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Examining Adolescent Sport Dropout and Prolonged Engagement from a Developmental Perspective

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This study examined youth sport dropout and prolonged engagement from a developmental perspective focusing on physical and psychosocial factors. Twenty-five dropout and 25 engaged adolescent swimmers, matched on key demographic variables, participated in a retrospective interview. Results indicated that dropouts were involved in fewer extra-curricular activities, less unstructured swimming play, and received less one-on-one coaching throughout development. Dropouts reached several developmental milestones (i.e., started training camps, started dry land training, and were top in club) earlier than engaged athletes. Dropouts were more likely to have had parents who were high-level athletes in their youth, were more likely to be the youngest in their training group, and were less likely to have a best friend at swimming. Findings are discussed in relation to past research; future directions and implications for researchers, sport programmers, coaches, and parents are suggested.

Organized sport plays an important role in the development of children and youth. With approximately 35 million children in the United States (Weiss & Hayashi, 1996) participating in community, school, or privately run sports programs, the physical and psychosocial benefits of sport involvement are well recognized (see Fraser-Thomas, Côté, & Deakin, 2005 for a review). However, dropout rates for youth sport programs in North America average 35% in any given year, and are most substantial during adolescence (Petlichkoff, 1996). Consequentially, sport psychology researchers have identified youth sport dropout as an area of concern (Gould, Feltz, Horn, & Weiss, 1982).

Over the past three decades, much research has explored youths' reasons for sport participation and withdrawal, framed primarily within theories of motivation. The most common reasons for participation relate to physical competence, social acceptance, and

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enjoyment, while the most commonly cited reasons for withdrawal include conflicts of interests, as well as negative experiences such as lack of fun, coach conflicts, and lack of playing time (see Weiss & Williams, 2004 for a review). Petlichkoff (1993) was among the first to suggest that reasons for participation and withdrawal may not be directly related. Instead, she delineated withdrawal as a slow and progressive process involving an ongoing cost-benefit analysis (e.g., weighing lack of playing time versus skill improvement). As such, she and many others (e.g., Weiss & Petlichkoff, 1989; Weiss & Williams, 2004) have emphasized the importance of understanding the *processes* children may go through before they withdraw from sport. Specifically, they suggested a need for longitudinal research to understand *how* physical factors (i.e., training patterns, level of maturation) and psychosocial factors (i.e., coach, parent, peer, and sibling influences) interact to influence the decision-making processes that may lead to continued participation in or withdrawal from sport.

Physical Factors

Training Patterns

Numerous situational factors have been cited among youths' reasons for dropout (e.g., a lack of playing time, program seriousness, Gould et al., 1982); however, little research has been conducted to systematically examine the impact of the structure of sport on participation and attrition rates (Petlichkoff, 1993). Many programs are encouraging children to start structured sport participation at increasingly early ages, to focus on just one sport from a young age, and to engage in large quantities of training for this sport on a year-round basis. This approach has been commonly termed early specialization (Wiersma, 2000) and has received support in the sport expertise literature. For example, some researchers have found that youth must engage in sport-specific training from an earlier age to achieve expert status (e.g., Helsen, Hodges, Van Winckel, & Starkes, 2000). These findings align with Ericsson, Krampe, and Tesch-Römer's (1993) framework of deliberate practice which suggests that to reach expert status in any domain, ten years or 10,000 hours of deliberate practice are required. Deliberate practice is defined as highly structured activity that requires effort, generates no immediate rewards, and is motivated by the goal of improving performance rather than inherent enjoyment.

However, many still argue the merits of engaging in a diversity of structured and unstructured sport activities during childhood. For example, Baker, Côté, and Abernethy (2003) suggested that children's involvement in a diversity of sports also leads to elite performance later in development, because young athletes develop general capabilities applicable in a variety of sports. Further, Kirk (2005) suggested that diverse sport involvement fosters quality early learning experiences and competence perceptions, which in turn lead to motivation for continued participation. Finally, some developmental psychologists (e.g., Hansen, Larson, & Dworkin, 2003) have suggested that involvement in different structured leisure activities (aside from sport) may lead to a variety of positive developmental outcomes.

Côté and colleagues' (Côté, Baker, & Abernethy, 2003; Côté & Fraser-Thomas, 2007) developmental model of sport participation is built upon a foundation of early athlete diversification and has received support in both the sport expertise and positive youth development literature. The model proposes that athletes pass through three stages of sport development: the sampling, specializing, and investment years. Athletes participate in a variety of sports during the sampling years (age 6–12), and a decreasing number of sports during the specializing (age 13–15) and investment years (age 16+). This model also suggests athletes engage in large quantities of deliberate play activities during the sampling years (activities that are less structured, designed to maximize inherent enjoyment, and regulated by flexible

age-adapted rules) and do not focus on deliberate practice activities until the specializing and investment years.

