Exploring the Relative Contributions of Training Patterns and Training Contexts to Burnout and Dropout in Swimming

by

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Abstract

Millions of children participate in youth sport, which has been associated with both potential benefits and harms. The promotion of positive, beneficial experiences in youth sport and the reduction of harmful, negative experiences requires discerning those factors which could be decisive in a positive or negative direction. The purpose of this dissertation was to better understand the relative contributions of training patterns (specifically, training volume and early specialization) and training contexts (i.e., the social environment) to burnout, dropout, and lifelong enjoyment of sport, specifically within the sport of swimming. Specific aims were to (i) advance the assessment of early sport specialization in alignment with its most recently established definition, (ii) examine the relationships that early specialization indicators and training volume have with burnout and dropout in swimming, (iii) explore theoretical models of these relationships, including psychosocial variables from the sport commitment model and self-determination theory, and (iv) explore the influence of youth swimming experiences—including training patterns and training contexts—on transitions to adult swimming participation. These first three aims necessitated surveys with youth swimming participants and their parents. Swimmers self-reported ratings on various psychological variables and their parents detailed the swimmers' sport backgrounds. Chapter 2 outlines the relationships of various markers of early specialization with each other, and with burnout and dropout. The early specialization items were not related to burnout or dropout in the expected directions. Several possible explanations for this finding are presented, including a motivational explanation. Chapter 3 continues this exploration, focusing on the relative contributions of training volume and training context

(represented by perceptions of autonomy support) to burnout and dropout. Structural equation modelling was used to test a commitment model of burnout. Compared to training volume, autonomy support emerged as a much stronger predictor of enjoyment, burnout, and intentions to continue swimming. The fourth aim was achieved by conducting interviews with twenty masters (adult) swimmers with previous youth swimming experience, discussed in Chapter 4. Some of these participants (labelled as "continuers") transitioned directly from youth swimming into masters swimming. Others (labelled as "rekindlers") had a break, sometimes lasting several years, between ending their youth swimming participation and returning to the sport as masters athletes. High training volume in youth swimming appeared to have both negative and positive consequences that influenced subsequent transitions to adult swimming. Findings suggested that the youth training context created by coaches and peers had a strong influence on how participants perceived their training volume. The findings from this dissertation suggest that early specialization and high volumes of training in and of themselves do not increase the risk of burnout, dropout, and decreased adult sport participation. Rather, the context in which training takes place is a much stronger determinant of whether or not these negative outcomes will occur. If athletes' psychological needs are met and not thwarted, and if they are experiencing enjoyment and functional commitment, the risk of burnout and dropout is likely low, regardless of their level of specialization or training volume.

Preface

This thesis is an original work by Heather K. Larson. The studies that comprise this dissertation received research ethics approval from the University of Alberta Research Ethics Board. The following ethics approvals are associated with the research conducted in this thesis: from Chapters 2 and 3, “Exploring the relationship between specialized training and adolescents' motivation to continue swimming”, Pro00062507, March 29, 2016; and from Chapter 4, “Long-term impacts of youth swimming experiences on adults' motivation for swimming,” Pro00066007, September 27, 2016.

Chapter 2 of this thesis has been submitted for publication as Larson, H. K., Young, B. W., McHugh, T.-L. F., & Rodgers, W. M. (2018). Markers of early specialization and their relationships with burnout and dropout in swimming. I conceptualized and designed the study with input from all co-authors. I was responsible for data collection and analysis as well as the manuscript composition. All authors were involved with manuscript edits.

Chapter 3 of this thesis has been submitted for publication as Larson, H. K., Young, B. W., McHugh, T.-L. F., & Rodgers, W. M. (2018). Training volume and training context: Relationships with psychological and behavioural outcomes in swimming. I conceptualized and designed the study with input from all co-authors. I was responsible for data collection and analysis as well as the manuscript composition. All authors were involved with manuscript edits.

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Exercise, 41, 12-20. I conceptualized and designed the study with input from all co-authors. I was responsible for the data generation and analysis as well as the manuscript composition. T.-L. F. McHugh also assisted with data analysis. All authors were involved with manuscript edits.

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Table of Contents

List of Tables

List of Figures

Chapter 1 – Introduction

Introduction

Youth sport is an important topic of research for several reasons. Although sport in and of itself is not inherently "good" or "bad," youth sport experiences have the potential to be beneficial or harmful, depending on a number of factors (Fraser-Thomas & Cote, 2009). Some of the purported benefits of youth sport include increased physical activity, positive body image, global self-esteem, mental health, academic achievement, and the development of life skills (Holt et al., 2017; Marsh & Kleitman, 2003; Sabo, Miller, Melnick, and Heywood, 2004). Conversely, youth sport has also been associated with negative consequences such as increased aggression, alcohol use, stress, negative body image, eating disorders, and injury, and decreased self-esteem (de Grace, Knight, Rodgers, & Clark, 2017; Kong & Harris, 2014; Merkel, 2013; Sønderlund et al., 2013). Specialized training in competitive youth sport, especially at a young age, has also been blamed for burnout and dropout from sport, and decreased adult sport participation (DiFiori et al., 2014; Russell & Limle, 2013).

Some scholars have pushed back against the "sport for all" movement and the promotion of sport as a public health intervention, positioning sport instead as "a leisure option for people to experience, just like French cooking and crossword puzzles" (Gard, Dionigi, & Dionigi, 2018, p. 81). However, the fact remains that millions of children in the United States and Canada participate in organized sport every year (Canadian Fitness and Leisure Research Institute, 2016; National Council of Youth Sports, 2008). The promotion of positive, beneficial experiences in youth sport and the reduction of harmful, negative experiences is therefore critical, and requires untangling those factors which may tip the scales in a positive or negative direction. The purpose of this dissertation was

to better understand the relative contributions of training patterns (specifically, training volume and early specialization) and training contexts (i.e., the social environment) to burnout, dropout, and lifelong enjoyment of sport, specifically within the sport of swimming.

Why Swimming?

Competitive youth swimming has been long-known for its high levels of burnout and attrition, often attributed to the intense training that takes place almost year-round (e.g., Raedeke & Smith, 2004). One of Swimming Canada's strategic foci is to be "a leader in world class performance and athlete development through strong technical leadership delivery, a world leading coaching development system, effective support infrastructure, and **systematic athlete development pathway**" (Swimming Canada, n.d.). However, their current athlete development pathway is based on Balyi and Hamilton's (2004) "Long-Term Athlete Development" (LTAD) model, which has been criticized for its lack of evidence, and an overemphasis on physiology while overlooking important psychological aspects of development (e.g., Ford et al., 2011; Holt, 2010). Additionally, the swimming-specific LTAD plan used in the UK was criticized by coaches who felt that it promoted excessive training volumes at young ages at the expense of technique and enjoyment (Lang & Light, 2010). More research is needed on the psychological and behavioural consequences of the current training practices advocated by Swimming Canada's LTAD plan, which is very similar to the plan used in the UK.

Swimming is a sport that provides many health benefits and can be enjoyed competitively or recreationally at any age, as evidenced by the newest masters swimming

age category: 105-109 (“Jaring Timmerman,” 2014). Cooper, Powell, and Rasch (2007) noted that swimming is an excellent form of exercise for older athletes because of the decreased weight-bearing that reduces stress on joints impacted by osteoarthritis and other conditions. Organized swim programs for adults (masters swimming) also provide opportunities for maintaining cardiovascular and musculoskeletal fitness and developing friendships (Cooper et al., 2007). However, whereas swimming remains the second most popular sport among children, participation in swimming by Canadians 15 years of age and older dropped by 50% between 2005 and 2010 (Canadian Heritage, 2013). Furthermore, according to Swimming Canada (2018), there were over 30,000 youth registered as competitive swimmers in 2007, yet ten years later, in 2017, there were less than 7,000 masters swimmers registered. This suggests that, although youth swimmers are eligible to register as masters swimmers any time after their 18th birthday, the majority of them either leave the sport permanently after concluding their youth swimming participation or return as masters athletes only after a lengthy lapse in participation.

A large survey of masters swimmers in the United States indicated that only 30% of those with competitive youth swimming experience joined masters swimming within 10 years of their youth swimming participation (Daughtrey, Vowles, & Black, 2011). Little is known about the factors involved in this long lapse in swimming participation or what might lead to their eventual return to the sport. One possibility worthy of further exploration involves the nature of their youth swimming experiences—the patterns or context of their training could influence their subsequent participation in swimming as adults.

Theoretical Framework

In seeking to understand the relative contributions of training patterns and training contexts to burnout, dropout, and long-term participation in swimming, I drew on theoretical propositions from three sources: the developmental model of sport participation (DMSP; Côté, Baker, & Abernethy, 2003; Côté & Fraser-Thomas, 2007), the sport commitment model (SCM; Scanlan, Carpenter, Simons, Schmidt, & Keeler, 1993; Scanlan, Chow, Sousa, Scanlan & Knifsend, 2016) and self-determination theory (SDT; Deci & Ryan, 1985). The DMSP and its associated postulates consider outcomes of youth sport participation that include not only talent development and elite performance, but also athletes' well-being and enjoyment of sport. As such, the DMSP provides a useful framework for investigating the influence of training patterns (referring here to the degree of early specialization as well as training volume), on burnout, dropout, and long-term sport participation. The SCM, as its name implies, is well-suited for investigations of continued participation, and has also been studied in relation to burnout. Finally, SDT has been used in countless domains to explain and predict people's behavioural persistence and wellbeing. The SCM and SDT are thus useful for exploring the influence of training context on burnout, dropout, and long-term sport participation. Intrapersonal factors, such as trait perfectionism, and socio-economic factors, such as household income, have also been found to influence sport outcomes (e.g., Hill & Curran, 2016; Canadian Heritage, 2013). However, my research focuses on training patterns and training contexts because 1) these are amenable to change, (e.g., through policy and education), and 2) changing the behaviour of even one coach or the policies of one sport organization can impact many athletes.

The DMSP proposes three potential pathways of youth sport involvement, each with its own set of probable outcomes (Côté, 1999; Côté, Baker, & Abernethy, 2003, 2007; Côté & Fraser-Thomas, 2007). These pathways are differentiated from one another primarily by the number of sports engaged in, and the ratio of deliberate practice to deliberate play. Deliberate practice is described as an effortful and highly structured activity, low in inherent enjoyment, with the explicit goal of improved performance (Ericsson, Krampe, & Tesch-Römer, 1993). In contrast, deliberate play is characterized by loosely-structured activities that are designed to maximize enjoyment (Côté & Hay, 2002).

The first two pathways are *recreational participation through sampling* and *elite performance through sampling*. These pathways both begin with a sampling phase that involves high levels of deliberate play and low levels of deliberate practice in a variety of sports. At around age 12, the pathways diverge. Children may continue participating in sport recreationally, maintaining high levels of play and low levels of practice. Probable outcomes of this pathway include enhanced health and enjoyment. Alternatively, they may enter a specializing phase, where they reduce involvement in multiple sports and increase levels of deliberate practice. Next is the investment phase, with even more practice and less play, in a single sport. This pathway, progressing from sampling to specializing and then investment, typically leads to elite performance, accompanied by enhanced health and enjoyment.

The third pathway is *elite performance through early specialization*, when young children engage in high levels of deliberate practice and low levels of deliberate play in a single sport, right from the start. According to the DMSP, the probable outcomes of this

pathway include elite performance, but also reduced enjoyment and increased burnout and dropout (Côté & Vierimaa, 2014). However, studies on early specialization have been hampered by the lack of a standardized definition and commensurate measure of early specialization (Jayanthi, LaBella, Fischer, Pasulka, & Dugas, 2015). Recently, the American Orthopaedic Society for Sports Medicine, (AOSSM), published a consensus statement that defined early specialization by three criteria: 1) the involvement of prepubertal children, 2) participation in one sport to the exclusion of participation in other sports, with limited free play overall, and 3) participation in intensive training and/or competition in organized sports for more than 8 months per year (LaPrade et al., 2016). The attainment of a shared definition, agreed upon by multiple experts in the field, opens up possibilities for the advancement of a standardized measure of early specialization.

The research cited as evidence for an association between early specialization and burnout and/or dropout has mostly involved in-depth, retrospective interviews, which can provide a great deal of high quality data (e.g., Gould, Tuffey, Udry, & Loehr, 1996; Fraser-Thomas, Côté & Deakin, 2008). However, such time-intensive methods necessitate very purposeful sampling (e.g., choosing athletes who display high levels of burnout and/or have already dropped out of sport), and are not well-suited to larger longitudinal studies that could afford greater confidence regarding the relationships between early specialization and negative outcomes. It is also unclear as to the best use of the data in assessing early specialization. If researchers could somehow obtain a single score representing an athlete's degree of early specialization, this could be used in path analyses to explore the relationship of early specialization with variables like enjoyment, commitment, burnout, or dropout.

High volumes of single-sport training in adolescence is no longer considered *early* specialization, but high training volumes may still carry a risk of negative consequences. The models of burnout developed by Smith (1986), Silva (1990), and Coakley (1992) would all consider excessive training volume as a potential antecedent of burnout, either because of the physical and psychological stress it induces or because of the reduced time for identity formation outside of sport. Light, Harvey, and Memmert (2013) noted that swimming is different from team sports, which tend to allow for a greater degree of deliberate play even within organized sport settings. The nature of competitive swimming tends to require a high degree of structure due to space limitations and safety concerns; therefore, training volume in swimming is essentially equivalent to deliberate practice. Again, deliberate practice is described as being effortful and low in inherent enjoyment (Ericsson et al., 1993). From a commitment perspective (Raedeke, 1997; Schmidt & Stein, 1991), if enjoyment is decreased, this may increase rates of burnout and dropout, via two types of commitment.

The original SCM defined commitment as a psychological construct representing "the desire and resolve to continue sport participation" (Scanlan et al., 1993, p.6). However, more recently, Scanlan and colleagues (2016) distinguished between what they call enthusiastic commitment (defined as above) and constrained commitment, which is defined as "the psychological construct representing perceptions of obligation to persist in a sport over time" (p. 235). This is a distinction that had already been made in exercise and masters sport contexts using the terms "functional commitment" and "obligatory commitment," respectively (Wilson, Rodgers, Carpenter, Hardy, & Fraser, 2004; Young, Piamonte, Grove, & Medic, 2011).

The SCM currently features several hypothesized predictors of commitment, the most prominent of which is enjoyment (Scanlan et al., 2016). A study of 982 adolescent athletes confirmed that enjoyment, valuable opportunities, and desire to excel-mastery achievement were positively and significantly related to functional commitment, whereas other priorities (including not just attractive alternatives, but also competing commitments such as work or family obligations), had a significant negative relationship with functional commitment. All together, the constructs predicted 81.8% of the variance in functional commitment (Scanlan et al., 2016). The same study found that five constructs were significantly associated with obligatory commitment: enjoyment and valuable opportunities were negatively related, whereas personal investments, other priorities, and social constraints were positively related to obligatory commitment (Scanlan et al., 2016). It is important to understand the antecedents of both functional and obligatory commitment, because each commitment type is associated with different outcomes. For example, functional commitment has demonstrated a stronger relationship than obligatory commitment with continued participation in sport and exercise (Santi, Bruton, Pietrantoni, & Mellalieu, 2014; Wilson et al., 2004).

Scanlan et al. (2016) suggested that connecting the SCM with other theories may prove useful in enhancing our understanding of the sport experience. One such complementary theory is Deci and Ryan's (1985) SDT, a theory of motivation that can be used to predict behavioural persistence and general well-being in various domains. Behavioural regulation is thought to exist on a continuum ranging from amotivation to intrinsic motivation, with several types of extrinsic motivation in between, each of which is thought to be more self-determined than the last, moving from left to right on the

continuum. External regulation, where a person engages in a behaviour to receive rewards or avoid punishment, is the least self-determined, and is closest to amotivation. Introjected regulation involves performing a behaviour to avoid feelings of shame or guilt, or in order to impress other people. Identified regulation and integrated regulation are the most self-determined, and they involve performing a behaviour because the outcomes are highly valued, or because one feels that it is part of their identity. To date, studies combining the SCM with SDT have focused on the relationships between these behavioural regulations and functional commitment. Zahariadis, Tsorbatzoudis, and Alexandris (2006) conducted a path analysis that showed positive direct and indirect (through enjoyment) effects of intrinsic motivation on functional commitment. Krinanthi, Konstantinos, and Andreas (2010) also found a positive relationship between intrinsic motivation and functional commitment, and a negative relationship between amotivation and functional commitment. Although a positive relationship between controlled motivations and obligatory commitment is theorized, this has yet to be explored.

SDT also posits that satisfaction of the needs for autonomy, competence, and relatedness, will lead to more self-determined regulation and overall well-being (Deci & Ryan, 2000). A systematic review of the correlates of youth sport dropout reported high-quality evidence for the negative relationships of autonomy, perceived competence, and relatedness, with dropout (Balish, McLaren, Rainham, & Blanchard, 2014). A perceived lack of competence, in particular, has been cited as a common reason for dropping out of swimming (Gould, Feltz, Weiss, & Petlichkoff, 1982; Salguero, Gonzalez-Boto, Tuero, & Marquez, 2003). Li, Wang, Pyun, & Kee's (2013) meta-analysis has also shown strong support for the significance of basic psychological needs as predictors of burnout in sport.

Of the seven studies in Li et al.'s (2013) meta-analysis looking at the relationship between psychological needs and burnout, six of them found negative relationships between need satisfaction and global burnout and/or burnout subscales, as measured by the Athlete Burnout Questionnaire (ABQ; Raedeke & Smith, 2001).

Psychological need satisfaction is heavily dependent on the *autonomy support* afforded by one's context. Of the various motivational influences present in a sport context, one of the most important may be the coach (Bartholomew, Ntoumanis, & Thøgersen-Ntoumani, 2009). Autonomy supportive coaches take their athletes' perspectives into account and provide them with choice and opportunities for input into decision-making, rather than pressuring them into certain behaviours (Gillet, Berjot, Vallerand, & Amoura, 2012). According to SDT, autonomy support should be positively related to self-determined behavioural regulation, and consequently, greater behavioural persistence (Deci & Ryan, 1985). These relationships have been supported by research in sport contexts. Adie, Duda, and Ntoumanis (2012) found that autonomy support from coaches was a positive predictor of need satisfaction in young soccer players, and need satisfaction was in turn positively related to subjective vitality, a measure of well-being. Gillet et al. (2012) tested a model based on Vallerand's (1997) hierarchical model of intrinsic and extrinsic motivation (HMIEM), which proposes three levels of generality for motivation: global, contextual, and situational. They hypothesized that global motivation (a person's level of self-determined motivation towards life in general) and autonomy support (from coaches) would jointly predict contextual motivation, which would in turn predict interest and intention to drop out of sport. This hypothesis was fully supported by their results. These findings endorse the importance of an autonomy supportive context.

Purpose and Overview of Studies

In light of the insufficient and sometimes contradictory evidence found in the literature, the purpose of this dissertation was to better understand the relative contributions of training patterns (specifically, training volume and early specialization) and training contexts (i.e., the social environment) to burnout, dropout, and lifelong enjoyment of sport, specifically within the sport of swimming. My specific aims were to (i) advance the assessment of early sport specialization in alignment with its most recently established definition, (ii) examine the relationships that early specialization indicators and training volume have with burnout and dropout in swimming, (iii) explore theoretical models of these relationships, including psychosocial variables from self-determination theory and the sport commitment model, and (iv) explore the influence of youth swimming experiences—including training patterns and training contexts—on transitions to adult swimming participation.

