (.70), it is consistent with prior estimates for the OC scale (Wilson et al., 2004). Overall, the commitment factors demonstrated divergent validity as modification indices and parameter change estimates suggested no cross-loadings.

Enjoyment and the opportunity for enjoyment. First, we conducted an exploratory factor analysis (principal axis factoring) with eight items entered simultaneously (four items for *the opportunity for enjoyment*; four items for *enjoyment*). The results demonstrated cross-loading violations and, in particular, the IOs item 'to enjoy myself' loaded more strongly on the *enjoyment* construct. We used SEM to more rigorously test for divergence in a two-factor measurement model using the maximum likelihood estimation method. The solution once again proved to be problematic. The modification indices suggested the addition of multiple error co-variances across factors suggesting redundancy between items. The suggested addition of cross-loadings also made it difficult to discern between the two factors. In particular, when allowed to co-vary freely, the latent factors *enjoyment* and *the opportunity for enjoyment* were correlated at .95 suggesting high multi-colinearity. No refinements produced an adequate fitting model using even the most liberal guidelines. As such, items representing the two constructs were collapsed into one factor and re-examined using SEM to test the factor validity. To ensure convergent validity on this single latent factor, we appraised regression weights and deleted the item 'I would miss the good times I have had' ($\beta = .54$). Modification indices suggested the addition of an error co-variance between items 'to have a good time' and 'to have fun', indicating possible redundancy in content between these items. In light of the fact that 'to have a good time' also had a weaker regression strength ($\beta = .59$), we elected to cut it from the model. Three final error co-variances were added between items 'I really like participating in my sport' and 'to have fun', between 'I am very happy when I participate in my sport' and 'to have fun, and between 'I am very happy when I participate' and 'to enjoy myself'. As a result, we arrived at a single latent factor solution comprising six observed items, $\chi^2(6, N = 531) = 12.82$, $p < .001$, CFI = .99, RMSEA = .04 (.01-.08), $p = .51$ (see Figure 1B), meeting CFI (> .95) and RMSEA

(< .06) criteria for good fit (Tabachnick & Fidell, 2013). This construct was labelled 'e*njoyment*' and we carried it forward to all subsequent analyses. Cronbach alpha for this scale was .92.

Internal consistency reliabilities and inter-factor correlations. Values in Table 2 pertain to exogenous variables in a direct model for commitment. All inter-factor correlations were less than .70 and all Cronbach alpha were above .70.

Structural Models for Functional Commitment

The standardized path coefficients are shown in Table 3 for each of the three sequential structural equation models relating to FC.

Structural model 1: Direct model. Model 1 demonstrated acceptable fit with $\chi^2(1267, N = 532) = 3258.19$, $p < .001$, CFI = .896, RMSEA = .054 (.052-.057), $p = .001$. Although our χ^2 index was significant, Byrne (2010) recommends that a χ^2 to degrees of freedom (df) ratio be inspected in the instance of kurtotic data; this model demonstrated a ratio of 2.6:1, meeting guidelines where fit is adequately demonstrated by a ratio that is between 2:1 and 3:1 (Garson, 2010). Although our CFI fell just shy of the standard for adequate fit (> .90), the RMSEA value surpassed a criterion for good fit (< .06; Tabachnick & Fidell, 2013), with a tighter confidence interval around the RMSEA value that further indicates that the population data would fit the model well. Pathways from *health and fitness* (β = .24) and *enjoyment* (β = .62) were significantly and directly associated with FC and accounted for 60.1% of the variance explained in FC.

Structural model 2: Indirect Model. Model 2 fit the data reasonably well with $\chi^2(1276, N = 532) = 3306.09$, $p < .001$, CFI = .894, RMSEA = .055 (.052-.057), $p < .001$. The χ^2 to df ratio was 2.7:1. Paths from *personal pursuits* (β = .31), *stress relief* (β = .22), *social* (β = .33), *health and fitness* (β = .30), and *delay and negotiate aging* (β = -.20) were significantly associated with *enjoyment* and explained 45.8% of the variance in *enjoyment*. *Enjoyment* (β = .75) was in turn

significantly associated with FC, explaining 54.0% of the total variance in FC from all indirect associations.

Structural model 3: Direct/indirect model. Model 3 demonstrated acceptable model fit with $\chi^2(1267, N = 532) = 3258.19$, $p < .001$, CFI = .896, RMSEA = .054 (.052-.057), $p < .001$. The χ^2 to df ratio was 2.6:1. Pathways from *personal pursuits* (β = .30), *stress relief* (β = .22), *social* (β = .34), *health and fitness* (β = .28), and *delay and negotiate aging* (β = -.203) were significantly associated with *enjoyment* and explained 44.8% of the variance in *enjoyment*. Pathways from *enjoyment* (β = .62) and *health and fitness* (β = .24) were significantly associated with FC and accounted for 60.1% of its total variance from both direct and indirect pathways.

Structural Models for Obligatory Commitment

The standardized path coefficients are shown in Table 4 for each of the three sequential structural equation models relating to OC.

Structural model 1: Direct model. Model 1 demonstrated acceptable model fit with $\chi^2(1216, N = 531) = 3079.98$, $p < .001$, CFI = .897, RMSEA = .054 (.051-.056), $p = .004$. The χ^2 to df ratio was 2.53:1 and the RMSEA met the criterion of <.06 to demonstrate good fit. Paths from *personal pursuits* (β = .19), *stress relief* (β = .16), delay *and negotiate aging* (β = .17), *team attachment* (β = .23), *recognition from others for competitive achievements* (β = .20), and *social* (β = -.20) were significantly and directly associated with OC, accounting for 30.3% of the variance in OC.

Structural model 2: Indirect model. Model 2 fit the data reasonably well with $\chi^2(1225, N = 531) = 3178.50$, $p < .001$, CFI = .892, RMSEA = .055 (.053-.057), $p < .001$. The χ^2 to df ratio was 2.68:1 and the RMSEA met the criterion of <.06 to demonstrate good fit. Paths from *personal pursuits* (β = .30), *stress relief* (β = .22), *social* (β = .35), *health and fitness* (β = .27), and *delay and negotiate aging* (β = -.20) were significantly associated with *enjoyment* and

explained 45.1% of the variance in *enjoyment*. *Enjoyment* (β = .18) was in turn significantly associated with OC, explaining 0.3% of its variance from indirect pathways.

Structural model 3: Direct/indirect model. Upon inspection of the regression pathways, the pathway between *enjoyment* and OC was non-significant (p = .31). This supports the notion that the relationship between IOs and OC is not dependent upon enjoyment as a mediator.

A Structural Model to Simultaneously Explain Functional and Obligatory Commitment

The simultaneous model demonstrated adequate fit (see Figure 2) with $\chi^2(1416, N = 532) = 3504.69$, p <.001, CFI = .893, RMSEA = .053 (.051-.055), p = .02. The χ^2 to degrees of freedom ratio was 2.48:1 and the RMSEA met the criterion of <.06 to demonstrate good fit. The standardized path coefficients are shown in Table 5.

Discussion

The purpose of this study was to test the associations of constituent IOs sub-themes to FC and OC. Prior research had made the case for the examination of IOs as they relate to sport commitment and had preliminarily validated numerous IOs factors that could be assessed within a Masters swimming population (see Manuscript 1, this thesis). To continue to advance this work, the purpose of the current study was to examine how specific IOs associate with FC and OC, and how these relationships may be mediated by enjoyment.

Where Should Enjoyment be Positioned in Models of Sport Commitment?

Three different structural model configurations were tested for FC and OC separately. Like prior researchers (Choosakul et al., 2009; Weiss et al., 2001), we compared successive models of a direct, indirect, and direct/indirect nature in explaining variance in commitment. Unlike these prior sport commitment researchers, however, we were primarily focused on examining these models as they related to uniquely to IOs and enjoyment (i.e., IOs were

examined in isolation from the other antecedent variables of sport commitment), and we examined relationships as they related to bi-dimensional rather than uni-dimensional commitment. Results for FC showed that the indirect model was the worst fitting model and explained the least amount of variance in FC. Although the direct and the direct/indirect FC models were essentially equal in model fit and variance explained, the direct/indirect model was a more representative model that captured both the direct and indirect influences of IOs sub-themes to FC. This interpretation parallels decisions in past research (e.g., Choosakul et al., 2009; Weiss et al., 2001) that determined the direct/indirect model to be more theoretically and practically appealing as it demonstrates the sources of commitment and the sources and consequences of enjoyment. Consistent with previous literature (Wigglesworth et al., 2012; Young & Medic, 2011a), our results showed that enjoyment was the most strongly associated direct factor with FC. Results for OC showed the direct model to be the best fitting model that explained far greater variance in OC than the indirect model. Furthermore, in the direct/indirect model, the pathway from enjoyment to OC was non-significant, suggesting that enjoyment does not act as a mediator.

We also tested a structural model to more rigorously test the relationships between the IOs sub-themes, enjoyment, and both commitment types simultaneously, thereby accounting for shared variance between the two commitment types. This simultaneous bi-dimensional model demonstrated adequate fit without losing explained variance in both commitment types, thus it appears to be the most appropriate model to use when examining the direct and indirect influences of IOs sub-themes to both FC and OC. For the most part, this model replicated findings from our successive models runs for FC and OC independently. However, one particular advantage of this more rigorous test of the bi-dimensional model was that it better informed our understanding of regression pathways and where enjoyment should be placed in the

model. By testing commitment types simultaneously, we are able to *compare* regression pathways across commitment types and how specific IOs affected each type. It is noteworthy that enjoyment was a necessary mediator for almost all IOs sub-themes for FC; while in contrast, enjoyment was not necessary to mediate any relationships between IOs sub-themes and OC.

Which Involvement Opportunities are Important to Commitment and Why?

Findings demonstrated that specific, constituent IOs sub-themes have different strengths and directions of association and vary in number by commitment type. Notably, amongst all IOs sub-themes, health and fitness was the only opportunity that was directly and positively associated with FC. It is a commonly cited benefit or anticipated outcome and is often one of the most highly rated sources of motivation for participation in adult sport. For example, Kolt, Driver, and Giles (2004) ranked participatory motives in older adults and found that six of the seven most highly rated items were related to health and fitness. Vallerand and Young (2014) explored physical activity motives for adult sportspersons and found that health and fitness motives were the most highly ranked opportunity after enjoyment. The health and fitness motive appears to be especially prevalent amongst MAs as it provides the opportunities to maintain health and general well-being which may foster a sense of control, independence, and positive attitudes towards the aging process (Baker et al., 2009). Interestingly, we found that the perceptions of health and fitness-enriching experiences offered through sport were the only IOs sub-theme that did not depend upon enjoyment of the activity in order to affect FC. Although health and fitness opportunities were also indirectly related to FC through enjoyment, this pathway was not as strong as the direct path. Notably, health and fitness had no relationship with OC, suggesting that these opportunities are internally driven and may not arise from external pressures.

Opportunities for personal pursuits and stress relief were each positively associated with commitment, albeit directly in terms of OC, and indirectly with FC through their positive influences on enjoyment. Personal pursuits have been identified by MAs as a source of enjoyment that ensues from a persistent sense of personal challenge and mastery that drives continued participation of MAs; MAs have particularly emphasized enjoying the challenge of beating personal bests and to be able to continue to do so despite increasing age (Dionigi, Baker, & Horton, 2011). Funk, Jordan, Ridinger, and Kaplanidou (2011) identified stress management as a significant motive for not only current sport commitment, but also for future exercise intention in adult runners. This finding was slightly surprising as it is intuitive to think that the opportunity to relieve stress may instill the feeling of obligation to continue to receive this benefit. A reason for this may be that sport may offer a buffer/coping mechanism as it serves as a 'time-out' from stressful situations to feel refreshed (Iwasaki & Schneider, 2003). Although higher perceptions of these two opportunities are important to MSs to enhance the enjoyment of an activity and in turn FC, higher perceptions of these opportunities also foster a sense of obligation to continue participating. In this sense, MSs may take stock of these opportunities and may feel that they are uniquely offered in swimming and not elsewhere; when contemplating the forfeiture of these opportunities, they may consider themselves as quitters, fear losing an effective method to reduce stress they experience, or fear squandering a method for challenging oneself and seeking self-betterment. In this manner, salient IOs may engender feelings of having to commit to sport.

The opportunity to establish and develop friendships was the second strongest and positive predictor of FC, and its influence worked indirectly by increasing perceptions of enjoyment inherent to sport. These findings parallel those of Choosakul et al. (2009), who found social opportunities to be positively and indirectly associated with commitment in youth

cricketers. One commonly cited motive by MAs was the companionship that they had fostered through their sport participation and how it made participating fun (Dionigi et al., 2011). Similarly, Senior Games participants cited opportunities to be more socially active to be a motive for participation because these opportunities were seen as enjoyable, engaging, and fostering healthy aging (Henderson, Casper, Wilson, & Dern, 2012). Furthermore, socializing appears to be emphasized by athletes when participating in events, in particular when they are away from home (Gillett & Kelly, 2006). Our results also showed that the opportunity to establish and develop relationships can be inversely and directly associated with OC. At first, this finding seemed counter intuitive as individuals would lose these opportunities they valued and enjoyed which would in theory increase their sense of obligation to continue. Instead, it appears as though opportunities to establish and develop relationships may serve as a buffer against feelings of obligation. As there is currently no research that supports whether or not obligatory commitment promotes or negates long-term participation in sport, we cannot state with confidence that the negative association between the opportunity to establish and develop friendships is a positive finding.

Team attachment was the most strongly loading opportunity for OC, suggesting that individuals feel increasingly obligated to continue their sport participation when they report higher team attachment, possibly due to the fear of letting their team down or losing the sense of camaraderie that is present in a team setting. Insight on how close teammates may actually influence obligation may be gleaned from a study by Young and Medic (2011a) on social influences on sport commitment. MSs felt feelings of obligation to continue in relation to their immediate training partners because they feared what these teammates might think, or feared their mates' disapproval, should they quit. It is important to note that the opportunity to establish and develop friendships was associated with OC in a direction *opposite* than that of team

attachment, thereby supporting the need to distinguish between these two social constructs. The contrary effects of social and team attachment opportunities on OC are interesting because literature often considers the opportunity for team attachment and to establish and develop friendships rather synonymously in youth (e.g., Carpenter & Coleman, 1998) and adult sport settings (e.g., Donigi et al., 2011). The difference in the direction of association for these two themes may be related to the items used for each scale. The opportunities to make new friends and spend time with friends and like-minded individuals may be inherently more enjoyable, which is supported by the strong association between the opportunity to establish and develop friendships and enjoyment. Team attachment items were related to the opportunities to belong to a team, to show one's devotion to a team, for fellowship with teammates, and to feel like part of a team. The team context is rather unique as athletes may consider the collective group's success above their own and how poor performance, missing practices, or quitting altogether will impact the team and the team's perception of oneself. Once the negative effects of the opportunity to establish and develop friendships on OC are accounted for (as they were in another IOs sub-theme), it is possible that these considerations of oneself in relation to their team may be somewhat dutiful.

Like prior research in youth (Choosakul et al., 2009), we found the effects of recognition opportunities on FC to be direct with no indirect associations through enjoyment; however, in our case, we found opportunities for recognition of competitive achievements to uniquely associate with OC. In a study of the social motivations of World Masters Games participants Hodge, Allen, and Smellie (2008) found a moderately high social recognition orientation, whereby individuals are motivated to gain recognition from others for performance and effort. Many athletes experience a sense of excitement and pride when they outperform others (Dionigi et al., 2011) and may perhaps miss the opportunities to be recognized for their achievements if

they were to discontinue their participation, thereby propagating the feeling that it is necessary for one to continue in swimming.

The opportunity to delay and negotiate aging was negatively associated with enjoyment and indirectly associated with FC, thereby suggesting that as an individual's desire to participate in swimming for age-related motives increases, he/she is less likely to enjoy the activity and to want to continue their sport. If MSs are overly focused on age-related decline and focus too much on appraising whether they are avoiding age-slowing, they may be less likely to want to continue, perhaps because all adult swimmers eventually experience notable age-related declines in performance (Young, Callary, & Niedre, 2014). However, results showed that the opportunity to delay and negotiate aging is positively and directly associated with OC. It is possible that athletes feel obligated to continue in sport in order to reduce age-related physical declines, or because they see sport as a way to negotiate ageist stereotypes. Dionigi (2006) argued that continued sport participation with age yields not only physical benefits, but a sense of empowerment. MAs are individuals who defy social stereotypes of aging who experience pride by distinguishing themselves from socially constructed norms. Should these individuals discontinue their participation in sport, they may fear that they are conforming to ageist ideas and lose the satisfaction that they had previously derived from their sport participation. It may then be recommended that the opportunity for health and fitness be emphasized over the opportunity to delay and negotiate aging.

Finally, the opportunities to travel and for professional prospects were found to be non-significant across all model configurations. It is possible that job-related opportunities may only be present when exploring younger highly elite and professional samples of athletes (Scanlan et al., 2003), and not MAs. Past research on travel related opportunities makes it less easy to discern the populations to which this opportunity may be most relevant. For example, Scanlan et

al. (2003) reported elite, professional athletes citing travel as an opportunity afforded by their sport participation, yet, Hritz and Ramos (2008) found that MSs who were the most skilled and engaged in their sport participation were less likely to travel due to sport. It may also be possible that the opportunity to travel is merely a means to an end in order to compete and socialize with other competitors. Future research may need to consider skill level and past experience when exploring the opportunity to travel sub-theme.