Limited studies have examined training patterns in relation to dropout, but there is preliminary support to suggest that the early diversification and later specialization path outlined by Côté and colleagues' developmental model of sport participation (Côté et al., 2003; Côté & Fraser-Thomas, 2007) may lead to less dropout, and more prolonged engagement. For example, Barynina and Vaitsekhovskii's (1992) study of Russian national team swimmers found that swimmers who specialized later took less time to reach international status, stayed on national teams longer, and retired later than early specialists. Further, Wall and Côté's (2007) study of dropout and engaged high-level youth hockey players found that the engaged group had started specialized training (e.g., off-ice training) later than the dropout group.

Level of Maturation

Individuals' levels of maturation may also contribute to youths' dropout decisions. Past research has found that the older one is relative to peers in the same grouping or sport team, the greater the probability of becoming an elite athlete. This has been named the relative age effect, and has been found in a variety of sports including ice hockey, baseball, basketball, and soccer (e.g., Dundink, 1994; Helsen et al., 2000). While the most obvious explanation for this effect is differences in individuals' physical maturity, Musch and Grondin (2001) suggested that psychological factors, training opportunities, and competition experiences may also contribute to this effect. Specifically, more physically mature youth may be identified by coaches, and in turn provided with environments more likely to facilitate skill development (e.g., additional coach attention, more playing time). Interestingly, a slower rate of maturation has been suggested to play a role in the development of elite athletes in some sports. For example, elite female gymnasts have been found to be shorter, to mature later, and to have later ages of menarche (Malina, 1994; Peltenburg, Erich, Zonderland, Bernink, VanDenBrande & Huisveld, 1984).

Psychosocial Factors

Parents

Typically, studies examining associations between parents' behaviors and youth sport outcomes have found that high perceived amounts of parent support, encouragement, involvement, and satisfaction have been associated with more enjoyment, intrinsic motivation, and preference for challenge (e.g., Scanlan & Lewthwaite, 1986). In contrast, high amounts of parental pressure, high expectations, criticism, and low amounts of parental support have been associated with decreased enjoyment, increased anxiety, dropout, and burnout (e.g., Gould, Udry, Tuffey, & Loehr, 1996; Robinson & Carron, 1982). For example, it has been suggested that parents often pressure their children by encouraging them on the path to early specialization by funding their involvement in camps, clinics, and lessons, and by providing sport-specific facilities in the home (Hill & Hansen, 1988). Further, it has been suggested that youth often experience pressure because they feel obligated to continue training and competing to fulfill parental expectations (Coakley, 1992).

Coaches

Coaches have long been known to influence youths' sport experiences (see Smoll & Smith, 2002 for a review). Typically, coaches who provide poor social support (i.e., pressure, unrealistic expectations, lack of empathy, lack of confidence in athlete) and lead with an autocratic style have been associated with negative outcomes such as negative attitudes towards

coaches, decreased motivation, dropout, and burnout (e.g., Gould et al., 1996; Pelletier, Fortier, Vallerand, & Briere, 2001; Price & Weiss, 2000). Intervention studies (e.g., Barnett, Smoll, & Smith, 1992) suggest that coach behaviors can be modified to enhance athlete outcomes.

Peers and Siblings

Despite limited investigation of peers in youth sport contexts, Smith (2003) suggested that peer relationships play an important role in youth sports, as peers have been linked to youths' sense of physical competence, their moral attitudes, and other affective outcomes. One qualitative study (Patrick, Ryan, Alfeld-Liro, Fredricks, Hruda, & Eccles, 1999) found that if youth had positive peer relations in their sport arena, these relations bolstered their enjoyment and commitment to the activity; however, if youth felt their sport was in conflict with their social development outside their sport, their commitment and motivation for their sport decreased. Other studies found that best friends' sport participation was a strong predictor of adolescent sport commitment and involvement (Weiss & Weiss, 2004; Wold & Anderssen, 1992) and that "playing up" with older peers was linked to burnout in elite youth athletes (Gould et al., 1996). Early studies examining sibling influence on youth sport participation patterns aimed to determine siblings' relative influence compared to significant others' influence and had mixed findings (e.g., Greendorfer & Lewko, 1978; Wold & Anderssen, 1992). Since then, only a few studies have shifted to focus on how siblings influence each other in youth sport settings (e.g., Côté, 1999).