Study 1 and Study 2 involved survey data collected from youth swimmers and their parents. Youth swimmers self-reported a variety of psychosocial variables. Parents provided details of their swimmers' sport backgrounds, from age 6 to their present age. Study 1 identified potential markers of early specialization derived from swimmers' sport background data and examined their relationships with each other and with swimmers' self-reported levels of burnout. These early specialization markers were also examined in relation to swimmers' status at the start of the subsequent season—either still swimming, or dropped out. Study 2 used structural equation modelling to examine the relative contributions of training volume and training context (represented by perceptions of autonomy support) to enjoyment, commitment, burnout and dropout.

Study 3 involved interviewing twenty masters swimmers with previous youth swimming experience. Some of these participants (continuers) transitioned directly from youth swimming into masters swimming. Others (rekindlers) had a break, sometimes lasting several years, between ending their youth swimming participation and returning to the sport as masters athletes. Qualitative content analysis was used to identify nuanced themes pertaining to the long-term influences of youth training patterns and contexts on subsequent adult swimming participation.

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Chapter 2 - Study 1

Markers of early specialization and their relationships with burnout and dropout in swimming

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Abstract

Empirical evidence directly associating early sport specialization with burnout and dropout is lacking, although a relationship is theorized. Research in this area relies on time-intensive retrospective interviews or questionnaires that generate large amounts of data. It is unclear what data are required for assessing early specialization and its relationship with key criterion variables. The purpose of this study was to add empirical evidence to literature regarding early specialization, burnout, and dropout. This involved examining a large group of hypothesized markers of early specialization and reducing them down to a smaller set, useful for predicting burnout and dropout. Survey data were collected from 137 swimmers, ages 12-13 years, and their parents, including descriptions of swimmers' sport backgrounds from the age of 6 up until present. Contrary to what was expected, the early specialization items were not positively related to burnout or dropout. We present several possible explanations, including key motivational considerations.

Introduction

Substantial literature on youth sport has linked early sport specialization to negative consequences, such as burnout and dropout. A consensus statement released by the American Orthopedic Society for Sports Medicine (AOSSM) defined early specialization (ES) as: 1) involving prepubertal children, who, 2) participate in one sport to the exclusion of others, with limited free play overall, and 3) participate in intensive training and/or competition in organized sports for more than 8 months per year (LaPrade et al., 2016). The same paper stated, "Early sport specialization…is believed to be unhealthy physically and mentally for young athletes...They are subject to overuse injury and burnout from concentrated activity" (p. 1). However, empirical evidence for statements linking ES to burnout and dropout is limited. When the sources for these claims are closely examined, one finds great variability in definitions for both ES and burnout, and a pattern of citations that are more theoretical than empirically supported. In the case of the AOSSM statement, for instance, the claim for the harmful effects of ES was circularly referenced to another consensus statement from the American Medical Society for Sports Medicine (DiFiori et al., 2014), rather than original empirical sources. Concern for the mental and physical health of youth athletes is paramount; therefore, it is necessary to be very careful in analyzing the conditions that produce such negative outcomes. One would not want to make recommendations that could result in unintended consequences such as unnecessarily limiting positive involvement in sport.

A survey of the literature on early sport specialization yields abundant review papers and position papers. While some of them have been quite comprehensive and intentional in pointing to knowledge gaps and laying the groundwork for future research

(e.g., Baker, Cobley, & Fraser-Thomas, 2009; Horn, 2015; Wiersma, 2000), many repeat standard cautions about the risks of early specialization, without citing new evidence (e.g. DiFiori et al., 2014). Much of the empirical research approaches the topic from either an injury prevention (e.g., Bell et al., 2016; Jayanthi, LaBella, Fischer, Pasulka, & Dugas, 2015) or talent development perspective (e.g., Baker, Côté & Deakin, 2005; Hopwood, Macmahon, Farrow, & Baker, 2016; Law, Côté, & Ericsson, 2007; Ward, Hodges, Williams, & Starkes, 2007), rather than looking at psychological and behavioural outcomes. Rare exceptions include studies by Wall and Côté (2007) and Fraser-Thomas, Côté, and Deakin, (2008), examining ES and dropout; and Strachan, Côté, and Deakin, (2009), exploring relationships between ES, personal development, and sport outcomes.

LaPrade et al. (2016, p. 3) noted that "studies directly linking youth sports specialization to psychosocial outcomes are lacking" but concluded that "available evidence suggests youth specialization before the age of 12 years is associated with increased burnout and dropout" (p. 3). They cited evidence from Fraser-Thomas et al. (2008), which involved comprehensive retrospective interviews with 50 athletes, following the protocol designed by Côté, Ericsson, and Law (2005). In fact, much of the available research and theory around developmental pathways in youth sport has originated from these retrospective interviews or questionnaires that generate very detailed athlete histories, often yielding reams of high quality data. While such research provides in-depth insights into developmental histories, it is unclear how to use such data in assessing ES. For example, how might researchers obtain an ES score that could be used in a path analysis to examine its relationships with other variables, like burnout and dropout? What information is needed in order to do that?

The purpose of this study was to add empirical evidence to literature regarding early specialization, burnout, and dropout. This involved examining a large group of hypothesized markers of ES, generated through a detailed retrospective questionnaire, and reducing them down to a smaller set that would be useful for predicting burnout and dropout. We hypothesized that markers of ES would be positively associated with burnout and dropout, and negatively associated with intentions to continue swimming competitively the following season.

Methods

Procedures

The present study analyzed survey data that were part of a larger project involving over 250 Canadian competitive swimmers between the ages of 12 and 17 and their parents. We purposefully recruited from summer clubs (May to August), where participants are more seasonally invested and thus are likely to sample various sports throughout the year, as well as "winter" (year-round clubs), where ES is often assumed to be more common. An institutional research ethics board approved all procedures.

We used data collected from 12 and 13-year-olds (N = 137; 67% female; 33% male) and their parents (one parent per child). We chose 12-13-year-olds to reduce potentially confounding variables arising from variations in training patterns occurring after age 12, when specialization is no longer early. All summer swimmers (n = 54) and some winter swimmers (n = 31) lived in Alberta. The remaining winter swimmers (n = 52) lived in British Columbia, New Brunswick, Ontario, Quebec, Saskatchewan, and Yukon. Swimmers' parents were highly educated; 42% had bachelor's, and 31% had graduate/professional degrees. Seventy-two percent came from families with a combined

annual income > $100,000.

Summer swimmers completed questionnaires at the sport facility within a month of the start of the season, and parents were given until season's end to complete their questionnaires during practice or at home. Winter swimming data from parents and swimmers were collected online and managed using REDCap electronic data capture tools (Harris et al., 2009). Online winter surveys were completed at one point between October and April. Notably, online data were also collected several months later from parents, at the start of the next swimming season (the following May for summer swimmers, September for winter swimmers) to follow up on their child's participation.

Retrospective questionnaire procedure for parents. Parents completed a retrospective questionnaire that has been widely used in studies of youth sport participation (e.g., Law et al., 2007) and expert development trajectories (e.g., Hopwood et al., 2016). We modeled our survey template after Côté et al. (2005) and, specifically, procedures adapted for swimming (Fraser-Thomas et al., 2008). Our procedure featured parental reports of children's developmental histories. In Section 1, parents completed a table about their child's yearly involvement from age 6 until present. For each year, parents reported the total number of sports in which their child participated, and then for up to three sports each year, they reported the duration of the season in months, the average number of practices/games per week, the average hours of practices/games per week, and whether the sport participation was recreational or competitive. In Section 2, parents responded to eight items about their child's "maturation into a swimmer" (Fraser-Thomas et al., 2008), recalling the ages when their child reached certain sport-specific milestones (if ever).

Swimmer self-report. Swimmers provided ratings for burnout and intentions to continue swimming.

Measures

Early specialization. Our markers were derived from the three AOSSM criteria (LaPrade et al., 2016) and, complementarily, from a review by Baker et al. (2009). The latter proposed four parameters of ES: (1) an early start age in sport, (2) early involvement in competitive sport, (3) early involvement in one sport, as opposed to multiple sports, and (4) early involvement in focused, high intensity training. In alignment with the AOSSM definition (LaPrade et al., 2016), our ES items tapped aspects of children's training occurring up to 12 years of age (beyond this, it would no longer be considered *early* specialization). Based on Section 1 of the parental questionnaire, we identified the age (if ever) when swimmers first participated in swimming, first competed in swimming, and first participated in *only* competitive swimming, and no other sports (if ever). We calculated total years in *only* competitive swimming between 6 and 12 years of age, identified the age at which swimmers first participated in competitive swimming for *more than 8 months out of the year*, and enumerated the number of years in which they participated in *only* competitive swimming for more than 8 months/year, between 6 and 12 years of age.

Neither Baker et al. (2009) nor LaPrade et al. (2016) specified what was meant by "high intensity" or "intensive training," thus we drew on the literature to identify a number of potential markers. Fraser-Thomas et al. (2008) identified participation in dryland training, attendance at training camps, and a lack of time for other activities, as markers of specialized training. We derived these dichotomous variables from data in

Section 2, specifically whether a child had *ever participated in dryland training*, *attended a training camp*, or *spent all of their available leisure time in swim training*. Further data pertaining to training intensity were extracted from Section 1; as per Fraser-Thomas et al. (2008), estimates were converted and summed across the years to obtain a measure of total swim training volume, from age 6 to 12.

Athlete Burnout Questionnaire. The Athlete Burnout Questionnaire (ABQ; Raedeke & Smith, 2001) measures three dimensions (emotional/physical exhaustion, reduced sense of accomplishment, and sport devaluation) with five items each. Swimmers were presented with statements about swimming experiences and rated how often they felt that way from 1 (almost never) to 5 (almost always). Mean scores were calculated for each subscale. The ABQ is the most popular measure of sport burnout; previous work supports its reliability and construct validity (Li et al., 2013; Raedeke & Smith, 2001). Confirmatory factor analysis using our full sample of 12-17-year-olds showed excellent model fit, S-B $\chi^2(87) = 152.20$, $p < .001$, CFI = .97, TLI = .96, SRMR = .03, RMSEA = .05 (90% CI = 0.04–0.07). However, two items were deleted from the reduced accomplishment subscale due to factor loadings < .70: "I am not performing up to my ability in swimming" and "I'm accomplishing many worthwhile things in swimming." Subscales using the remaining items had satisfactory internal consistency among 12-13-year-olds (all αs > .82).

Intention. Swimmers rated their intention to swim competitively next season from 1 (strongly do not intend to) to 7 (strongly intend to).

Continued participation. The follow-up questionnaire asked parents if their child was still swimming with the same club. If they answered yes, the survey ended. If

they answered no, they were asked if their child was swimming with a different club or team.

Planned Data Analyses

Following data screening, we used bivariate correlations and Cronbach's alpha coefficients to explore relationships between continuous variables within coherent groups of ES markers. These coherent groups pertained to *age items*, *swimming volume items*, and *swimming only items*. We used correlations to examine relationships between the ES markers and each of the burnout subscales and intentions. Within each group of markers, we sought to identify redundant items that correlated strongly with others but did not necessarily add anything to the prediction of the criterion measures. We performed multivariate analyses of variance (MANOVAs) for mean differences on burnout subscales and intentions by the three dichotomous markers of training intensity. Chi-square tests examined relationships between those same dichotomous markers, and swimming status at follow-up.

Results

Preliminary Analyses

Missing data ranged from 0 to 10% per variable, with 8% missing overall. Little's MCAR, χ^2 (453) = 199.929, p = 1.00 confirmed that data were not missing completely at random, as many variables depended on the sport background portion of the questionnaire being thoroughly completed. Due to the cumulative nature of some of the ES variables, one incomplete cell of the sport background table could lead to several missing variables. For example, if the swimming season duration was given for ages 6-10, but not age 11, we could not be sure of the number of years they had swam for

8months or more, nor could we compute the sum of yearly training volume. Missing data were handled on an analysis-by-analysis basis. For correlations, we used multiple imputation to generate 40 data sets, with all independent variables, dependent variables, and demographic variables included as predictors. Given that SPSS is unable to perform multiple imputation for most ANOVA-related analyses (Graham, 2012), we used list-wise deletion for the MANOVAs and the chi-square analyses.

Descriptive Statistics

Descriptive statistics are displayed for all continuous variable markers in Table 1; markers representing similar indices have been grouped together and may be considered plausible arrangements for subscales of ES (see Table 2). With respect to swimmers' burnout subscale scores, the mean and standard deviation values were 2.59 ± .95 for emotional/physical exhaustion, 1.90 ± .86 for reduced sense of accomplishment, and 1.76 ± .93 for sport devaluation. Swimmers' ratings of intention to swim competitively next season ranged from 1 to 7, with a mean of 6.00 ± 1.47. At follow-up, 104 swimmers were still with the same club, 5 had continued with different clubs, 20 had stopped swimming altogether, and 8 were missing data.

Age Markers

Correlations between the continuous variables are displayed in Table 2. The three age items did not show strong associations with one another. The age at which swimmers first participated in swimming was not significantly related to the age at which they first competed or first participated in dryland training. Considering these items as a potential subscale, we deleted the age of first participation item, which improved internal reliability α =.45 to .64. None of the age items were significantly correlated with

intentions to continue swimming, or with any of the burnout scores.

Swimming Volume Markers

These items performed poorly as a subscale, with a Cronbach's alpha of .05. If the sum of yearly swim training volume were removed, internal reliability would increase considerably to $\alpha = .57$. However, considering this total is often a "gold standard" for estimating involvement across the years, we were reluctant to delete this item. Instead, we saw it providing different information not captured by the other items. In contrast, years of swimming (competitively or recreationally) >8 months/year and years of swimming (competitively) >8 months/year were very strongly correlated; they appeared redundant because a case could be made that only competitive swimmers swim more than 8 months yearly. Thus, we only retained the latter competitive item. Table 2 shows none of the swimming volume markers were significantly correlated with burnout scores. Contrary to hypotheses, swim training volume and total years of swimming more than 8 months/year showed small positive relationships with intentions to continue swimming.

Swimming Only Markers

These ES items showed very strong internal reliability ($\alpha = .93$). Two pairs of items (items 9 and 10, items 11 and 12, in Table 2) were so strongly correlated as to be redundant, so only the competitive versions from each pair were retained. None of the swimming only items were related to intention or burnout scores.

Dichotomous Markers of Training Intensity

MANOVAs showed no differences for intention or burnout by leisure time training, F (4, 127) = 1.69, p = .30; Wilk's $\Lambda = 0.92$, partial $\eta^2 = .084$, observed power = .38, or by dryland training, F (4, 127) = 1729, p = .15; Wilk's $\Lambda = 0.95$, partial $\eta^2 = .05$,

observed power = .51. For the third MANOVA, by training camp, the assumption of equality across within-group covariance matrices was not met (Box's M = 24.28, p = .009), so we used Pillai's Trace. Significant differences for intention and burnout were identified, F (4, 127) = 2.71, p = .03; Pillai's Trace = 0.08, partial η^2 = .08, observed power = .74. However, because Levene's Test was also significant for two dependent variables, a stricter alpha level (α = .001) was adopted for examination of the univariate ANOVAs. As a result, none of these ANOVAs were statistically significant, though two were of interest. Contrary to expectations, those who had attended a training camp had higher intentions to continue (F = 6.84, p = .01, partial η^2 = .05, observed power = .74) and lower exhaustion levels (F = 4.08, p = .05, partial η^2 = .03, observed power = .52) than those who had never attended a camp (see Table 3).

With respect to chi-square tests by dichotomous markers of training intensity (Table 4), only one result was significant. Eighty-eight percent of those who had participated in dryland training were swimming at the start of next season compared to only 67% of those who had never participated in dryland training.

Simultaneous Regression to Explain Continuance or Dropout

As a final (unplanned) test, the continuous ES variables that were retained following our correlation analyses (i.e., those that were not discarded following judgments of redundancy) were put into a simultaneous binary logistic regression to explain swimming status at follow-up (continued participation versus dropout). The overall model was not significant, χ^2 (9, N = 97) = 11.12, p = .27, Nagelkerke R^2 = 0.20, and none of the individual items approached significance as predictors of swimming status (Table 5).

Discussion

The purpose of this study was to add empirical evidence to literature regarding early specialization, burnout, and dropout. In doing so, we sought to reduce a large group of markers of ES down to a smaller set that would be useful for predicting burnout and dropout. It seems likely that ES is a multidimensional construct, thus computing a single "score" that could be put into a path analysis may not be possible. We started with 15 potential markers, three dichotomous, and 12 continuous, and although we eliminated a few redundant items, the remaining items do not appear suitable for forming a collective scale. Even when grouped into age, swimming volume, and swimming only items, the continuous variables did not always show high internal consistency. We recommend that future assessment focus on items relating to competitive sport involvement, rather than general sport participation. We also posit that studies that do not assess training volume (both season duration and weekly practice hours) are missing a large component of ES.

In terms of advancing empirical discussion regarding the relationships between ES, burnout, and dropout, although the majority of our findings lacked statistical significance, these null findings do make a significant contribution to the literature. Few of our ES items were significantly related to burnout or dropout, and some of the training volume markers showed weak but positive relationships in the opposite direction from what was hypothesized. There are several possible explanations. We first problematized whether there may be issues with our criterion measures; however, this seems unlikely. The ABQ has been widely established as a valid and reliable measure, and we confirmed its fit with a large group of youth swimmers. As for dropout, we took a straightforward longitudinal approach and are confident in its validity. Second, there is possibly an issue

with our markers of ES. These markers were chosen based on the available literature and they align with the most recently established definition of ES (LaPrade et al., 2016), but of course, there should be further study in this area. Third, there may be certain considerations with respect to our sample that may explain our results. This was a fairly large, representative sample of Canadian youth swimmers, including a range of competitive levels and investment levels. Although position statements on ES portend to apply broadly to competitive youth sport participants, it may be that ES markers do not explain key criterion outcomes in heterogeneous cohorts and the expected maladaptive associations would be more prominent in a more homogenous group of older, distinctly high-performance athletes.

A fourth possibility is that ES markers alone do not directly associate with burnout and dropout. It is worth noting neither Fraser-Thomas et al. (2008) nor Wall and Côté (2007) found significant differences between dropouts and engaged athletes as a direct function of training volume in youth. To account for such null findings, we believe that motivational explanations are required. According to the sport commitment model, for example, athletes remain determined to continue swimming as a reflection of the amount of time and effort they have already attributed to their sport (Scanlan, Chow, Sousa, Scanlan, & Knifsend, 2016). Thus, markers that describe greater investment can be associated with intentions and self-reported valuation of sport. Furthermore, as long as swimmers are experiencing enjoyment and feelings of competence, their significant investment in early involvement may not be maladaptive. The developmental model of sport participation (DMSP; Côté, Baker, & Abernethy, 2003; Côté & Fraser-Thomas, 2007) posits that maladaptive ES occurs when younger athletes spend extensive

structured/deliberate practice in one sport, with very little sport play, while forfeiting the sampling of alternative sport activities. The premise is that athletes in such a trajectory would have controlled motivational regulations and would not have sufficient occasions for enjoyment.

