The influence of early physical activity: Sampling in ADHD males and physical education teaching majors

by

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For the Major Program

DEDICATION

TO MY PARENTS, BROTHERS, SISTER, WIFE

AND DR. HUSSEIN ABU AL-RUZ

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ABSTRACT

Two studies examined early physical activity (PA) influence on adult PA. PA reduces health risk; thus, identifying precursors to PA are important.

PA engaged time, sampling and the person who influenced children to initiate an activity was compared in college males who had been diagnosed with Attention Deficit Hyperactivity Disorder (ADHD) and matched controls. The ADHD group spent significantly more hours in PA as children and adults than the controls. Sampling during childhood was correlated with adult PA, and both sampling and PA engaged time were relatively stable across the years of age from 6 through 17 and to the previous year in college. ADHD males participated in more individual sports than non-ADHD males, this explained most of the difference between the groups. The two groups participated in an equal number of other activities (OA) (e.g., music, scouts). Family was the primary influence for both groups to initiate OA. For sport the only influence above chance was self.

In the second study the same survey and dependent variables were used to examine gender and group differences comparing physical education teaching majors (PETM) to other secondary education teaching majors (SETM). A love of sport and a sport background has been hypothesized as a factor in selecting physical education as a major. Males in the general population are more active than females, with small differences during childhood and large differences emerging during adolescence. The PETM group was more engaged in PA at every age than the SETM group. The PETM group began sampling at age 6 years and increased sampling through the previous year in college. The SETM followed a pattern similar to the general population where sampling increased from 6-14 years and decreased after 15 years of age. There was a marked difference in both groups between, before, and

after 12 years of age in sampling and PA. Family members were the most influential for initiating sport, however peers also were a significant factor. The two groups did not differ on the number of OA. These activities were initiated as a result of influence by parents and self.

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CHAPTER 1.

The Influence of Early Physical Activity: Sampling in ADHD Males and Physical Education Teaching Majors

Introduction

Two studies were conducted to examine the impact of early physical activity on later physical activity. The first study examined physical activity in male college students with and without Attention Deficit Hyperactivity Disorder (ADHD). The second study examined the potential impact of sampling on adult physical activity engaged time and the choice of physical education teaching as a career. Sampling is the variety of activities tried and will be described later in more detail. There are four parts in this dissertation, this part is the general introduction that begins with a brief description of the role of physical activity in health and the factors influencing physical active lifestyles. The next two sections are manuscripts developed from the two studies. The final section is a general discussion of both studies.

Physical Activity

Physical activity is defined as any bodily movement produced by skeletal muscles that results in energy expenditure (Casperson, Powell, & Christenson, 1985). Physical activity has increasingly become an integrated part of both the prevention and treatment of many diseases. At least 60 minutes of daily physical activity is recommended to reduce health risk, 30 minutes of which should be moderate to vigorous (U. S. Department of Health & Human Services, 2000). Physical activity can influence health indirectly, since people who become physically active also tend to change other health related habits in a positive direction. Physical education is often the first systematic exposure for children to organized physical

activity. Physical education teachers can be a critical component in the development of physical activity of children. Scientific data examining the effects of physical activity on many disease risk factors in the growing years do provide some evidence that promoting exercise in children might serve as a means of preventing future diseases such as cardiovascular disease (Maehlum, 1993; Rowland, 2001). Physical activity is related to a decreased risk of coronary heart disease. Additionally, shorter sessions of activity are incentives for those sedentary to become more physically active (Lee, Sesso, & Paffenbarger, 2000).

People can substantially improve their health and quality life by including moderate amounts of physical activity in their daily lives. However, many adults live sedentary or inactive lives. Health benefits from physical activities are achievable for most people, including those who may dislike vigorous exercise, those who may have been previously discouraged by the difficulty of adhering to a program of vigorous exercise, people with special needs, and elderly. Physical activity for health includes activities of daily life such as walking, gardening and using the stairs. The health benefit is associated with a change in activity from sedentary to active. However, more information about these various groups will be necessary to develop a truly comprehensive national initiative for better health through physical activity (Maehlum, 1993).