Purpose

While past research has contributed to our understanding of youths' motives for participation and withdrawal, there are still considerable gaps in the youth sport dropout literature. Past research was framed primarily within theories of motivation, yet as Petlichkoff (1993) suggested, reasons for withdrawal are not always directly related to reasons for participation. Further, studies focusing solely on dropout have usually used questionnaires to assess reasons for withdrawal, a methodology labeled 'superficial' and 'subjective' by some researchers (i.e., Lindner, Johns, & Butcher, 1991). As such, there is a need to examine processes throughout development that may contribute to youths' dropout decisions. This study extends past research by using a retrospective interview procedure to examine quantifiable physical and psychosocial development-related factors that may contribute to dropout and prolonged engagement. Specifically, this study examined factors that could be measured throughout development (e.g., hours of swim training from age 6 to current age), factors that marked developmental milestones (e.g., start age in competitive swimming), and development-related demographic factors (e.g., height).

METHOD

Participants and Procedure

Competitive swimmers provided an appropriate sample for this study because of the study's focus on dropout by highly invested adolescent athletes rather than by sport samplers or transfers (Weiss & Petlichkoff, 1989). Age-group swimming is an individual, year-round, high investment sport; it is the primary sport of most adolescents involved, team members are not cut, and performances are primarily self-referenced rather than peer-referenced. Participants included 25 dropout and 25 engaged swimmers, recruited through head coaches and administrators of various clubs in Ontario and Nova Scotia, Canada. All participants were screened based on three criteria: a) aged 13 to 18, b) enrolled in competitive swimming for

a minimum of three years, and c) involved in a minimum of ten hours of training per week. Additional criteria for dropouts included withdrawal between the ages of 14 and 17, within the past three years; these cut-offs were set to eliminate younger sport samplers and transfers, to eliminate older athletes whose withdrawal from sport may have been a natural transition at the end of high school, and to maintain consistency in the time period at which participants were involved in swimming. Additional criteria for engaged swimmers included involvement or intended involvement in competitive swimming until at least the end of high school.

As dropouts were logistically difficult to involve in the study, they were recruited first. Engaged swimmers were recruited later, and screened to match dropouts on several demographic variables. Forty-seven dropout and 33 engaged athletes were contacted by telephone or e-mail and provided with an overview of the study, with 53% and 76% respectively agreeing to participate. Most commonly cited reasons for non-participation in the study related to a lack of time or interest. Interviews were conducted by the primary researcher in athletes' homes, with parents present in the home. The primary researcher had extensive experience conducting interviews for research purposes. Prior to commencement of the interview, athletes and parents were given information sheets and signed consent forms. Interviews were 1 to 2 hours in duration. Upon conclusion of the interview, athletes were given a small monetary award (\$10) as a token of appreciation for their time.

Retrospective Interview

All measures were collected through a swimming adapted version of the Côté, Ericsson, and Law's (2005) retrospective interview procedure. The interview used primarily closed-ended questions to collect quantitative data on athletes' general patterns of activity involvement and psychosocial influences throughout development. Questions were focused in five key areas: demographic information, early activities (i.e., time line of involvement in all structured leisure activities throughout development), developmental milestones (i.e., age athlete reached key swimming-related milestones), swimming-specific activities (i.e., time spent in specific types of swimming training at each stage of swimming development), and psychosocial influences (i.e., subjective ratings of parent, coach, peer, and sibling influences at each stage of swimming development). Data were recorded in a series of tables and charts. (Additional details are provided below. A complete copy of the interview procedure is available upon request from the first author.)

Matching Variables

Demographic information was collected to match engaged swimmers to dropouts. Eight matching variables were measured as single-items: a) age, b) gender, c) competitive swimming experience (in years), d) ability (highest level of current competition; regional/provincial/national), e) family structure (traditional/mixed/single parent), f) number of siblings, g) parent education (completed high school/community college/university), and h) geographic region (urban/rural).

Physical Factors

Physical factors examined from a developmental perspective included: a) number of extra-curricular activities, b) number of sports, c) unstructured play swimming time, d) swimming practice time, e) swimming competition time, and f) swimming dry land practice time. Physical factors that marked developmental milestones and represented development-related demographic information included: a) start age in competitive swimming, b) start age in dry land training, c) start age in training camps, d) age at which reached 'top in club' status, e)

time off from competitive swimming (yes/no), f) club switching (yes/no), g) age relative to competitors, h) height, and i) weight.

Physical factors examined from a developmental perspective were those in which data were collected from age six to current age (up to a maximum of age 18). Variables were quantified by calculating means for each of four stages of development (10 and under, 11–12, 13–14, and 15 and over). These developmental stages were used as they coincide with the age-groups outlined by Swimming Canada, and align closely with Côté and colleagues' (Côté et al., 2003; Côté & Fraser-Thomas, 2007) sampling (12 and under), specializing (13–15), and investing (16 and over) years. Physical factors that marked developmental milestones and development-related demographic factors were measured as single-items collected through athletes' developmental charts and through additional interview questions. The 'age relative to competitors' variable was quantified by grouping athletes into three birth-month time periods based on peak meets with Swimming Canada (November-February, March-June, and July-October).