An alternative consideration in light of our null findings is the "early engagement" hypothesis (Ford, Ward, Hodges, & Williams, 2009). It suggests that elite performance is reached through high amounts of practice, but also play, mostly in one sport, beginning at an early age. There is emerging evidence that, at least from ages 13-15, elite soccer players who followed an early engagement trajectory report high levels of autonomous and low levels of controlled regulation (Hendry, 2018; Hendry, Crocker, & Hodges, 2014). This might suggest that sampling other sports is not necessary to be protected from burnout and dropout, though we cannot be sure as we did not measure time spent in unstructured/playful swimming and its psychological correlates. However, Strachan et al. (2009) found minimal differences between "samplers" and "specializers" on a variety of measures. Although specializers scored a bit higher than samplers on emotional/physical exhaustion, they also reported more experiences related to diverse peer groups, and did not differ from samplers in enjoyment or developmental assets. In all, our findings lead us to suggest that that extensive early engagement in one sport may not be troublesome, as long as it is accompanied by positive mediating conditions, particularly enjoyment, autonomy and competency.

There are athletes who specialize early and do not experience negative outcomes because of an autonomy-supportive social environment (Horn, 2015). Experiences of positive/negative outcomes likely depend on psychological need satisfaction/thwarting

(Deci & Ryan, 2000). Light, Harvey, and Memmert's (2013) work with 9-12-year-old swimmers supported the idea that effects of ES are moderated by need satisfaction. They revealed social dimensions of being in a club, and learning and achievement associated with an enjoyment of competition, were main reasons for continued participation; they noted these positive aspects compensated for an early emphasis on deliberate practice versus deliberate play, and a year-round swimming focus. The swimmers may have displayed higher enjoyment and intentions to continue, despite ES, because their needs for relatedness and competence were satisfied. Interviews with adults who deliberately reflected on their reasons for discontinuing youth swimming revealed explanations far more complex than simply training too much, too young (Larson, McHugh, Young, & Rodgers, 2018). They blamed high training volume only when in conjunction with reduced perceptions of competence—not seeing adequate returns on investment—and/or fraught relationships with coaches or teammates. In the same study, there were adult swimmers who recounted enjoying long swimming careers despite high training volume because of their strong relationships within swimming.

Most studies used as evidence for a link between ES and dropout have not controlled for psychological need satisfaction/thwarting. Barynina and Vaitsekhovskii's (1992) study is frequently cited, yet they failed to define "specialized training" or describe the psychosocial context of training. Fraser-Thomas and colleagues (2008) hinted at differences between dropouts and engaged swimmers in their relationships with coaches, teammates, and parents, but did not directly compare the impact of these psychosocial factors to that of the physical/training factors that were also measured. Russell and Limle (2013) found that young adults who had specialized in one sport as

youth were less likely to continue playing sports as young adults compared to those who had sampled a variety of sports. In a follow-up study, Russell (2014) included a retrospective measure of participants' motivation to participate in youth sport, comparing the motivations of specializers to non-specializers, but failed to look at associations between motivation for youth and adult sport participation. However, he suggested that specialized sport settings may not be detrimental, if self-determined motivation is maintained.

Conclusion

We found no evidence of a direct link between ES indicators and increased burnout or dropout. Further study is needed, as there is pragmatic reason to treat ES with caution, coming from an injury prevention and psychosocial health standpoint (Jayanthi et al., 2015). However, future research should consider broader motivational contexts, including notions of personal investment, competence motivation and self-determination.

Our efforts to problematize the findings should not be taken as criticism of the retrospective-longitudinal methods on which we relied. Our concern is with how these data are used as assessment markers to predict maladaptive outcomes of ES. The null findings lead us to wonder whether, in the absence of rigorous empirical, data-driven, mediated designs, we have too long assumed that ES markers are direct determinants of maladaptive outcomes. We are not advocating for overturning position statements, nor are we denying that there are cases where athletes train too hard, too young, and thus experience negative consequences. We advocate that teasing out the differences between healthy (and indeed, flourishing) early sport engagers and maladaptive early specializers may require a new perspective on gathering empirical evidence that recognizes

complexities and mediated psychological conditions.

Table 2.1

Descriptive Statistics for Early Specialization Items

Description	Valid	Missing	*M*	*SD*	Range
Age items					
Age first participated in swimming	137	0	1.06	1.94	0-11
Age first competed in swimming	137	0	8.13	1.94	4-13
Age when swimming (either competitive or recreational) was their only sport for the first time	69	7 (61 N/A)	8.35	1.93	6-12
Age when swimming (competitive) was their only sport for the first time	60	6 (71 N/A)	9.23	1.72	6-12
Age when swimming (either competitively or recreationally) > 8 mos/yr	81	11 (45 N/A)	8.79	2.05	6-12
Age first participated in dryland training for swimming	115	0 (22 N/A)	10.30	1.70	6-13
Age first attended a training camp for swimming	59	0 (78 N/A)	10.83	1.48	5-13
Age when first spent all available leisure time training for swimming	56	0 (81 N/A)	10.88	1.29	6-13
Swimming volume items					
Yrs from age 6-12 participating in swimming (either competitive or recreational)	132	5	5.31	1.77	1-7
Yrs from age 6-12 participating in swimming (competitive)	128	9	4.02	1.78	0-7
Yrs from age 6-12 when they swam (either competitively or recreationally) > 8 mos/yr	125	12	2.41	2.38	0-7
Years from age 6-12 when they swam competitively > 8 mos/yr	125	12	1.88	2.05	0-7
Sum of yearly swim training volume (measured in hrs) from age 6-12	123	14	932.53	663.29	72-3792
Swimming only items					
Yrs from age 6-12 when swimming (either competitive or recreational) was their only sport	130	7	1.70	2.06	0-7
Yrs from age 6-12 when swimming (competitive) was their only sport	131	6	1.26	1.70	0-6
Yrs from age 6-12 when they swam (either competitively or recreationally) > 8 mos/yr and did not participate in any other sports	125	12	1.08	1.61	0-7
Yrs from age 6-12 when they swam competitively >8 mos/yr and did not participate in any other sports	125	12	.92	1.42	0-6

Note. Some of the age variables were missing because that experience had never occurred for some swimmers. For example, 59 participants had attended a training camp, and indicated the age at which they had done so, but 78 participants had never attended a training camp, and therefore could not answer that question. These instances are marked with "N/A" for "not applicable." The content of these items was captured either in dichotomous variables or through the cumulative items. Only items with $n > 100$ were used in correlational analyses, thus some of the age items do not appear in the subsequent table.

Table 2.2

Bivariate Correlations for Early Specialization Item Groupings, Intention, and Burnout

	1	2	3	4	5	6	7	8	9	10	11	12
1. Age first participated in swimming												
2. Age first competed in swimming	.11											
3. Age first participated in dryland training for swimming	.10	.38*										
4. Yrs from age 6-12 participating in swimming												
5. Yrs from age 6-12 participating in *competitive* swimming				.52*								
6. Yrs from age 6-12 when they swam > 8 mos/yr				.28*	.12							
7. Yrs from age 6-12 when they swam *competitively* > 8 mos/yr				.16	.27*	.86*						
8. Sum of yearly swim training volume from age 6-12				.35*	.44*	.71*	.77*					
9. Yrs from age 6-12 when swimming was their only sport												
10. Yrs from age 6-12 when *competitive* swimming was their only sport									.88*			
11. Yrs from age 6-12 when they swam > 8 mos/yr and did not participate in any other sports									.74*	.72*		
12. Yrs from age 6-12 when they swam *competitively* >8 mos/yr and did not participate in any other sports									.70*	.78*	.94*	
13. Intention to continue swimming competitively	-.03	-.05	-.08	.03	.11	.24*	.24*	.21	-.03	.06	.10	.11
14. Emotional and physical exhaustion	.15	.00	.14	.01	-.07	-.10	-.14	-.09	.13	.06	-.03	-.03
15. Reduced sense of accomplishment	-.05	.00	.00	-.06	-.10	-.15	-.16	-.13	.04	.01	.02	.04
16. Sport devaluation	-.03	-.09	.05	.08	.03	-.15	-.12	-.06	.14	.08	.02	.01

*$p < .01$.

Table 2.3
Burnout and Intention Means by Training Intensity Items

	Spent all leisure time training				Participated in dryland training				Attended training camp			
	Yes (n = 54)		No (n = 78)		Yes (n = 110)		No (n = 22)		Yes (n = 59)		No (n = 73)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Intention to swim competitively next season	6.26	1.17	5.83	1.64	6.10	1.36	5.55	1.92	6.37	1.08	5.71	1.68
Physical and emotional exhaustion	2.49	0.94	2.62	0.91	2.58	0.93	2.48	0.87	2.39	0.89	2.71	0.92
Reduced sense of accomplishment	1.86	0.86	1.88	0.86	1.86	0.85	1.95	0.90	1.72	0.84	2.00	0.85
Sport devaluation	1.67	0.74	1.75	0.93	1.66	0.79	2.02	1.10	1.60	0.62	1.81	1.00

Table 2.4
Continued Participation Versus Dropout by Training Intensity Items

	Still swimming	Not swimming	Chi-square tests of independence
Spent all leisure time training			χ^2 (1) = 2.77
Yes	49 (91%)	5 (9%)	p = .10
No	60 (80%)	15 (20%)	Φ = .15
			n = 129
Participated in dryland training			χ^2 (1) = 6.09
Yes	95 (88%)	13 (12%)	p = .01
No	14 (67%)	7 (33%)	Φ = .22
			n = 129
Attended training camp			χ^2 (1) = 1.37
Yes	48 (89%)	6 (11%)	p = .24
No	61 (81%)	14 (19%)	Φ = .10
			n = 129

Table 2.5

Simultaneous Binary Logistic Regression to Predict Continued Participation Versus Dropout With All Retained Continuous Variables

	B	SE	Wald	*p*	Exp (B)
Age first participated in swimming	.12	.22	.30	.58	1.13
Age first competed in swimming	.06	.37	.03	.87	1.06
Age first participated in dryland training for swimming	-.13	.23	.30	.59	.88
Yrs from age 6-12 participating in swimming (either competitive or recreational)	.34	.26	1.73	.19	1.41
Yrs from age 6-12 participating in swimming (competitive)	-.30	.38	.64	.43	.74
Yrs from age 6-12 when they swam competitively > 8 mos/yr	.05	.36	.02	.89	1.05
Sum of yearly swim training volume (calculated by multiplying months by hrs) from age 6-12	.01	.01	1.68	.20	1.01
Yrs from age 6-12 when swimming (competitive) was their only sport	-.17	.33	.26	.61	.84
Yrs from age 6-12 when they swam competitively >8 mos/yr and did not participate in any other sports	.11	.53	.04	.84	1.12
Constant	.72	4.30	.03	.87	2.05

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Chapter 3 – Study 2

Training volume and training context:

Relationships with psychological and behavioural outcomes in swimming

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Abstract

There are hypothesized associations between high training volume in youth sport and negative psychological and behavioural outcomes, such as decreased enjoyment and increased burnout and attrition. However, some research suggests that negative effects of training volume are moderated or attenuated by other factors, such as the sport context provided by coaches. The purpose of this study was to explore the respective relationships of training volume and perceived coach autonomy support with enjoyment, commitment, burnout, and dropout in swimming. Survey data were collected from 265 swimmers between the ages of 12 and 17, and their parents. Swimmers self-reported their current levels of autonomy support, enjoyment, commitment, burnout, and intentions to continue swimming. Parents provided information on swimmers' training volume, including season duration, frequency of weekly practices, and total hours per week of swimming. Structural equation modeling showed significant pathways from autonomy support, but not training volume, to enjoyment, which predicted two types of commitment. Functional and obligatory commitment differentially predicted burnout and intentions to continue swimming. These results suggest that perceptions of an autonomy-supportive training context have a much greater impact than training volume on psychological and behavioural outcomes such as enjoyment, commitment, burnout, and dropout.

Introduction

The amount of training required to become successful in sport has been vigorously debated in the literature. Ericsson, Krampe, and Tesch-Romer's (1993) proposal that expert performances—whether in music, chess, or sport—were the result of voluminous hours of deliberate practice garnered much attention in both sport research and practice. Their findings seemed to support growing trends toward early sport specialization, with young children accruing large amounts of deliberate practice before reaching adolescence. In contrast, the developmental model of sport participation (DMSP; Côté, Baker, & Abernethy, 2003; Côté & Fraser-Thomas, 2007) posits that elite sport performance is not hindered, and may in fact be enhanced, by lower levels of sport-specific deliberate practice and higher levels of play in a variety of sports at an early age. A third perspective, the "early engagement hypothesis," proposes that expert performance may be achieved through children's engagement in relatively high amounts of play, practice, and competition in one primary sport, and participation in a low number of other sports (Ford, Ward, Hodges, & Williams, 2009).

Elite performance, however, is just one measure of success in sport; not all participants in competitive sport strive for, or are capable of achieving, elite status. Many would agree that enjoyment, continued participation, and physical, social, and emotional well-being are important indicators of success. These types of outcomes may also be dependent on the patterns of training outlined above. Ericsson and colleagues (1993) acknowledged that sustaining high levels of deliberate practice, which is effortful and not necessarily inherently enjoyable, requires sufficient motivation, and may lead to burnout at a young age. This idea is echoed in the DMSP, which highlights the necessity of first

building a base of intrinsic motivation through high amounts of deliberate play, prior to involvement in high levels of deliberate practice (Côté & Vierimaa, 2014). Likewise, Ford and colleagues (2009) noted the need for an appropriate balance between participation in deliberate practice and participation in enjoyable/fun activities that likely foster motivation in one predominant sport, prior to adolescence.

The sport commitment model (SCM; Scanlan, Carpenter, Simons, Schmidt, & Keeler, 1993; Scanlan, Chow, Sousa, Scanlan & Knifsend, 2016) has been proposed as a way of understanding aspects of personal motivation. For example, the SCM presents hypotheses about how participants weigh costs against benefits when comparing the allure (or lack thereof) of their sport opportunities to alternative activities. It has been supported as a model for understanding the motivation of participants on developmental trajectories associated with elite sport (e.g., Starkes, 2000; Weiss & Weiss, 2007; Young & Medic, 2008), and derives from seminal work on sport enjoyment (Scanlan, Stein, & Ravizza, 1989). Within the SCM, enjoyment is the most prominent predictor of commitment, having a strong positive relationship with enthusiastic, or functional commitment (FC), and a negative relationship with constrained, or obligatory commitment (OC; Scanlan et al., 2016; Young & Weir, 2015). These two central commitment constructs in contemporary versions of the SCM allow for broader, cross-model discussions of self-determined motivation (e.g., Wilson, Rodgers, Carpenter, Hardy, & Fraser, 2004). It is important to distinguish between these two types of commitment as they are thought to promote different motivational and behavioural outcomes. FC reflects a voluntary, personally-initiated and self-accepted commitment type that has been positively associated with self-determined motives and participation in

physical activity, exercise, and sport (Gabriele, Gill, & Adams, 2011; Santi, Bruton, Pietrantoni, & Mellalieu, 2014; Wilson et al., 2004; Zahariadis, Haralambos & Alexandris, 2006). In contrast, OC reflects a more controlling and less self-accepted form of commitment that has been associated with burnout, an undesirable sport outcome (Raedeke, 1997).

Burnout is a psychological syndrome characterized by emotional and physical and exhaustion, reduced sense of accomplishment, and sport devaluation (Raedeke, 1997). Schmidt and Stein (1991) developed their commitment model of burnout (which was later expanded upon by Raedeke in 1997), in response to perceived limitations of stress-based models of burnout. They hypothesized that burnout could be predicted based on three distinct commitment profiles: 1) attraction-based (functional) commitment, 2) entrapment-based (obligatory) commitment, and 3) low commitment. Athletes displaying OC would theoretically be prone to burnout, whereas those with FC would likely continue enjoying sport, and athletes exhibiting low commitment might drop out of sport, but not due to burnout. These hypotheses were largely supported by Raedeke's (1997) findings, as adolescent swimmers displaying characteristics of OC had higher burnout scores than those in the high FC or "indifferent"[1] categories. Weiss and Weiss (2003) expanded on these findings by considering motivation. Adolescent gymnasts were divided into "attracted," "entrapped," and "vulnerable"[2] categories, and their motivational

[1] Raedeke's cluster analysis placed swimmers into four categories, listed here in order from highest to lowest ratings of burnout: malcontented, obligated, indifferent, and enthusiastic. Indifferent swimmers were those who seemed neither particularly attracted to the sport, nor entrapped by it, and were thought to be the most likely to drop out.

[2] The vulnerable category included gymnasts whose ratings of enjoyment, costs, benefits, and attractive alternatives were moderate, compared to the more extreme ratings by attracted and entrapped gymnasts. The absence of a "low commitment" category was attributed to the level of investment required by the sport—those with low commitment would have already dropped out.

profiles were then examined. Those in the entrapped category had significantly lower self-determined motivation and higher amotivation compared to the other two groups. This motivational profile has been associated with higher rates of burnout (Li, Wang, Pyun, & Kee, 2013). Although they did not measure burnout, when Weiss and Weiss (2006) followed up on their previous study they found that gymnasts who had been previously categorized as "entrapped" were more likely to have dropped out a year later compared to those in the other two categories. Together, these findings reinforce the need to consider enjoyment, FC, and OC in examinations of burnout and dropout from sport.

Much literature pertaining to the youth sport experience holds the view that high training volumes prior to adolescence contribute to sport attrition. There are a couple of ways by which this may occur. A lack of enjoyment is one of the primary reasons given for dropping out of sport (Butcher, Lindner, & Johns, 2002; Crane & Temple, 2015). As previously discussed, the deliberate practice involved in training is effortful and not necessarily enjoyable. Another commonly cited reason for dropout in studies involving samples of young athletes is a lack of time (Butcher et al., 2002). Crane and Temple (2015) conducted a systematic review on children and adolescents' dropout from organized sport. They found that "time" was the most prominent structural constraint leading to dropout, and some of the interpersonal constraints identified in their review were also related to time, such as "having other things to do" and "other social priorities." The implication was there was not enough time to do everything, and sport was the activity that was dropped. A recent investigation of high school swimmers' sport commitment also highlighted the difficulties of balancing sport with school, part-time jobs, and other non-sport activities (Larson, Young, & Reade, 2018). Together, these

findings suggest that high training volumes may indirectly, if not directly, contribute to sport dropout.

Recent research offers insights on youth/adolescent sport experiences by asking adult swimmers to reflect back on their earlier sport participation patterns and describe reasons for continued or disrupted patterns. For example, retrospective interviews with masters swimmers who swam competitively as youth revealed mixed findings with regards to training volume (Larson, McHugh, Young, & Rodgers, 2018). High training volume frequently resulted in time constraints, forcing them to sacrifice other activities in order to keep swimming. Some participants blamed high training volume for their decision to ultimately leave youth swimming, but this was typically only in conjunction with reduced perceptions of competence, for example, not seeing adequate returns on investment, and/or fraught relationships with coaches or teammates. Others reported maintaining long swimming careers despite high training volumes because of their strong positive relationships within the sport. These qualitative findings lend credence to an alternative view of the relationship of training volume with motivational and behavioural outcomes; it may be that training volume is not very important when it comes to burnout and dropout from sport, or perhaps it matters only under certain circumstances.