In sum, there are many IOs that appear to be important to MSs because of their possibility of increasing commitment types. Sport marketers and programmers may wish to particularly tailor their activities to accommodate those sub-themes that facilitate commitment, because such strategies can increase participatory behaviours and behavioural adherence (Weiss, Weiss, & Amorose, 2010), especially in the case of FC. Health and fitness should be a primary opportunity to be marketed and focused on in programming initiatives as it has two pathways by which it increases FC. The opportunity to establish and develop friendships should also be emphasized as important opportunities as they are positively and strongly associated with FC, through enjoyment as a mediator, and negatively associated with OC. This is important as FC is thought to be more adaptive and may promote long-term adherence to sport while OC may be guided by external pressures and motives that may have negative consequences including drop-out (e.g., Pelletier et al., 2001). It is unclear whether the opportunities for personal pursuits and stress relief should be promoted as they are moderately associated with increases in both OC than FC. At this time, we would also caution promotion of the opportunities to delay and negotiate aging as they are inversely related to FC, and we are reluctant at this time to suggest promoting team attachment and recognition from others for competitive achievements as they are solely associated with increases in OC. Emerging research shows that OC can relate to more frequent sport behaviour in the short term (Santi et al., 2014), so more work is needed to

understand the consequences of OC, along with FC, on long-term participation. Future research is needed to verify which commitment types promote adherence and healthy activity or if it is necessary to have moderate to high levels of both to foster strong adherence to sport.

Support for a Bi-dimensional Model of Commitment

Several of our findings support the need to consider two commitment types rather than one commitment dimension, at least in terms of how IOs are associated with adults' resolve to continue in sport. First, there were three IOs sub-themes that had an influence on one type of commitment, but not the other. Specifically, health and fitness was uniquely associated with FC, and recognition opportunities and team attachment had paths only to OC. Second, the strength and direction of association differed the opportunity to delay and negotiate aging and establish and develop friendships as a function of commitment type. Third, all the IOs that predicted FC were fully mediated by enjoyment, except health and fitness, which was partially mediated; however, no IOs were mediated by enjoyment for OC. Finally, although the simultaneous structural model explained substantially more variance in FC compared than OC, there were more sub-themes that were directly associated with OC – this may relate to the concept that IOs are foreclosed should an individual discontinue their participation in sport (Scanlan, Carpenter, Schmidt et al., 1993), thereby propagating a sense of obligation to continue their sport involvement.

Limitations and Future Research

This study was limited in that it only examined IOs sub-themes alongside enjoyment without considering the remaining four determinants of the SCM. Future research will need to examine salient IOs and their predictive pathways alongside the broader determinants, as it is reasonable to expect that the influence of IOs sub-themes may vary. Second, this study was a cross-sectional design which does not identify how changes in IOs sub-themes affect FC and OC

over time; future use of a longitudinal design would help determine the predictive utility and issues of causality around IOs. Third, the age range of the participants is wider than would be desired as there is evidence of changes in the direction of association of IOs when studied collectively as a function of age (Young et al., 2011). Future research should consider examining IOs sub-themes, while considering potential differences as a function of age, sex, and skill level. Additionally, age should be considered as a moderator in regression and structural models.

In attempting to understand pathways between IOs, enjoyment, and commitment, we performed preliminary analyses to determine whether the factor structure of one particular opportunity – the opportunity to enjoy oneself, was distinct from the proposed mediator (i.e., enjoyment). In our case, they were not different and were merged. These preliminary analyses and our decision to merge the constructs may have afforded more clarity in our analyses, and eventual results, in comparison to prior work. For example, many researchers (e.g., Carpenter & Coleman, 1998; Casper & Andrew, 2008; Scanlan, Simons, et al., 1993; Young & Medic, 2011a) embedded opportunity for enjoyment items in their collective assessment of IOs without verifying the factorial validity of such a decision, perhaps accounting for some past difficulties in construct clarity (e.g., Wilson et al., 2004) and equivocal findings (e.g., Young & Medic, 2011a). We suggest that future researchers take the same step to ensure that the enjoyment mediator is sound, especially because of its prominence in any path analysis to explain commitment. This is particularly important when the potential enjoyment mediator comprises initial items representing current enjoyment of an activity (e.g., "I really like participating in my sport") as well as two new anticipatory items (e.g., "I would miss the good times" and "My sport involvement gives me the opportunity to have a good time"), which demonstrate different temporal aspects.

In conclusion, it was evident that the influence of specific IOs sub-themes vary in terms of number, strength, and direction of associations for each commitment type. Our findings suggest that enjoyment should be placed as a mediating variable in a simultaneous direct/indirect model for FC and OC as some antecedents are mediated by enjoyment and it accounts for shared explained variance between both commitment types. Based on their influence on MSs' FC, the opportunities for health and fitness, personal pursuits, and to establish and develop friendships should be emphasized in marketing and programming initiatives. We would caution the promotion of the opportunities for stress relief, personal pursuits, recognition from others for competitive achievements, team attachment and to delay and negotiate aging until future research investigates the implication of promoting high levels of OC to long-term participation in sport.

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Table 1

Descriptive Statistics for Survey Items

Items	*M*	*SD*	Skewness	Kurtosis
Test and Assess Oneself				
I would miss the opportunity to challenge my personal best.[a]	5.91	1.50	-1.50	1.64
To identify personal accomplishments.	5.71	1.40	-1.15	0.92
To achieve personal goals.	5.95	1.24	-1.20	1.22
To pursue personal challenges.	5.76	1.41	-1.27	1.39
Stress Relief				
To clear my mind.	6.31	1.08	-2.08	5.36
To relieve stress I am feeling.	6.09	1.32	-1.77	3.05
To put myself in a better state of mind.	6.32	0.99	-2.01	5.52
To release any tension I am feeling.	5.96	1.34	-1.58	2.40
Delay and Negotiate Aging				
I would miss the opportunity to deter the effects of aging.[a]	5.52	1.68	-1.17	0.57
To defeat aging stereotypes.	5.00	1.90	-0.77	-0.55
To delay the effects of aging.	5.40	1.66	-1.00	0.28
To feel younger.	5.29	1.65	-0.91	0.09
To look younger.	4.83	1.86	-0.54	-0.75
Team Attachment				
I would miss the chance to belong to a team.[a]	4.89	1.97	-0.63	-0.75
To feel like I am part of a team.	4.95	1.84	-0.60	-0.66
To show my devotion to a team.	4.03	1.89	-0.05	-1.02
To be affiliated with a team.	4.47	1.93	-0.31	-1.02
For fellowship with teammates.	5.15	1.81	-0.74	-0.48
Professional Prospects				
I would miss the career/job opportunities afforded by my sport involvement.[a]	2.04	1.67	1.63	1.66
For career opportunities.	1.82	1.61	2.07	3.23
For job-related benefits.	1.70	1.42	2.42	5.27
Travel				
I would miss the occasion for unique travel experiences.[a]	3.75	2.19	0.16	-1.40
To travel.	3.89	2.20	0.11	-1.41
To tour new sites.	3.35	2.09	0.37	-1.22
To visit new places.	3.68	2.18	0.20	-1.37
Recognition from thers for Competitive Achievements				
I would miss the occasion to be recognized for my accomplishments.[a]	4.30	1.90	-0.10	-1.08
To be known as a good athlete.	4.65	1.84	-0.47	-0.73
To demonstrate my ability to others.	4.33	1.90	-0.18	-1.07
To have my ability viewed favourably compared to other participants.	3.68	1.98	0.13	-1.13
To receive awards and trophies.	3.22	2.04	0.43	-1.11
To get publicly recognized for my achievements.	2.39	1.74	1.19	0.40

To compete against others.	4.79	1.86	-0.61	-0.61
To be a winner.	4.45	1.93	-0.26	-1.01
To establish new records relative to my peers in competition.	3.59	2.22	0.22	-1.40
To move to a higher level of competition.	4.01	2.15	-0.07	-1.33
To surpass the expected level of competitive performance for my age group.	4.22	2.12	-0.21	-1.29
Establish and Develop Friendships				
I would miss my friends.	5.55	1.69	-1.05	0.12
To interact with other like-minded individuals.[a]	5.86	1.34	-1.24	1.06
To be with friends.	5.56	1.57	-1.00	0.21
To make new friends.	5.47	1.46	-0.82	0.10
Health and Fitness				
To improve my health.	6.46	0.86	-2.00	5.16
To improve my fitness.	6.58	0.79	-2.93	12.68
To look and feel healthy.	6.44	0.88	-2.24	7.44
The Opportunity for Enjoyment				
I would miss the good times I have had.[a]	6.10	1.23	-1.68	3.00
To have a good time.	6.19	1.06	-1.58	3.19
To have fun.	6.36	0.91	-1.57	2.93
To enjoy myself.	6.45	0.79	-1.46	1.79
Enjoyment				
I am very happy when I participate in my sport.	6.58	.73	-2.35	8.46
I really like participating in my sport.	6.66	.68	-2.66	10.89
I find participating in my sport to be very enjoyable.	6.49	.04	-1.97	4.29
Participating in my sport is a lot of fun.	6.45	.04	-2.00	5.37
Functional Commitment				
I am dedicated to keep doing my sport.	6.48	0.85	-1.97	4.95
I am willing to do almost anything to keep doing my sport.	5.41	1.52	-0.88	0.11
I am determined to keep doing my sport.	6.41	0.95	-2.37	8.02
It would be hard for me to quit my sport.	6.11	1.29	-1.67	2.54
I am committed to keep doing my sport.	6.40	0.99	-2.38	7.54
I want to keep doing my sport.	6.66	0.67	-3.02	14.74
Obligatory Commitment				
I feel compelled to continue my sport involvement.	4.77	2.09	-0.58	-0.99
I feel forced to continue my sport involvement.	1.45	1.14	3.34	11.54
I feel it is necessary for me to continue my sport.	5.07	1.93	-0.80	-0.50
I feel obligated to continue my sport involvement.	3.28	2.16	0.42	-1.26
I feel that my sport involvement is a duty.	1.96	1.52	1.74	2.31
Multivariate			Kurtosis	C.R.
Functional Commitment Models			772.20	116.85
Obligatory Commitment Models			597.57	92.13

Note. All items were preceded with 'My sport involvement/participation gives me the opportunity…' except [a] items were preceded with 'If I stopped/quit/discontinued my sport participation/involvement…'.

Table 2

Latent Factor Correlations among Exogenous Variables and Internal Consistency Values

	Personal Pursuits	Stress Relief	Delay and Negotiate Aging	Team Attachment	Professional Prospects	Travel	Recognition from Others for Competitive Achievements	Establish and Develop Friendships	Health and Fitness	Enjoyment
Personal Pursuits	-									
Stress Relief	.16	-								
Delaying and Negotiating Aging	.34	.36	-							
Team Attachment	.20	.22	.11	-						
Professional Opportunities	.19	.10	.17	.14	-					
Travel	.39	.06	.20	.21	.33	-				
Recognition from Other for Competitive Achievements	.66	.07	.29	.23	.30	.47	-			
Social	.25	.33	.23	.69	.16	.29	.25	-		
Health and Fitness	.36	.44	.58	.13	.05	.12	.14	.23	-	
Enjoyment	.44	.42	.22	.27	.13	.26	.26	.46	.44	-
α	.81	.72	.89	.93	.88	.94	.91	.87	.79	.91

Table 3

Standardized Path Coefficients for Structural Relationships between IOs, Enjoyment, and Each of Functional Commitment (FC)

Structural Model 1				Structural Model 2				Structural Model 3			
Path	*β*	S.E.	*P*	Path	*β*	S.E.	*p*	Path	*B*	S.E.	*p*
Structural path coefficients between exogenous and endogenous variables				*Structural path coefficients between endogenous variables*				*Structural path coefficients between endogenous variables*			
PP→FC	.103	.048	.097	E→FC	.753	.051	<.001	E→FC	.625	.064	<.001
SR→FC	-.019	.032	.665	*Structural path coefficients among exogenous and endogenous variables*				*Structural path coefficients among exogenous and endogenous variables*			
DNA→FC	-.025	.029	.634	PP→E	.311	.043	<.001	PP→E	.303	.044	<.001
TA→FC	.027	.027	.612	SR→E	.220	.029	<.001	SR→E	.224	.029	<.001
PR→FC	-.075	.027	.055	DNA→E	-.203	.026	<.001	DNA→E	-.203	.026	<.001
TR→FC	-.035	.017	.409	TA→E	-.098	.024	.080	TA→E	-.101	.025	.073
RCA→FC	.066	.032	.251	PR→E	.011	.024	.782	PR→E	.020	.025	.637
EDF→FC	-.089	.037	.137	TR→E	.059	.016	.190	TR→E	.063	.016	.163
HF→FC	.240	.093	<.001	RCA→E	-.029	.030	.638	RCA→E	-.035	.030	.571
E→FC	.625	.064	<.001	EDF→E	.334	.032	<.001	EDF→E	.345	.033	<.001
Disturbance terms for endogenous variables				HF→E	.300	.080	<.001	HF→E	.283	.081	<.001
FC	.284	.031	<.001	*Disturbance terms for endogenous variables*				*Structural path coefficients between exogenous and endogenous variables*			
				FC	.332	.034	<.001	PP→FC	.103	.048	.097
				E	.287	.026	<.001	SR→FC	-.019	.032	.665
								DNA→FC	-.025	.029	.634
								TA→FC	.027	.027	.612
								PR→FC	-.075	.027	.055
								TR→FC	-.035	.017	.409
								RCA→FC	.066	.032	.251
								EDF→FC	-.089	.037	.137
								HF→FC	.240	.093	<.001
								Disturbance terms for endogenous variables			
								FC	.284	.031	<.001
								E	.294	.026	<.001

Note. PP = personal pursuits; SR = stress relief; DNA = delay and negotiate aging; TA = team attachment; PR = professional prospects; TR = travel; RCA = recognition from others for competitive achievements; EDF = establish and develop friendships; HF = health and fitness; E = enjoyment.

Table 4

Standardized Path Coefficients for Structural Relationships between IOs, Enjoyment, and Obligatory Commitment (OC)

Structural Model 1				Structural Model 2				Structural Model 3			
Path	*β*	S.E.	*P*	Path	*β*	S.E.	*p*	Path	*B*	S.E.	*P*
Structural path coefficients between exogenous and endogenous variables				*Structural path coefficients between endogenous variables*				*Structural path coefficients between endogenous variables*			
PP→OC	.195	.115	.027	E→OC	.183	.110	<.001	E→OC	-.075	.145	.310
SR→OC	.162	.077	.012	*Structural path coefficients among exogenous and endogenous variables*				*Structural path coefficients among exogenous and endogenous variables*			
DNA→OC	.173	.069	.018	PP→E	.305	.044	<.001	PP→E	.305	.044	<.001
TA→OC	.232	.066	.003	SR→E	.226	.029	<.001	SR→E	.225	.030	<.001
PR→OC	.062	.064	.264	DNA→E	-.201	.026	<.001	DNA→E	-.203	.026	<.001
TR→OC	-.069	.041	.249	TA→E	-.106	.025	.067	TA→E	-.109	.025	.060
RCA→OC	.204	.078	.014	PR→E	.019	.025	.651	PR→E	.018	.025	.661
EDF→OC	-.205	.090	.019	TR→E	.065	.016	.151	TR→E	.066	.016	.145
HF→OC	.095	.217	.267	RCA→E	-.034	.030	.582	RCA→E	-.037	.030	.551
E→OC	-.075	.145	.310	EDF→E	.350	.033	<.001	EDF→E	.353	.034	<.001
Disturbance terms for endogenous variables				HF→E	.276	.082	<.001	HF→E	.276	.083	<.001
OC	1.416	.233	<.001	*Disturbance terms for endogenous variables*				*Structural path coefficients between exogenous and endogenous variables*			
				OC	2.094	.342	<.001	PP→OC	.195	.115	.027
				E	.293	.026	<.001	SR→OC	.162	.077	.012
								DNA→OC	.173	.069	.018
								TA→OC	.232	.066	.003
								PR→OC	.062	.064	.264
								TR→OC	-.069	.041	.249
								RCA→OC	.204	.078	.014
								EDF→OC	-.205	.090	.019
								HF→OC	.095	.217	.267
								Disturbance terms for endogenous variables			
								OC	1.416	.233	<.001
								E	.295	.026	<.001

Note. PP = personal pursuits; SR = stress relief; DNA = delay and negotiate aging; TA = team attachment; PR = professional prospects; TR = travel; RCA = recognition from others for competitive achievements; EDF = establish and develop friendships; HF = health and fitness; E = enjoyment

Table 5

Path Coefficients Resulting from a Direct/indirect Simultaneous Structural Model Specified for the Relationships between IOs, Enjoyment, and Both Functional and Obligatory Commitment