Psychosocial Factors

Psychosocial factors examined from a developmental perspective included: a) parent support, b) parent pressure, c) coach support, d) one-on-one coaching time, e) school peer influence, f) swimming peer influence, and g) sibling influence. Psychosocial factors that marked developmental milestones and represented development-related demographic information included: a) parents being athletes in their youth, b) parent-athletes' level in their youth, c) age at which athlete developed a close or extended relationship with coach, d) age relative to training group, and e) context of best friend.

Psychosocial factors examined from a developmental perspective were quantified similarly to physical factors examined from a developmental perspective, with mean ratings calculated for each of the four stages of development. All single-item psychosocial factors required additional questioning. Athletes were asked if their mother and father had participated in sports in their youth (yes/no), and if so, what their parents' highest competition level had been (regional/provincial or above). Finally, athletes were asked at what age (if ever) they first developed a close or extended relationship with their coach, their age relative to their training group (younger/average/older), and the context of their best friend (swimming/school).

Validity and Reliability

Past research suggests that retrospective procedures can elicit valid and reliable physical activity and sport participation data. For example, Ropponen, Levälähti, Simonen, Videman, and Battié's (2001) longitudinal study of Finnish twins collected physical activity data at five-year intervals for 35 years, and concluded that both type of activity and hours of activity per week were recalled reliably. Friedenreich, Courneya, and Bryant (1998) used cognitive-based interviews to collect data on senior women's physical activity patterns six to eight weeks apart, also concluding reliability of mean hours of physical activity per week.

Côté, Ericsson, and Law (2005) argued that their retrospective interview procedure limits recall challenges because sport is a significant component of athletes' daily routines, and the interview focuses on information about athletes' general longitudinal patterns (e.g., training hours) rather than specific details of involvement (e.g., practice content). They outlined a variety of procedures to assure the validity and reliability of the interview, which have been used successfully in past studies (e.g., Baker, Côté, & Deakin, 2005), and were used in the present study. For example, much of the information collected was verified through athletes' training logs, club training schedules, newspaper clippings, pictures, scrapbooks, and parent discussions. In addition, data for 10% of the dropouts and 10% of engaged athletes was cross-validated with data provided by their parents on most physical variables (i.e., number of extra-curricular activities, number of sports, unstructured play swimming time, swimming

practice time, swimming competition time, swimming dry land practice time, start age in competitive swimming, start age in dry land training, start age in training camps, age at which reached 'top in club' status, time off from competitive swimming, club switching, and age relative to competitors) and on three psychosocial variables (i.e., parents being athletes in their youth, parent-athletes' level in their youth, and athlete age relative to training group). Pearson product-moment correlations were high, ranging from .87 to 1.00.

Analyses

Prior to conducting analyses, Pearson product-moment correlations were examined to determine whether relationships existed between variables. All correlations were in the low to moderate range ($r = .01$ to $.60$) except correlations between athletes' number of extra-curricular activities and number of sports ($r = .78$). This high correlation was expected given the overlap in measurement of sporting activities in both categories; however, independent examination of both variables was considered warranted given the varied outcome sets associated with different structured leisure activities (Hansen et al., 2003).

All variables examined from a developmental perspective used 2×4 (group \times stage) analyses of variance (ANOVA's) with repeated measures across stages (10 and under, 11–12, 13–14, 15 and over). Specifically, ANOVA's were used to examine six physical variables (i.e., number of extra-curricular activities, number of sports, unstructured play swimming time, swimming practice time, swimming competition time, and swimming dry land practice time) and seven psychosocial variables (i.e., parent support, parent pressure, coach support, one-on-one coaching time, school peer influence, swimming peer influence, and sibling influence). Multiple ANOVA's versus a single multivariate analysis of variance (MANOVA) were used given the theoretical independence of the training and psychosocial variables being examined.

A full data set (i.e., age 6 to 18) was not available for all participants because participants ranged in age from 13 to 18 at the time of data collection. Data were available for all participants ($n = 50$) for the first three stages of development (10 and under, 11–12, 13–14) and for the majority of participants ($n = 30$) for the final stage of development (15 and over). Post hoc analyses were conducted using Bonferroni tests. Cohen's d and eta-squared values (η^2) were calculated to determine effect sizes. Log transformations were conducted on physical and psychosocial variables that measured hours of involvement due to signs of non-normality and heterogeneity of variance (see Gravetter & Wallnau, 2000 for an explanation).