Horn (2015) suggested that the social environment, particularly the degree of autonomy support, is highly influential in determining whether an athlete will experience positive or negative outcomes. Autonomy support is demonstrated by authority figures, such as teachers, parents, or coaches, when they take into account the perspectives of the individuals under their supervision, and provide them with choice and opportunities for input into decision-making (Gillet, Berjot, Vallerand, & Amoura, 2012). According to

self-determination theory (SDT; Deci & Ryan, 1985), an autonomy-supportive context where athletes' needs for autonomy, competence, and relatedness are being met should foster more self-determined, even intrinsic motivation, of which enjoyment is a key feature. This literature again suggests that training volume may be a poor predictor of burnout and dropout, compared to the training context. In line with Horn's (2015) proposition, if the training context is autonomy supportive, burnout and dropout are much less likely to occur, even with high training volumes.

In summary, whereas there is a theoretical proposition for a positive association between training volume in youth sport and burnout or dropout, empirical findings are mixed, with some researchers reporting no relationship between training volume and dropout (e.g., Fraser-Thomas, Côté, & Deakin, 2008; Wall & Côté, 2007) or burnout (Gustafsson, Kenttä, Hassmén, & Lundqvist, 2007; Larson, Young, McHugh, & Rodgers, 2018). The training *context*, which in this study is represented by coach autonomy support, may be as important or more important in predicting burnout and dropout than training *volume*, through its influence on enjoyment and commitment. The assertive theorizing and equivocal empirical evidence revealed in the literature leads to the question, "What are the relative contributions of training volume and training context to positive and negative psychosocial constructs, including enjoyment, commitment, burnout, and dropout?"

Therefore, the purpose of this study was to explore the respective relationships of training volume and perceived coach autonomy support with enjoyment, commitment, burnout, and dropout from swimming. Based on theoretical propositions from the SCM and SDT, we hypothesized that 1) autonomy support would be positively associated with

enjoyment, 2) enjoyment would be positively associated with FC and negatively associated with OC, 3) FC would be positively associated with intentions to continue swimming, and negatively related to burnout and dropout, and 4) OC would be positively associated with burnout. However, we were not sure what we would find in terms of the relationship between training volume and enjoyment, commitment, burnout, or dropout.

It is clear that the relationships among these variables must be complex. To date, the limited empirical evidence has been restricted to traditional statistical treatments such as ANOVAs and hierarchical regressions. In order to examine the unique variance associated with multiple possible outcomes of sport participation, we used structural equation modeling (SEM), as it affords a more sophisticated simultaneous consideration of numerous factors that might be important. Although rather complex in the design of equations, SEM also affords simple inferences and conclusions to be drawn where appropriate.

Methods

Procedures

The study involved 265 competitive youth swimmers and their parents, together representing more than 50 swim clubs across Canada. By strategically recruiting from summer swim clubs and winter swim clubs, a range of competitive levels are represented in this study. “Summer” swim clubs typically run from May until August and are generally less competitive, whereas “winter” (year-round) clubs typically run from September until June or July and generally require high levels of investment and training volume. To be eligible to participate in this study, swimmers had to be between the ages of 12 and 17 at the start of data collection, with the ability to read, write, and understand

English well enough to complete a questionnaire independently. All procedures were approved by an institutional research ethics board.

Swimmers and their parents who agreed to participate were given questionnaires to complete. Summer swimming data were collected in person, generally within a month of the beginning of the swim season. Winter swimming data were collected and managed online, using REDCap electronic data capture tools hosted and supported by the Women and Children's Health Research Institute at the University of Alberta (Harris et al., 2009). The majority of these questionnaires were completed between October and April. This time frame represents a typically stable time of training, when swimmers have had enough time to settle into the season and establish their relationships with coaches and teammates.

Swimmers self-reported perceptions of autonomy support, enjoyment, commitment, burnout, and intentions to continue swimming. Parents completed a questionnaire regarding their own child's sport participation, including the duration of their swim season in months and weekly hours of practice. Several months after each data collection, at the start of the next swimming season, (May for summer and September for winter swimmers), all parents received a brief follow-up survey online asking whether their child was still swimming or had dropped out.

Participants

Participants comprised 265 competitive swimmers (M_{age} = 13.78 ± 1.60) and their parents (i.e., 265 swimmer + parent pairs). The sample included more girls (60%) than boys. Forty percent of the swimmers were recruited from summer clubs. At the start of data collection, swimmers' education level ranged from Grade 6 to Grade 12, with 50%

of the sample in either Grade 7 or Grade 8. The majority of swimmers (67%) came from families with a combined annual family income of $100,000 or more. The parents were highly educated; 41% had bachelor's degrees, and 28% had graduate or professional degrees.

Measures

The internal validity and reliability of all multi-item measures were assessed with confirmatory factor analysis (CFA). This is a critical first step in SEM, as it provides the basis for evaluating each construct's measurement properties as well as the overall fit of first the measurement model, then the structural model (Little, 2013). Any issues identified at this stage in the process are described below.

Training volume. Swimmers' weekly practice hours, as reported by their parents, were converted into hours per month, then multiplied by the duration of their swim season in months to obtain a measure of their total swim training volume for the year.

Autonomy support. Swimmers' perceived autonomy support was measured with the short-form Sport Climate Questionnaire (SCQ; Deci, 2001). The short form contains six of the 15 items found on the long form. All items deal with athletes' perceptions of their current coach and are rated on a scale from 1 (strongly disagree) to 7 (strongly agree). An example item is "My coach listens to how I would like to do things." Scores for the six items are averaged, with higher means indicating higher perceptions of autonomy support. These items demonstrated excellent internal reliability in the present sample ($\alpha = .89$).

Enjoyment. Swimmers' sport enjoyment was measured using four items, (Scanlan, Carpenter, Simons, Schmidt, & Keeler, 1993b), each rated on a Likert scale

from 1 (strongly disagree) to 5 (strongly agree). An example is “I am happy swimming.” Scores on these items were averaged to obtain a single enjoyment score. These items also demonstrated excellent internal reliability in the present sample (α = .95).

Commitment. Swimmers’ FC to competitive swimming was assessed with modified versions of the three items used by Wilson et al. (2004). OC was measured with modified versions of the three items used by Wilson et al. (2004) as well as two additional items that Young, Piamonte, Grove, and Medic (2011) used to improve the internal reliability of this scale. Swimmers rated items on a scale from 1 (strongly disagree) to 5 (strongly agree), with higher scores reflecting stronger FC/OC. The FC items demonstrated excellent internal reliability in the present sample (α = .88). An example of an item measuring FC is “I am dedicated to swimming.” The OC items did not perform as well (α = .73), and CFA showed poor factor loadings, with only two of the five OC items over .70. As a result, we opted for a single item indicator, choosing the item “I feel obligated to continue swimming” as best representing the construct. Recent research suggests that the use of a single item can provide an appropriate measure for a unidimensional construct, such as OC (Gogol et al., 2014).

Burnout. Swimmers completed the Athlete Burnout Questionnaire (ABQ; Raedeke & Smith, 2001). This instrument measures three dimensions of burnout—emotional/physical exhaustion, reduced sense of accomplishment, and sport devaluation. For each subscale, swimmers were presented with five statements about feelings and experiences within the sport of swimming and were asked to indicate how often they felt that way. Rating options were 1, (almost never), 2, (rarely), 3 (sometimes), 4 (frequently), and 5 (almost always). The ABQ is the most popular measure of burnout in sport and its

reliability and construct validity have received empirical support (Li, et al., 2013; Raedeke & Smith, 2001). CFA with our sample showed excellent model fit, S-B $\chi^2(87) = 152.20$, $p < .001$, CFI = .97, TLI = .96, SRMR = .03, RMSEA = .05 (90% CI = 0.04–0.07). However, we deleted two items from the reduced accomplishment subscale due to factor loadings < .70: "I'm accomplishing many worthwhile things in swimming" and "I am not performing up to my ability in swimming." Subscales composed of the remaining items had satisfactory internal consistency (all αs > .83). Mean scores were obtained for each subscale.

Intention. Swimmers were asked to rate their intention to swim competitively next season on a scale from 1 (strongly do not intend to) to 7 (strongly intend to).

Continued participation. The follow-up questionnaire administered at the beginning of the next swim season asked parents if their child was still swimming with the same club. If their answer was no, they were asked if their child was now swimming with a different club, or, depending on their age, on a high school, university, or adult swim team.

Data Analyses

Data screening and bivariate correlations were performed using IBM SPSS Statistics 25. Next, we conducted two-step SEM using robust maximum likelihood estimation (MLR) in Mplus (Muthén & Muthén, 1998–2012). The first step consisted of confirming the measurement model. Once satisfied with the fit of the measurement model, we proceeded with the second step, structural regression. Our first hypothesized model began with autonomy support and training volume as exogenous variables predicting enjoyment, which in turn predicted FC and OC. This pathway is supported by

previous work identifying enjoyment as a mediator between constructs such as perceived competence or valuable opportunities and commitment (Weiss, Kimmel, & Smith, 2001). The three burnout subscales were included as outcomes of commitment and predictors of intentions to continue swimming. However, as Smith (1986) noted, not all athletes who withdraw from sport do so because of burnout, and not all athletes who experience burnout withdraw from sport. Therefore, we also tested a second model that included intention alongside the burnout subscales as outcome variables, under the assumption that substantial reduction in intentions is an outcome that could associate with dropout.

Model fit was evaluated with a combination of the χ^2 test, root mean squared error of approximation (RMSEA), Comparative Fit Index (CFI), Tucker Lewis Index (TLI) and standardized root mean squared residual (SRMR). Adequate fitting models are achieved with RMSEA $\leq .08$, CFI $\geq .90$, TLI $\geq .90$, and SRMR $\leq .08$ (Little, 2013). Ideally, the chi-square statistic is as small as possible, with a statistically non-significant p-value. However, this statistic is not seen as a critical marker of model fit, because 1) it is a test of exact fit, which is unattainable, and 2) it is greatly influenced by sample size (Little, 2013).

Considering the merits of the longitudinal design, we felt it was important to focus some analyses on our dichotomous outcome variable—swimming status at follow-up. We did so using SPSS, as the small number of dropouts was not conducive to the use of SEM. Multivariate analysis of variance (MANOVA) was used to look for mean differences among training volume and the eight psychological variables, between those who were still swimming and those who had dropped out. Finally, we performed a binary logistic regression to predict swimming status. We selected predictor variables based on

their performance in the MANOVA, rather than attempting to analyze all of them, due again to the small number of dropouts in our sample.

Results

Preliminary Analyses

Less than 1% of the data to be used for SEM were missing, therefore we felt confident that using robust maximum likelihood estimation would provide a satisfactory solution (Little, Jorgensen, Lang, & Moore, 2013). The only variable with a more substantial amount of missing data was swimming status at follow-up, with 9% missing. Due to the small amount of missing data overall and the fact that SPSS is unable to perform multiple imputation for most ANOVA-related analyses (Graham, 2012), list-wise deletion was used for the MANOVA, as well as the binary logistic regression.

Descriptive Statistics and Correlations

Descriptive statistics and bivariate correlations for all continuous variables are displayed in Table 1. At follow-up, 208 participants were still swimming, and 34 had dropped out. Follow-up data for 23 participants were missing. Correlations were mostly in the expected directions. However, training volume was only significantly related to two variables, showing small positive relationships with both exhaustion *and* intentions to continue swimming. Notably, training volume did not have a sizable or significant direct association with reduced accomplishment or devaluation. Autonomy support was positively related to enjoyment and intentions to continue swimming, and negatively related to OC and all three burnout subscales. Surprisingly, the relationship between autonomy support and FC was almost non-existent.

Structural Equation Models

We tested two models, both of which began with autonomy support and training volume as exogenous variables. These were hypothesized to predict enjoyment, which would then predict FC and OC. The first model had FC and OC as predictors of burnout, which then predicted intentions to continue swimming. The second model predicted direct relationships between FC, OC, and intention. Of the two models, the second had slightly better fit[3], S-B $\chi^2(362) = 778.99$, $p < .001$, CFI = .91, TLI = .90, SRMR = .09, RMSEA = .07 (90% CI = 0.06–0.08), and is shown in Figure 1. The relationships between variables were mostly as expected. Training volume was not significantly related to enjoyment. Autonomy support positively predicted enjoyment, which had a small negative association with OC and a very strong positive association with FC. FC negatively predicted burnout and positively predicted intentions to continue swimming, as hypothesized, and OC was associated with reduced accomplishment and exhaustion.

Relationships With Swimming Status at Follow-Up (Continued Participation or Dropout)

For the MANOVA at follow-up, the assumption of equality across within-group covariance matrices was not met (Box's M = 84.53, $p = .003$), so Pillai's Trace, which is more robust to violations of this assumption, was used instead of Wilks' Λ. The multivariate test was significant, indicating a large difference between the continuers and dropouts, $F(9, 210) = 5.00$, $p < .001$; Pillai's Trace = 0.18, partial $\eta^2 = .18$, observed power = .99. Levene's Test was also significant for five variables, so a strict alpha level ($\alpha = .001$) was adopted for examination of the univariate ANOVAs. As expected, those

[3] Fit indices for the first model, with burnout subscales predicting intentions to continue swimming: S-B $\chi^2(367) = 847.54$, $p < .001$, CFI = .90, TLI = .88, SRMR = .08, RMSEA = .07 (90% CI = 0.07–0.08).

who were still swimming at follow-up had reported significantly higher levels of enjoyment, FC, and intentions to continue swimming, and lower levels of sport devaluation several months earlier in the prior season, compared to those who dropped out. Those who were still swimming at follow-up also had significantly higher levels of training volume than those who dropped out. The results of these univariate ANOVAs are displayed in Table 2.

Variables that achieved significance in the univariate ANOVAs were put into a simultaneous binary logistic regression to see if they could predict swimming status at follow-up (continued participation versus dropout). Autonomy support was also included due to its status as a contextual variable, despite not achieving significance at $\alpha = .001$. Preliminary tests of necessary assumptions were met. The overall model was significant, χ^2 (6, $N = 221$) = 35.80, $p < .001$, Nagelkerke $R^2 = .27$. Although training volume achieved statistical significance, its effect size was negligible. Intention was the only other significant predictor. Swimmers who had reported higher intentions to continue months earlier had far greater odds of being in the continuer group. Details are presented in Table 3.

Discussion

The purpose of this study was to explore the respective relationships of training volume and perceived coach autonomy support with enjoyment, commitment, burnout, and dropout from swimming. We set out to test the theoretical support for a negative relationship between training volume and enjoyment, which could lead to increased burnout and dropout. In the same analysis, we comparatively examined the proposition that training context, in this case, autonomy support, would impact enjoyment, and could

provide buffering against burnout and dropout. Contrary to what has been theorized, training volume was not associated with decreased enjoyment. There are several possible explanations for these findings. It may be that the training volume measure in our study did not capture the demanding and non-enjoyable nature of deliberate practice, or the nature of training pursued by our particular sample was not sufficiently taxing to be perceived as generally inherently unenjoyable. However, the measure was consistent across all the swimmers, and any inherent weakness in it would be a constant and therefore unlikely to explain a differential relationship with continuers versus dropouts. Further, it is possible that high levels of deliberate practice do not result in decreased enjoyment of the activity. For example, several studies of elite athletes show they report deliberate practice to be somewhat enjoyable (Baker & Young, 2014). Reports of enjoyment may depend on conditions within the training context. For example, findings from Larson, McHugh, et al.'s (2018) qualitative study with masters swimmers who swam competitively as youth showed that high volume training was perceived as more enjoyable when accompanied by a sense of relatedness emanating from close relationships with teammates and coaches. Horn (2015) suggested that autonomy support could serve as a buffer against negative outcomes that might otherwise result from the focused and intense training associated with early sport specialization at a young age. This may also hold true for training volume at any age.

Our hypotheses regarding the relationships between enjoyment, commitment, burnout, and intention were largely supported. Enjoyment was positively associated with FC and negatively associated with OC, as predicted by the SCM (Scanlan et al., 2016). FC was positively related to intentions to continue swimming, and negatively related to

all three burnout dimensions. The strength of the relationship between FC and sport devaluation is especially noteworthy, suggesting that they could almost represent opposite ends of a spectrum. This makes sense, considering that if one no longer feels that participation in sport is worthwhile, it is unlikely that they would "desire and resolve to persist in a sport over time" (Scanlan et al., 2016, p. 235). In contrast, OC had small positive associations with exhaustion and reduced accomplishment, but was not significantly related to sport devaluation. OC was not significantly related to intentions to continue swimming either, which contradicts SCM propositions but is consistent with previous research showing a lack of association between OC and continued participation in sport or exercise (Santi et al., 2014; Wilson et al., 2004). Of the three burnout subscales, devaluation had the strongest negative relationship with intentions to continue swimming. This supports discussions of the progression of burnout which suggest that exhaustion occurs first, and devaluation is the impetus for withdrawal from sport (Gustafsson, Kenttä, Hassmén, Lundqvist, & Durand-Bush, 2007; Raedeke, 1997).

A strength of this study was the longitudinal follow-up to see who was still swimming and who had dropped out. The biggest difference between continuers and dropouts was on intentions to continue. MANOVA effect sizes for sport devaluation, functional commitment, enjoyment, and training volume were medium or close to medium. The higher training volume seen in the continuers is in contrast to research either citing lack of time for other activities as a primary reason for dropout (e.g., Crane & Temple, 2015), or finding no significant differences between dropouts and engaged athletes by training volume (e.g., Fraser-Thomas et al., 2008; Wall & Côté, 2007). According to the SCM, substantial investments of time and effort into sport will increase

OC, but only if participants believe that their investments would be lost to them if they discontinued participation (Scanlan et al., 2016). The small negative correlation seen between training volume and OC in the present sample suggests that loss was not a prominent factor here. Instead, the continuers' higher training volume may be a result of enjoyment and high FC. Future investigations grounded in the SCM should use longitudinal approaches to untangle the temporal relationships between personal investments and commitment.

Conclusions

All three of the approaches to training outlined at the start of this paper suggest that deliberate practice is incompatible with enjoyment, and therefore must be accompanied by a sufficient level and quality of motivation. The DMSP and the early engagement hypothesis suggest that motivation is fostered through playful activities (Côté et al., 2003; Côté & Fraser-Thomas, 2007; Ford et al., 2009). However, we suggest that these approaches give inadequate attention to the varied contexts in which deliberate practice may take place. Deliberate practice in sport often necessitates being with other people, in contrast to the solo practice typical of musicians. Even though swimming is an individual sport, coaches and teammates are central to practice, and therefore their influence on enjoyment must be considered.

In the present study, no meaningful relationships were identified between training volume and enjoyment, commitment, or burnout. We posit that the positive relationship between training volume and intentions to continue swimming likely reflects a desire to train more, due to an enjoyable and autonomy supportive training context, rather than the other way around (i.e., investment of time and effort into training leading to increased

commitment). The significantly lower levels of training volume seen in dropouts as compared to continuers may be an artifact of the dropouts' higher levels of sport devaluation. While there may be other reasons to limit training volume, (e.g., injury prevention; Jayanthi, LaBella, Fischer, Pasulka, & Dugas, 2015), if high levels of training volume are internally initiated and take place in an autonomy supportive environment, the risk of burnout and dropout may not be as great as was previously thought.