Path	*B*	S.E.	*P*
Structural path coefficients between endogenous variables			
E→FC	.622	.064	<.001
E→OC	-.059	.145	.423
Structural path coefficients among exogenous and endogenous variables			
PP→E	.304	.044	<.001
SR→E	.224	.029	<.001
DNA→E	-.204	.026	<.001
TA→E	-.102	.025	.071
PR→E	.020	.025	.637
TR→E	.064	.016	.162
RCA→E	-.036	.030	.564
EDF→E	.346	.033	<.001
HF→E	.283	.081	<.001
Structural path coefficients between exogenous and endogenous variables			
PP→FC	.111	.048	.076
SR→FC	-.016	.032	.718
DNA→FC	-.024	.029	.643
TA→FC	.034	.027	.524
PR→FC	-.074	.027	.058
TR→FC	-.037	.017	.386
RCA→FC	.065	.032	.261
EDF→FC	-.098	.037	.103
HF→FC	.240	.093	<.001
PP→OC	.208	.116	.020
SR→OC	.165	.077	.010
DNA→OC	.168	.070	.022
TA→OC	.221	.065	.003
PR→OC	.079	.064	.153
TR→OC	-.073	.041	.221
RCA→OC	.193	.079	.021
EDF→OC	-.202	.088	.019
HF→OC	.081	.215	.341
Disturbance terms for endogenous variables			
FC	.282	.031	<.001
OC	1.419	.234	<.001
E	.294	.026	<.001

Note. PP = personal pursuits; SR = stress relief; DNA = delay and negotiate aging; TA = team attachment; PR = professional prospects; TR = travel; RCA = recognition from others for competitive achievements; EDF = establish and develop friendships; HF = health and fitness; E = enjoyment; FC = functional commitment; OC = obligatory commitment

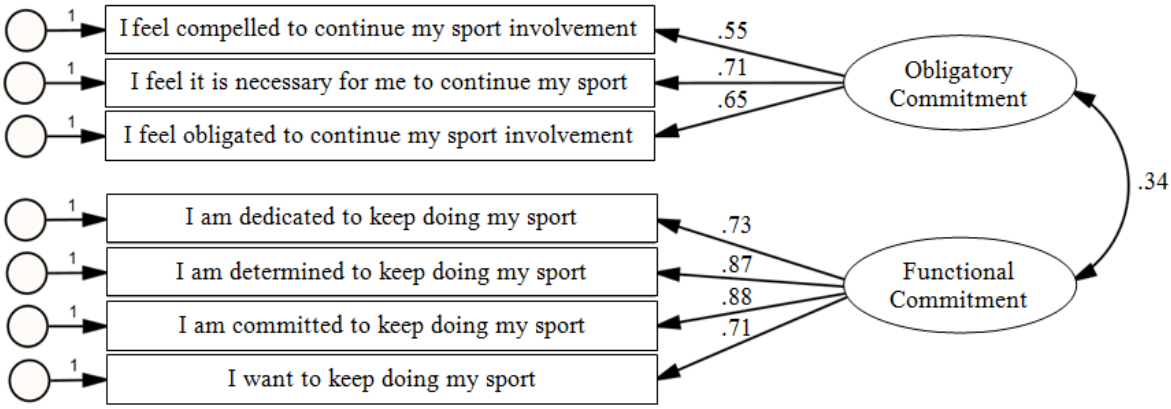

Figure 1A

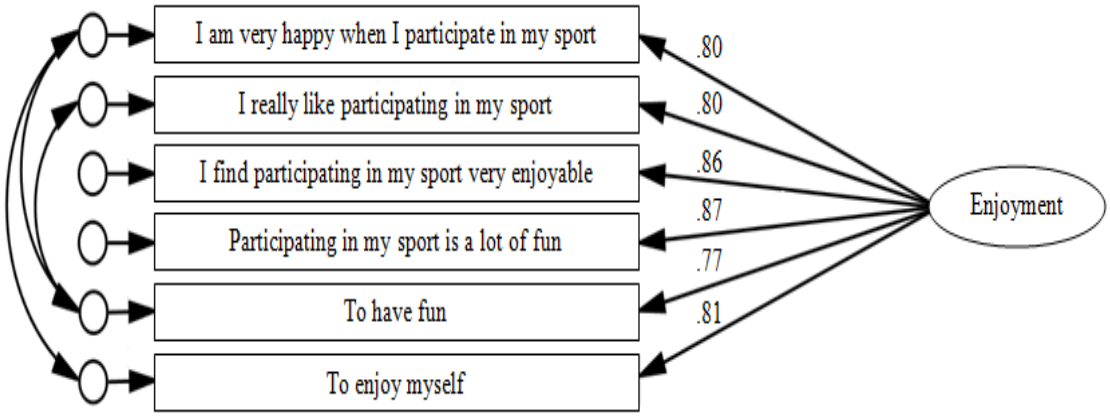

Figure 1B

Figure 1. Structural equation model solutions for preliminary analyses of obligatory and functional commitment (1A) and for the merged enjoyment construct (1B)

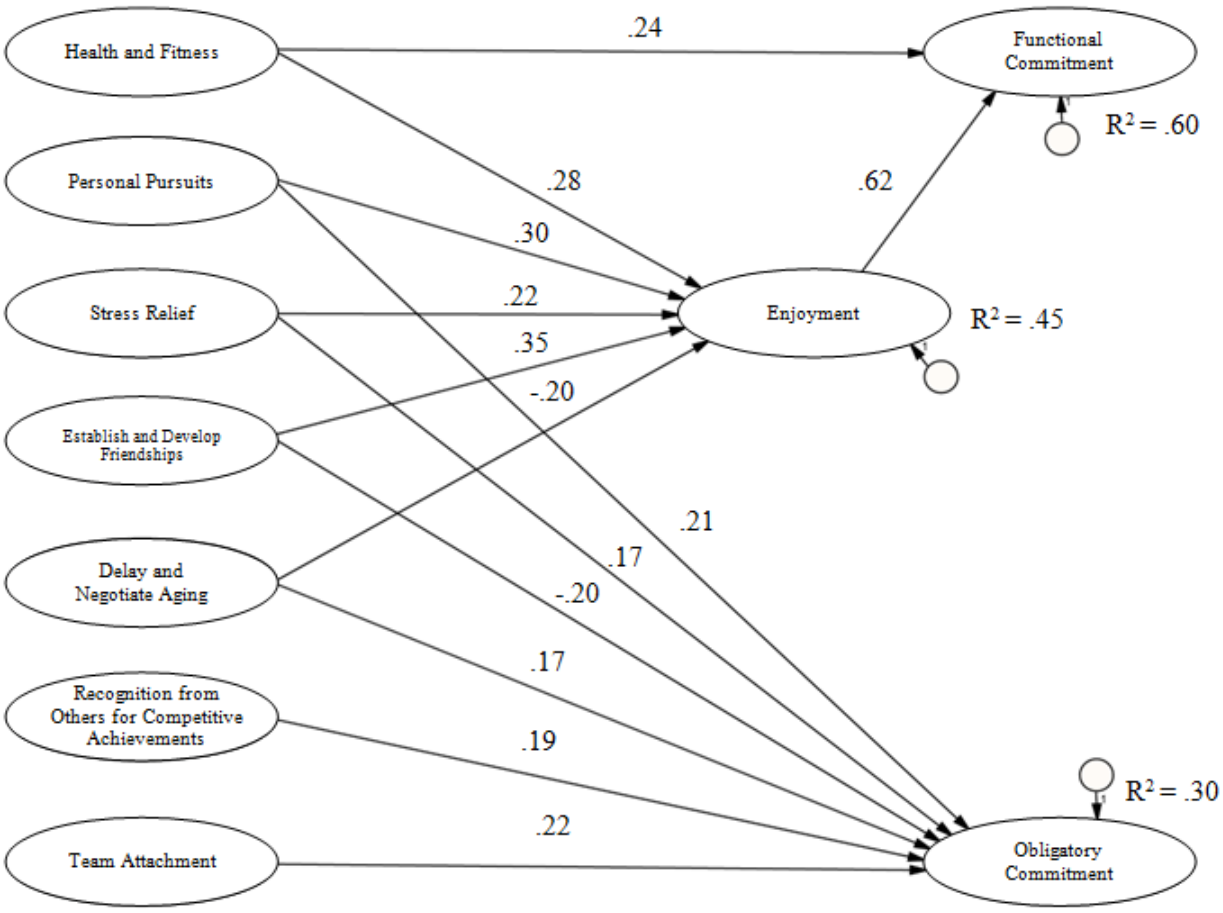

Figure 2. The simultaneous structural model. This model shows only standardized significant pathways following the specification of a direct/indirect structural model. Note: all IOs sub-themes were included in the analysis and were permitted to freely co-vary.

CHAPTER 5: EXAMINING DIFFERENCES IN SPECIFIC INVOLVEMENT OPPORTUNITIES BETWEEN SHO`RT- AND LONG-TERM SWIMMERS

This dissertation had several purposes. First, it aimed to develop valid and reliable measures for various IOs sub-themes. Second, it sought to examine relationships between these IOs sub-themes and types of commitment, and particularly how enjoyment mediates such relationships. A third objective, which this chapter examines, was to identify whether the relationships between specific IOs sub-themes that predict FC and OC differ between MSs who have only recently engaged in sport and those who have been continuously involved over many years. The rationale for such an examination was based on the notion that individuals may have different motives for joining an activity than they may have for continuing one. If this were to be the case, then the opportunities that attract an individual to join a sport and those retaining them in a sport may be differently programmed and marketed to potential and already active athletes. Green (2005) proposed that new athletes often join sport as a form of sponsored recruitment (i.e., support and encouragement from significant others) or for the potential new friendships they may form, while athletes who had been engaged more long-term continued their participation for opportunities such as team affiliation or fitness. Moreover, past research on IOs has shown trends indicating differences between athletes of varying durations of involvement. Chu and Wang (2012) divided Taiwanese national college level dance sport athletes into four prior lengths of participation durations: <1 year, 1-3 years, 3-5 years, and 6-10 years. The authors identified a significant difference in mean levels of collectively measured IOs between athletes with <1 year and 1-3 years of participation.

Initially, the intention was to explore differences in MSs between the ages of 30 to 60 with <1 year and >1 year participation in swimming, based on the assumption that there would

be a relatively large number of recent initiates as Masters sport is one of the fastest growing areas of sport participation and is popular with the aging Baby Boomers cohort (Weir, Baker, & Horton, 2010; Young, Bennett, & Séguin, in press). The age restriction was applied to reduce the possible moderating effect of age on IOs and their relationship to FC (Young, Piamonte, Grove, & Medic, 2011). To this end, extensive efforts were undertaken to recruit athletes at aquatics events and electronically through local clubs and national sporting bodies. Data were collected on-site at the 2013 European Masters Aquatics Championships which had over 5000 athletes in attendance, yet, recruitment proved to be difficult due to language barriers. As our survey was only in English, many athletes were unable to participate as they were not proficient. Electronic recruitment proved to be more promising when our research was endorsed by the United States Masters Swimming Association who consented to contacting over 50,000 club swimmers who were affiliated with their governing body. Recruitment efforts resulted in 892 MSs completing the survey. However, when descriptive statistics were performed on the distribution for duration of experience, of the only 534 individuals aged 30-60, strikingly, only 20 participants (i.e., 3.7 % of respondents) reported having been involved in Masters swimming for <1 year. Thus, we were unable to obtain an adequate sample size of MSs aged 30-60 years with <1 year experience to pursue our initially planned analyses for recent initiates (< 1 year) versus continuously involved participants (> 1 year).

Although we could not faithfully pursue the < 1 year versus > 1 year comparison, we elected to instead explore potential differences in IOs sub-themes as they relate to < 5 years or > 5 years of participation in Masters swimming. Our rationale for choosing this different delimitation is that research has shown that the majority of Masters sport participants will experience a threat or perturbation to their sport involvement during a 5 year span. Specifically,

the organizational arrangement of Masters sport in consecutive five-year brackets means that most participants will become relatively-older within their constituent age bracket (e.g., age 64 in the 60-64 year old competitive category). This relatively-older position is a threat to motivation, especially because past research has shown that as athletes move into an older position within the same age bracket, they are less likely to continue competing (Medic, Young, & Medic, 2010); in the current analysis, we are assuming that all individuals in a > 5 year group confronted such a threat and successfully continued participation, making them a hardy participatory group. Choosing this < 5 year and > 5 year delimitation also allowed us pragmatically to considering sufficient number of participants required in each group to have the statistical power necessary to use structural equation modeling. In sum, the final division of participants for this study was into two categories: 'short-term' (<5 years) and 'long-term' (>5 years) participation. Using this new delineation, the purpose of this portion of study was to examine whether specific IOs differently predicted FC and OC in short- and long-term MSs.

Methods

Analyses described herein relate to the *same* cross-sectional design, ethics procedures, online survey, screening, and participant pool outlined in Chapter 3. 534 swimmers aged 30-60 completed the survey. The initial dataset was divided into two groups for subsequent analyses. The first group, which we hereafter refer to as the *short-term group*, consisted of 173 participants (61 males, 112 females; M_{age} = 44.49, *SD* = 8.64, age range: 30-60) who reported less than five years of continuous involvement in masters swimming (< 1 year: *n* = 20, 11.6%; 1-2 years: *n* = 42, 24.3%; 2-3 years: *n* = 48, 27.7%; 3-4 years: *n* = 39, 22.5%; 4-5 years: *n* = 24, 13.9%). The second group, which we refer to as the *long-term group*, consisted of 361 participants (114 males, 247 females; M_{age} = 48.19, *SD* = 8.34, age range: 30-60) who reported five or more years of

continuous involvement in masters swimming (5-10 years: *n* = 106; 10-15 years: *n* = 69; 15-20 years: *n* = 67; 20-25 years: *n* = 40; 25-30: years *n* = 38; >30 years: *n* = 41).

Survey Measures

A total of 43 IOs items representing nine latent factors that previously demonstrated construct validity were borrowed from the final measurement model in Manuscript 1 from this thesis (see page 127). These nine factors were the opportunity for *Personal Pursuits* (4 items), *Stress Relief* (4 items), *Team Attachment* (5 items), *Professional Prospects* (3 items), *Recognition from Others for Competitive Achievements* (11 items), *Health and Fitness* (3 items), to *Delay and Negotiate Aging* (5 items), *Travel* (4 items), and *Establish and Develop Friendships* (4 items). A tenth factor, *Enjoyment* (6 items) was borrowed from the merged *enjoyment* and *the opportunity to enjoy myself* latent factors in Manuscript 2 from this thesis (see page 119). Six items representing FC and five items representing OC were borrowed from previous sport commitment literature (Young & Medic, 2011a; Young, et al., 2011; Wilson et al., 2004). For all items, please refer to Appendix J.

Planned Analyses

Structural equation modeling (SEM) was conducted in three stages, with analyses taken to examine measurement model invariance prior to structural (causal) group invariance (Byrne, 2010). In the first stage, measurement model group invariance for IOs was tested between the short- and long-term groups. The initial establishment of measurement invariance is important because it means that the same IOs construct is being measured similarly irrespective of group membership. In the second stage, structural model group invariance was tested for FC. The third stage tested structural model group invariance for OC. Beyond establishing measurement

invariance, structural model invariance importantly tells us whether specific IOs sub-themes differently predict FC or OC for short- and long-term athletes.

We used the direct/indirect model to test for invariance as it was determined to be the best-fitting model that provided information for not only the sources of commitment, but also for sources of enjoyment (see Manuscript 2, this thesis; Choosakul, et al., 2009; Weiss et al., 2001). In all invariance analyses, guidelines by Byrne (2004; 2010) were followed. First, baseline models were inspected for both the short- and long-term groups independently and error covariances were added based on modification indices (MIs) that were present for *both* groups. Once baseline models had been specified independently and matched across groups, they were incorporated into a single model, titled the configural model. Second, the configural model was advanced to test for group invariance in the short- and long-term groups simultaneously. The configural model provided model fit indices for both the short- and long-term groups simultaneously by estimating parameters for both groups at the same time with no equality constraints imposed upon the model (i.e., values for parameters were free to vary across groups). Invariance testing proceeded from this configural model in a hierarchical, stepwise way. Subsequent models were specified in a systematic way so that certain sets of parameters were systematically and increasingly constrained (i.e., set to be equal across short- and long-term groups) within the model and compared against this configural model. The configural model provided the baseline fit value – for each systematic change in constraints, the corresponding change in model fit was compared to the configural model to test for significance.

If significant differences in model fit were found between the configural model and a subsequently constrained model, this would indicate possible non-invariance between the short- and long-term groups, and between group differences for at least one parameter within a set of

constrained parameters (Byrne, 2004; 2010; Byrne, Shavelson, & Muthén, 1989). According to Byrne (2010), there are several ways to statistically determine whether a subsequent model step is significantly different from the configural model and to pinpoint sources of group non-invariance. The significance associated with the change in chi-square between the configural model and a subsequently constrained model is a common method used, whereby a *p*-value of <.01 (a conservative guideline) indicates significant between group differences for at least one parameter. Another conservative method to identify group non-invariance is to examine the change in Comparative Fit Index (CFI) between the configural model and a subsequently constrained model, whereby a change that is greater than .01 indicates at least one significant parameter that is variant between the two groups (Byrne, 2010). If significant criteria were found and indicated possible non-invariance, further analyses would conducted to determine which exact parameters were accounting for these non-invariant findings, by constraining parameters one by one, and comparing these successive iterations of the model to the configural model fit (see Byrne 2004; 2010, for full descriptions of steps).