All single-item data (i.e., developmental milestones and demographic information) were analyzed using t-tests and Mann-Whitney U tests. Specifically, t-tests were used to examine differences in means on six physical variables (i.e., start age in competitive swimming, start age in dry land training, start age in training camps, age at which reached 'top in club' status, height, and weight) and one psychosocial variable (i.e., age at which developed close or extended relationship with coach), with Cohen's d used to calculate effect sizes. Mann-Whitney U tests were used to examine differences in frequency counts on three physical variables (i.e., time off from competitive swimming, club switching, and age relative to competitors) and four psychosocial variables (i.e., parents being athletes in their youth, parent-athletes' level in their youth, age relative to training group, and context of best friend).

RESULTS

Matching Variables

Table 1 outlines descriptive statistics for the eight demographic variables examined to assure a matched sample; no significant differences were found between dropout and engaged groups. Participants ranged in age from 13 to 18, with mean age being 17.6 (SD = 4.1) for dropout

Table 1
Descriptive Statistics for Matching Variables for Dropout and Engaged Athletes

	Dropout	Engaged
Age	M = 17.6 (4.1)	M = 18.7 (6.6)
Gender	N = 21 females, N = 4 males	N = 21 females, N = 4 males
Years of competitive swimming experience	M = 6.8 (2.3)	M = 7.3 (3.0)
Ability	N = 12 regional, N = 13 provincial/national	N = 11 regional, N = 14 provincial/national
Family structure	N = 23 traditional, N = 2 single parent/mixed	N = 24 traditional, N = 1 single parent/mixed
Number of siblings	M = 1.8 (0.8)	M = 1.8 (1.0)
Parent education	N = 4 high school, N = 46 post-secondary	N = 6 high school, N = 44 post-secondary
Geographic region	N = 19 urban, N = 6 rural	N = 20 urban, N = 5 rural

and 18.7 (SD = 6.6) for engaged athletes. More females participated in the study than males (n = 42 versus n = 8); however, this imbalance is representative of age group swimming in Canada (e.g., Swim Ontario, 2005).

Physical Factors

Variables Examined From a Developmental Perspective

Descriptive statistics for physical factors examined from a developmental perspective are presented in Table 2. A significant effect for the group was found on athletes' number of extra-curricular activities ($F(1, 33) = 5.01, p < .05, d = .38$). Dropout athletes participated in significantly fewer activities than engaged athletes. A significant effect for stage was found for athletes' number of sports ($F(3, 99) = 4.61, p < .01, \varepsilon = .79, \eta^2 = .67$). Pair-wise comparisons of means across stages (Bonferroni adjusted alpha of $p < .009$) revealed that athletes were involved in significantly more sports during stages 2 and 3 ($M = 3.9$ sports/year, $SD = 1.7$ and $M = 3.8$ sports/year, $SD = 1.8$ respectively) than during stages 1 and 4 ($M = 3.1$ sports/year, $SD = 1.2$ and $M = 3.3$ sports/year, $SD = 2.0$ respectively). There were no other significant main effects or interaction effects for either of these variables.

Analyses of the log of athletes' unstructured play swimming time revealed a significant main effect for group ($F(1, 36) = 4.03, p < .05, d = .27$) and stage ($F(3, 54) = 12.24, p < .001, \varepsilon = .35, \eta^2 = .12$), but no significant interaction effect. Dropouts participated in significantly less unstructured play swimming than engaged athletes. Pair-wise comparisons of means across stages (Bonferroni adjusted alpha of $p < .002$) revealed that athletes participated in significantly more unstructured play swimming in stages 1 and 2 than in stages 3 and 4. A significant effect for stage was also found for the log of athletes' swimming practice time ($F(3, 57) = 54.75, p < .001, \varepsilon = .54, \eta^2 = 1.08$), swimming competition time ($F(3, 57) = 8.79, p < .001, \varepsilon = .36, \eta^2 = .65$), and dry land practice time ($F(3, 39) = 26.63, p < .001, \eta^2 = .47$). Pair-wise comparisons of means across stages revealed that athletes generally increased the time they spent in swimming practices, competitions, and dry land training from stages one to four. There were no other significant main or interaction effects for any of these variables.

Table 2
Descriptive Statistics for Physical Factors Examined from a Developmental Perspective for Dropout and Engaged Athletes