Table 3.1

Descriptive Statistics and Bivariate Correlations

	TV	AS	ENJ	FC	OC	EXH	RA	DEV	INT
TV									
AS	-.03								
ENJ	-.01	**.33***							
FC	.07	.06	.25*						
OC	-.11	-.25*	-.20*	**.57***					
EXH	.18*	**-.32***	**-.46***	.01	**.30***				
RA	.03	**-.41***	**-.41***	-.06	.29*	**.46***			
DEV	.00	**-.37***	**-.77***	-.28*	.20*	**.57***	**.57***		
INT	.26*	**.31***	**.56***	**.38***	-.05	**-.32***	**-.44***	**-.70***	
M	374.67	5.29	4.50	3.28	2.92	2.73	2.06	1.93	5.81
SD	265.66	1.21	0.80	0.69	1.48	0.97	0.91	0.97	1.68

Note. *$p < .01$. All correlations representing **medium to large effect sizes are bolded**. TV = current swim training volume in hours per year; AS = autonomy support; ENJ = enjoyment; FC = functional commitment, OC = obligatory commitment; EXH = exhaustion; RA = reduced accomplishment; DEV = devaluation; INT = intention to continue swimming. The burnout, enjoyment, and commitment subscales were measured on a scale from 1 to 5; all other psychological constructs used a scale from 1 to 7.

Table 3.2
Mean Differences by Swimming Status at Follow-up

	Still swimming (n = 189)		Not swimming (n = 31)				
Item description	*M*	*SD*	*M*	*SD*	*F*	*p*	*Partial* η^2
Training volume (hours per year)	398.41	277.42	230.39	181.80	10.60	.001	.05
Autonomy support	5.38	1.20	4.82	1.50	5.27	.023	.02
Enjoyment	4.57	0.70	4.06	1.19	11.09	.001	.05
FC	3.32	0.66	2.88	0.67	11.29	.001	.05
OC	2.88	1.50	2.84	1.37	.02	.876	.00
Emotional/physical exhaustion	2.66	0.91	2.98	1.11	2.96	.087	.01
Reduced sense of accomplishment	2.00	0.91	2.31	0.97	2.98	.086	.01
Sport devaluation	1.83	0.84	2.50	1.32	14.10	.000	.06
Intention to continue swimming	6.07	1.38	4.23	2.31	37.96	.000	.15

Table 3.3

Simultaneous Binary Logistic Regression to Predict Continued Participation Versus Dropout (N = 221)

	B	S.E.	Wald	*p*	Exp (B)
Training volume (hours per year)	0.00	0.00	5.13	0.02	1.00
Autonomy support	0.18	0.19	0.92	0.34	1.20
Enjoyment	-0.04	0.38	0.01	0.93	0.97
FC	0.66	0.38	3.00	0.08	1.94
Sport devaluation	0.07	0.40	0.03	0.87	1.07
Intention to continue swimming	0.37	0.17	4.66	0.03	1.45
Constant	-3.91	2.89	1.83	0.18	0.02

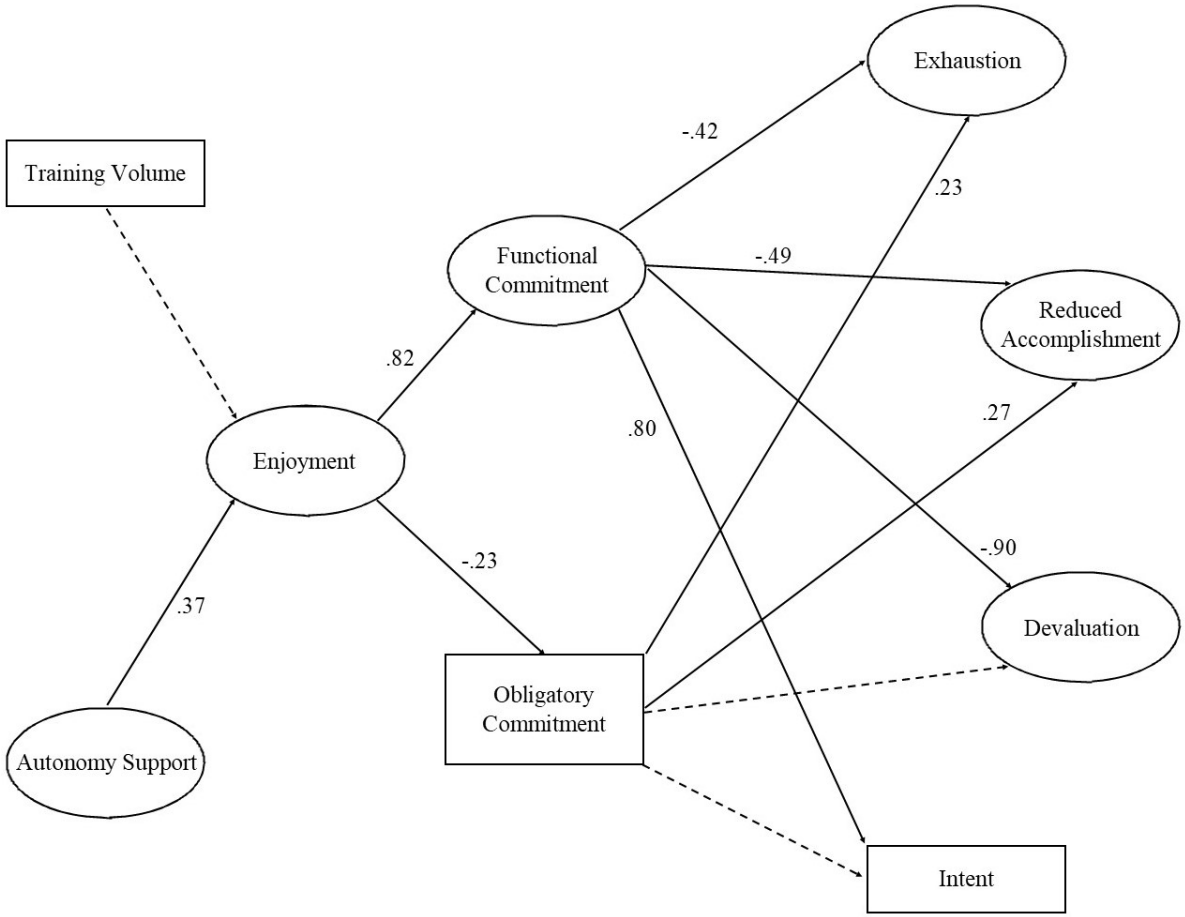

Figure 3.1. Structural equation model predicting burnout and intentions to continue swimming.

Note. All coefficients are standardized and are given only for significant pathways at $p < .01$.

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Chapter 4 – Study 3

Pathways from youth to masters swimming:

Exploring long-term influences of youth swimming experiences

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Abstract

Objectives: Some swimmers, "continuers," transition directly from youth swimming into masters swimming. Others, "rekindlers," take time off before returning to swimming as masters athletes. The purpose of this study was to explore how youth swimming experiences shape subsequent participation in masters swimming. ***Design:*** This research was guided by a qualitative description method, as described by Sandelowski (2000). ***Method***: Twenty masters swimmers (10 men and 10 women, *M* age = 40.5 years) were purposefully selected for semi-structured retrospective interviews regarding their youth swimming experiences and transitions into masters swimming. Eight were continuers, and 12 were rekindlers. Data were submitted to qualitative content analysis. ***Results:*** Analyses revealed disruptive, attractive, and enabling forces stemming from youth swimming. For rekindlers, high training volume in youth swimming led to negative physical and emotional consequences and scheduling conflicts between swimming and other activities. When they felt their performance was no longer improving, these costs led them to drop out of youth swimming. In contrast, the continuers' focus on enjoyment, social aspects, and other non-performance-related reasons for swimming led to a smooth transition from youth swimming into masters swimming. As adults, rekindlers had confidence in their swimming abilities because of their youth training, but they required a shift away from performance-related motives in order to return to swimming. ***Conclusions***: These findings demonstrate the varied and long-lasting influences of youth sport experiences on adult sport participation. They also point to some specific theoretical and practical implications for researchers, coaches, parents, and club administrators.

Introduction

One of the most popular masters sports is swimming, which is well-suited for lifelong participation (Cooper, Powell, & Rasch, 2007). Masters swimmers are adults who typically train together under the guidance of a coach two or more times per week; they may swim recreationally, for fitness, or competitively (Stevenson, 2002) and all acknowledge at least a fairly regular pattern of participation in a formal program (Young, 2011). While the minimum age requirement for international competition is 25, in many countries, swimmers can register as masters athletes beginning at age 18. This means it is possible to transition directly from age group or varsity swimming programmes (hereafter referred to as "youth swimming") into masters swimming. Dionigi (2015) classified athletes who transition directly from youth to masters sport as "continuers." In her qualitative study examining pathways to involvement in masters sport, she also identified "rekindlers" (those who took a break after youth sport and returned to masters sport later in life) and "late bloomers" (those who did not begin participating in sport until they were adults). Reports suggest that the majority of masters swimmers swam competitively as youths, but few could be classified as "continuers" (Cooper et al., 2007). A large survey of masters swimmers with previous competitive youth swimming experience found that only 30% of them joined masters swimming within 10 years of ending their youth swimming participation (Daughtrey, Vowles, & Black, 2011). This puts the majority of those surveyed in the "rekindler" category.

It is unclear whether this gap in participation reflects time away from swimming only or withdrawal from sport and physical activity in general. Almost nothing is known about the factors influencing this long lapse in participation, involvement in other

activities during this time away from swimming, or what leads to an eventual return to the sport. Exceptions include Stevenson (2002) and Rathwell, Callary and Young (2015) who described socialization processes during middle-age, involving sponsors already in masters swimming, as particularly important in inviting adults to re-engage in adult sport after time away. A delayed return to adult sport could be due to external factors like finances, career, and/or family obligations (Dionigi, 2015). However, another possibility is that the increasingly specialized nature of youth swimming has deleterious and latent effects on later adult motivation for participation in masters swimming. Youth swimming is known for high levels of burnout and attrition, often attributed to intense training that takes place almost year-round (e.g., Raedeke & Smith, 2004). Yet, to our knowledge, no research has considered the quality and context of masters swimmers' previous competitive youth swimming experience and its impact on their patterns of swimming participation as adults. Although there is literature that has compared masters athletes with younger cohorts on motives and embodiment (e.g., Howells & Grogan, 2012) and associated masters' motives with short-term correlates of adherence (Young, Callary & Rathwell, 2018) and psycho-social outcomes of sport participation (Gayman, Fraser-Thomas, Dionigi, Horton & Baker, 2017), no studies have framed early to later life sport participation transitions through a motivational lens. Additionally, although a limited number of studies (e.g., Harada, 1994; Dionigi, 2015) have addressed developmental pathways in sport across the lifespan, none has framed their inquiry in psychological models of motivated behaviour.

There are a number of theoretical propositions that are relevant to the current study, including aspects of self-determination theory (Deci & Ryan, 2000) and sport

commitment (Scanlan, Chow, Sousa, Scanlan, & Knifsend, 2016), which have been the focus of much research on motivation in masters athletes (see Young, 2011 and Young et al., 2018). Additionally, the proposition that earlier life experiences could be tied to later transitional experiences has been noted in studies of specialization and burnout within youth sport (Côté, Baker, & Abernethy, 2007), but similar experiences have not been explored with respect to links between adolescent and later participation as adult athletes.

Foundational youth sport experiences are assumed to be important because they can have a (latent) association with people's decision to continue or perhaps return to sport later on (e.g., Côté et al., 2007). According to Côté and colleagues, volitional, self-led play in childhood, (which is viewed as the antithesis to specialized training), can lead to autonomous motivation for sport participation in adulthood. Horn (2015) theorized that early specialization has a detrimental effect on intrinsic motivation. Framed within self-determination theory (Deci & Ryan, 2000), Hendry, Crocker and Hodges (2014) posited that when young children are asked to engage in high levels of effortful, intensive, "deliberate practice" (Ericsson, Krampe, & Tesch-Römer,1993) rather than building a base of enjoyment and intrinsic motivation, their training is more likely to be regulated by external influences. We suggest it may then be difficult to shift from this controlled motivation to a more self-determined and sustainable motivation. This hypothesis was partially supported by Russell (2014), who found that young adults who had specialized in one sport as youth reported higher controlled motivation than non-specializers, though they also reported higher levels of one type of intrinsic motivation.[1] Specializers in his

[1] Russell used the sport motivation scale (SMS; Pelletier et al., 1995), which measures three different types of intrinsic motivation: 1) to know, 2) to accomplish things, and 3) to experience stimulation. Specializers in Russell's study reported higher levels of intrinsic motivation to know than non-specializers.

study were also less likely to participate in sports as young adults compared to non-specializers. However, he did not examine their motivation for participating in sport as adults.

The sport commitment model (SCM; Scanlan et al., 2016) provides another lens through which to examine sustained sport participation. The SCM differentiates between an attraction-based "want to" commitment and an obligated "have to" commitment, and specifies antecedents of both forms (Schmidt & Stein, 1991). The antecedents of both types of commitment have been examined in youth sport populations (Scanlan et al., 2016) and in masters athletes (e.g., Young & Medic, 2011), but the potential for latent effects to carry over from youth sport into adulthood has not yet been explored. It is possible that "continuers" maintain their participation over time due to certain attracting or restraining forces present in youth swimming, while other forces disrupt the "rekindlers" participation. These forces may relate to motivation, commitment, and physical aspects of training. Therefore, the purpose of this study was to explore how participants' youth swimming experiences shaped subsequent participation in masters swimming. This research is important because youth sport participation is often promoted as a way to encourage lifelong physical activity (Gard, Dionigi, & Dionigi, 2018), but very little is actually known about how early sport experiences influence sport participation later on.

Method

Qualitative description, as described by Sandelowski (2000), was the method used to guide this research. Qualitative description involves summarizing people's perceived experiences in plain, everyday language (Sandelowski, 2000). Our selection of this

method was informed by the first author's ontological and epistemological assumptions, which include ontological relativism (accepting multiple, mind-dependent realities) and epistemological constructivism (believing one's knowledge of reality is constructed through subjective personal experiences). Sandelowski's (2000) commentary on qualitative description is consistent with this paradigm, noting that "Researchers seeking to describe an experience or event select what they will describe and, in the process of featuring certain aspects of it, begin to transform that experience or event" (p. 335). However, there is a tendency to stay near to the data—findings are not transformed to the extent one might see in other qualitative approaches. Sandelowski (2000, p. 337) notes that viewing language as a form of communication, rather than a structure to be analysed, allows for "largely unadorned" answers to questions of interest to practitioners and policy makers—for example, "How can we better promote lifelong participation in swimming?" With little research done in this area, we sought a straight-forward description around a relatively complex phenomenon. Qualitative description has been used elsewhere in sport and exercise to better understand complex phenomena (e.g., Larson, McFadden, McHugh, Berry, & Rodgers, 2017); in fact, Sandelowski cites qualitative description as the method of choice for such investigations. As such, we deemed it appropriate for exploring the complexities of long-term motivational consequences of youth swimming experiences.

Participants

Twenty participants were purposefully selected using maximum variation sampling to capture varied patterns of swimming participation and to elicit a wide range of retrospective perspectives on youth swimming experiences. Maximum variation

sampling is an especially useful method for exploring the unique and common manifestations of a phenomenon across a range of varied cases (Sandelowski, 2000).

Participants were recruited for interviews after completing an online survey regarding patterns of sport participation, especially swimming, from childhood to adulthood. They were asked to indicate the age at which they began participating in swimming, began competing in swimming, and reduced their sport involvement to only swimming (if ever). Involvement in focused, high-intensity training was assessed based on previously identified markers of specialization in swimming, including participation in training camps and dryland training (Fraser-Thomas, Côté, & Deakin, 2008). Survey participation was limited to masters swimmers over the age of 18 who were currently registered with a Canadian swim club, training with teammates and a coach, and who had participated in at least one season of competitive swimming prior to age 18. A total of 205 eligible swimmers completed the survey, 115 of whom indicated their interest in participating in an interview. Twenty survey participants (10 women and 10 men) were purposefully selected for interviews based on their responses to survey questions regarding their sport backgrounds (i.e., total years of youth swimming participation, degree of involvement in early specialized training) and their transition time between youth swimming and masters swimming. These participants are described further in Table 1. Those who took a full year or more off between their youth and masters swimming participation were classified as "rekindlers" (n = 12). The others were classified as "continuers" (n = 8), as they continued swimming without any breaks between their youth and masters participation. All procedures were approved by the first author's university research ethics board.

Data Generation

All participants took part in one-on-one interviews with the first author, who is a masters swimmer and youth swim coach. Interviews provide a means of capturing the nature and shape of personal experiences, and as such, were useful in generating data for qualitative description (Sandelowski, 2000). Interviews were completed either face-to-face or over the phone. They ranged from 24 to 65 minutes in duration ($M = 46$, $SD = 11$), and were recorded and transcribed verbatim. Providing potential participants with a choice between telephone and face-to-face interviews allowed for the inclusion of a wider range of participants with differing needs and preferences, as well as geographical locations. Previous research has shown that face-to-face and telephone interviews yielded similar qualitative findings, with no reduction in data quality due to phone use (Sturges & Hanrahan, 2004).

The interviewer's involvement in swimming meant she already knew five of the participants and could easily build rapport with the others, even over the phone, based on shared experiences and knowledge of swimming terminology. Dwyer and Buckle (2009) noted that this insider status often leads to greater acceptance by participants, resulting in increased openness and greater depth to the data. Another advantage identified in the present study was the ability to focus on participants' feelings and stories, rather than getting bogged down in explanations of what a "dual meet" or "200 IM" entails. When interviewing participants who were already known to her, the interviewer encouraged them to share information as if she had not heard it before, so as not to lose out on rich descriptions due to assumptions of prior knowledge.

The interviews began by using selected sections of the retrospective interview procedure developed and validated by Côté, Ericsson, and Law (2005). This procedure was adapted for collecting data about youth swimming by Fraser-Thomas and colleagues (2008), using primarily closed-ended questions to collect quantitative data on athletes' general patterns of activity involvement and psychosocial influences throughout development. Three pilot interviews were used to refine the interview guide used in the present study. Some of the more specific questions were removed to leave more time for eliciting rich descriptions of swimming experiences during the interviews. Participants were asked about their overall sport involvement (e.g., type of sport, duration of season, weekly hours of practice, level of competition) from childhood through adolescence, with special attention given to swimming. During this phase of each interview, the interviewer recorded the participant's responses in a chart, creating a visual frame of reference for her own personal use during the remainder of the interview. Changes in sport participation over time were noted, as well as changes in swimming context (e.g., switching clubs, or going from club swimming to varsity) and training (e.g., increases or decreases in training volume, beginning dryland training, attending a training camp for the first time, etc.).

Next, the interviewer shifted to a semi-structured interview format and explored the transition periods noted on the chart with open-ended questions like, "How did you feel about your swimming abilities at that time?" and "What were your relationships like with your coaches and teammates?" Participants were asked about their main reason for leaving youth swimming, what they did after leaving, and how they decided to join masters swimming. Interviews culminated with the question, "Thinking back on your

youth swimming experiences, how would you say they've impacted your motivation for swimming as an adult?"