Results

Involvement Opportunities Measurement Model: Group Invariance

The measurement model consisted of nine latent factors representing IOs constructs. The measurement model allowed all observed items to load onto one latent factor, latent factors were permitted to co-vary, and one path from each latent variable to one observed variable was constrained by assigning the value of '1' (see Figure 5.1). Prior to testing a configural model (i.e., the multiple group baseline model that would be tested for its invariance across short- and long-term groups), it was first necessary to examine baseline models separately for each group to ensure that measurement models could be similarly specified across groups (Byrne, 2010). The

baseline models were first estimated with maximum likelihood estimation and model fit was determined using Chi-square, Comparative Fit Index (CFI), and Root Mean Square Error of Approximation (RMSEA) values (Byrne, 2010; Garson, 2010; Tabachnick & Fidell, 2013). Additions of error covariances to each measurement model were guided by MIs and were only made if they were present in both the short-term and long-term groups.

After inspecting the baseline model for the short-term group, we noted evidence of multivariate kurtosis (217.76) and univariate kurtosis for the items 'to improve my fitness' (9.12) and 'to look and feel healthy' (9.46). Two outlying cases were removed and two error covariances were added between 'to be known as a good athlete' and 'to demonstrate my ability to others', and between 'to receive awards and trophies' and 'to be publicly recognized for my achievements'. The model fit was $\chi^2(1080, n = 171) = 1894.28$, $p < .001$, CFI = .85, RMSEA = .066 (.061-.071), $p < .001$, Hoelter .01 = 109. Although the measurement model for the short-term group did not meet standard criteria (i.e., CFI, χ^2 index) for good fit, these criteria are often highly sensitive to small sample sizes and kurtosis, both of which applied to our sample. Unfortunately, AMOS v.21 does not support robust fit indices to adjust fit indices to account for multivariate kurtosis, thus we were unable to calculate the 'true' CFI index value. However, the RMSEA value – an index that is sensitive to small sample sizes, approached the criterion for good fit (< .06) and met the criterion for acceptable fit (less than .08), accompanied by a smaller confidence interval, which indicates a good fit and representation of the true population value (Byrne, 2010; Garson, 2010; Tabachnick & Fidell, 2013).

The baseline model for the long-term group demonstrated multivariate (551.68) and univariate kurtosis for the items 'to improve my fitness' (14.57), 'I am very happy when I participate in my sport'(8.93), and 'I really like participating in my sport' (12.12). Two outlying

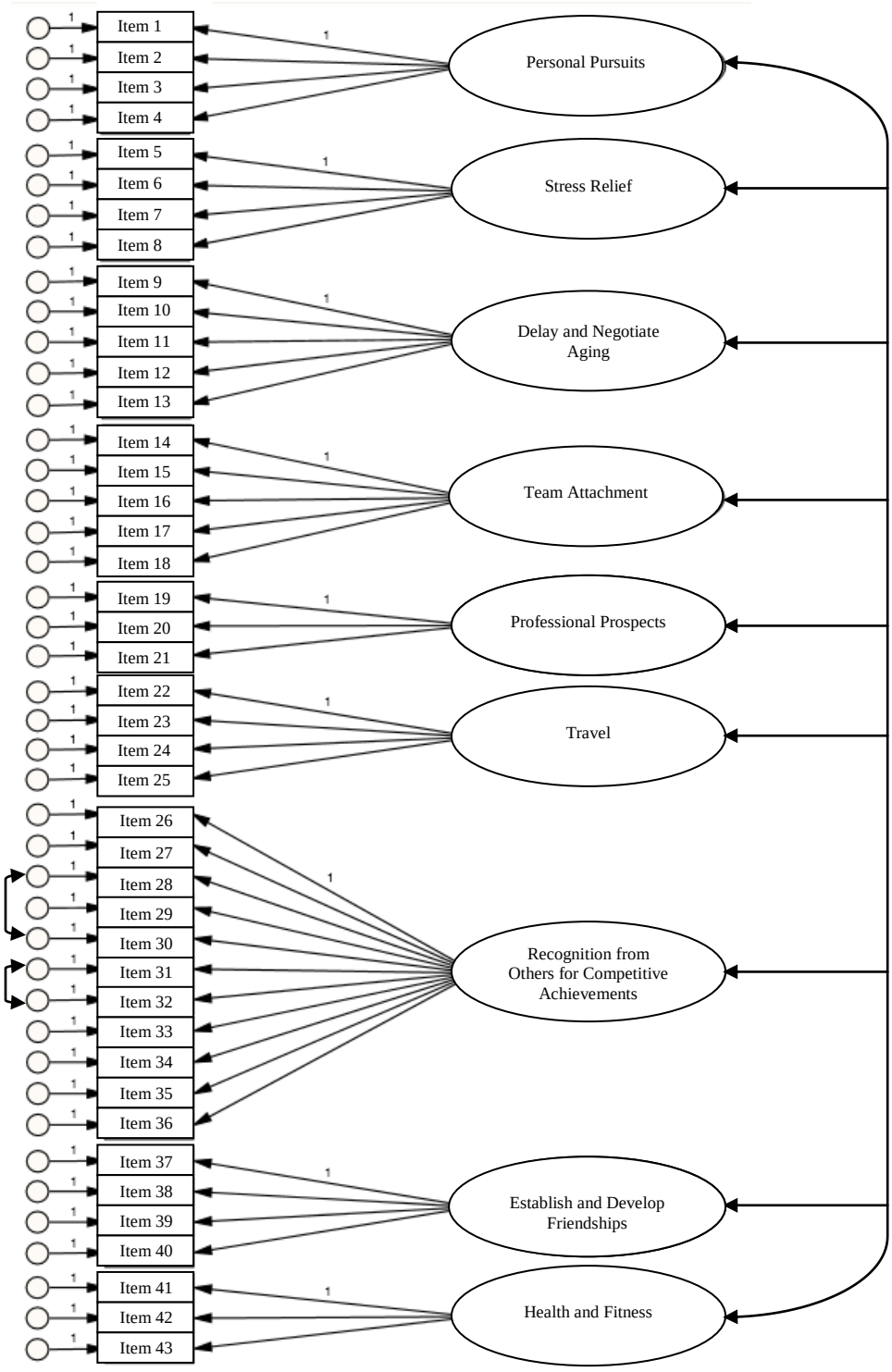

Figure 5.1. Simultaneous configural IOs measurement model representing nine sub-themes. Note: ovals signify latent variables, rectangles signify observed variables, circles signify errors, single headed-errors represent 'causal' relationships, and double-headed arrows represent covariances.

cases were removed, and the same two error covariances were added as for the baseline model of the short-term group. Final model fit was $\chi^2(1080, n = 359) = 2500.47$, $p < .001$, CFI = .88, RMSEA = .061 (.058-.064), $p < .001$, Hoelter .01 = 170. Findings for these initial examinations of baseline models yielded a model that was identically specified for short- and long-term groups, which became the configural model used in the subsequent testing for measurement invariance.

To test for group invariance, both groups were tested simultaneously using SEM. In invariance testing, the configural model represents the model in which no parameters are constrained, that is to say that all parameters in the model are free to be estimated for each group independently. All comparisons using maximum likelihood estimation techniques are made in contrast to the configural model, to identify whether constraining sets of parameters to be equal across groups makes the model fit significantly worse. To this end, our configural model was systematically and increasingly constrained to be invariant across groups. According to the outline by Byrne (2010), parameter constraints were accrued in the following order: 1) no constraints; 2) measurement pathways between latent factors and indicator variables; 3) error covariances; and 4) factor covariances (see Table 5.1).

Table 5.1

Results for Testing of Group Invariance for the Involvement Opportunities Measurement Model Comparisons between Short-term vs. Long-term Groups

Model	χ^2	$\Delta\chi^2$	df	Δdf	CFI	ΔCFI	sig.
1) Configural	4396.14	-	2160	-	.875	-	-
2) Regressions constrained	4429.72	33.58	2199	39	.875	0	.715
3) Regressions and error covariances constrained	4433.08	36.94	2201	41	.875	0	.652
4) Regressions, error covariances, and factor covariances constrained	4507.94	111.80	2246	86	.873	.002	.032

Table 5.1 indicates that the change in χ^2 model fit for the constrained Model 4 compared to the configural model is $p = .032$; however, the change in CFI is less than .01. Byrne (2010) recognized different methods for identifying non-invariance across groups. With respect to χ^2 change as a method to assess non-invariance, Byrne particularly noted that a confidence interval of 99% may be more appropriate than the traditional guideline of 95% to have confidence that the group differences are in fact real and that a Type I error is not committed. Moreover, Byrne has also advocated for the assessment of the change in CFI to assess group invariance. With respect to change in CFI values observed between the configural model CFI value and each subsequently constrained model in Table 5.1, Byrne contended that unless the change value is greater than .01, we cannot state with certainty that there are in fact group differences. As the current research is novel, we chose to use guidelines that were more stringent and to apply a more stringent significance criterion with respect to χ^2 change, and to apply the CFI change criterion as well. Additionally, as the model did not achieve adequate fit for all fit indices, we cannot have full confidence in potential variance findings. Thus, we concluded that there was no substantive evidence for group differences in the IOs measurement model. Group invariance for the measurement model allowed us to proceed to testing of the causal structural model as we have now established that the same constructs are being measured similarly across both groups.

Testing for Group Invariance Relating to the Structural Model for Functional Commitment

The FC direct-indirect structural model consisted of nine latent factors representing the IOs constructs, *enjoyment* as a mediating variable, and FC as the dependent variable. The nine IOs latent factors were permitted to co-vary, one path from each latent variable to one observed variable was constrained by assigning the value of '1', and the *enjoyment* and FC latent factors

were given disturbance terms (see Figure 5.2). In keeping with the direct-indirect model affirmed in prior analyses (see Manuscript 2, this thesis), indirect causal paths were drawn from the nine IOs latent variables to enjoyment and direct causal pathways were drawn from the nine IOs latent variables and *enjoyment* to FC. Prior to testing a configural model, it was first necessary to examine baseline models separately for each group to ensure that structural models could be similarly specified across groups (Byrne, 2010). Thus, the baseline models were first estimated with maximum likelihood estimation for short- and long-term swimmers separately. Error covariances guided by MIs were only added if they were present in both groups.

The baseline model for the short-term group demonstrated multivariate kurtosis (278.49) and univariate kurtosis for the items 'I want to keep doing my sport' (11.35), 'I am determined to keep doing my sport' (7.64), 'I am committed to keep doing my sport' (8.83), 'to improve my fitness' (9.12), and 'to look and feel healthy' (9.46). Three outlying cases were removed and two error covariances were added between items 'to be known as a good athlete' and 'to demonstrate my ability to others', and between items 'to be publicly recognized for my achievements' and 'to receive awards and trophies', thereby improving model fit. The final model fit was $\chi^2(1373, n = 170) = 2431.51$, $p < .001$, CFI = .82, RMSEA = .068 (.063-.072), $p < .001$, Hoelter .01 = 105.

The baseline model for the long-term group demonstrated multivariate (741.10) and univariate kurtosis for the items 'I want to keep doing my sport' (16.78), 'I am determined to keep doing my sport' (8.22), 'I really like participating I my sport' (12.12), 'I am very happy when I participate in my sport' (8.93), and 'to improve my fitness' (14.57). Two outlying cases were removed and the same two error covariances were added to the baseline model as for the short-term baseline model. Final model fit was $\chi^2(1373, n = 359) = 2965.62$, $p < .001$, CFI = .88,

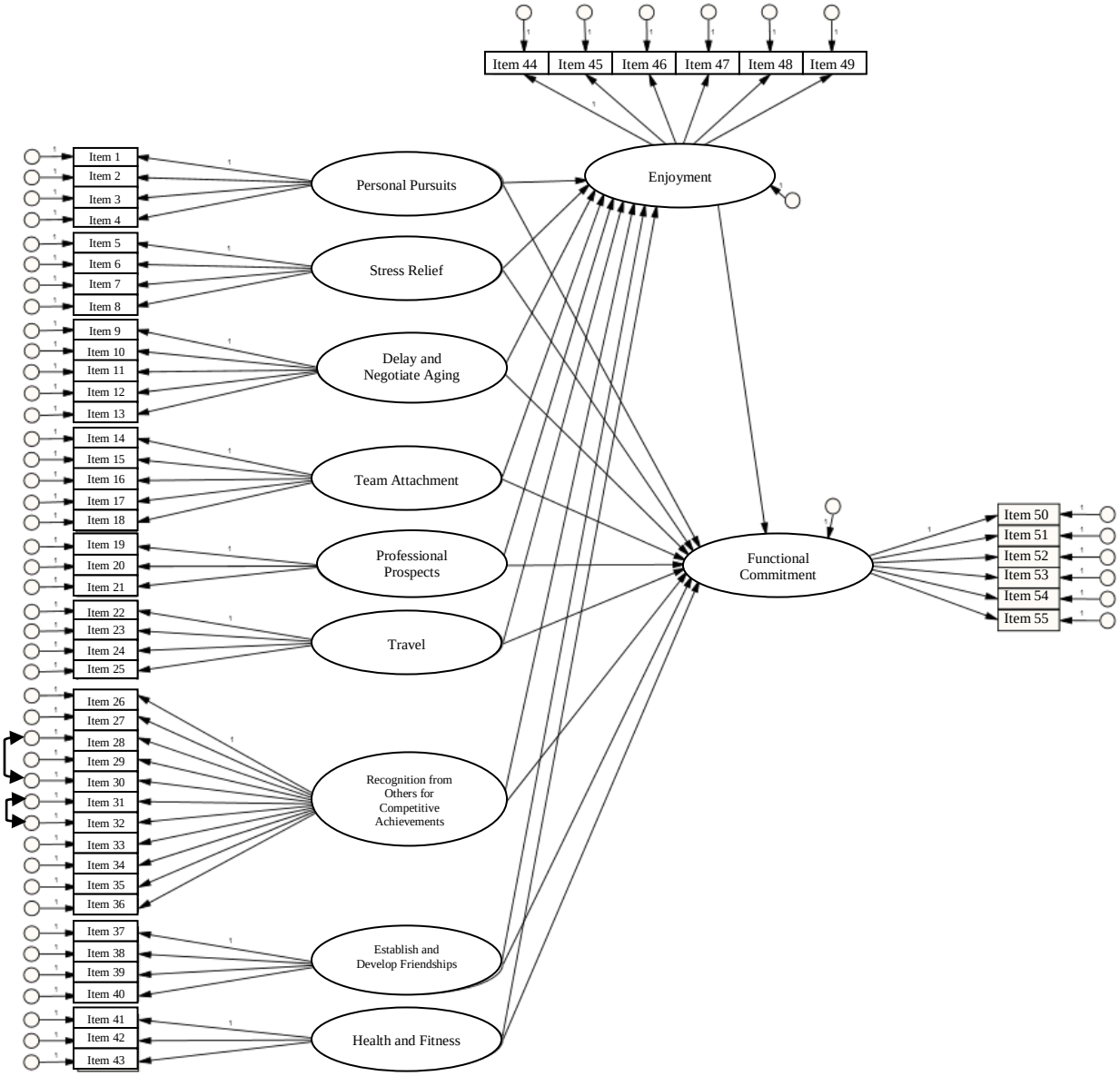

Figure 5.2. Direct-indirect structural equation model for functional commitment group invariance testing. The indicator variables for the nine latent involvement opportunities were the same as those in the measurement model and all nine latent factors were free to co-vary. Note: ovals signify latent variables, rectangles signify observed variables, circles signify errors or disturbance terms, single headed-errors represent 'causal' relationships, and double-headed arrows represent covariances.

Table 5.2

Results from Invariance Tests between Short-and Long-term Groups for a Direct-indirect Structural Model Explaining Functional Commitment

Model	χ^2	$\Delta\chi^2$	df	Δdf	CFI	ΔCFI	sig.
1) Configural	5399.33	-	2746		.867	-	-
2) Measurement pathways constrained	5448.13	48.80	2790	44	.867	0	.286
3) Measurement and structural pathways constrained	5482.28	82.96	2809	63	.866	.001	.047
4) Measurement pathways, structural pathways, and error covariances constrained	5476.14	76.81	2809	63	.866	.001	.113
5) Measurement pathways, structural pathways, error covariances, and factor covariances constrained	5535.62	136.29	2845	99	.865	.002	.008

RMSEA = .057 (.054-.060), p <.001, Hoelter .01 = 181. These initial examinations of baseline models resulted in a model that was similarly specified for short- and long-term groups, which became the configural model used in subsequent testing of causal paths for group invariance.

To test for group invariance, both groups were tested simultaneously using SEM. The model was increasingly constrained to be invariant across groups. Parameter constraints were accrued in the following order: 1) no constraints; 2) measurement pathways between latent factors and indicator variables; 3) structural pathways; 4) error covariances; and 5) factor covariances (see Table 5.2). Table 5.2 indicates that the change in χ^2 model fit was non-significant (p >.01) and the change in CFI was <.01 for each increasingly constrained model. In light of the poor model fit, paired with little substantive evidence of invariance with respect to the structural pathways, we do not have definitive evidence to conclude non-variance across groups.