Sampling

The impact of specializing - - practicing and playing one sport - - was examined by Côté, Baker, and Abernethy (2001). Elite athletes did not specialize until after age 12 years. The instrument used was a recall survey, which was compared to parent interviews and provided insight into the types and amount of activity during childhood. Validity was

established by correlation of parent to child reports. All correlations were significant at all ages (years) from 5 – 30, except age 23, with correlations from .53 to 1.0 between athletes and their parents (Côté, Ericsson, & Beamer, in review). Reporting of time in training was therefore, reliable. The survey had face validity as it asked participants (and their parents in this study) to identify the activities that were completed to estimate activities sampled. In a comparison of deliberate practice, deliberate play and organized play, athletes were also consistent with parents (.99, .70, and .88 respectively). Robertson-Wilson, Baker, Derbinshyre, and Côté (in press) conducted a study that examined physical activity in active and inactive adolescent girls. Girls were selected and separated into active and inactive groups by the amount of activity reported during their senior year in high school (e.g., inactive reported 5 or less hours, active reported 25 or more hours per week). They found that active girls participated in a significantly greater variety of activities than inactive girls (e.g., sampled more). Active girls increased in the number of participation hours from ages 6-18 years. However, active and inactive girls did not differ on the number of artistic (art and dance) or club activities. The results indicate that parents of both active and inactive females were the most influential factor in initiating physical activity. Parents of active females initiated more physical activity involvement in their daughters than parents of inactive females did. The results also illustrate that certain periods in childhood and adolescence appear to be critical for developing long-term physical activity habits.

Sampling represents the number of different activities a person tried. For example, during a year a child might participate in 1-2 sports each season and be a "high" sampler. Another child might specialize and participate in one sport across the four seasons, this child would be low in sampling. Early research on sampling and specialization focused on the

impact of these variables on expertise in sport. Robertson-Wilson et al. (in review) were the first to identify sampling as an important factor in active versus inactive girls. Additional influences on physical activity patterns among adults and young people include confidence in one's ability to engage in regular physical activity (e.g., self- efficacy), enjoyment of physical activity, support from others, positive beliefs concerning the benefits of physical activity, and lack of perceived barriers to being physically active (McCullick, 2001; Wuest & Bucher 1999).

Other Predictors of Physical Activity

Whitehead and Corbin (1997) argue that there is a correlation between confidence and competence developed in childhood and adult physical activity. They maintain that more confident and competent (skilled) children show greater physical activity as adults. Competence in this instance is motor skill. Similarly, Robertson-Wilson et al. (in press) established a relationship between participation in various sports and physical activity in girls. Thus, three variables have been identified that are viable predictors of physical activity as adults—sampling, competence and confidence. While these are discrete, there is a likely relationship among them. Intuitively, a person who is low in sampling may not try enough activities to develop a high level of skill. Higher skill is associated with confidence. Conversely, an expert may try one sport, become an expert and exhibit great confidence in her ability but have low sampling due to specialization. So, the three potential predictors are distinct, yet undoubtedly related. No previous research has attempted to examine the affect of sampling on males or comparing ADHD (who are known to be very active) to non-ADHD participants. For adults, some interventions have been successful in increasing physical activity in communities, workplaces, health care settings, and at home. Interventions

targeting physical education in elementary school can substantially increase the amount of time students spend being physically active in physical education classes (Wuest & Bucher, 1999). However, none of these have looked at the long term effects of the programs on physical activity, nor measured sampling.

For the present investigation, two studies were conducted using the Côté, et al. (in review) retrospective interview procedure. The first study was conducted on college students, and compared males with attention deficit hyperactivity disorder (ADHD) to similar college males without ADHD. The second study used a similar procedure with male and female physical education and secondary education (e.g. English, Math) majors as participant. Thus, these studies extend the previous work done by Côté et al. (in review), who focused on women and expert athletes.

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CHAPTER 2.

Attention Deficit Hyperactivity Disorder and Physical Activity

Introduction

Health is important to everyone, including individuals with disabilities. For many disabilities little is known about typical physical activity patterns. Attention deficit hyperactivity disorder (ADHD) is an example. While excessive movement is associated with the disorder, little is known about goal directed physical activity. Two issues are a) maintaining health related physical activity and b) increasing goal directed activity in the individual with ADHD.