Analysis

Sandelowski (2000) describes content analysis as an optimal choice for qualitative description. Qualitative content analysis distils words into categories of information that summarize events or phenomena (Elo & Kyngäs, 2008). Our analysis followed the three-step process described by Elo and Kyngäs (2008). The first step, preparation, involved immersion in the data by reading through all of the transcripts several times. In keeping with a qualitative descriptive approach, we decided to analyze the manifest content (using the words themselves), rather than extending the analysis to latent content (i.e. interpreting meaning based on sighs, pauses, laughter, etc.). During the second step, organization, the first author engaged in open coding, which is the process of writing notes and headings in the transcript margins in an attempt to describe all aspects of the content. These headings were used to create categories, which were then collapsed into higher-order themes upon discussion and arrival at consensus with the second author. For example, the headings "training volume as deterrent to coming back to swimming sooner" and "viewed swimming as work" generated the category, "negative aspects of training volume," which was then included in the theme, "Physical and emotional consequences of high training volume." The third step, reporting, involved presenting the themes accompanied by direct quotes from participants.

Rigour

A relativist approach to rigour means that relevant criteria for evaluation should be selected while engaging with a piece of inquiry, rather than beforehand, as the

standards used to evaluate qualitative research are dependent on the study's context and purpose (Smith & McGannon, 2017). For example, while an auto-ethnography might be judged on aesthetic merit and evocation, these criteria are not relevant to the present study. Instead, we invite readers to reflect on the following considerations as discussed by Smith and McGannon. *Coherence* was achieved by allowing the qualitative descriptive approach to guide the participant sampling, data generation, and analysis. We selected a *worthy topic*, as lifespan patterns of sport participation are understudied, yet may have significant impacts on physical and mental wellbeing. The purposeful selection of interviewees from a large pool of potential participants in order to obtain abundant data regarding the topic of interest demonstrates *utility*. Finally, the credibility of our work is enhanced through the use of conversations with *critical friends*—co-authors and researchers outside the study who encouraged reflexivity (attention to one's own role in constructing knowledge) and a fuller, more complex understanding of the phenomenon by suggesting alternative explanations and interpretations.

Results

The purpose of this study was to explore how participants' youth swimming experiences shaped subsequent participation in masters swimming. Of the 20 participants, eight were "continuers," with smooth transitions from youth swimming into masters swimming, and the remaining 12 were "rekindlers," with a full year or more passing between their youth and masters swimming participation. The themes derived from the experiences described by continuers and rekindlers are presented in three sections: 1) Disrupting Influences, 2) Experiences of Change, and 3) Attracting and Enabling

Influences. The rekindlers' voices are more dominant in the first two sections, and the continuers' experiences are more central to the final section.

Disrupting Influences

Four rekindlers cited burnout from youth swimming as a primary factor in their delayed return to swimming as adults. Indeed, aspects of exhaustion, a reduced sense of accomplishment, and sport devaluation appear in some of the quotes in this section. The other rekindlers were drawn away from youth swimming by various attractive alternatives, especially when their enjoyment of swimming started waning due to excessive training, negative experiences with coaches or teammates, and perceptions that they were reaching the limits of their performance abilities.

Physical and emotional consequences of high training volume. Rekindlers descriptively recalled how the high training volume that is so common in swimming often led to fatigue and decreased enjoyment of the sport. When asked about the feelings she tended to experience before practice during her last year of age group swimming, Nancy (R) replied, "Um just being tired, I think, was the main one." She added, "I guess towards the end I was getting bored of it and the mileage we were putting in and also being a distance swimmer always having to do the long distance…that was just like ok, I've had enough." Phil (R) recalled, "In Grade 12, I would fall asleep in class right in front of the teacher. I was so tired, you know? And he would make comments and I wouldn't clue in; I was out."

Even though Paul (R) described very positive experiences in youth swimming, particularly at the end of his career in varsity swimming, he took many years off before returning to the sport. When asked what contributed to this long break, he said:

> You know, it was just the endless, I wouldn't say endless, but you know what I mean, it was up at 5 every morning or whatever for years on end, and then just the volume of training and when you're done, you just go, I'm done, I'm done…Some of the best swimmers in the world or Canada never come back as masters swimmers, because they probably had to do even more volume and more than I went through… It was just enough pounding of your body and early mornings and so on.

In contrast, Brian (C) recounted a training volume that was lower than many of his friends and suggested that this difference played a role in their pattern of participation (he continued swimming, while his friends did not):

> I think there is something to be said about the intensity of my experiences…I have best friends that swam age group and stopped and we talk about what it was like when we were swimming when we were young and their experiences are a lot different 'cause there's an intensity that they had, thank God I didn't have. I swam five times a week. That was the most I ever swam. I never did doubles [two practices in the same day] all the way up until I was in varsity. Like there was no chance for me ever—I never ever felt like I didn't wanna come to practice. I always wanted to go. I always wanted to do that stuff and I think in some ways, that's something that made a difference for me.

The negative consequences of training volume seemed to be moderated to some extent by the characteristics of coaches, the quality of relationships with teammates, and swimmers' perceived competence. Carter (C) experienced very high training volume, but explained that his positive relationships with his coaches and teammates made it

bearable. He said, “it would help when you’re doing all the heavy training loads, having friends to joke about things.” Ashley (R) talked about a shift where swimming “seemed more like work than enjoyment” and noted that, at the time, she wasn’t getting along with her coach. Finally, Lisa (R) described less personal tolerance for the training volume as she saw diminishing returns on her investment. She said,

> Well, as you get older…you know the margins of improvement get smaller and smaller, right, like it gets down to the tenth of a second improvement. You are putting in a hell of a lot of effort to see marginal improvements, so that plays on your psyche, right?

Sacrificing other activities for swimming. High training volume also created time constraints and conflict between swimming and other necessary or desirable activities. Nancy (R) said, “Swimming was it. When I was much younger, I did take some piano lessons and Brownies but even those really fell by the wayside ‘cause I was just too busy.” At age 12, Ian chose swimming over national level judo participation because he could no longer do two sports at once. Lauren (R) loved music and wanted to sign up for marching band, but it would have meant giving up swimming. She stuck with swimming, but said, “Both my sisters ended up in marching band and I was like, man that’s the thing I would have been real good at; I would have liked that a lot.” Later on, she described an incident in Grade 10 where she angered her coaches by choosing to skip a swim practice to attend jazz band instead: “It was a huge fight if I remember correctly…I mean, I was never their star swimmer so I think they cared a little less, but yeah, it was a fight for sure.”

Many rekindlers expressed interest in school sports, but were thwarted by their involvement in club swimming. Phil (R) said,

> It got to the point where I wasn't allowed to do anything else but swim. Like in high school, I wanted to try out for the volleyball team and I had tried out for the football team and actually made it and then the coach basically gave me an ultimatum, you swim or you play football or you play these other sports, but you can't do both. So I stuck with swimming. At that point, we were swimming 11 times a week.

For his last year of high school, he switched to a different swim club and drastically decreased his training volume. With this new freedom, he again tried out for school sports, but this time didn't make any of the teams: "I kinda tried to embrace everything that I missed. But, of course, it was too late 'cause these guys had come up through the junior ranks and everything else, right? So there was no hope."

Realizing the limits of their abilities. While many young athletes in sports such as hockey, basketball, soccer, and tennis dream of playing at a professional, or even semi-professional level, there are no equivalent opportunities for swimmers. For swimmers, the Olympics tend to represent the pinnacle of achievement in their sport, and as a result, just about every participant in this study referenced them in explaining their aspirations and competency levels in youth swimming. At a certain point, every participant came to the realization that they were not going to make the Olympics. For some, this realization had little impact because elite performance had never been a goal. Elizabeth (C) said, "I was just getting sick of swimming six to eight times a week...I wasn't improving and I certainly wasn't fast enough to swim at a varsity level and I wanted to go to university

and focus on school." When asked if there was anything hard about leaving youth swimming, she replied,

> No, I felt like I had the tools to, you know, move forward and like I'd gotten what I needed to get out of it…I think that's one thing that my mom did a really good job of. It wasn't like she put us in swimming when we were little to be Olympic champions.

She went on to explain that there had always been more of a fitness focus than a performance focus in her family.

In contrast, Nancy (R) said, "What I wanted to do was go to nationals and make the Olympic team…and I fell short of that." She talked about what led her to quit swimming before the end of high school:

> I guess just the amount of time I was putting in and then the pressures of school and not having any social life whatsoever…like I really had no friends in high school. All my friends were swimmers 'cause I would go in the morning; I would go right after school. Also, I think because I set records when I was 12 and then 13, 14, going into sort of senior swimming, I wasn't going any faster and I was working all that time that it just felt like, oh my God, this is a waste of time now. So I think that's what got me to quit; I felt like I peaked when I was 12 and I was now a 'has-been.'

Ian (R) also discussed how the realization of his limitations in swimming combined with other interests outside of swimming led to a withdrawal from the sport:

> I was really startin' to feel like swimming was never gonna be like a profession for me as an athlete. Like you kinda get to a certain age and you just kinda know,

> like your placing, your times, your development…and that's just the way it is. And so yeah, it's probably fair to say that that realization definitely would've influenced my desire to carry on pushing myself and training hard, especially with a new girlfriend and disagreements with the coach and all that.

Experiences of Change

Tasting freedom. Ending youth swimming participation provided opportunities to try activities that were previously precluded by swim training, even if that was just having unscheduled time. This was true for both rekindlers and also continuers. Masters swimming programmes rarely offer the opportunity to train at the same volume as youth swim clubs, and even if they do, practice attendance is generally up to the volition of the masters swimmer. For example, if a masters swimmer wants to skip a Tuesday night swim practice to attend a concert, they are not subject to the same negative consequences that a youth swimmer might experience.

When asked to describe the best thing about leaving youth swimming, Andrew (C) said,

> You just have a lot more freedom. Like, you can enjoy other things in life rather than just being at the pool 24/7 'cause…especially in the winter is the worst, you get there at like 5 in the morning, it's dark. You leave at 8, it's still dark. You go to school. Come out of school, it's like a little bit of sunshine, right back into the pool and then you come out and it's dark again…But once I left that, I found you can just see a lot more sunrises and sunsets on your own terms.

Ian (R) responded similarly, saying the best thing about not swimming was "not being on a schedule. Like just being flexible and able to do whatever I wanted, whenever I wanted."

Many rekindlers jumped at the chance to start part-time jobs for the first time, often still at the pool, as lifeguards. Lisa (R) said, "I would say I got a job immediately after I quit swimming or pretty soon after quitting swimming. I didn't have a job while I was swimming; it was almost impossible to have a job." Sports and social activities were other popular ways to spend time previously taken up by swimming. Phil (R) said, "One of the things I did do when I stopped swimming was I embraced other sports." He picked up running and volleyball, and did not mind being less competent in these activities than at swimming, saying: "I didn't really care to be honest. I just wanted to do something different, whether I was good or not, right? It was more of just getting out and having fun."

Shifting motives. For the rekindlers, taking time off from swimming and trying other activities allowed for negative memories of youth swimming to fade. Lauren (R) said, "I needed those years [off] to remember how much I enjoyed swimming and forget all the nonsense around it." This break from swimming also allowed for a shift in motives. When asked what happened during her time off that allowed her to come back to swimming and enjoy it again, Lisa (R) said, "Well, 'cause I'm just doing it for fitness. For health reasons, I'm just doing it for health reasons." Ashley (R) also explained how she negotiated new motives when she returned to swimming:

> Yeah. I definitely think I just switched mentality on how I swim and now it's mostly just to get a good workout in for the fitness aspect and for like meeting

> new people, being part of a team. I don't focus so much on speed as I used to, so I think that's the big difference.

Many continuers experienced this same shift in motives, but earlier on. Carter (C) was very serious about swimming and had hopes of going to the Olympics until he was plagued by illness in high school that interfered with his training. He was unsure he would continue swimming at all, but when he started university, he was welcomed onto their team. He continued to enjoy swimming, but his education took over as top priority. Following graduation, he followed a former swim coach to Australia for a couple more years of less intensive youth swimming before returning to Canada and joining a masters team. He said about his time there,

> I was pretty much like, ok, I'm retired now…I'm not going to be swimming 12 times a week anymore or whatever it was. But I just wanted to keep doing it, and be consistent with it. And so yeah for me, it was making the transition from being a high performance, competitive athlete to just being able to do something that I really enjoy for the physical health and the mental wellness side to it, and the social aspects.

Elizabeth (C), who had always had more of a focus on fitness than performance, contrasted her motivation for swimming with a former youth teammate who had failed to make that switch:

> I notice that kind of different mentality at the pool when I'd see people that were competitive swimmers at the same time I was. This one guy, he's like, "Can I join you to do your set?" and I'm like, "Sure." But then he quit halfway through the 400 [metres] 'cause he's like, "Oh, I just can't do this anymore." Whereas

> I'm like, ok, I'm not as fast as I used to be when I was a competitive [youth] swimmer, but I know the fitness benefits that I get from this.

Attracting and Enabling Influences

Creating expectations of continued benefits from swimming. For the continuers, positive experiences in youth swimming led to expectations of similar experiences in masters swimming. Carter (C) said,

> If [youth swimming] hadn't been the way it had been, like so positive for me as an individual, like socially, and relationships with mentors…I probably wouldn't be doing it anymore. But because it has been so positive and especially when other challenges come up in life then you always have that "Ok, I can go to the pool," right? So yeah, for me to summarize it, it's my positive experience that has led me to then continue it on.

Many of those positive earlier experiences were related to strong relationships with teammates. Logan (C) said, "Swimming, at an early age, taught me that it could create a pool of friends and social aspects come along with it." Brian (C) discovered this during his varsity swimming experience: "Well, that's the social aspect. Like, the fun you could have at swim meets and the lifelong friends." These continuers sought out masters swimming programmes to connect with like-minded people and make new friends.

Other continuers focused on perpetuating the physical and mental health benefits. Jennifer (C) said,

> You learn the benefits of it for your own body, right? I think that's my main thing now is just, learning how swimming helped me to stay as healthy as I was, I don't wanna stop doing that now just because I'm not competing.

Elizabeth (C) stopped competing in youth swimming when she finished high school, but because she was conscious of how swimming benefitted her, she didn't stop swimming. She said, "Honestly, my first day of university classes, it was a bit traumatizing, but the first thing I did was look up the pool schedule, picked out a workout, headed to the pool and had a great swim."

In contrast, the rekindlers were more likely to leave youth swimming at a time when the costs of participation seemed to outweigh the benefits. When they considered returning to swimming as adults, the benefits drawing them to the sport (e.g., cardiovascular health) were not necessarily ones they would have thought about as youth.

Providing skills required for future swimming participation. The continuers emphasized skills related to discipline and routine derived from their early swimming participation that also facilitated their regular participation as masters swimmers. Tomas (C) said,

> There's a sense of developing a routine, like all my friends are like, "I can't believe when it's minus 30 degrees out, you have to get up at 4 o'clock to go swimming." You know, the discipline that swimming gave me, it's priceless. Like I don't care if it's snowing, if it's raining, if it's sunny, I'm going to the practice, I don't care. So that angle is thanks to swimming.

Similarly, Elizabeth (C) said,

> I feel so fortunate that I was able to participate in youth sport as much as I was able to, just because it gives you skills like time management, stress management, like how to set a goal and work towards it…Also just getting into that routine and having base fitness—it's much easier to stay fit than to get fit.

Several participants cited enjoying their college/university swimming experiences more than their age group swimming participation as adolescents. However, these swimming experiences hinged on competence developed as age group swimmers. Amy (C) said,

> Well, I think if I hadn't done the age group swimming, I wouldn't have got involved in [university] swimming and then I wouldn't have got involved in masters swimming. So as much as the age group experience was not 100% enjoyable, you know, developing the ability to swim for fun and fitness did start then.

After using up her university eligibility in Canada, Amy pursued graduate studies in Europe and was able to train and compete with age group, university, and masters teams at various times there. Immediately upon her return to Canada, she looked up a masters swim team.

The rekindlers also highlighted how their youth swimming experiences gave them confidence in their swimming abilities as adults, which facilitated their entry into masters swimming. For example, Julie (R) said,

> I love it that I used to swim so I can swim now. Like, I'm pretty fast in general as the population goes… I mean the fact that if you don't go 14 hours a week, you're not gonna be as good as I am now.

Niall (R) explained that he got into masters swimming through triathlon, and credited his willingness to try the triathlon to his youth swimming background: "If I didn't have the swimming background, I probably wouldn't have done it."

Planting the seeds of enjoyment. The continuers explained that youth swimming was when they got hooked on the sport. Carol (C) said,

> It's something that I've always done and I can't see myself stopping…I've heard of other swimmers and talked to other swimmers that could hardly wait to be done when they were finished and some people quit. I mean, I had a brother that quit, a sister that quit, but I just never did. I just have always liked being in the water.

Similarly, Brian (C) said, "It was foundational for the love of the sport. I got a chance to swim competitively and I loved every minute of it…because I liked it so much, I kept on swimming right through my life."

Some rekindlers described early experiences of enjoyment as an important latent factor in their return to the sport, even if they had left swimming on a low note. Phil (R) described some very negative experiences as an adolescent, but credited his earlier, more positive experiences with his return to swimming after a long break. He said,

> The early years instilled a love of swimming for me and I think that is the foundation. Had I not had that, I don't think I would've gone through my adolescent years in swimming and not into university and I most definitely wouldn't have started into masters swimming. I think it's that grassroots beginning of swimming foundation that I had fun that kinda just set the tone.

Lauren (R) specifically spoke to the role of youth coaches, saying, "My earlier coaches helped me build my love of swimming for sure." She explained that, as a current youth swim coach, she remained very conscious of her role in generating this enjoyment.

Other rekindlers were convinced to try swimming again by external influences, either for health reasons or due to some friendly peer pressure. Once they got going in

masters swimming, the enjoyment that they had experienced early on was reawakened, and this strengthened their attraction to masters swimming, despite some negative experiences in between. Ian (R) said, "I did really enjoy swimming and now that I'm back at it, I do currently very much enjoy it. But, yeah, there was definitely that burnout and you know nearly 10 years off for me from competing." Similarly, Ashley (R) said,

> I think [my youth experiences] maybe um, dimmed [my motivation for swimming] for a little bit afterwards, like just left me with a bit of a bad taste in my mouth from the experience, but I'm really glad that I joined the masters team 'cause it renewed my passion and my love of swimming and made it a positive experience again. So now I associate it again with positive feelings and memories.

Discussion

Our findings support Côté and colleagues' (2007) fundamental assumption that foundational youth sport experiences are important because, among other reasons, they can have a latent association with people's decision to continue or perhaps return to sport later on. While continuers and rekindlers shared many of the same experiences in youth swimming, there were some important differences in the contexts and timing of those experiences that seemed to influence subsequent patterns of swimming participation as adults. These experiences and contexts are discussed in terms of two overarching themes, one exploring the consequences of training volume, and the other exploring the realization of performance limits in youth.

Short-Term and Long-Term Effects of Training Volume: Negatives and Positives

Many participants, rekindlers and continuers alike, reported high training volume and intensity in age-group swimming almost year-round. High levels of deliberate practice at a young age, particularly in a single sport, have been linked to increased rates of injury, burnout, and dropout from sport (Baker, Cobley, & Fraser-Thomas, 2009). However, for the continuers who reported very high training volumes, positive relationships with coaches and teammates seemed to lessen some of the potentially negative impacts of their training. This is in line with Horn's (2015) suggestion that young athletes' social environment may moderate the negative effects of early specialization on various psychological and behavioural outcomes. These findings also parallel results from Light, Harvey, and Memmert's (2013) examination of children's reasons for joining and staying in swim clubs. Questionnaires and interviews with 9-12-year-old swimmers revealed two main reasons for continuing to swim: 1) the social dimensions of being in the club, and 2) a sense of learning and achievement associated with an enjoyment of competition. Light and colleagues noted that the positive social aspects associated with club membership made up for an early emphasis on deliberate practice versus deliberate play, and a year-round focus on swimming. These findings support the possibility of psychological need satisfaction (Deci & Ryan, 2000), especially relatedness, moderating the relationship of early specialization with decreased enjoyment and increased likelihood of burnout and/or dropout. Similarly, it seems that some of the continuers in our study continued swimming despite high levels of intensive practice, because their needs for relatedness were being met. In contrast, rekindlers noted that their training became intolerable when accompanied by diminishing returns in performance

(reduced competence satisfaction) and poor relationships with coaches (relatedness thwarting).