Finally, to test more rigorously for between group differences, we refined the configural model by removing non-significant pathways to reduce the number of parameters in the structural model. To do this, regression coefficients for causal paths were re-examined for each of the baseline models, separately, for short- and long-term groups. Non-significant causal paths were identified, and were deleted from the resulting configural model only when the same causal path failed to approach significance in both groups ($p < .07$). Pathways from each of *team attachment* and *professional prospects* to *enjoyment*, and pathways from each of *stress relief*, *professional prospects*, *travel*, and *recognition from others for competitive achievements* to FC were cut from the configural model. This configural model was moved forward for structural invariance testing, following the recommended systematic and incremental pattern of applying constraints (Byrne, 2010). Table 5.3 shows that no significant differences were observed for any constrained model step compared to the configural model. In sum, these tests for causal structural model invariance for FC appeared to show that the short- and long-term groups are invariant, even when non-significant pathways were removed from the causal structural model.

Testing for Group Invariance Relating to the Structural Model for Obligatory Commitment

The OC direct-indirect structural model consisted of nine latent factors representing the IOs construct, *enjoyment* as a mediating variable, and OC as the dependent variable. The nine IOs latent factors were permitted to co-vary, one path from each latent variable to one observed variable was constrained by assigning the value of '1', and the *enjoyment* and OC latent factors were given disturbance terms (see Figure 5.3). In keeping with the direct-indirect model affirmed in prior analyses (Choosakul et al., 2009; Weiss et al., 2001), causal paths were drawn from the nine IOs latent variables to enjoyment and direct causal pathways were drawn from the

Table 5.3

Results from Invariance Tests between Short- and Long-term Groups for a Direct-indirect Structural Model Explaining Functional Commitment, using a Configural Model for which Non-significant Paths had been Removed

Model	χ^2	$\Delta\chi^2$	df	Δdf	CFI	ΔCFI	sig.
1) Configural	5410.39	-	2758		.867	-	-
2) Measurement pathways constrained	5459.09	48.70	2802	44	.867	0	.290
3) Measurement and structural pathways constrained	5475.85	65.46	2813	55	.867	0	.158
4) Measurement pathways, structural pathways, and error covariances constrained	5479.40	69.01	2815	57	.866	.001	.132
5) Measurement pathways, structural pathways, error covariances, and factor covariances constrained	5518.74	108.35	2846	88	.866	.001	.070

nine IOs latent variables and *enjoyment* to OC. It was first necessary to examine baseline models separately for each group to ensure that structural models could be similarly specified across groups in a configural model (Byrne, 2010). The baseline models were first estimated with maximum likelihood estimation for short- and long-term swimmers separately. Error covariances guided by MIs were added only if they were present in both groups.

The baseline model for the short-term group demonstrated multivariate kurtosis (221.95) and univariate kurtosis for the items 'I feel forced to continue my sport involvement' (13.33), 'to improve my fitness' (9.12), and 'to look and feel healthy' (9.46). After inspecting the baseline model fit for the short-term group, three outlying cases were removed and three error covariances were added between items 'I feel that my sport involvement is a duty' and 'I feel forced to continue my sport involvement', between items 'to be known as a good athlete' and 'to

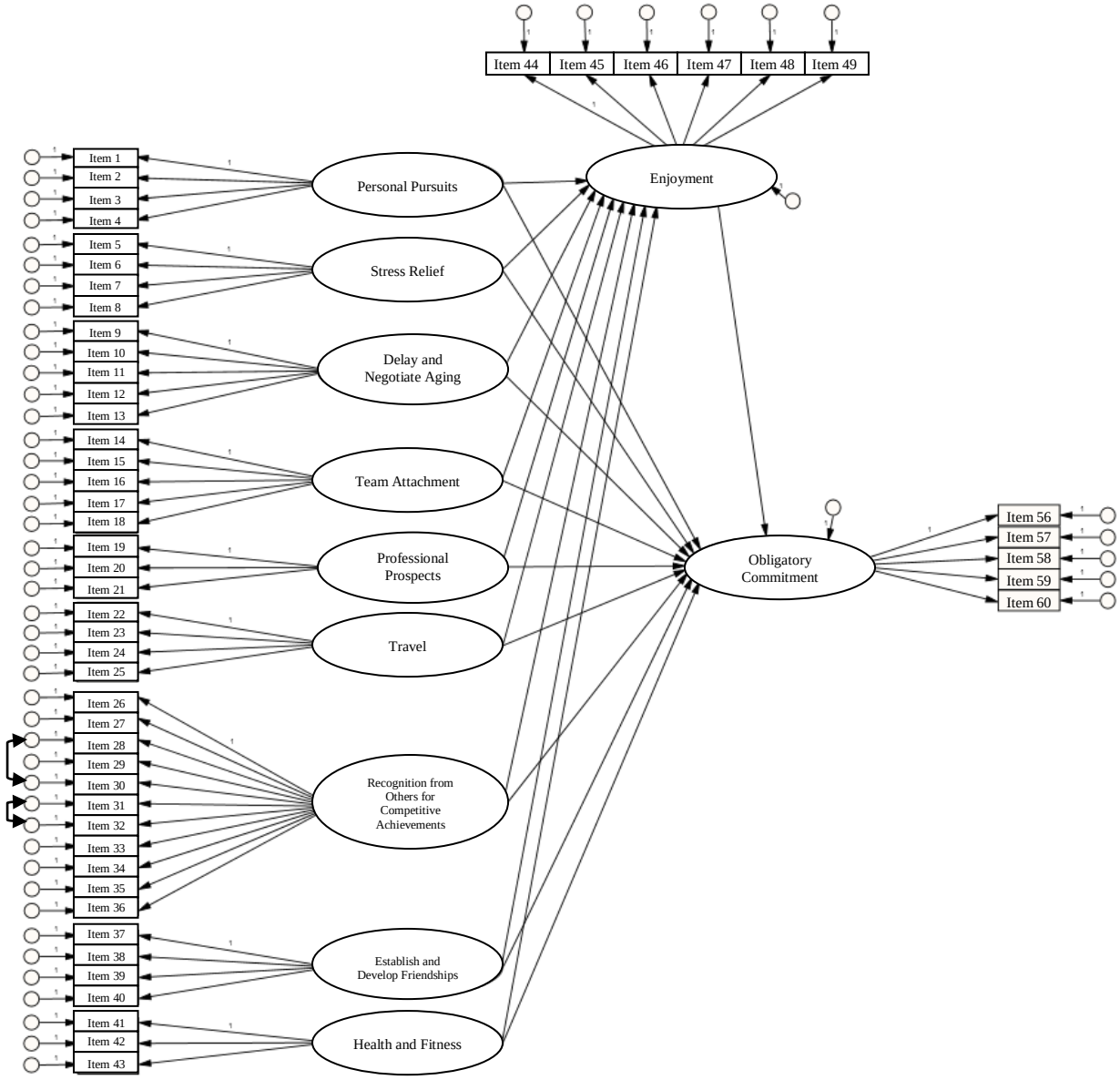

Figure 5.3. Direct-indirect structural equation model for obligatory commitment group invariance testing. The indicator variables for the nine latent involvement opportunities were the same as those in the measurement model and all nine latent factors were free to co-vary. Note: ovals signify latent variables, rectangles signify observed variables, circles signify error or disturbance terms, single headed-errors represent 'causal' relationships, and double-headed arrows represent covariances.

demonstrate my ability to others', and between items 'to be publicly recognized for my achievements' and 'to receive awards and trophies'. The final model fit was $\chi^2(1319, n = 170) = 2218.78$, $p < .001$, CFI = .84, RMSEA = .063 (.059-.068), $p < .001$, Hoelter .01 = 111. The baseline model for the long-term group demonstrated multivariate kurtosis (562.49) and univariate kurtosis for the items 'I feel forced to continue my sport involvement' (10.64), 'I really like participating in my sport' (12.12), and 'to improve my fitness' (14.57). Two outlying cases were removed and the same three error covariances were added as in the short-term group baseline model. The final model fit was $\chi^2(5216.64, n = 359) = 2871.14$, $p < .001$, CFI = .88, RMSEA = .057 (.054-.060), $p < .001$, Hoelter .01 = 180. At this point, the configural model was similarly specified to represent short- and long-term groups. To test for group invariance, both

Table 5.4

Results from Invariance Tests between Short -and Long-term Groups for a Direct-indirect Structural Model Explaining Obligatory Commitment

Model	χ^2	$\Delta\chi^2$	df	Δdf	CFI	ΔCFI	sig.
1) Configural	5091.71	-	2638		.868	-	-
2) Measurement pathways constrained	5134.49	42.77	2681	43	.868	0	.481
3) Measurement and structural pathways constrained	5152.89	61.17	2700	62	.869	.001	.506
4) Measurement pathways, structural pathways, and error covariances constrained	5156.67	64.96	2703	65	.868	0	.478
5) Measurement pathways, structural pathways, error covariances, and factor covariances constrained	5216.64	124.93	2739	101	.867	.001	.053

groups were tested simultaneously using SEM. The configural structural model was systematically and increasingly constrained to be invariant across groups (Byrne, 2010). Parameter constraints were accrued in the following order: 1) no constraints; 2) measurement pathways between latent factors and indicator variables; 3) structural pathways; 4) error covariances; and 5) factor covariances. Paired with the inadequate CFI fit index, results in Table 5.4 show that the groups were found to be invariant for all constrained models compared to the configural model.

Table 5.5

Results from Invariance Tests between Short- and Long-term Groups for a Direct-indirect Structural Model Explaining Obligatory Commitment, using a Configural Model for which Non-significant Paths had been Removed

Model	χ^2	$\Delta\chi^2$	df	Δdf	CFI	ΔCFI	sig.
1) Configural	5095.57	-	2646	-	.869	-	-
2) Measurement pathways constrained	5138.87	43.30	2689	43	.869	0	.458
3) Measurement and structural pathways constrained	5156.09	60.52	2704	58	.869	0	.385
4) Measurement pathways, structural pathways, and error covariances constrained	5159.62	64.35	2707	61	.869	0	.360
5) Measurement pathways, structural pathways, error covariances, and factor covariances constrained	5219.81	124.24	2743	97	.867	.002	.033

Finally, we refined the configural model by removing non-significant pathways to reduce the number of parameters to more rigorously test for group differences. To do this, regression coefficients for causal paths were re-examined for each of the baseline models, separately, for short- and long-term groups. Non-significant causal paths were identified, and were deleted

from the resulting configural model only when the same causal path failed to approach significance for both groups (i.e., $p > .07$). Pathways from each of *team attachment* and *Professional prospects* to *enjoyment* and pathways from each of *travel* and *health and fitness* to OC were cut from the configural model. When this configural model was advanced for invariance testing, (see Table 5.5), results showed a non-significant change in χ^2 model fit and a change in CFI <.01. In sum, these tests for causal structural model invariance for OC paired with unacceptable CFI index fit mean that we do not have evidence to support invariance between the short- and long-term groups.

Discussion

One of the purposes of this study was to compare how specific IOs may differently predict FC and OC in short- and long-term MSs. Before determining whether groups differed on causal relationships, it was important to determine whether they were equivalent with respect to the measurement model pertaining to nine latent IOs factors. Results identified no significant differences between short- and long-term swimmers. This means that the survey measured the IOs constructs the same way in groups of MSs varying in duration of involvement.

Once measurement model invariance was established, we tested for structural model group invariance separately for FC and OC. As this study's research is novel, we elected to use a more conservative guideline in establishing instances of group non-invariance. We followed Byrne's (2010) conservative recommendation to use two sets of statistical criteria – that is, a constrained model should show a significant change in χ^2 model fit as well as a change in CFI model fit greater than >.01, when compared to the configural model. When we examined the direct-indirect structural model for FC, our results failed to show significant evidence for invariance; this was also the case even when non-significant pathways were removed from the

configural model. Finally, our results revealed no significant between-group structural differences in a direct-indirect model for OC, even when non-significant pathways were removed from the configural model. It is important to note that the CFI index was only approaching acceptable fit for each model and the results must therefore be interpreted with caution. Although it would have been ideal to use robust fit indices to adjust the CFI index to account for multivariate kurtosis, it was not a feature available in AMOS v.21. In sum, our findings do not allow us to suggest that there are differences in the causal paths predicting FC and OC between groups of athletes with less than five years of experience and those with more than five years of experience.

Future research should consider exploring potential differences between athletes who have been involved for a very brief period of time (e.g., <1 year) against those who have been involved for longer periods of time (e.g., >1 year) as potential differences may be exaggerated when comparing IOs of recent initiates to Masters swimming versus more continuously-involved participants (e.g., Chu & Wang, 2012). If such differences were to exist, we may be able to better tailor programs to more readily recruit new athletes and to maintain already active athletes.

CHAPTER 6: DISCUSSION

This project was an exploratory investigation into the IOs that are afforded to MSs and how they relate to an individual's desire or resolve to continue sport participation over time. More specifically, we were interested in developing and validating a survey instrument on IOs that was grounded in sport commitment literature, literature on Masters athletes' sport commitment, and themes on opportunities seen in broader Masters participatory motives literature (Manuscript 1). We were also interested in then testing its predictive utility for FC and OC (Manuscript 2). Furthermore, we examined the placement of enjoyment within a structural model and how enjoyment may mediate specific pathways to two commitment types (Manuscript 2). We also explored potential differences in the specific IOs sub-themes as they may relate differently to short- and long-term swimmers (Chapter 5). Analyses were pursued to advance the assessment of IOs at the level of the sub-theme for future research and to provide evidence-based recommendations for programming and marketing specific opportunities to enhance commitment. This chapter will also provide: (a) a succinct summary of the findings of each study; (b) overall strengths, limitations, and future directions; and (c) the practical applications and impact of the research.

Summary of Studies

Manuscript 1. The first manuscript focused on the development and validation of an instrument grounded in sport commitment and Masters sport literature that could be used to measure and assess IOs at the level of the sub-theme. 65 original items representing 11 hypothesized IOs sub-themes were submitted to three stages of analyses that involved EFA, CFA, and tests of invariance, using calibration and cross-validations samples of MSs. In the end, a 10 factor IOs measurement model structure was confirmed and validated using SEM. The 10 sub-

themes comprised of 47 items that were identified were: *Personal Pursuits; Stress Relief; Delay and Negotiate Aging; Team Attachment*; *Professional Prospects*; *Travel*; *Recognition from Others for Competitive Achievements*; *Establish and Develop Friendships*; *Health and Fitness*; and *Enjoyment*.

The scales had evidence of convergent factor validity such that all items loaded on a single factor with moderate, significant standardized regression weights above .63 and .60 for the calibration and cross-validation samples, respectively and there were no cross-loadings across factors. All scales demonstrated high internal consistency. The scales also demonstrated divergent factor validity such that indicator variables were more strongly associated with their respective latent factor than others and all inter-factor correlations were below .70 (Byrne, 2010), with the exception of *Establish and Develop Friendships* and *Team Affiliation* that were correlated at .74 and .73 for the calibration and cross-validation samples, respectively. In sum, we developed and validated a new survey instrument to measure IOs at the level of the sub-theme.

Manuscript 2. The objective of Manuscript 2 was to examine the direct and indirect relationships between specific IOs sub-themes to FC and OC, and to test the placement of enjoyment within the model to identify how enjoyment may mediate such relationships. First, we tested to see if enjoyment and the opportunity to enjoy oneself were two conceptually distinct factors. We were unable to find evidence to support two distinct concepts and hence merged the two temporally different concepts under a single factor called enjoyment. Next, we tested the placement of enjoyment in three different structural model configurations to test the predictive utility of IOs sub-themes for FC and OC separately: (a) a direct model where all IOs sub-themes and enjoyment directly predicted commitment; (b) an indirect model where enjoyment acts as a

mediating variable between IOs sub-themes and commitment; and (c) a direct/indirect model where IOs sub-themes could directly and/or indirectly predict commitment. We also tested a fourth direct/indirect model that tested the predictive utility of IOs sub-themes concurrently for FC and OC. Similar to past structural modeling studies (e.g., Choosakul et al., 2009; Wilson et al., 2004), we felt the fourth model that attained adequate fit was the most representative model that provided additional theoretical relevance as it identified not only sources of commitment, but also sources and consequences of enjoyment. In addition, testing FC and OC concurrently accounted for shared explained variance from IOs sub-themes and permitted the comparison of associations and causal paths.

Results showed that specific IOs have different pathways and associations to FC and OC and that models of commitment need to consider enjoyment as a mediator for IOs. The opportunity for health and fitness was the strongest predictor of FC and was the sole positive, direct predictor of FC. Health and fitness also had an indirect effect on FC through enjoyment. Moreover, it did not associate with OC. Opportunities for personal pursuits, stress relief, to establish and develop friendships, and delay and negotiate aging had both indirect, or enjoyment-mediated effects on FC, and direct effects on OC, concurrently. Opportunities for personal pursuits and stress relief were positively and indirectly associated with FC through enjoyment, and were at the same time positively and directly related to OC. The opportunity to establish and develop friendships was positively and indirectly associated with FC, while also being negatively and directly associated with OC. The opportunity to delay and negotiate aging was indirectly and negatively associated with FC while it was directly and positively associated with OC. The effects of team attachment and recognition from others for competitive achievements were uniquely upon OC. Team attachment was the strongest predictor of OC. Finally, the opportunity

for professionally prospects and to travel were both non-significantly associated with both commitment types which may be related to the competition level of our sample of MSs.