Attention deficit hyperactivity disorder is a complicated topic in the field of education. It is documented as one of the most common disabilities and remains controversial and contentious today. ADHD refers to a family of related chronic neurobiological disorders that interfere with an individual's capacity to regulate activity level (hyperactivity), inhibit behavior (impulsivity), and attend to tasks (inattention) in developmentally appropriate ways (Dowdy, Patton, Smith, & Polloway, 1998). Children with ADHD have functional impairment across multiple settings including home, school, and peer relationships. Children with ADHD experience an inability to sit still and pay attention in class and the negative consequences of such behavior. In other words, children with ADHD are more active than other children. This activity is often non-goal oriented, that is, movement without a purpose. Their academic and social difficulties have far-reaching and long-term consequences. For many individuals, the impact of ADHD continues into adulthood (Barkley, 1998; Sherrill, 1998).

The defining feature of Attention-deficit / Hyperactivity Disorder (ADHD) is behavior that seems "inattentive, hyperactive, and impulsive to an extent that is unwarranted for the person's developmental age and is a significant hindrance to their social and educational success" (Reason, 1999, p. 85). ADHD occurs more frequently in boys than girls, with estimates ranging from about 2:1 to 10:1 males to females. The ratios tend to be higher in samples of children referred to clinics, averaging about 6:1, than in samples taken from the population at large, where they average about 3.4:1 (Barkley, 1998). This difference in male to female ratios in clinic-referred versus community sample is often used as evidence of gender-biased referral. Authorities have noted that boys are more likely than girls to exhibit aggressive behavior, which causes them to be referred to the clinics. This has led some to suggest that boys may be over-identified as ADHD and/or that girls may be under-identified as ADHD. Although it is very likely that some referral bias does exist, the fact that boys still outnumber girls by more than three to one in surveys of the community at large suggests that the disparity may be due to constitutional differences (Barkley, 1998).

Sport, Physical Activity and Physical Education

Both behavioral interventions and stimulant medication have been shown to increase attentiveness and reduce noncompliance among ADHD-diagnosed children in the classroom (Barkley, 1998; Reitman, Hupp, O'Callaghan, Gulley, & Northup, 2001). Attending to and complying with the myriad of rules that apply in team sports constitutes an important element of athletic competence. Failure to follow the rules may represent an important reason why children diagnosed with ADHD experience rejection in a wide variety of interpersonal contexts, including athletics (Guevremont & Dumas, 1994).

Though the academic and discipline-related problems of children diagnosed with ADHD (American Psychiatric Association, 1994) have been well-documented, the impact of behavior on participation in extracurricular activities such as sports is less well-known. Because of the structure and demands of athletic competition, there is good reason to believe that children diagnosed with ADHD encounter significant problems in sustaining participation in sport activities. Moreover, because athletics constitute an important socialization context for many children, those who experience failure in these environments may be at greater risk for social isolation, low self-concept, and other social and behavioral problems (Guevremont & Dumas, 1994). At least two factors may contribute to failure in athletic settings, low skill level (poor athletic competence) and failure to abide by the social rules associated with the sports activity (poor sportsmanship) (Hupp & Reitman, 1999).

Poor athletic competence may be a contributing factor to the problems of some children diagnosed with ADHD. Pelham, McBurnett, Harper, Milich, Murphy, Clinton, and Thiele (1990) noted that many children diagnosed with ADHD have poor motor skills and do not follow game rules. Further, they speculated that training in sports skills may be a good supplement to other behavior modification techniques in the treatment of children diagnosed with ADHD. Skills training has been shown to increase competence in non-clinical ADHD populations. For example, Salokun (1994) increased participants' skills in field hockey and athletics (i.e., sprints, discus, long jump) as well as other positive effects (e.g., improved self-concept and social status). However, few researchers have attempted to enhance sports competence for children diagnosed with ADHD. Interestingly, athletic competition may serve as a useful context in which to identify social problems and to train new, more adaptive social behaviors. Clearly, in addition to difficulties with specific sport skills, many children

diagnosed with ADHD also display poor sportsmanship, possibly as a consequence of deficiencies in communication, social knowledge, and emotional regulation (Guevremont & Dumas, 1994).