	Dropout				Engaged				Total
	10 & U Stage 1	11-12 Stage 2	13-14 Stage 3	15 & O Stage 4	10 & U Stage 1	11-12 Stage 2	13-14 Stage 3	15 & O Stage 4	
Number* of extra-curricular activities	4.0 (1.6)	4.9 (2.3)	5.0 (2.8)	3.9 (2.8)	4.3 (1.7)	5.3 (2.3)	5.6 (2.7)	5.8 (2.8)	5.3 (2.3)
Number of sports	3.2 (1.3)	3.8 (1.7)	3.6 (1.8)	2.8 (1.9)	3.1 (1.2)	4.0 (1.7)	4.0 (1.8)	3.7 (2.0)	3.7 (1.3)
Unstructured play swimming time**	31.0 (24.8)	38.0 (41.2)	28.6 (28.1)	19.0 (21.9)	86.9 (75.3)	74.4 (75.6)	54.1 (69.7)	37.3 (64.4)	63.2 (61.6)
Swimming practice time	158.6 (87.3)	280.7 (117.0)	439.7 (146.5)	531.1 (178.8)	176.1 (78.9)	294.1 (115.4)	411.0 (127.1)	515.9 (161.4)	349.3 (110.0)
Swimming competition time	118.9 (87.7)	190.0 (76.4)	240.7 (64.3)	253.2 (88.7)	110.5 (72.0)	202.5 (58.0)	231.4 (36.7)	238.8 (47.3)	195.8 (40.0)
Swimming dry land practice time	7.0 (12.4)	38.2 (41.1)	99.5 (63.9)	111.8 (78.7)	4.3 (10.9)	32.8 (35.8)	72.4 (41.2)	100.7 (63.2)	52.6 (52.7)

Note. Number* represents number per year. **Time in hours per year.

Developmental Milestone and Demographic Variables

Dropouts started dry land training activities significantly earlier than engaged athletes ($M = 11.4$ years, $SD = 2.2$ versus $M = 13.0$ years, $SD = 2.0$, $p < .01$, $d = .79$), had their first training camp significantly earlier than engaged athletes ($M = 11.8$ years, $SD = 2.0$ versus $M = 13.7$ years, $SD = 2.5$, $p < .01$, $d = .87$), and reached ‘top in club’ status earlier than engaged athletes ($M = 10.8$ years, $SD = 2.6$ versus $M = 11.9$ years, $SD = 2.4$, $p < .10$, $d = .44$). Significantly fewer dropouts had taken time off during their careers than engaged athletes ($N = 1$ versus $N = 6$, $U = 250$, $p < .05$) and significantly fewer dropouts had switched clubs throughout their swimming careers ($N = 4$ versus $N = 11$, $U = 225$, $p < .05$). Further, dropouts were significantly shorter than engaged athletes ($M = 64.6$ inches, $SD = 3.2$ versus $M = 66.4$ inches, $SD = 2.9$, $p < .05$, $d = .60$). Dropout and engaged swimmers did not differ significantly in their start age in competitive swimming or in their weight, and there were no significant differences in the number of dropout and engaged athletes born in each birth-month time period of the year.

Psychosocial Factors

Variables Examined From a Developmental Perspective

Descriptive statistics for psychosocial factors examined from a developmental perspective are presented in Table 3. Analyses of athletes’ ratings of parent support revealed a significant main effect for stage ($F(3, 57) = 8.41$, $p < .001$, $\varepsilon = .44$, $\eta^2 = .08$), but no significant effect for group, and no significant interaction effect. Pair-wise comparisons of means across stages (Bonferroni adjusted alpha of $p < .005$) revealed that athletes rated parent support significantly higher in stages 1 and 2 ($M = 95.4\%$, $SD = 9.3$ and $M = 95.5\%$, $SD = 8.8$ respectively) than in stage four ($M = 87.3\%$, $SD = 14.6$). A significant effect for group was found for the log of athletes’ one-on-one coaching time ($F(1, 19) = 6.25$, $p < .05$, $d = .96$). Dropout athletes experienced significantly less one-on-one coaching than engaged athletes. No significant effects were found on the remaining psychosocial variables.

Developmental Milestone and Demographic Variables

Significantly more dropouts had parents who had been athletes in their youth than did engaged athletes ($N = 45$ versus $N = 33$, $U = 202.5$, $p < .01$), as well as parents who had been high level athletes (provincial and above) in their youth ($N = 22$ versus $N = 11$, $U = 205.5$, $p < .05$). Further, dropouts felt they developed a close or extended relationship with their coach at a significantly earlier age than engaged athletes ($M = 10.5$ years, $SD = 2.3$ versus $M = 12.3$ years, $SD = 2.4$, $p < .05$, $d = .79$). Finally, dropouts considered themselves the youngest in their training group more frequently than engaged athletes ($N = 10$ versus $N = 3$, $U = 225$, $p < .05$), and considered their best friend came from the swimming context less frequently than engaged athletes ($N = 6$ versus $N = 13$, $U = 176$, $p < .05$).