Chapter 5. The purpose of Chapter 5 was to use invariance testing to identify if specific IOs sub-themes differently predicted FC and OC in short- (< 5 years) and long-term (>5 years) athletes. Using conservative guidelines, we identified no significant between groups differences for how IOs sub-themes are measured and how they predict FC and OC. Even when non-significant pathways were removed from the model, there was still no firm significant between group differences.

Questions that were Answered

Can a variety of distinct involvement opportunities sub-themes be measured validly within a sample of Masters swimmers? Past research with the sport commitment model has yielded equivocal findings for the association between IOs and uni-dimensional (e.g., Casper et al., 2008; Zaharidas et al., 2006) and bi-dimensional (e.g., Young et al., 2011) commitment, or has dropped the construct altogether (e.g., Gabriele et al., 2011; Wilson et al., 2004). Many of the equivocal findings were related to inconsistent or incomplete content in the measurement of the IOs construct, and/or the overlap of content with the enjoyment construct in the sport commitment model. As such, we decided to address this issue pertaining to the unrealized contribution of IOs by using a novel approach to methodology (i.e., considering IOs as sub-themes instead of a collective like prior work) and generation of item content (i.e., examining a greater variety and breadth of opportunities than prior work) and how it may impact findings for commitment. Our findings provide preliminary support for the factorially valid assessment of a variety of distinct IOs sub-themes in a sample of MSs.

This thesis provided evidence for the emergence of the Involvement Opportunities Scale (IOS) which showed acceptable indices for factorial validity. This scale comprises 47 items across 10 sub-themes entitled, respectively, as the opportunity: for *Personal Pursuits; Stress Relief; Team Attachment*; *Recognition from Others for Competitive Achievements*; *Health and Fitness*; *Enjoyment; Professional Prospects*; to *Travel*; *Delay and Negotiate Aging;* and *Establish and Develop Friendships*. The scale demonstrated convergent validity as all regression pathways were moderate to high, divergent validity as there were no items cross-loading between different latent factors, and there were generally low inter-factor correlations (with one minor exception), and all sub-theme scales had a Cronbach alpha >.70 (Manuscript 1, this thesis).

Our research provides an instrument that we believe captures a snapshot of the opportunities afforded to MSs as a whole. That said, we recognize that our initial inspection of the breadth and variety of sub-themes was based on an in-house review and vetting of information from what we believed to be pertinent studies. Although this process was thorough, it was limited in that an external panel was not used to authenticate the initial item pool, and other investigators in the domain of sport commitment and/or Masters sport may wish to suggest content (sub-themes) that were omitted. Future research could also consider re-examining sub-themes that were lost in the exploration process by ensuring there are sufficient items built around hypothesized themes that conceptually splintered. In particular, items centered on self-improvement that have been previously identified as valued opportunities in Masters sport research (e.g., Dionigi et al., 2011) could be re-examined..

Are there differences in how the different involvement opportunities sub-themes associate with commitment types? Findings from Manuscript 2 showed differences were identified in the strength, direction, and pathway of association from each IOs sub-theme to FC

and OC. This is a crucial finding as it demonstrates the need to consider specific sub-themes and opportunities at the thematic level as the relative contribution and effect exerted by each opportunity sub-theme may be negated when multiple sub-themes are considered as a collective construct, as was the case in prior work.

The bi-dimensional commitment model is still relatively young in the sport commitment field and has been slowly gaining traction as a necessary modification to the model. We have evidence to support this decision as the strength, direction of association, and the pathway of association varied by the IOs sub-theme. These findings, paired with those of the remaining antecedents of sport commitment in past research has begun to provide conclusive evidence for the need to consider commitment as two unique but concurrent entities (e.g., Salin et al., 2014; Wigglesworth et al., 2012; Young & Medic, 2011a; Young et al., 2011). With respect to the current thesis, however, we conclude that it appears useful to examine IOs distinctly using the IOS if one wished to better understand effects of IOs on bi-dimensional forms of commitment.

How are involvement opportunities mediated by enjoyment? A commonly hypothesized reason for the inconsistent and non-significant findings associated with IOs relates to the notion of washing out or negative suppression of IOs by the construct enjoyment (e.g., Weiss et al., 2011; Young et al., 2011a). Enjoyment has consistently been identified as the strongest predictor of sport commitment and as such it may minimize the contribution of other constructs to commitment. Another common speculation is that the washout of IOs is due to content overlap with enjoyment (e.g., Wilson et al., 2004). Many articles have used the opportunity to enjoy themselves and similarly worded statements as a way to assess IOs in sport. As our exploratory factor analysis in Manuscript 2 (this thesis) indicates, the antecedent *enjoyment* and the IOs sub-theme *the opportunity for enjoyment* are in essence measuring the

same thing. As such, we elected to merge the opportunity for enjoyment items into one enjoyment construct and advocate that future researchers use this merged construct comprising 6 items in path analyses of sport commitment in future. This merged enjoyment construct also appears suitable for examining mediating processes between IOs and commitment.

Traditionally, enjoyment is considered as an antecedent variable within the sport commitment model. Previous studies had examined the possibility of enjoyment acting as a mediator for the remaining antecedents of sport commitment and found evidence of mediation (e.g., Casper et al., 2007; Choosakul et al., 2009; Wilson et al., 2001). Our findings from Manuscript 2 (this thesis) support the need to consider enjoyment (i.e., the merged enjoyment construct discussed above) as a mediating variable as many IOs sub-themes were dependent upon enjoyment to mediate the association to FC. As enjoyment only appears to be needed as a mediating variable for FC, it is necessary to use a direct-indirect model when examining FC and OC concurrently. It was also crucial to have identified that enjoyment only served as a mediator for the association between IOs sub-themes and FC, but not for OC. This further underscores the need to consider bi-dimensional commitment types when examining associations with IOs.

Overall, our findings in Manuscript 2 showed that specific IOs sub-themes have different pathways and associations to FC and OC and that models of commitment need to consider enjoyment as a mediator for IOs. The opportunity for health and fitness was the strongest predictor of FC and was the sole positive, direct predictor of FC. Health and fitness also had an indirect effect on FC through enjoyment. Moreover, it did not associate with OC. Opportunities for personal pursuits, stress relief, to establish and develop frienships, and delay and negotiate aging had both indirect, or enjoyment-mediated effects on FC, and direct effects on OC, concurrently. Opportunities for personal pursuits and stress relief were positively and indirectly

associated with FC through enjoyment, and were at the same time positively and directly related to OC. The opportunity to establish and develop friendships was positively and indirectly associated with FC, while also being negatively and directly associated with OC. The opportunity to delay and negotiate aging was indirectly and negatively associated with FC while it was directly and positively associated with OC. The effects of team attachment and recognition from others for competitive achievements were uniquely upon OC. Team attachment was the strongest predictor of OC. Finally, professional opportunities and the opportunity to travel were both non-significantly associated with both commitment types which may be related to the competition level of our sample of MSs.

Which involvement opportunities might be promoted to facilitate sport involvement? Functional commitment, or wanting to commit, is viewed as a volitional commitment that should relate to healthy activity and prolonged activity in sport. Accordingly, findings from Manuscript 2 suggest that the opportunity to establish and develop friendships and health and fitness could be emphasized in sport marketing and programming as they are positively associated with increases in FC. However, the predictive utility of these and other IOs sub-themes in fostering FC needs to be explored using longitudinal designs, and causal effects on behaviour and sport adherence needs to be more fully examined.

From a practical perspective, there is the possibility that the IOS may have utility as an assessment tool unto itself, beyond theoretically-grounded commitment studies. For example, future research may wish to consider the use of this survey instrument outside of the SCM for marketing, advertising, and messaging (Lithopoulos et al., 2013; Young et al., in press). By using the IOS to identify the opportunities that are most highly valued and rated in a target cohort, organizations could use this information to guide programming and

marketing/advertising decisions to increase the attraction and commitment of Master athletes to their sport programs.

Questions that Remain Unanswered

How might future research clarify the inter-factor correlation between the opportunities for team attachment and opportunities for establishing and developing friendships? Although we were not pleased with the inter-factor correlation of .73 for the opportunity for team attachment and to establish and develop friendships, we believe that there is still enough face validity and statistical evidence at this point in time to continue to distinguish between these two constructs in the IOS. The content of the two sub-themes differ as team attachment is related to the unique content of a team where individuals can experience a sense of camaraderie, devotion, and belonging to a team while establishing and developing friendships can be with any individual without specifically relating it to the relationships in a team sport context. Statistically, there was evidence to support keeping the two constructs separate as there were no factor cross-loadings or shared error covariances between items for these two latent factors, and each scale had strong internal consistency (Manuscript 1, this thesis). Most importantly, the two IOs sub-themes were associated with commitment differently (Manuscript 2, this thesis). The opportunity to establish and develop friendships was positively associated with FC through enjoyment, but it was negatively associated with OC. Conversely, team attachment was positively associated with OC. Still, The inter-factor correlation of .73 draws attention to the need to consider revising or adding items to each factor in order to help clarify the content of each sub-theme and to clearly make distinct between the two themes in future work.

What are the exact direct and indirect effects of involvement opportunities that are mediated by enjoyment? Although we had determined the strength and direction of association

and the pathways by which IOs sub-themes are related to FC and OC, we are still unable to compare the strength of direct and indirect (mediated) effects and the unique explained variance for each of the IO pathways. This is an important consideration for any research looking to advance the current findings. This would be an important consideration, for example, for our result relating to the opportunity for health and fitness. Promoting opportunities for health and fitness associates with higher 'wanting to' commitment. Knowing the extent to which this association depends on adults perceiving their activity as enjoyable, and comparing this statistically to the direct promotion of health and fitness (which does not consider enjoyment), may have implications for how promotional messages could be tailored. To answer this, it would be necessary to complete a full decomposition analysis (Preacher & Kelley, 2011) in order to identify the strength of each regression and pathway and the unique variance which is explained.

What will happen to the associations between involvement opportunities, enjoyment, and commitment when the full sport commitment model is considered? Although we made the case that IOs sub-themes should first be studied alongside enjoyment, but in isolation of the remaining antecedents of sport commitment, future research needs to test IOs sub-themes amongst the remaining antecedents of sport commitment. By including the remaining antecedents of sport commitment, we will be able to identify which IOs sub-themes continue to be significant predictors of FC and OC when tested in parallel with social support, social constraints, personal investments, and involvement alternatives. We expect that the associations observed in the current thesis would change especially considering that IOs have had content overlap with social support in past work (e.g., Wilson et al., 2004), although future research using structural equation modeling is necessary to determine the extent to which various IOs become less significant (in terms of direct effects) or mediated by other antecedent constructs in

the model. Additionally, as there are two social antecedents (social support, social constraints) included within the traditional sport commitment model, it would be prudent to test for possible content overlap with our emerging sub-theme scales representing opportunities for team attachment and opportunities for establishing and developing friendships, and how the effects of these IOs scales may be mediated by social support and social constraints.

How reliable and valid is the scale for obligatory commitment? The OC scale in Manuscript 2 (this thesis) was approaching (.67) but fell just short of Nunally's (1978) criterion for internal consistency reliability. Moreover, we had to perform various re-specifications involving items in our OC scale to ensure a valid structure that was distinct from FC, and even then, the individual item loadings on the latent factor were noticeably lower for OC than FC. For example, in order to keep a minimum three items for OC, we were forced to retain one item that had a factor loading of .55. Challenges relating to internal consistently reliability and individual items within the OC construct have been noted in past research with the bi-dimensional sport commitment model (Wilson et al., 2004). As such, future research should consider reviewing and revising the OC scale in order to refine and add or remove questions to improve the internal consistency and validity of this important scale.

What is the long-term impact of obligatory commitment on sport participation continuity? It remains unclear whether OC serves to facilitate commitment and whether these conditions change over time. To date, there is no research that has examined the long-term impact of OC on sport participation continuity and dropout. Wilson et al. (2004) noted that OC could have some psychological parallels to less self-determined forms of motivation and research shows that motivational regulations related to 'duty' (i.e,, introjected regulation) can have benefits to sport participation in the short term that disappear in the long-term (e.g., Pelletier et

al., 2001). More seriously, however, being motivated by controlling motives such as obligation can actually be harmful, undermining the quality of the sport activity experience, with literature noting that these are motives that should not be encouraged at all (Weis & Amorose, 2008). If, in fact there are parallels between the impacts of less self-determined motives and OC, compromised adult sport experiences and dropout may be potential consequences of promoting OC; in this case, it may be more important to inform strategies to help athletes decrease their levels of OC, or maintain them at much lower levels relative to FC. Research needs to examine this construct longitudinally in order to provide justification to support high or low levels of OC as a way to increase long-term participation. Until its impact has been explored, we are unable to draw conclusions about whether or not we should be promoting aspects of sport that increase OC. Thus, we would advise caution in promoting IOs that foster OC, particularly OC exclusively with no concurrent fostering of FC (e.g., team attachment and recognition from others for competitive achievements), until the consequences of OC on Masters athletes' persistence and sporting experiences are better understood in future research.

One interesting notion to pursue in future research is whether promoting certain IOs that encourage both FC and OC might be adaptive for encouraging continuity of sport involvement. It could be that moderate levels of OC are effective for sustaining healthy participation as long as they are paired with higher levels of FC. If we knew the effects of the two commitment types in tandem on continuity, this would help us better appraise the applied implications of some of the present findings for IOs. For example, opportunities for health and fitness, personal pursuits, and to establish and develop friendships should be emphasized in marketing and programming initiatives as they are associated with increases in FC. This said, we refrain from promoting these

IOs explicitly at this point because the existing sport commitment research does not inform us about the consequent effects of OC and FC in tandem.

How generalizable are the current findings? Our participants for this study varied significantly in age and ethnicity. Unfortunately due to our sample size, we were unable to control for ethnicity, sex, age, or team/individual sports when conducting our analyses. The lack of homogeneity in the sample makes it more difficult to generalize the findings of this study to a specific population or to other sports. Although it would be expected that the strength and direction of association may vary by sample, it would be reasonable to expect to find some generalizability of the sub-themes that were identified in Manuscript 1 (this thesis) across a wide range of populations and sports. Future research should consider validating the IOS in different populations prior to conducting further analyses.

Are there differences pertaining to IOs between recent initiates and continuously involved swimmers? Although it would have been ideal to explore the differences between recent initiates (<1 year) and continuously involved (>1year) athletes, it was not feasible with our sample distribution. Research has often focused on the motives for continuing sport participation and dropping out, yet less has examined why an individual chooses to join an activity, for example, within the first year of involvement, compared to the opportunities that explain why an individual perpetuates involvement across many years. This notion was not suitably examined in the present thesis. Instead, the purpose of Chapter 5 was to use invariance testing to identify if specific IOs sub-themes differently predicted FC and OC in short- (< 5 years) and long-term (>5 years) athletes. Using conservative guidelines, we identified no significant between groups differences for how IOs sub-themes are measured and how they predict FC and OC. Even when non-significant pathways were removed from the model, there

was still no firm significant between group differences. Thus, we concluded that there was no substantive evidence of non-invariance between < 5 year involvement and > 5 year involvement groups in the current sample of MSs. However, future work is needed to more fully confirm this, as the respective indices for each of our < 5 and > 5 groups at baseline fell short of criteria for good fit model, meaning that our conclusions should be taken with some caution. There remains great value in examining whether our emerging IOS survey is structurally similar across recent initiates and more continuously-involved Masters. Furthermore, it would be valuable to examine how scores on the IOS sub-scales differ between recent initiates and continuously-involved groups to help in the design, marketing, and implementation of programs differently to better match the needs and motives of athletes.

Conclusion

In conclusion, the findings from this thesis have resulted in the validation of a new IOs scale (i.e. the Involvement Opportunities Scale (IOS) and supported the need to consider IOs at the level of the sub-theme. Furthermore, we have clarified the placement of enjoyment within the SCM, provided novel insights relating to the number, strength, and direction of associations from specific IOs sub-themes to FC and OC, and provided evidence for the need to use a bi-dimensional commitment model. The identification of specific IOs sub-themes and their capacity to enhance FC and OC may ultimately be used to better tailor sport programs to increase athletes' sport commitment.

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Appendix A: Letter of Permission for Recruitment from Community Organizations

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LETTER OF APPROVAL FOR RECRUITMENT PURPOSES FROM COMMUNITY (EVENT) REPRESENTATIVES

Dear Representative of *(insert sport governing body or event committee name here)*,

We are contacting you in the hope that you will consider endorsing our research and grant us permission to recruit participants who will be attending the *(insert name of sport event/tournament here)*.