The number of children diagnosed as hyperactive continues to grow each year. A question often arises about whether athletic activity is appropriate for these children. Evidence strongly suggests that not only is it appropriate, but that sports such as tennis, fencing, and track and field can improve self-esteem and can help them feel less like oddities among their peers (Alexander, 1990). It is possible this is because these sports are more interesting and meaningful for children with ADHD.

Sherrill (1998) argues that students with ADHD need a different kind of physical education content than that used in most regular physical education settings. More emphasis should be placed on learning relaxation techniques, impulse control, sport, dance, and aquatic activities that encourage reflectivity and attention to detail. Individual and small-group counseling, Sherrill (1998) maintains, helps students to set personal goals for managing their behavior in school and community facilities where fitness and leisure skills are pursued. The goal, of course, is to learn self-control and self-responsibility necessary for social acceptance in after school and weekend youth sport.

Many children with ADHD excel in activities that focus more on individual skills than on team-work. Sports like wrestling, karate, swimming, fencing, track and field, and tennis may afford participants with ADHD the same benefit thought to be afforded to non-disabled players. The training milieu for these events lends itself to individual performance, and coaching is more one-to-one. Karate may be one of the best examples of sport that is

therapeutic for the ADHD child. Since karate is potentially dangerous, the best instructors teach listening skills and self-control before they demonstrate techniques (Alexander, 1990).

Children and youth with ADHD exhibit inattention and/or hyperactivity-impulsivity that may pervade all areas of life. Carefully selecting physical education content that can be delivered in a structured manner is likely to ensure students with ADHD the objectives of physical education instruction. Youth sport experiences are likely to be more meaningful for players with ADHD if care is given to how typical symptoms associated with the disorder can be countered (Bishop & Beyer, 1995).

Children often play sports during weekends, recess, and after school, and these activities provide ongoing opportunities for social interaction and peer acceptance (Gencoez, 1997). In fact, greater athletic competence is associated with higher social status for both boys and girls (Weiss & Duncan, 1992). Children with ADHD can find athletic competition enjoyable, and their early participation in sports may sow the seeds for continued physical fitness activities in later years (Alexander, 1990).

Over time the construct of athletic competence has been broadened to include sportsmanlike behavior, sports knowledge, and attending to important aspects of the game, rather than being defined solely in term of specific sports skills such as dribbling or shooting (Hupp & Reitman, 1999; Pelham et al. 1990).

Allen (1998) used a simplified habit-reversal and contingency management procedure to reduce angry outbursts during tennis matches for a 14-year-old boy. More recently, a few studies have emerged that illustrate how a behaviorally oriented approach to integrating social skills and sports training might be used to address behavior problems in athletic settings. Hupp and Reitman (1999) demonstrated that both athletic skill and sportsmanlike

behavior (e.g., praising a peer) could be improved during a basketball camp for children diagnosed with ADHD. Good sportsmanship is defined as initiating a pro-social act during the game. To conclude, while ADHD participants have been hypothesized to to select and thrive in individual sports, no previous research has attempted to investigate the effect of sampling in individuals with ADHD. The prevalence of ADHD in males is higher than in females, thus this study will focus on male.

The Purpose of the Study

Males with ADHD may be attracted to physical activities during childhood, leading to more sampling. Sampling during childhood has been positively related to increased physical activity as an adult. Previous work has been done with females demonstrating this relationship. Thus, this study seeks to examine this relationship in males and to compare ADHD to non-ADHD college males. The purpose of this study is twofold:

- Compare recall of sampling and physical activity patterns during childhood and adolescents in ADHD and non-ADHD male college students
- Examine the influence of significant role models (e.g. parents, peers, teacher) as factors related to physical activity in male college students, both ADHD and non-ADHD.

The Hypotheses of the Study

1. Sampling will have a positive impact on time spent in physical activity, thus
    - during the senior year in high school and during the year in college previous to this study, high sampling will be associated with more hours per week of physical activity in both ADHD and non-ADHD college males.
    - sampling will be higher in ADHD than non-ADHD participants.

2. Parents in particular, and significant others (e.g., peers, teachers) in general, will have a positive impact on sampling.
    - Participants whose parents encouraged sampling will have higher sampling than participants whose parents did not encourage sport participation during ages 6-18 years.
3. ADHD participants will report greater time engaged in individual sport and exercise than in team sports.