DISCUSSION

Physical Factors

This study highlights substantial distinctions in the training patterns of dropout and engaged athletes throughout development. Of particular interest is that while dropout and engaged athletes’ start ages in competitive swimming did not differ significantly the structure of their early involvement varied, with dropouts demonstrating a clear pattern of early specialization (Côté, et al., 2003; Côté & Fraser-Thomas, 2007; Hill, 1988; Hill & Hansen, 1988; Wiersma,

Table 3
Descriptive Statistics for Psychosocial Factors Examined from a Developmental Perspective for Dropout and Engaged Athletes

	Dropout				Engaged				Total
	10& U Stage 1	11-12 Stage 2	13-14 Stage 3	15 & O Stage 4	10& U Stage 1	11-12 Stage 2	13-14 Stage 3	15 & O Stage 4	
Parent support*	96.6 (6.7)	96.4 (7.1)	95.2 (8.8)	92.9 (9.2)	95.3 (7.3)	94.6 (10.4)	90.5 (12.3)	83.3 (16.5)	90.6 (11.7)
Parent pressure	21.0 (22.1)	29.4 (25.6)	37.5 (29.8)	43.8 (29.1)	32.9 (25.8)	31.6 (25.2)	35.6 (25.3)	25.9 (24.9)	31.4 (22.5)
Coach support	76.9 (24.4)	80.0 (16.7)	75.5 (24.6)	66.2 (31.8)	74.7 (18.5)	82.2 (18.7)	83.3 (21.4)	88.1 (11.3)	87.7 (11.5)
One-on-one coaching time**	1.0 (2.7)	0.8 (2.3)	3.2 (9.6)	0.8 (2.9)	1.5 (3.3)	11.5 (18.3)	15.9 (19.7)	20.7 (30.3)	15.2 (18.3)
School peer influence***	1.8 (1.0)	2.1 (1.2)	2.3 (1.4)	2.1 (1.4)	2.1 (1.1)	1.9 (0.9)	2.7 (1.5)	2.3 (1.4)	2.3 (1.2)
Swimming peer influence	3.1 (1.4)	3.5 (1.3)	3.6 (1.2)	3.7 (1.2)	3.5 (1.2)	2.9 (1.0)	3.7 (1.3)	3.5 (1.3)	3.3 (0.9)
Sibling influence	2.4 (1.6)	2.4 (1.5)	2.3 (1.5)	2.3 (1.7)	2.4 (1.5)	2.7 (1.4)	2.9 (1.6)	2.2 (1.6)	2.7 (1.4)

Note. * Support and pressure as a percentage. ** Time in hours per year. *** Influence on 5-point Likert scale.

2000). Specifically, dropouts participated in significantly fewer extra-curricular activities and spent significantly less time in unstructured play swimming than engaged athletes throughout development. Dropouts also started dry land training significantly earlier than engaged athletes (age 11.4 versus age 13.0), had their first training camp significantly earlier than engaged athletes (age 11.8 versus age 13.7), and reached 'top in club' status earlier than engaged athletes (age 10.8 versus age 11.9). These early training patterns may have collectively contributed to youths' dropout decisions. For example, dropouts may not have been psychologically capable of handling the pressure that accompanied athletic success (i.e., being 'top in club') and consequentially may have become frustrated or disillusioned when they encountered obstacles such as performance plateaus during adolescence (Hill, 1988; Hill & Hansen, 1988).

This study also examined club switching and time-off as training factors that may have influenced adolescents' swimming involvement, and found that fewer dropouts had switched clubs or taken time off from competitive swimming throughout their careers than engaged athletes. While specific reasons for club changes were not examined in this study, when interpreted within the framework of Côté and colleagues' (Côté et al., 2003; Côté & Fraser-Thomas, 2007) developmental model of sport participation, one might speculate that club changes often led to healthier training and psychosocial environments, while time off may have provided adolescents with a physical and mental break, so they were able to return to their sport refreshed. This explanation is consistent with Ferreira and Armstrong's (2002) study that examined withdrawal and club switching in soccer, and found that club switching was more common when parents and athletes had already invested significantly in the sport but were dissatisfied with their coaches, while withdrawal was more common when parents were dissatisfied with club management or sport costs.

Interestingly, this study did not find any significant differences in the number of dropout and engaged athletes born in each of the three time periods of the year (November-February, March-June, and July-October). These findings suggest that the relative age effect may not hold in individual sports such as competitive swimming, given that past studies examining the effect were done primarily in team sport settings (Dundink, 1994; Helsen, et al., 2000). One reason for this may be that in many individual sports athletes move up age groups on their birthday rather than according to the calendar year. As such, every athlete has an opportunity to be at the top of their age group (as they approach his or her birthday) and is faced with the challenges of being at bottom of their age-group (immediately following his or her birthday). Nevertheless, dropouts were significantly shorter than engaged athletes, suggesting that consistent with past literature, physical size was an influential factor in athletes' sport participation patterns (e.g., Malina, 1994; Peltenburg et al., 1984).