This study is part of a larger research project that is examining the nature of Masters Athletes' commitment to their sport and how various involvement opportunities can facilitate athletes' involvement. The principal investigator is studying issues how participants' perceptions of special personal and social involvement opportunities relate to sport involvement across the lifespan.

We would like to distribute a questionnaire to all participants who will be attending your sporting event/tournament that are over 35 years of age. The questionnaire involves two parts. First, participants will be asked to estimate how much time they spent in various activities in their sport over the past 12 months. Second, they will be asked to judge the extent to which their sport affords them unique involvement opportunities. These tasks may take about 30 minutes to complete; however, participants do not have to complete the questionnaire on-site as they will be asked to return questionnaires using pre-stamped, pre-addressed envelopes, or invited to complete the survey online at (*insert weblink to surveymonkey.com*). Please note that the data collected is subject to the US Patriot Act.

In accordance with ethical procedures at the University of Ottawa, all the information that participants give to us will remain confidential and all steps will be taken to ensure the anonymity of participants during data analyses and reporting of results. The athletes' participation in the study is entirely voluntary. If at any time an athlete wishes to withdraw from the study, he/she may do so freely without penalty of any kind.

This study has the potential to be beneficial for all those involved. We believe that athletes will find this study interesting and worthwhile. All participants will be offered the opportunity to receive a summary of research findings. These findings might be interpretable in an instructional light, especially for middle- and older-aged adults wishing to remain engaged in sport. You will also be offered the chance to request a summary report of the results for your organization. These results may benefit your organization as well as other sport programmers who

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employ strategies to make the sporting context more inviting for increased athlete participation, especially at older ages. Finally, the information that is obtained will hopefully enable us to meet our research objectives and contribute to a better understanding of how various opportunities help motivate Masters Athletes to commit to sport.

Considering the potential benefits of this study, we ask you to consider granting us permission to print or insert our questionnaire (including an accompanying Letter of Information) in your event program to be distributed to all participants who register to attend the event and to include our web link for our online survey in both the event program and on the event's website. We also ask that you consider granting the investigators permission to maintain an on-site booth during the event. This booth will enable the investigators to be on-site to answer any questions or address concerns with regards to the questionnaire or the nature of the research, as well as to distribute flyers for interested participants to complete the survey online at a later date. If granted permission, we understand that 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. We also understand that participants at the venue would have to approach the booth to discuss our research and that investigators would not solicit participants at other locations at the venue. Finally, we ask that you consider providing us access to a roster of e-mail addresses for the participants of the event so that we may distribute recruitment e-mails to invite individuals to take part in this study. In doing so, you are attesting that you have permission as the organization's representative to share participants' e-mail addresses to the principal investigator so that we may e-mail individual recruitment invitations to each member. All e-mailed individuals can ignore/delete this e-mail freely without any penalty of any kind.

Your approval of this study is entirely voluntary and if you wish to withdraw your organization's entire approval, you have the right to do so freely at any time without reprisal and with our full compliance. If you wish to withdraw your organization's partial approval for either the event-program, the web link, or for the questionnaire booth, you have the right to do so freely at any time without reprisal and with our full compliance.

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As a representative of this organization, I consent to give the investigators permission to print or insert questionnaires in the event/tournament program that will be distributed to all participants. By signing this letter, I understand the nature of the research and have read a copy of the questionnaire.

Signature: _____ Date:_____

As a representative of this organization, I consent to include the investigators' web link for the online survey in both the event program and on the event's website.

Signature: _____ Date: _____

As a representative of this organization, I consent to give the investigators permission to maintain a questionnaire information booth on-site during the event/tournament.

Signature: _____ Date: _____

As a representative of this organization, I consent to give the investigators permission to access a roster of participants' e-mails to distribute individual recruitment e-mails. I attest that I have permission as my organizations' representative to share participants' e-mail addresses to the principal investigator so that he can e-mail individual recruitment invitations to each participant. I understand that all e-mailed individuals can ignore/delete this e-mail freely without any penalty of any kind.

Signature: _____ Date: _____

You can contact us about any part of the research being conducted at any time at the address indicated below. Information requests or complaints about the ethical conduct of the project can be addressed to the Protocol Officer for Ethics in Research indicated below.

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Appendix B: Recruitment Flyer

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University of Ottawa
Faculty of Health Sciences
School of Human Kinetics

Are you interested in helping improve sport programming?

Are you interested in sport research?

The University of Ottawa is currently seeking adults aged 25 and over who would like to participate in a study investigating the involvement opportunities afforded through sport participation and how they motivate individuals to engage in sport. Upon completion of the study, you will have the opportunity to request a summary of the findings and you will be automatically entered into a lottery to have a chance to win 1 of 6 prizes of $50.00 (Canadian).

Your participation would take approximately **10-15 minutes** and information you provide will remain anonymous.

If you would like to participate, please follow the secure weblink below:

https://www.surveymonkey.com/s/masters_sport_survey

If you would like more information, please feel free to contact one of us at information below.

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Appendix C: Recruitment E-mail Script

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RECRUITMENT EMAIL SCRIPT

Dear participant,

We have received permission from your club's representative to ask you to consider taking part in a research study and we thank you for your interest in this research. We are interested in understanding your degree of commitment to your sport as well as the different involvement opportunities that are afforded through your participation in sport. Upon completion of the study, you will have the opportunity to request a summary of the findings and will be automatically entered into a lottery for a chance to win 1 of 6 prizes of $50.00.

This survey will require you to complete the following online questionnaire that will take approximately 10-15 minutes to complete and will ask questions relating to special personal and social involvement opportunities you are afforded through your participation in sport. 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 delete this email, or should you choose not to do this study. 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.

https://www.surveymonkey.com/s/masters_sport_survey

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

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Appendix D: Letter of Information for Participants

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LETTER OF INFORMATION

Dear Athlete,

We have received permission from the EMC Committee to ask you to consider taking part in our research. The purpose of our research is to examine various sport involvement opportunities that are associated with your Masters Sport activities. We are interested in understanding your degree of commitment to your sport as well as the different involvement opportunities that are afforded through your participation in sport.

This study will require you to complete a questionnaire that asks you about personally-important personal and social opportunities you are afforded through your participation in sport. You will also be asked to provide information about how much time you spent doing activities in your sport over the past 12 months. These tasks may take about 10-25 minutes to complete. Upon completion of the study, you will have the opportunity to request a summary of the findings. The information that is obtained will hopefully enable us to meet our research objectives and contribute to a better understanding of how various involvement opportunities motivate Masters Athletes to commit to sport.

In accordance with research ethics procedures, all the information that you provide us will remain confidential. To ensure confidentiality, personal information will be coded and stored in a locked lab and password protected computer to which only the principal investigator will have access. You will be assigned an identification number in order to maintain your anonymity throughout the course of data collection and analysis. 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 upon individual cases. Information is normally kept for a period of ten years post-publication, after which it will be destroyed. Collected data will be used for analyses in the present study; data from the present study might also be used in future research in summary form, up to a period of ten years. Please note that the data collected is subject to the US Patriot Act.

You must be presently 25 years of age or older to participate. Your participation in this study is entirely voluntary. Filling out a hard copy of the questionnaire and returning it in the pre-addressed and pre-stamped envelope would indicate that you freely consent to participate in this study. Alternatively, if you complete the survey online, **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,

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understand that you have the opportunity to ask questions and discuss this study, and have been assured that your information will remain confidential. If at any time you no longer wish to continue as a participant, you may withdraw freely without penalty of any kind. If you wish to withdraw from the study after submitting the questionnaire, please indicate to the researcher either verbally or in writing your intention to withdraw. Your information will be removed from the study upon your request and destroyed.

To thank you for your contribution to the research project, you will be given the option to enter a lottery to win one of six cash prizes of $50 (Canadian). All participants who return the study will be automatically entered in the draw. Upon completion of the study, six people will be randomly selected amongst those who have entered and they will be informed by e-mail of their prize. If each winner cannot be reached within 14 days from the date of the draw, the prizes will be awarded to the subsequent names that are randomly selected and so on until the prizes have been awarded. The odds of winning a prize will depend on the number of eligible entries received. The prize must be accepted as awarded or forfeited. The email that you provide when you enter the draw is collected for the purposes of contacting you if your name is selected in the draw. Your email contact information you have provided will be kept confidential and then destroyed once the prizes have been awarded. We reserve the right to cancel the draw or cancel the awarding of the prizes if the integrity of the draw or the research or the confidentiality of the participants is compromised. This draw is governed by the applicable laws of Canada. If you are interested in being contacted should you be selected for a prize, please provide us with a valid e-mail address in the box below.

Your participation would be extremely helpful and greatly appreciated. You can contact us about any part of the research being conducted at any time at the contact indicated below. Information requests or complaints about the ethical conduct of the project can be addressed to the Protocol Officer for Ethics in Research indicated below.

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Appendix E: Certificate of Ethics Approval

File Number: H02-08-16B **Date (mm/dd/yyyy):** 06/19/2013

Université d'Ottawa
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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)

First Name	Last Name	Affiliation	Role
		Health Sciences / Human Kinetics	Principal Investigator

File Number: H02-08-16B

Type of Project: Professor

Title: Analyses of Influences on the Sport Commitment and Participation of Masters Athletes

Approval Date (mm/dd/yyyy)	Expiry Date (mm/dd/yyyy)	Approval Type
06/19/2013	06/18/2014	Ia

(Ia: Approval, Ib: Approval for initial stage only)

Special Conditions / Comments:
N/A

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Ottawa, Ontario K1N 6N5 Canada

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Appendix F: Questionnaire: Introductory Page

Masters Sport Study

Dear participant,

The following questionnaire takes approximately 10 to 25 minutes to complete. It asks about:

A) your role in relation to adult or Masters sport;

B) the conditions at a Masters sport event that would encourage you to judge it as the 'best ever';

C) as an athlete, the involvement opportunities that are afforded through your participation in Masters sport;

D) as an athlete, your feelings toward and commitment to various aspects of your involvement.

This study is being conducted in accordance with research ethics procedures at the University of Ottawa. It is important for you to understand that:

- Participation is entirely voluntary. You are not required to participate, and there will be no negative consequences if you choose not to do so. If during completion of the survey, you no longer wish to continue as a participant, you may withdraw freely without penalty of any kind.

- All the information that you provide us will remain confidential. We may publish our findings at some point in the future, but those publications will not contain any personally identifiable information.

- To thank you for your contribution to the research project, you will be given the option to enter a lottery to win one of six cash prizes of $50 (Canadian). All participants who return the survey will be automatically entered in the draw. Upon completion of the study, people will be randomly selected and informed by email if they have won a prize.

If you have any questions or want more information, you can contact one of the investigators shown at the bottom of this page.

By providing the information requested on the following pages, 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.

To begin, please go to page 2.

Thank you.

Appendix G: Questionnaire - Demographic Information

ABOUT YOU

1. Please indicate your sex:

- o Male
- o Female

2. Please indicate your date of birth:

_____/_____/_____
(YYYY) (MM) (DD)

3. Please indicate your area of residence:

Country: _____

State/province: _____

City: _____

4. What is your current marital status?

- o Married
- o Single, never married
- o Separated/divorced
- o Widowed

5. How many children do you have? _____

6. How many grandchildren do you have? _____

7. What is your ethnicity?

- o North American Aboriginal
- o Other North American Origins
- o European
- o Caribbean
- o Latin, Central, and South America
- o African
- o Asian
- o Oceania
- o Other (please specify):

_____

8. Do you currently have a full-time or part-time job of any kind?

- o Yes, work for wage
- o Yes, unpaid work
- o No
- o Retired
- o Home duties

9. What is your highest level of education?

- High school graduate, diploma, or equivalent
- Trade/technical/vocational training
- Professional degree
- Bachelor's degree (or undergraduate)
- Post-graduate university degree (master’s or doctorate)

Appendix H: Questionnaire - Sport Involvement

ABOUT YOUR SPORT

1. What are three words or things that come to mind when you think of Master's sport?

2. What sports do you presently participate in? (please list them all)

3. What do you consider to be your primary sport as an adult or Masters athlete at present? (Your primary sport is the sport you spend the most time and energy participating in at present.)

_____

4. What is your level of competition for your primary sport? (Please select all that are relevant to you)

- o Regional/local
- o Provincial/State
- o National
- o International
- o Recreational
- o Professional

5. Across your life, how long have you been participating in your primary sport?

- o < 1 year
- o 1-2 years
- o 2-3 years
- o 3-4 years
- o 4-5 years
- o 5 or more years

6. To the best of your knowledge, when did you specifically begin participation in your primary sport <u>as a Masters or adult athlete</u>? Please specify the year (e.g., 1991):

_____

7. Working backwards from today, what is the duration of <u>uninterrupted participation</u> in your current primary sport <u>as an adult or Masters athlete</u>?

- o < 1 year
- o 1-2 years
- o 2-3 years
- o 3-4 years
- o 4-5 years
- o 5 or more years

8. With respect to your most recent interruption to participation in your primary sport as an adult or Masters athlete, please answer the following items:

	Not at all true for me			Somewhat true for me			Very true for me
I attribute the most recent interruption to my sport participation to personal injury.	1	2	3	4	5	6	7
I attribute the most recent interruption to my sport participation to personal illness.	1	2	3	4	5	6	7
I attribute the most recent interruption to my sport participation to circumstances that were outside of my personal control.	1	2	3	4	5	6	7

9. Please answer the following three items about your sport training:

	Not at all true for me			Somewhat true for me			Very true for me
It is important for me to maintain a consistent training routine if I wish to attend Masters sport competitions in the future.	1	2	3	4	5	6	7
I need to regularly train to get myself ready for my sport competitions.	1	2	3	4	5	6	7
In order to attend adult sport events, it is necessary for me to prepare by practicing in advance.	1	2	3	4	5	6	7

ABOUT YOUR SPORT INVOLVEMENT

Please answer all questions in relation to your PRIMARY sport.

1. In the past 12 months, how many months have you spent training or competing? _____

2. How many of these months were heavy months (i.e., in-season) of sport involvement where you invested a large amount of time and how many were light months (i.e., out of season) where you invested a smaller amount of time?

# of months

heavy involvement: _____

light involvement: _____

3. During a heavy month, how many hours per week did you typically spend:

doing **INTENSE TRAINING** for sport? (practice activities that are vigorous, involve strenuous effort, which often occur at a fast pace, when your heart beats rapidly and you sweat heavily) ☐

doing **LESS INTENSE TRAINING** for sport? (practice activities consisting of moderate to mild exercise, demanding less effort, often done at a regular pace, not resulting in exhaustion) ☐

doing **PHYSICAL ACTIVITY DURING GAME PLAY** or **DURING COMPETITIONS**? (Only consider instances when you actually played in games, or were physically active in races or competitive events) ☐

4. During a light month, how many hours per week did you typically spend:

doing **INTENSE TRAINING** for sport? (practice activities that are vigorous, involve strenuous effort, which often occur at a fast pace, when your heart beats rapidly and you sweat heavily) ☐

doing **LESS INTENSE TRAINING** for sport? (practice activities consisting of moderate to mild exercise, demanding less effort, often done at a regular pace, not resulting in exhaustion) ☐

doing **PHYSICAL ACTIVITY DURING GAME PLAY** or **DURING COMPETITIONS**? (Only consider instances when you actually played in games, or were physically active in races or competitive events) ☐

5. How many competitive events (e.g., games, race) did you participate in during the past 12 months?

_____

Appendix I: Questionnaire - Sport Commitment

YOUR EXPERIENCES IN SPORT

On this page, there are a number of statements concerning the opportunities that people may be afforded from their participation in sport. We wish for you to consider opportunities that are valued to you, that you would miss if you were to cease your involvement in sport. We want to know about the opportunities that you personally feel you would miss if you left your sport, not whether you think the statements are opportunities that other people in general may miss. Please answer the following questions based on your primary sport. Please respond to each item as if it were the only item. That is, do not worry about being consistent in your responses.

Please read each statement carefully and circle the appropriate number that indicates the degree to which you agree or disagree with each statement.

	Not at all true for me						Very true for me
If I discontinued my sport participation, I would miss the opportunity to challenge my personal best.	1	2	3	4	5	6	7
If I quit my sport, I would miss the chance to compare myself against my peers in competition.	1	2	3	4	5	6	7
If I stopped doing my sport, I would miss the opportunity to be considered an athlete.	1	2	3	4	5	6	7
If I discontinued my sport participation, I would miss the chance to belong to a team.	1	2	3	4	5	6	7
If I quit my sport, I would miss the opportunity to maintain my fitness.	1	2	3	4	5	6	7
If I stopped doing my sport, I would miss the good times I have.	1	2	3	4	5	6	7
If I stopped doing my sport, I would miss the occasion to be recognized for my accomplishments.	1	2	3	4	5	6	7
If I discontinued my sport involvement, I would miss the occasion for unique travel experiences.	1	2	3	4	5	6	7
If I quit my sport, I would miss the chance to feel relaxed.	1	2	3	4	5	6	7
If I discontinued my sport involvement, I would miss the opportunity to deter the effects of aging.	1	2	3	4	5	6	7
If I stopped doing my sport, I would miss the career/job opportunities afforded by my sport involvement.	1	2	3	4	5	6	7
If I quit my sport, I would miss the chance to maintain my health.	1	2	3	4	5	6	7
If I discontinued my sport participation, I would miss my friends.	1	2	3	4	5	6	7

Please answer all questions in relation to your PRIMARY sport.
Read the following statements carefully and choose the response that best described how <u>you</u> usually feel about your sport involvement.