High training volume also produced conflicts between swimming and alternative activities (other sports, music, socializing, academics and paid work) that were more pronounced for the rekindlers than the continuers. Early attempts at quantitatively measuring the effects of attractive alternatives on commitment in youth sport proved difficult and led researchers to conclude that, for typical non-elite youth sport athletes, conflicts between leisure time activities are not problematic (Scanlan, Simons, Carpenter, Schmidt, & Keeler, 1993). However, for participants with mandatory swim practices six days a week, these time conflicts were much more prevalent and seemed to become an increasingly disruptive influence to rekindlers. More recent research within the sport commitment model differentiated between functional (enthusiastic) commitment and obligatory (constrained) commitment, and identified attractive alternatives/other priorities as being associated with higher levels of obligatory commitment (Scanlan et al., 2016; Young, Piamonte, Grove, & Medic, 2011). Obligatory commitment without sufficient levels of functional commitment is not sustainable, and has been linked to burnout (Raedeke, 1997). The continuers in this study either described less attraction to alternative activities, or they reported lessening their swim training volume (by switching youth programmes or transitioning into masters swimming) to accommodate these other activities. The rekindlers, on the other hand, felt they had no choice but to stop swimming altogether. They may have been unable to find alternative swimming programmes with lower levels of training volume, or they may have been unable to negotiate the investment required to stay involved in swimming.

One positive side effect of high training volume was the development of physical fitness and skill in the water, as well as time management and discipline. Participants described how their youth swimming experiences gave them a foundation for future adult participation in swimming. The personal assets framework (Côté, Turnnidge, & Evans, 2014) posits that youth sport provides opportunities for the development of the 4 C's—confidence, competence, connection, and character. The development of these assets then influences long-term outcomes, including participation. This was evident in the present study, where rekindlers described their return to swimming as being dependent on their confidence in their swimming abilities. Continuers emphasized the competence they had developed in swimming—not only in terms of physical skills, but also in terms of mental skills and time management—as a key factor in their continued participation. Baker, Fraser-Thomas, Dionigi, and Horton (2010) noted the importance of interrogating whether sport participation provides benefits throughout the lifespan, above and beyond those provided by physical activity. For our participants, it seems that positive development through youth sport had long-lasting effects, which transitioned to later life involvement, even through long periods of reduced sport involvement. Future research might identify specific assets, competencies, qualities, and motivational attributes inculcated during youth sport that contribute to continuance, or re-engagement in sport as masters athletes. Dionigi, Fraser-Thomas, Stone, and Gayman (2018) noted that psychosocial development does not end in adulthood, and may be enhanced by masters sport participation. Their investigation resulted in a "6Cs" model, identifying three new Cs (commitment, cognition, and challenge) that seemed especially relevant to mid-life athletes. Future studies could also examine how the change from youth/adolescent, early

adulthood (often in a performance sport context) translates into the masters sport context and interacts with maturation and aging.

Realizing Limits and Shifting Motives

One of the more unique aspects of swimming is the fact that yearly participation is largely dictated by the swimmer. Unlike sports with limited spots on the team (e.g., basketball, soccer), the size of a swim club is only limited by pool space and coaching staff. As a result, swimmers don't get "cut" from age group swimming. In addition, swimmers don't "age out." While university/college swim teams offer limited years of eligibility, it is entirely possible for 27-year-olds to continue training alongside high schoolers in a club swimming context. This means it is up to the individual swimmer to decide on how and when to make a "graceful exit." A primary consideration is expectations of future success in competition. Both continuers and rekindlers came to a realization of their limits—the fact that they were not going to be Olympic swimmers. Participants' response to this realization depended heavily on their motives for participation in swimming. Those whose sole or primary focus was elite performance no longer saw a reason to continue. This was true regardless of whether swimmers held task or ego goal orientations. While a task goal orientation is generally thought to be positive and adaptive in sport (e.g., Duda, Chi, Newton, Walling, & Catley, 1995), it may nonetheless become problematic upon reaching a point where a person is unlikely to continue improving relative to their past performances, especially in swimming, which revolves around "best times." Dionigi, Horton, and Baker (2013) noted that negotiation of the aging process within masters sport differed depending on athletes' status as late bloomers, rekindlers, or continuers. For late bloomers, participation in masters sport gave

them the opportunity to become champions and set personal bests. However, continuers and rekindlers who had previously performed at a high level in sport spoke of the need to accept that they would no longer be able to reach their past levels of performance. Some participants resorted to changing sports or events in order to accommodate aging and potentially injured bodies and to still experience success in a different context. Others embraced the "fun and friendship" aspects of master sport (Dionigi et al., 2013).

In the present study, the decision to participate in masters swimming seemed reliant on the recognition of and motivational shift toward valuable involvement opportunities unrelated to self- or other-referenced performance. Valuable opportunities are defined as "highly valued aspects of the sport experience that are only present through continued sport involvement" (Scanlan et al., 2016, p. 236). Valuable opportunities previously identified by high school swimmers included the chance to meet make new friends and maintain a healthy lifestyle (Larson, Young, & Reade, 2018). Similarly, in the present study, even if the continuers did not expect much in terms of their performance, they had experienced enjoyment, positive social aspects, and physical and emotional wellbeing through swimming, and they expected these benefits to continue through participation in masters swimming. While the continuers recognized and shifted their focus toward the positive social aspects and benefits to their wellbeing during or towards the end of their youth swimming careers, for the rekindlers, this shift took place during their time off, and they approached masters swimming with a mindset that was different from their youth. This new mindset was typically consistent with research describing health benefits as a common motive for involvement in masters swimming (Ferrari, Bloom, Gilbert, & Caron, 2017).

Finally, continuers identified enjoyment as a primary factor in their long-term swimming participation and for some rekindlers, their memories of early enjoyment of swimming were described as a factor in their return later on. Enjoyment has been consistently identified as the strongest determinant of sport commitment (Scanlan et al., 2016), including among masters athletes (Young & Weir, 2015). Some of the sources of enjoyment cited by high school swimmers included the physical sensations associated with moving through the water, as well as valued opportunities for social interactions, new friendships, and being part of a team (Larson et al., 2018). Similarly, participants in the present study described taking pleasure in just being in the water, and the sense of fun and playfulness injected into practices by certain coaches. Social aspects were also highlighted as a major contribution to enjoyment. Many participants described their university/college swimming experiences as being more enjoyable than their age group swimming experiences because of the opportunities to compete and gain points for the team at dual meets, rather than focusing on individual performances and rankings. This is quite similar to the enjoyable team experience described by high school swimmers (Larson et al., 2018)

Conclusion

The present study expands our understanding of lifespan sport participation. Rather than replicating research looking at common external barriers to adult sport participation (e.g., Lim et al., 2011), we examined the physical and motivational conditions originating in youth swimming experiences and whether these foundational experiences were latently associated with adult involvement. Dionigi (2015) highlighted three categories of masters athletes, each representing a different pathway to masters

sport: late bloomers, continuers, and rekindlers. Our examination of continuers and rekindlers in swimming revealed further nuances in their journeys to masters sport participation that have both theoretical and practical implications for youth swimming, and potentially other sports as well. First, while heavy training volume has been labeled as a precursor of burnout, we identified both positive and negative outcomes arising from training volume, as well as support for the importance of psychological need satisfaction as a buffer against negative consequences. If youth swimming programs endorse high volumes of training, it is critical that positive relationships are maintained between athletes and coaches. Second, our findings suggest that task goal orientations can be problematic when looking to encourage life-long participation in an individual sport like swimming. Coaches and parents should encourage diverse motives for swimming, including enjoyment, friendship, health benefits, and personal development, rather than focusing solely on performance outcomes. This will give swimmers reasons to continue on in the sport even when they have reached their limits in terms of performance. Third, our study suggested that, when forced to choose between swimming and other attractive alternatives, youth swimmers will either quit swimming, or they might continue swimming, but with a more constrained, obligatory commitment that puts them at a higher risk for burnout and disruption of participation. Gard et al. (2018) have critiqued the promotion of sport as an avenue for improving public health, preferring to position sport as "a leisure option for people to experience, just like French cooking and crossword puzzles" (p. 81). However, many clubs treat swimming more like a job than a leisure option, forcing swimmers to commit at a high level or leave. It is important that youth swimmers experience some degree of autonomy in their activity schedule. To

reduce burnout and encourage positive development for life, youth swimming contexts should allow for participation in other sports and activities outside of swimming.

Finally, although we focused on two pathways to masters sport and commonalities that could be ascribed to their journeys, the current study also showed that the process was highly individualized. The balance of rewards and costs surrounding participants' investment in swimming and their profile of motivation regulations as youth varied. Our findings speak to the complexity of promoting sport for life, given the diverse and long-lasting influences of numerous unique youth sport experiences. Thus, in keeping with literature on masters sport that views sport as a highly personal lived experience with individualized meanings (e.g., Gard et al., 2018), one of the practical implications for those interested in encouraging participants to continue, or to re-engage in adult sport, is to foremost understand their personal reasons and orientations in choosing the sport activity and how such choices are dependent on broader social contexts.

Table 4.1
Participant Characteristics

Pseudonym	*Years off after youth swimming*	*Gender*	*Current age*	*Age at peak*	*Peak swim training hours per week*	*Total years of youth swimming*
Isabel	<1	Woman	21	15	11	4
Elizabeth	<1	Woman	25	14	14	10
Jennifer	<1	Woman	30	21	16	15
Amy	<1	Woman	56	24	23	26[a]
Andrew	<1	Man	19	13	28	11
Logan	<1	Man	30	13	12	14
Tomas	<1	Man	40	-	-	10
Brian	<1	Man	43	18	19	13
Carter	<1	Man	33	15	25	15
Ashley	1	Woman	31	14	24	9
Carol	1	Woman	55	14	40	13
Lauren	12	Woman	28	13	15	10
Lisa	14	Woman	54	12	17	9
Nancy	18	Woman	54	12	22	14
Julie	25	Woman	43	15	12	5
Ian	14	Man	33	16	19	11
Paul	18	Man	54	20	23	9
Phil	23	Man	46	17	14	16
Henry	23	Man	52	16	17	16
Niall	41	Man	62	13	13	10

[a]In this paper, we use the term "youth swimming" to describe competitive swimming in any context other than masters swimming. Amy had an unusually long youth swimming career due to training and competing on a university team in Europe during her graduate studies and also training with youth clubs (as an adult) for some time.

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Chapter 5 – General Discussion

General Discussion

The purpose of this dissertation was to better understand the relative contributions of training patterns (specifically, training volume and early specialization) and training contexts (i.e., the social environment) to burnout, dropout, and lifelong enjoyment of sport, specifically within the sport of swimming. Specific aims were to (i) advance the assessment of early sport specialization in alignment with its most recently established definition, (ii) examine the relationships that early specialization indicators and training volume have with burnout and dropout in swimming, (iii) explore theoretical models of these relationships, including psychosocial variables from self-determination theory and the sport commitment model, and (iv) explore the influence of youth swimming experiences—including training patterns and training contexts—on transitions to adult swimming participation. To accomplish these aims, I engaged in both quantitative and qualitative research involving youth swimmers and masters swimmers.

The first study (Chapter 2) focused on the influence of training patterns—specifically, early sport specialization—on youth burnout and dropout. The results were unexpected. Contrary to DMSP predictions (Côté & Vierimaa, 2014) and warnings issued by numerous position statements and review papers (e.g., Brenner, 2016; DiFiori et al., 2014; LaPrade et al., 2016), we found no evidence of a direct positive relationship between markers of early specialization and burnout or dropout. The absence of a relationship between the early specialization markers and our criterion variables meant that we were unable to determine the markers most critical in predicting burnout and dropout. However, we did eliminate some redundant measurement items. We also made recommendations regarding future attempts at assessing early specialization using

combinations of self-report and parental report, emphasizing the importance of capturing competitive aspects of sport participation, as well as training volume.

The second study (Chapter 3) included aspects of training patterns—in the form of training volume—and contexts, represented by coach autonomy support. Once again, the impact of training patterns on burnout and dropout appeared to be minimal. In contrast, the extent to which swimmers perceived autonomy support from their coaches was positively related to enjoyment, which in turn was differentially associated with two types of commitment. The commitment types differentially predicted characteristics of burnout and intentions to continue swimming. In addition to testing the relationships of training volume with burnout and dropout, this study took a novel approach by looking at associations between autonomy support, enjoyment, and both types of commitment found in bidimensional conceptualizations of the SCM (e.g., Scanlan, et al., 2016).

The third study (Chapter 4) allowed for a more in-depth, retrospective exploration of training patterns and contexts in youth swimming, and how these influenced subsequent participation in swimming as adults. Training volume emerged as a primary, overarching theme, with both negative and positive effects. One participant referenced high training volume as the primary reason for his lengthy absence between youth and adult swimming, despite enjoying close friendships and competitive success in youth swimming. However, for most participants who experienced high training volumes, the negative outcomes only occurred when combined with a lack of psychological need satisfaction, or even need thwarting. There were several participants who did not seem to mind high training volumes because of their strong positive relationships with coaches and teammates.

Taken together, these findings provide further evidence that the training *context* is paramount in determining the positive or negative valence of youth sport experiences and subsequent outcomes. Although youth training patterns may be relevant in predicting such outcomes as injury or elite performance, the impact of training patterns—in particular, early specialization—may have been overstated when it comes to burnout and dropout. LaPrade et al. (2016) highlighted the dearth of literature regarding early sport specialization and psychosocial outcomes, and therefore the evidence contributed by this dissertation research is timely and relevant.

Methodological Strengths

One of the methodological strengths of this research was the unique balance of detail and volume of data generated regarding early swimming specialization. Many of the larger studies examining early specialization have used rather simplistic measures that do not fully capture all dimensions of early specialization (e.g., Buckley et al., 2017; Gallant, O'Loughlin, Brunet, Sabiston, & Bélanger, 2017; Pasulka, Jayanthi, McCann, Dugas, & LaBella, 2017; Post et al., 2017). Simply counting the number of activities in which participants engage, or asking if they have a main sport that they play year-round, does not get at the intensity and weekly volume of training that are key features of early specialization. For example, the classification system used by Gallant and colleagues (2017) would label an 11-year-old who participated in swimming lessons, and no other sports, for one hour, once a week, all year long, as an early specializer. However, if that same 11-year-old also participated in five hours per week of year-round competitive gymnastics training, in addition to those swimming lessons, they would now be labelled as an early sampler, despite having a profile that is now much more consistent with that

of an early specializer. Clearly, a more detailed account of an athlete's sport background is needed to accurately assess early specialization.

At the other end of the spectrum are the more time-intensive studies that have generated very detailed athlete histories from small samples of athletes (e.g., Fraser-Thomas et al., 2008; Law et al., 2007; Wall & Côté, 2007). Although instrumental in sparking conversations and further research around early specialization, the small sample sizes of these studies (ranging from 8-50 participants) placed limits on the sophistication of analytical techniques available and the generalizability of their findings. By focusing on the details most pertinent to the assessment of early sport specialization, and putting the interview guide into a survey format, I was able to expand my sample size, while still retaining valuable data on participants' sport backgrounds, in much greater detail than the large studies cited above. This affords greater confidence in the statement regarding the non-significant relationships of training patterns with burnout and dropout from swimming. Although further research across cultures and in other sport settings is warranted, particularly within team sports, I believe these findings are generalizable to youth swimmers across Canada and the United States.

Theoretical Implications

Another strength of this dissertation research was the use of a consistent theoretical framework to guide measurement, analysis, and interpretation of findings. Taken together, the three studies highlight certain theoretical implications. First and foremost, these findings support a more nuanced interpretation of the DMSP (Côté et al., 2003; Côté & Fraser-Thomas, 2007), and more specifically, the relationship between deliberate practice and enjoyment. The DMSP proposes—in line with Ericsson and

colleagues' (1993) definition—that deliberate practice is effortful and not enjoyable, and high levels of deliberate practice must therefore be preceded by a playful period of sampling. However, Light and colleagues (2013) have suggested otherwise. Upon studying the motivation of 9-12-year-old swimmers in three different countries, they concluded that, although they could be classified as early specializers due to their high amounts of deliberate practice in a single sport, the enjoyable social context in which this practice took place compensated for a lack of deliberate play. My own null findings regarding a relationship between early specialization or training volume and enjoyment add further evidence for the possibility of deliberate practice and enjoyment coexisting. Baker and Young (2014) noted that reports of athletes enjoying deliberate practice may depend on the timing and type of rating system used. For example, ratings of specific deliberate practice activities immediately following practice may result in lower ratings of enjoyment compared to a more general assessment of enjoyment during practice (Hodges, Kerr, Starkes, Weir, & Nananidou, 2004). However, if the goal is simply to decrease burnout and dropout and increase self-determined motivation for long-term participation, general ratings of sport enjoyment are likely more important than the enjoyment of some specific training activities. Moreover, the role of motivationally-mediated factors, such as the internalization and integration of deliberate practice as valuable to one's athletic identity and sense of self, especially when supported in a context where basic needs being met, may explain why deliberate practice is not necessarily judged as unenjoyable. Together, these findings suggest that the DMSP could benefit from consideration of the broader context in which children either sample or specialize.

Second, my findings supported several tenets of the SCM (Scanlan et al., 2016), such as the prominent role of enjoyment in predicting functional and obligatory commitment, but also revealed some aspects that deserve further examination. Although these studies did not include all seven of the antecedents of commitment found in the SCM, some of these antecedents were used to interpret findings. For example, the positive relationship between training volume and intentions to continue swimming found in Study 1 and Study 2 could be explained by the hypothesized positive relationship between personal investments (i.e., the time, effort, and money that have been put into swimming, and would be lost if participation was discontinued) and functional commitment. However, this relationship was not significant in Scanlan et al.'s (2016) investigation with a large sample of young athletes. An alternative explanation is that experiences of enjoyment and subsequent functional commitment led some swimmers to pursue higher volumes of training, when possible. The directionality of this relationship should be explored with future longitudinal research.

Third, this dissertation uniquely examined the relationships between autonomy support, enjoyment, and commitment. Scanlan et al., (2016) advocated combining the SCM with other motivational theories in order to better understand the sport experience, but such work has been limited to date. Parallels have been drawn between self-determined motivation and functional commitment (Scanlan et al., 2016), and previous studies have found positive relationships between intrinsic motivation and functional commitment (Krinanthi et al., 2010; Zahariadis et al., 2006). Autonomy support positively predicted enjoyment, as hypothesized, but the relationship was weaker than expected. The absence of a direct association between autonomy support and functional

commitment may indicate that the parallels between autonomous or controlled regulations and functional or obligatory commitment, respectively, may not be as strong as previously imagined. Future studies with larger sample sizes could add measures of psychological need satisfaction and thwarting, as well as behavioural regulations, in order to better understand which constructs within SDT and the SCM might overlap and which constructs add unique explanatory value.