Psychosocial Factors

This study also found interesting differences in the psychosocial influences of dropout and engaged competitive swimmers. For example, dropouts received significantly less one-on-one coaching throughout development and felt they developed a close or extended relationship with their coach significantly earlier than engaged athletes (age 10.5 versus age 12.3), despite rating coaches' support similarly to engaged athletes. While these findings may initially appear contradicting, one explanation might be that dropouts' current perceptions of coach support were in comparison to perceptions of coach support when they were younger (and one of the top performers in the club). It has been suggested that one of the dangers of early specialization is that disappointment and decreased self-concept may accompany the shift from child stardom to adolescent mediocrity (Hill, 1988).

The findings that more parents of dropouts had been athletes in their youth, and more parents of dropouts had been athletes at a provincial level or higher are particularly interesting. Further investigation is warranted to determine if these associations are mediated by other factors. For example, some parents may unintentionally place pressure on their children given their athletic histories. The finding that parent support decreased throughout development is consistent with past studies that suggest parent support plays a decreasing role in athletes' sport commitment over time (e.g., Weiss & Weiss, 2004). Further, the finding that dropouts' best friends came from the swimming context less frequently than engaged athletes' best friends complements past literature (Weiss & Weiss, 2004; Wold & Anderssen, 1992). Finally, the finding that dropouts considered themselves the youngest in their training group more frequently than engaged athletes parallels past research on similar aged peers in youth sport contexts (Gould et al., 1996; Patrick et al., 1999).

Implications for Practice

The findings of the present study have important implications for sport programmers. Although much of the current youth sport programming is moving towards institutionalization, elitism, early selection, and early specialization (Hill, 1988; Hill & Hansen, 1988), this study suggests such a sport programming model may not lead to long-term youth sport involvement. Instead, this study suggests that children should be encouraged to participate in a diversity of playful sport and extra-curricular activities. These conclusions support the contention by recent researchers that early diversification facilitates the development of physical competence, enjoyment, and continued motivation for sport participation (Côté & Fraser-Thomas, 2007; Kirk, 2005). Wiersma (2000) actually suggested that sport organizations may soon need to restrict children's hours of training in a specific sport based on age. Clearly, further investigation of specific outcomes associated with different youth sport models is warranted to provide programmers with necessary guidance and direction.

Findings of this study also highlight the critical roles that coaches and parents play within youth sport structures. Specifically, findings suggest coaches must reinforce reasonable practice schedules to allow for other extra-curricular activity involvement, create fun and motivating climates, delay specialized training (e.g., training camps, dry land training) until athletes are physically and psychosocially ready, provide individual attention to all program participants, keep athletes with peers within their own age-group, and facilitate effective communication with parents (Côté & Fraser-Thomas, 2007; MacPhail & Kirk, 2006; Wiersma, 2000). Parents must take initiative in their children's healthy sport development by being aware of their changing roles, providing opportunities for unstructured play, learning to value the benefits of diversification, and being aware of any unintentional pressure that they may demonstrate given their past sport involvement (Gould et al., 1996; MacPhail & Kirk, 2006; Wiersma, 2000). Coaches and parents should consider some of the implications of this study, which may in turn lead youth to have more positive and prolonged sport experiences.

Finally, this study has important implications for researchers. While findings are consistent with other studies (e.g., Gould et al., 1996; Wall & Côté, 2007), this study went one step beyond past studies by collectively examining training, maturational, and psychosocial factors throughout development that may contribute to dropout and prolonged engagement, rather than focusing on specific variables at one stage of development. Researchers should continue along this line of investigation by examining how these and other physical (e.g., resources), psychosocial (e.g., identity, perfectionism), and motivational (i.e., motives for participation and withdrawal) factors may interact to contribute to dropout or prolonged engagement.

Research using a retrospective interview procedure (Côté et al., 2005) should also continue to determine whether findings of the present study hold in all sport types (team and individual), in all sport contexts (school, club, community), and for all levels of investment (high and low). Further, given that the sample in the current study was primarily female and that females often experience their sport environment differently than males (e.g., Gilbert, 2001), future investigation should focus on understanding how gender differences may influence dropout and prolonged engagement during adolescence. Qualitative research is also necessary to explore some of the discrepancies found in the present study between athletes' subjective ratings of their psychosocial environments (e.g., ratings of parent pressure and coach support) and more objective measures of their psychosocial environments (e.g., parents' sporting backgrounds, one-on-one coaching). In particular, more concrete understanding of specific parent and coach behaviors that adolescent athletes find supportive and pressuring in different contexts is necessary (Stein, Raedeke, & Glenn, 1999). As findings become increasingly generalizable, intervention research should be conducted at a programming level to further understanding of the specific means by which physical and psychosocial influences can facilitate prolonged engagement and other positive developmental outcomes.

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