Please circle the appropriate number that indicates the degree to which you agree or disagree with each statement.

	Not at all true for me			Somewhat true for me			Very true for me
I am very happy when I participate in my sport.	1	2	3	4	5	6	7
I am dedicated to keep doing my sport.	1	2	3	4	5	6	7
Compared to my sport, there are other things I could do that would be more worthwhile.	1	2	3	4	5	6	7
I have to keep doing my sport to please other people who are important to me.	1	2	3	4	5	6	7
I feel compelled to continue my sport involvement.	1	2	3	4	5	6	7
I really like participating in my sport.	1	2	3	4	5	6	7
I am willing to do almost anything to keep doing my sport.	1	2	3	4	5	6	7
I have invested a lot of effort into my sport.	1	2	3	4	5	6	7
I feel pressure from other people who are important to me to do my sport.	1	2	3	4	5	6	7
People who are important to me support my sport involvement.	1	2	3	4	5	6	7
I feel forced to continue my sport involvement.	1	2	3	4	5	6	7
All things considered, my sport is very satisfying.	1	2	3	4	5	6	7
Because I participate in my sport, I feel satisfied.	1	2	3	4	5	6	7
I am determined to keep doing my sport.	1	2	3	4	5	6	7
Compared to my sport, there are other things I could do that would be more fun.	1	2	3	4	5	6	7
People who are important to me will think that I am a quitter if I stop doing my sport.	1	2	3	4	5	6	7
I have invested a lot of energy into my sport.	1	2	3	4	5	6	7
I find participating in my sport to be very enjoyable.	1	2	3	4	5	6	7

On this page, there are a number of statements concerning the opportunities that people may be afforded from their participation in sport. We wish for you to consider opportunities that are valued to you and that can only be experienced through your continued involvement in your sport. Remember, we want to know about the opportunities that you personally feel <u>you</u> experience through continued sport involvement, not whether you think the statements are opportunities that other people in general may experience. Please answer the following questions based on your <u>primary sport</u>. Respond to each item as if it were the only item. That is, do not worry about being consistent in your responses.

Please read each statement carefully and circle the appropriate number that indicates the degree to which you agree or disagree with each statement.

My sport involvement gives me the opportunity...

	Not at all true for me						Very true for me
to clear my mind.	1	2	3	4	5	6	7
to improve my physical skills.	1	2	3	4	5	6	7
to do something exciting.	1	2	3	4	5	6	7
to travel.	1	2	3	4	5	6	7
to identify areas for personal improvement.	1	2	3	4	5	6	7
to feel like I am part of a team.	1	2	3	4	5	6	7
to defeat aging stereotypes.	1	2	3	4	5	6	7
to interact with other like-minded individuals.	1	2	3	4	5	6	7
to identify personal accomplishments.	1	2	3	4	5	6	7
to improve my health.	1	2	3	4	5	6	7
to be with friends.	1	2	3	4	5	6	7
to relieve stress I am feeling.	1	2	3	4	5	6	7
to have a good time.	1	2	3	4	5	6	7
to show my devotion to a team.	1	2	3	4	5	6	7
to be a good role model for others on how to age gracefully or successfully.	1	2	3	4	5	6	7
to be affiliated with a team.	1	2	3	4	5	6	7
to control my weight.	1	2	3	4	5	6	7
to put myself in a better state of mind.	1	2	3	4	5	6	7
to have fun.	1	2	3	4	5	6	7

Participating in my sport gives me the opportunity...

	Not at all true for me						Very true for me
to improve my fitness.	1	2	3	4	5	6	7
for fellowship with teammates.	1	2	3	4	5	6	7
to achieve personal goals.	1	2	3	4	5	6	7
to look and feel healthy.	1	2	3	4	5	6	7
to spend time with family.	1	2	3	4	5	6	7
to feel better.	1	2	3	4	5	6	7
to compete against others.	1	2	3	4	5	6	7
for financial benefits.	1	2	3	4	5	6	7
to pursue personal challenges.	1	2	3	4	5	6	7
to delay the effects of aging.	1	2	3	4	5	6	7
to be a winner.	1	2	3	4	5	6	7
to spend time with a significant other(s).	1	2	3	4	5	6	7
to tour new sites.	1	2	3	4	5	6	7
for job-related benefits.	1	2	3	4	5	6	7
to be known as a good athlete.	1	2	3	4	5	6	7
to feel younger.	1	2	3	4	5	6	7
to learn new things.	1	2	3	4	5	6	7
to release tension I am feeling.	1	2	3	4	5	6	7
to make new friends.	1	2	3	4	5	6	7
to demonstrate my ability to others.	1	2	3	4	5	6	7
to establish new records relative to my peers in competition.	1	2	3	4	5	6	7

Please answer all questions in relation to your PRIMARY sport.
Read the following statements carefully and choose the response that best describes how <u>you</u> usually feel about your sport involvement.

Please circle the appropriate number that indicates the degree to which you agree or disagree with each statement.

	Not at all true for me			Somewhat true for me			Very true for me
It would be hard for me to quit my sport.	1	2	3	4	5	6	7
My sport involvement gives me career opportunities.	1	2	3	4	5	6	7
People who are important to me think it is okay for me to do my sport.	1	2	3	4	5	6	7
I have invested a lot of my own money into my sport activity.	1	2	3	4	5	6	7
Participating in my sport is a lot of fun.	1	2	3	4	5	6	7
I am committed to keep doing my sport.	1	2	3	4	5	6	7
Compared to my sport, there are other things I could do that would be more enjoyable.	1	2	3	4	5	6	7
People who are important to me would be disappointed with me if I quit my sport.	1	2	3	4	5	6	7
I have invested a lot of time into my sport.	1	2	3	4	5	6	7
I feel obligated to continue my sport involvement.	1	2	3	4	5	6	7
I find my sport involvement to be very rewarding.	1	2	3	4	5	6	7
I want to keep doing my sport.	1	2	3	4	5	6	7
People who are important to me encourage me to do my sport.	1	2	3	4	5	6	7
I would be happier doing something else instead of my sport.	1	2	3	4	5	6	7
I feel that my sport involvement is a duty.	1	2	3	4	5	6	7

Please answer all questions in relation to your PRIMARY sport.

Read each statement carefully and circle the appropriate number that indicates the degree to which you agree or disagree with each statement.

My sport involvement gives me the opportunity...

	Not at all true for me						Very true for me
to achieve my competitive goals.	1	2	3	4	5	6	7
to look younger.	1	2	3	4	5	6	7
to receive attention from the media.	1	2	3	4	5	6	7
to move to a higher level of competition.	1	2	3	4	5	6	7
to have my ability viewed favourably compared to other participants.	1	2	3	4	5	6	7
to enjoy myself.	1	2	3	4	5	6	7
to receive awards and trophies.	1	2	3	4	5	6	7
to give my best effort.	1	2	3	4	5	6	7
to visit new places.	1	2	3	4	5	6	7
to get publicly recognized for my achievements.	1	2	3	4	5	6	7
to surpass the expected level of competitive performance for my age group.	1	2	3	4	5	6	7

Appendix J: Questionnaire - Sport Commitment Items

Enjoyment (7)
1. I am very happy when I participate in my sport.
2. I really like participating in my sport.
3. I find participating in my sport to be very enjoyable.
4. Participating in my sport is a lot of fun.

Functional Commitment (6)
5. I am dedicated to keep doing my sport.
6. I am willing to do almost anything to keep doing my sport.
7. I am determined to keep doing my sport.
8. It would be hard for me to quit my sport.
9. I am committed to keep doing my sport.
10. I want to keep doing my sport.

Obligatory Commitment (5)
11. I feel compelled to continue my sport involvement.
12. I feel forced to continue my sport involvement.
13. I feel it is necessary for me to continue my sport involvement.
14. I feel obligated to continue my sport involvement.
15. I feel that my sport involvement is a duty.

Appendix K: Questionnaire - Involvement Opportunities Scale

The Opportunity for Enjoyment (5)
16. If I stopped doing my sport, I would miss the good times I have had.
17. My sport involvement gives me the opportunity to do something exciting.
18. My sport involvement gives me the opportunity to have a good time.
19. My sport involvement gives me the opportunity to have fun.
20. Participating in my sport gives me the opportunity to enjoy myself.

The Opportunity for Recognition from Others (8)
21. If I stopped doing my sport, I would miss the opportunity to be considered an athlete.
22. If I stopped doing my sport, I would miss the occasion to be recognized for my accomplishments.
23. Participating in my sport gives me the opportunity to be known as a good athlete.
24. Participating in my sport gives me the opportunity to demonstrate my ability to others.
25. Participating in my sport gives me the opportunity to receive attention from the media.
26. Participating in my sport gives me the opportunity to have my ability viewed favourably compared to other participants.
27. Participating in my sport provides me the opportunity to receive awards and trophies.
28. Participating in my sport gives me the opportunity to get publicly recognized for my achievements.

The Opportunity to Establish and Develop Relationships (6)
29. If I discontinued my sport participation, I would miss my friends.
30. My sport involvement gives me the opportunity to interact with other like-minded individuals.
31. My sport involvement gives me the opportunity to be with friends.
32. My sport involvement gives me the opportunity to spend time with family.
33. Participation in my sport gives me the opportunity to spend time with significant others.
34. Participation in my sport gives me the opportunity to make new friends.

The Opportunity to Test and Assess Oneself (8)
35. If I discontinued my sport participation, I would miss the opportunity to challenge my personal best.
36. My sport involvement gives me the opportunity to improve my physical skills.
37. My sport involvement gives me the opportunity to identify areas for personal improvement.
38. My sport involvement gives me the opportunity to identify personal accomplishments.
39. My sport involvement gives me the opportunity to achieve personal goals.
40. My sport involvement gives me the opportunity to pursue personal challenges.
41. Participation in my sport provides me the opportunity to learn new things.
42. Participating in my sport provides me the opportunity to give my best effort.

The Opportunity for Health and Fitness (6)
43. If I quit my sport, I would miss the opportunity to maintain my fitness.
44. If I quit my sport, I would miss the chance to maintain my health.
45. My sport involvement gives me the opportunity to improve my health.
46. My sport involvement gives me the opportunity to control my weight.
47. My sport involvement gives me the opportunity to improve my fitness.
48. My sport involvement gives me the opportunity to look and feel healthy.

The Opportunity for Competition (7)
49. If I quit my sport, I would miss the chance to compare myself against my peers in competition.
50. My sport involvement gives me the opportunity to compete against others.
51. Participating in my sport gives me the opportunity to be a winner.
52. Participating in my sport gives me the opportunity to establish new records relative to my peers in competition.
53. Participating in my sport gives me the opportunity to achieve my competitive goals.
54. Participating in my sport gives me the opportunity to move to a higher level of competition.
55. Participating in my sport gives me the opportunity to surpass the expected level of competitive performance for my age group.

The Opportunity for Team Attachment (5)
56. If I discontinued my sport participation, I would miss the chance to belong to a team.
57. My sport involvement gives me the opportunity to feel like I am part of a team.
58. My sport involvement gives me the opportunity to show my devotion to a team.
59. My sport involvement gives me the opportunity to be affiliated with a team.
60. My sport involvement gives me the opportunity for fellowship with teammates.

The Opportunity for Stress Relief (6)
61. If I quit my sport, I would miss the chance to feel relaxed.
62. My sport involvement gives me the opportunity to clear my mind.
63. My sport involvement gives me the opportunity to relieve stress I am feeling.
64. My sport involvement gives me the opportunity to put myself in a better state of mind.
65. My sport involvement gives me the opportunity to feel better.
66. Participation in my sport gives me the opportunity to release any tension I am feeling.

The Opportunity to Travel (4)
67. If I discontinued my sport involvement, I would miss the occasion for unique travel experiences.
68. My sport involvement gives me the opportunity to travel.
69. Participating in my sport gives me the opportunity to tour new sites.
70. Participating in my sport gives me the opportunity to visit new places.

The Opportunity to Delay and Negotiate Aging (6)
71. If I discontinued my sport involvement, I would miss the opportunity to deter the effects of aging.
72. My sport involvement gives me the opportunity to defeat aging stereotypes.
73. My sport involvement gives me the opportunity to be a good role model for others on how to age gracefully or successfully.
74. My sport involvement gives me the opportunity to delay the effects of aging.
75. Participation in my sport gives me the opportunity to feel younger.
76. Participation in my sport gives me the opportunity to look younger.

The Opportunity for Professional Prospects (4)
77. If I stopped doing my sport, I would miss the career/job opportunities afforded by my sport involvement.
78. Participating in my sport gives me the opportunity for financial benefits.
79. My sport involvement gives me career opportunities.
80. My sport involvement gives me the opportunity for financial benefits.

Appendix L: Questionnaire Numbered Items for Invariance Testing in Chapter 5

Sub-scale questionnaire items for the two commitment types, enjoyment, and involvement opportunities constructs for invariance testing in Chapter 5.

The Opportunity for Personal Pursuits
1. My sport involvement gives me the opportunity to pursue personal challenges.
2. My sport involvement gives me the opportunity to achieve personal goals.
3. If I discontinued my sport participation, I would miss the opportunity to challenge my personal best.
4. My sport involvement gives me the opportunity to identify personal accomplishments.

The Opportunity for Stress Relief
5. My sport involvement gives me the opportunity to relieve stress I am feeling.
6. Participating in my sport gives me the opportunity to release any tension I am feeling.
7. My sport involvement gives me the opportunity to put myself in a better state of mind.
8. My sport involvement gives me the opportunity to clear my mind.

The Opportunity to Delay and Negotiate Aging
9. My sport involvement gives me the opportunity to delay the effects of aging.
10. Participating in my sport gives me the opportunity to look younger.
11. My sport involvement gives me the opportunity to defeat aging stereotypes.
12. Participating in my sport gives me the opportunity to feel younger.
13. If I discontinued my sport involvement, I would miss the opportunity to deter the effects of aging.

The Opportunity for Team Attachment
14. My sport involvement gives me the opportunity to be affiliated with a team.
15. My sport involvement gives me the opportunity to feel like I am part of a team.
16. My sport involvement gives me the opportunity to show my devotion to a team.
17. If I discontinued my sport participation, I would miss the chance to belong to a team.
18. My sport involvement gives me the opportunity for fellowship with teammates.

The Opportunity for Professional Prospects
19. Participating in my sport gives me the opportunity for job-related benefits.
20. My sport involvement gives me career opportunities.
21. If I stopped doing my sport, I would miss the career/job opportunities afforded by my sport involvement.

The Opportunity to Travel
22. Participating in my sport gives me the opportunity to visit new places.
23. My sport involvement gives me the opportunity to travel.
24. If I discontinued my sport involvement, I would miss the occasion for unique travel experiences.
25. Participating in my sport gives me the opportunity to tour new sites.

The Opportunity for Recognition from Others for Competitive Achievements
26. Participating in my sport gives me the opportunity to have my ability viewed favourably compared to other participants.
27. Participating in my sport gives me the opportunity to establish new records relative to my peers in competition.
28. Participating in my sport gives me the opportunity to get publicly recognized for my achievements.
29. Participating in my sport gives me the opportunity to be a winner.
30. Participating in my sport gives me the opportunity to receive awards and trophies.
31. Participating in my sport gives me the opportunity to demonstrate my ability to others.
32. Participating in my sport gives me the opportunity to be known as a good athlete.
33. Participating in my sport gives me the opportunity to surpass the expected level of competitive performance for my age group.
34. If I stopped doing my sport, I would miss the occasion to be recognized for my accomplishments.
35. My sport involvement gives me the opportunity to compete against others.
36. Participating in my sport gives me the opportunity to move to a higher level of competition.

The Opportunity to Establish and Develop Friendships
37. If I discontinued my sport participation, I would miss my friends.
38. My sport involvement gives me the opportunity to be with friends.
39. Participating in my sport gives me the opportunity to make new friends.
40. My sport involvement gives me the opportunity to interact with other like-minded individuals.

The Opportunity for Health and Fitness
41. My sport involvement gives me the opportunity to improve my fitness.
42. My sport involvement gives me the opportunity to look and feel healthy.
43. My sport involvement gives me the opportunity to improve my health.

Enjoyment
44. Participating in my sport is a lot of fun.
45. I am very happy when I participate in my sport.
46. I really like participating in my sport.
47. I find participating in my sport to be very enjoyable.
48. Participating in my sport gives me the opportunity to enjoy myself.
49. My sport involvement gives me the opportunity to have fun.

Functional Commitment

50. I am committed to keep doing my sport.
51. I am dedicated to keep doing my sport.
52. I am willing to do almost anything to keep doing my sport.
53. I am determined to keep doing my sport.
54. It would be hard for me to quit my sport.
55. I want to keep doing my sport.

Obligatory Commitment

56. I feel obligated to continue my sport involvement.
57. I feel compelled to continue my sport involvement.
58. I feel forced to continue my sport involvement.
59. I feel it is necessary for me to continue my sport.
60. I feel that my sport involvement is a duty.