Practical Implications

The findings of this dissertation also have practical implications for swim coaches, parents, and club administrators, many of which have already been addressed in Chapter 4. Concerns have been rightly raised over high training volume recommendations for young swimmers (e.g., Lang & Light, 2010). From an injury prevention standpoint, training volume should certainly be monitored. It is recommended that athletes do not train more hours per week than their age in years, and there is some evidence that training in only one sport may further increase the risk of injury (Jayanthi et al., 2015). However, the evidence presented in this dissertation suggests that if training takes place in a context that meets swimmers' psychological needs and fosters enjoyment, the risk of burnout and dropout is lower.

Coaches can meet swimmers' psychological needs by engaging in autonomy-supportive behaviours. Some examples include providing their athletes with an appropriate level of choice, explaining the rationale behind decisions, giving athletes opportunities to take initiative and work independently, listening to their athletes, and trying to understand athletes' perspective on issues (Bartholomew et al., 2009). Coaches should be careful to avoid using tangible rewards or giving feedback in a controlling

manner. Coaches should also avoid exerting excessive personal control (for example, dictating athletes' behaviour outside of sport practices), engaging in "intimidation behaviours" like yelling or even using physical force, promoting ego-involvement, or using conditional regard (Bartholomew et al., 2009). These types of controlling behaviours can thwart athletes' psychological needs, resulting in higher rates of burnout (Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011). Club administrators should note that coaches' autonomy-supportive or controlling behaviours are influenced by their own psychological well-being and need-satisfaction, therefore it is important to support coaches' autonomy by allowing them to have input and participate in decision-making regarding athletes' training sessions and preparation for competition. Administrators should also acknowledge coaches' feelings and perspectives and listen to their ideas and concerns (Bartholomew et al., 2009).

Conclusion

In conclusion, this dissertation research makes a valuable contribution to the literature on youth sport by challenging prior assumptions regarding the impacts of training patterns on enjoyment, burnout, and dropout. Although these studies were limited to one sport, swimming, the methodological strengths of this research—in particular, framing questions within pertinent theories and sampling thoughtfully—should prompt similar investigations in other sports and socio-cultural contexts. The large number of children and parents recruited allowed for the use of sophisticated quantitative analytical techniques, including structural equation modelling, and the survey with masters swimmers afforded very purposeful sampling of interview participants who could best provide retrospective insight into the long-term influence of youth swimming

experiences. The findings of this dissertation emphasize the importance of training contexts in supporting transitions from youth to adult swimming, and consequently should be considered in dialogue relating to the promotion of lifelong enjoyment of sport. It is hoped that the practical implications that have been presented here will translate into more positive experiences for youth swimmers in Canada and beyond.

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Appendices

Appendix A – Youth Swimmer Questionnaire

ID: _____

Youth Swimming Questionnaire

Gender:_____ Grade: _____ Age: _____

Ethnicity (your family background, e.g. Ukrainian, Korean, Métis, etc.): _____

Swimming
For the purposes of this questionnaire, "swimming" specifically refers to the sport of swimming, and the training and competing involved—NOT swimming lessons, synchro, lifesaving, or recreational swimming.

For each of the following statements, please indicate how true it is for you by circling the number that most accurately represents your thoughts.

	Strongly Disagree			Somewhat true			Strongly Agree
I believe I had some choice about swimming this season.	1	2	3	4	5	6	7
I felt like it was not my own choice to swim this season.	1	2	3	4	5	6	7
I didn't really have a choice about swimming this season.	1	2	3	4	5	6	7
I felt like I had to swim this season.	1	2	3	4	5	6	7
I am registered to swim this season because I had no choice.	1	2	3	4	5	6	7
I am registered to swim this season because I wanted to.	1	2	3	4	5	6	7
I am registered to swim this season because I had to.	1	2	3	4	5	6	7

This questionnaire contains items that are related to your experience with your current swim coach. Coaches have different styles in dealing with athletes, and we would like to know more about how you have felt about your encounters with your coach. Your responses are confidential. Please be honest and candid.

	Strongly Disagree			Neutral			Strongly Agree
I feel that my coach provides me with choices and options.	1	2	3	4	5	6	7
I feel understood by my coach.	1	2	3	4	5	6	7
My coach conveys confidence in my ability to do well in swimming.	1	2	3	4	5	6	7
My coach encourages me to ask questions.	1	2	3	4	5	6	7
My coach listens to how I would like to do things.	1	2	3	4	5	6	7
My coach tries to understand how I see things before suggesting a new way to do things.	1	2	3	4	5	6	7

ID: _____

Thinking about your feelings and experiences within the sport of swimming, please indicate how true these statements are for you.

	Not true at all						Very true
I show concern for others in swimming.	1	2	3	4	5	6	7
I have the ability to perform well in swimming.	1	2	3	4	5	6	7
In swimming, I feel that I am being forced to do things that I don't want to do.	1	2	3	4	5	6	7
In swimming, I get opportunities to make decisions.	1	2	3	4	5	6	7
I get opportunities to feel that I am good at swimming.	1	2	3	4	5	6	7
In swimming, I really have a sense of wanting to be there.	1	2	3	4	5	6	7
I feel I am good at swimming.	1	2	3	4	5	6	7
In swimming, I have a say in how things are done.	1	2	3	4	5	6	7
I feel I participate in swimming willingly.	1	2	3	4	5	6	7
In swimming, I get opportunities to make choices.	1	2	3	4	5	6	7
I choose to participate in swimming according to my own free will.	1	2	3	4	5	6	7
I have close relationships with people in swimming.	1	2	3	4	5	6	7
I am skilled at swimming.	1	2	3	4	5	6	7
In swimming, I feel I am doing what I want to be doing.	1	2	3	4	5	6	7
In swimming, there are people who I can trust.	1	2	3	4	5	6	7
I can overcome challenges in swimming.	1	2	3	4	5	6	7
In swimming, I feel close to other people.	1	2	3	4	5	6	7
In swimming, I can take part in the decision-making process.	1	2	3	4	5	6	7
In swimming, I feel I am pursuing goals that are my own.	1	2	3	4	5	6	7
There are people in swimming who care about me.	1	2	3	4	5	6	7

What is your best event in swimming? (For example, 50 free, 100 fly, 200 IM…) _____

What is your best time for that event? _____

Is swimming your main sport?

- ○ **Yes**
- ○ **No, my main sport is** _____

ID: _____

For each of the following statements about feelings and experiences within the sport of swimming, please indicate how often you feel that way.

I feel so tired from my training that I have trouble finding energy to do other things.				
1	**2**	**3**	**4**	**5**
Almost never	Rarely	Sometimes	Frequently	Almost always
I am not performing up to my ability in swimming.				
1	**2**	**3**	**4**	**5**
Almost never	Rarely	Sometimes	Frequently	Almost always
I feel overly tired from my swimming participation.				
1	**2**	**3**	**4**	**5**
Almost never	Rarely	Sometimes	Frequently	Almost always
I don't care as much about my swimming performance as I used to.				
1	**2**	**3**	**4**	**5**
Almost never	Rarely	Sometimes	Frequently	Almost always
I'm not achieving much in swimming.				
1	**2**	**3**	**4**	**5**
Almost never	Rarely	Sometimes	Frequently	Almost always
I feel "wiped out" from swimming.				
1	**2**	**3**	**4**	**5**
Almost never	Rarely	Sometimes	Frequently	Almost always
I have negative feelings toward swimming.				
1	**2**	**3**	**4**	**5**
Almost never	Rarely	Sometimes	Frequently	Almost always
I'm not into swimming like I used to be.				
1	**2**	**3**	**4**	**5**
Almost never	Rarely	Sometimes	Frequently	Almost always
I'm accomplishing many worthwhile things in swimming.				
1	**2**	**3**	**4**	**5**
Almost never	Rarely	Sometimes	Frequently	Almost always
I feel successful at swimming.				
1	**2**	**3**	**4**	**5**
Almost never	Rarely	Sometimes	Frequently	Almost always
I am exhausted by the mental and physical demands of swimming.				
1	**2**	**3**	**4**	**5**
Almost never	Rarely	Sometimes	Frequently	Almost always
I feel less concerned about being successful in swimming than I used to.				
1	**2**	**3**	**4**	**5**
Almost never	Rarely	Sometimes	Frequently	Almost always
The effort I spend in swimming would be better spent doing other things.				
1	**2**	**3**	**4**	**5**
Almost never	Rarely	Sometimes	Frequently	Almost always
I feel physically worn out from swimming.				
1	**2**	**3**	**4**	**5**
Almost never	Rarely	Sometimes	Frequently	Almost always
It seems that no matter what I do, I don't swim as well as I should.				
1	**2**	**3**	**4**	**5**
Almost never	Rarely	Sometimes	Frequently	Almost always

ID: _____

Please consider your general experiences in the sport of swimming and indicate how much you agree or disagree with each statement.

In swimming . . .	**Strongly Disagree**						**Strongly Agree**
There are situations where I am made to feel like I'm not good enough.	1	2	3	4	5	6	7
I feel prevented from making choices with regard to the way I train	1	2	3	4	5	6	7
Situations occur in which I am made to feel incapable	1	2	3	4	5	6	7
I feel pushed to behave in certain ways	1	2	3	4	5	6	7
I feel *other people* are envious when I achieve success	1	2	3	4	5	6	7
I feel others "brush me off"	1	2	3	4	5	6	7
I feel I am rejected by those around me	1	2	3	4	5	6	7
I feel *forced* to follow training decisions made for me	1	2	3	4	5	6	7
I feel other people dislike me	1	2	3	4	5	6	7
I feel like I'm not good enough because I am not given opportunities to fulfill my potential	1	2	3	4	5	6	7
I feel under pressure to agree with the training regimen I am provided	1	2	3	4	5	6	7
There are times when I am told things that make me feel like I'm not very good at swimming	1	2	3	4	5	6	7

Please respond to each statement by circling the number that is appropriate for you. Again, "swimming" involves training and competing in the sport of swimming.

	Strongly Disagree				**Strongly Agree**
I enjoy swimming.	1	2	3	4	5
I am happy swimming.	1	2	3	4	5
I have fun swimming.	1	2	3	4	5
I like swimming.	1	2	3	4	5

I am dedicated to swimming.	1	2	3	4	5
I feel obligated to continue swimming.	1	2	3	4	5
I feel forced to continue swimming.	1	2	3	4	5
I am determined to continue swimming.	1	2	3	4	5
I feel compelled to continue swimming.	1	2	3	4	5
I feel it is necessary for me to continue swimming.	1	2	3	4	5
I feel that my swimming is a duty.	1	2	3	4	5
I am committed to swimming.	1	2	3	4	5

Please rate your intention to swim competitively next season.

1	2	3	4	5	6	7
Strongly do not intend to						Strongly intend to

Appendix B – Parent Questionnaire

ID: _____

Parent/Guardian Questionnaire

Gender: _____

Age: _____

Please state your combined family income over the past 12 months:

☐ less than $5,000 ☐ $5,000 – 11,999 ☐ $12,000 – 15,999

☐ $16,000 – 24,999 ☐ $25,000 – 34,999 ☐ $35,000 – 49,999

☐ $50,000 – 74,999 ☐ $75,000 – 99,999 ☐ $100,000+

☐ Don't know ☐ No response

What is the highest certificate, diploma, or degree that you have completed?

☐ High school diploma ☐ College diploma ☐ Bachelor's degree

☐ Master's degree ☐ Doctorate degree ☐ Professional (MD, LLB etc.)

☐ Other: _____ ☐ None of the above

Occupation: _____

Marital Status:

☐Single ☐Separated ☐ Married ☐ Common Law

☐Divorced ☐Widowed ☐No response

Please describe your current involvement in sport, whether as a participant, volunteer, coach, etc.:

_____

_____

ID: _____

Please fill in the following table about your child's background in sport. **For each age, please indicate the total number of sports** in which they participated. **For up to three sports each year**, **(including swimming!)** please indicate the frequency and duration of their participation, as well as whether their participation was competitive or recreational, to the best of your memory.

Age	Total # of sports at that age	List up to three of those sports:	Duration of their season, in months	Average number of practices/games per week	Average total time spent in practices/games in minutes, per week	Competitive or Recreational? Please circle your response.
6						Comp Rec
						Comp Rec
						Comp Rec
7						Comp Rec
						Comp Rec
						Comp Rec
8						Comp Rec
						Comp Rec
						Comp Rec
9						Comp Rec
						Comp Rec
						Comp Rec
10						Comp Rec
						Comp Rec
						Comp Rec
11						Comp Rec
						Comp Rec
						Comp Rec

ID: _____

Please fill in the following table about your child's background in sport. **For each age, please indicate the total number of sports** in which they participated. **For up to three sports each year**, **(including swimming!)** please indicate the frequency and duration of their participation, as well as whether their participation was competitive or recreational, to the best of your memory.

Age	Total # of sports at that age	List up to three of those sports:	Duration of their season, in months	Average number of practices/games per week	Average total time spent in practices/games in minutes, per week	Competitive or Recreational? Please circle your response.
12						Comp Rec
						Comp Rec
						Comp Rec
13						Comp Rec
						Comp Rec
						Comp Rec
14						Comp Rec
						Comp Rec
						Comp Rec
15						Comp Rec
						Comp Rec
						Comp Rec
16						Comp Rec
						Comp Rec
						Comp Rec
17						Comp Rec
						Comp Rec
						Comp Rec

ID: _____

Maturation into a Swimmer: This section focuses more specifically on your child's development as a swimmer. We will try to get a sense of your child's development by exploring a number of different factors.				
Development and Sport Specific Milestones: At what age did your child…		**Performance career:** These questions are about your child's performance at various levels of competition.	Was your child ever…	If yes, how old was your child?
____ first go swimming?		**At the club level** recognized among top five swimmers for their age, in their event?	___ never happened	___
____ begin regular unstructured swimming (cottage, beach, pool)?	___ never happened	recognized as the best swimmer for their age, in their event?	___ never happened	___
____ begin regular structured swimming (lessons)?	___ never happened	**At the regional level** recognized among top five swimmers for their age, in their event?	___ never happened	___
____ begin swimming on a team?		recognized as the best swimmer for their age, in their event?	___ never happened	___
____ begin dryland training? (Not including dry warmups before getting in the pool).	___ have never done it	**At the provincial level** recognized among top five swimmers for their age, in their event?	___ never happened	___
____ begin spending all available leisure time training?	___ never happened	recognized as the best swimmer for their age, in their event?	___ never happened	___
____ go to their first "Spring Break / Christmas" training camp?	___ have never participated	**At the national level** recognized among top five swimmers for their age, in their event?	___ never happened	___
____ first establish a close and extended relation with a coach?	___ never happened	recognized as the best swimmer for their age, in their event?	___ never happened	___

Appendix C – Followup Questionnaire

Confidential

Swimming Followup

Please complete the survey below.

Thank you!

Is [f_name] still swimming with the same swim club as last year?	◯ Yes ◯ No
Is [f_name] swimming with a different swim club this year?	◯ Yes ◯ No
Will [f_name] be joining a summer (i.e. May to August only) swim club this year?	◯ Yes ◯ No
What grade is [f_name] completing right now?	◯ Grade 4 ◯ Grade 5 ◯ Grade 6 ◯ Grade 7 ◯ Grade 8 ◯ Grade 9 ◯ Grade 10 ◯ Grade 11 ◯ Grade 12 ◯ [f_name] has already completed high school.
Will [f_name] be swimming with a high school swim team this year?	◯ Yes ◯ No
Is [f_name] swimming on a college or university (varsity) team this year?	◯ Yes ◯ No
Is [f_name] swimming with a masters swim team this year?	◯ Yes ◯ No
Does [f_name] swim recreationally (for fun!) on a regular basis?	◯ Yes ◯ No
If there has been a change in [f_name]'s swimming participation (e.g. switched teams or is no longer swimming) please comment on the reason for that change. If there is anything else you would like to say about [f_name]'s current and future swimming participation, please do so here:	_____

Appendix D – Interview Guide for Masters Swimming Study

Interview Guide for Masters Swimming Study

Introductions & Informed Consent

Thank you for participating in my study! This interview is meant to explore your past experiences with competitive swimming and other sports, and the impact of those past experiences on your subsequent participation in swimming. I am particularly interested in your perception of the circumstances around your transitions out of youth swimming and into masters swimming, and any time off in between. There are no right or wrong answers—I'm just looking for an in-depth understanding of your past experiences with swimming and your attitudes towards swimming now. Everything we discuss will be kept confidential. If you are uncomfortable answering any questions, just let me know and we'll move on, and if you wish to end our interview at any time, you are free to do so. I'd really like to make an audio recording of this interview so that I don't have to rely on my memory or note-taking abilities. Is that ok? Do you have any questions before we begin? I'm going to turn on the recorder now.

Background [Sketch out timeline including start age in swimming, peak swim training, and end of youth swimming]

First, I would like to establish some context for the rest of this interview by focusing on your sport background as a child and adolescent. I can see that you started swimming competitively at age ___ and your peak swim training occurred at age ___. What kind of club were you training with? Did you stay with that same club for the duration of your youth swimming experience? Did you take any breaks from swimming? What other sport activities did you participate in, at what ages? Did you consider swimming to be your primary sport?

Qualitative Questions:

Tell me about your last season of youth swimming.

- How was it different from the season before? Any big changes?
- How would you describe your attitude towards swimming at that time? What feelings did you tend to experience before beginning practice each day? (e.g. anticipation, dread, didn't think about it—just routine)
- How did you feel about your swimming abilities at that time?
    - When did you feel really good about yourself?
    - When were you discouraged or frustrated with yourself?
- What were your relationships like at that time with your teammates? And what about with your coach or coaches?
- Describe your family's involvement in swimming.

- What other activities were you doing at that time (other sports, dance, music, volunteering, paid work, academics)? What else did you have going on in your life at that time?

What was the main reason for ending your participation in youth swimming?

- Were there any other factors that caused you to end your participation in youth swimming?
- To what extent did you feel that it was your own choice to end your participation in youth swimming?

How did you feel about leaving youth swimming?

- What was hard about leaving?
- What was good about leaving?
- After you left, did you stay in touch with your teammates and coaches?

After you left youth swimming, what other activities did you engage in?

- How often?
- For how long?
- Are you still involved in _____?

When did you first start thinking about participating in masters swimming?
What was it that motivated you to actually join?

- To what extent did you feel that it was your own choice to join masters swimming?
- What were you hoping to get out of masters swimming?
- What kept you from joining earlier (if applicable)?

How long have you been participating in masters swimming now?

- Have there been any breaks in your masters swimming participation?
    - If so, what caused those breaks?

To what extent do you feel that you are participating in masters swimming because you really want to participate?
To what extent do you feel obligated to participate in masters swimming?

- What sorts of things make you feel obligated to continue participating in masters swimming?

How do you feel about your swimming abilities now?

What are your relationships like with your teammates? And what about with your coach or coaches?

How much longer do you think you'll continue participating in masters swimming? What do you think you'll get out of continuing to participate in masters swimming?

Conclusion

Is there anything else you'd like to tell me about your past or present experiences with swimming or other sports? Thank you so much for participating in this interview with me. May I contact you if I have another question or need some further clarification on a point?