Limitations of the Study

The study used a retrospective questionnaire to gather longitudinal data about early physical activity for years 6-18 and for the immediately previous year in college, and about persons influencing the participants' initiation of activities. One limitation of the study have been identified. The participants may not have been able to recall past activities accurately. Another limitation of the study was that the participants are all college students, thus successful, while this is the best case scenario for any individual with a disability, these participants may not represent the general ADHD population. However, these participants do provide a window into the previous experience of successful individuals with ADHD.

Methods

Participants

Two groups of male college students (n = 24 males per group) participated in this study. ADHD participants had been previously identified as ADHD by a psychologist, participants provided this documentation to the investigator. Disability resources (DR) contacted all ADHD students enrolled with DR asking for volunteers. Signs asking for

volunteers were posted at several sites on campus. Approximately one fifth of all ADHD students enrolled with disability resources responded to the email (n=19). Further, psychologists serving ADHD patients assisted recruiting volunteers; one participant came from these referrals. The remaining participants volunteered in response to the signs (n=4). Non-ADHD college students (control group) were matched with the ADHD students. The control group was recruited to match, as closely as possible to major, age, and credit hours of the ADHD participants. All participants were in good standing academically. The descriptive information about the participants is presented in Table 1. These males represented 15 different majors (4 pairs mechanical engineering, 3 pairs electrical engineering, 3 pairs sport management, 2 pairs finance, 2 pairs liberal studies and 1 pair each from 10 other majors).

The number of participants in the ADHD and control groups was determined using the power of .8 and the 1.25 effect size (Robertson-Wilson, Baker, Derbinshyre, and Côté, in press), thus 30 participants per group were needed to detect differences at the .05 level. However, Robertson-Wilson, et al. (in press) detected differences between active and inactive with 9 participants for each group. Therefore 24 participants per group was deemed sufficient.

Instruments

The questionnaire (see appendix A) developed by Côté, Ericsson, and Beamer (in review) was used to gather longitudinal data about early physical activity for years 6-18 and the immediately previous year in college. This instrument was determined valid and reliable (Côté, et al., in review). Validity was established by correlation of parent to child reports. All correlations were significant at all ages (years) from 5 – 30, except age 23, with correlation

from .53 to 1.0 between athletes and their parents (Côté, Ericsson, & Beamer, in review). Reporting of time in training was therefore, reliable. In a comparison of deliberate practice, deliberate play and organized play, athletes were also consistent with parents (.99, .70, and .88 respectively). Because the instrument had not been developed for or used by ADHD participants, the reliability was tested on this group using a sub-sample and the test-retest method. Test and re-test reliability of the instrument was completed on the ADHD participants by randomly selecting 5 participants who re-took the survey from 1-5 days after the first time they completed the survey. Time and sampling were used as dependent variables yielding 10 correlations for reliability. The correlations ranged from .95 to 1.00. Thus, the instrument was deemed reliable.

Procedure

Participants were informed of their rights and sign an informed consent. ADHD participants provided evidence of their disability. All participants reported their major, age, credits earned, and stated that they were in academic good standing (see appendix). The questionnaire was administered individually. There were three steps to administering the survey (see appendix). First, participants were asked to recall activities (e.g., sport, clubs, lessons, music, art) in which they participated. Second, participants identified the person most responsible for initiating the activity. Third, participants were questioned using the probe technique to determine the years, months, and hours of participation in each activity. All participants were paid $25 for their participation.

Design

This was a descriptive study with the independent variable of group (with two levels; ADHD and non-ADHD). The dependent variables were number of physical activities per

year (sampling), hours of physical activity engaged time per week, club and artistic participation per year, and significant others who encouraged physical activity.

The repeated measure factor was 3-year intervals (i.e.,., ages 6-8, 9-11, 12-14, 15-17) and called time periods.

Results

The first analysis was to determine if the data met the assumption of the normal curve. The mean physical activity engaged time increased across the first four time periods (from 6.8 to 19.7 hours per week for ADHD and 3 to 11 hours per week for non-ADHD, as did the standard deviations. Time period 5 was similar to time period four for both groups. Sampling means increased across time periods one to four for the ADHD group, and across time periods one to three for non-ADHD group. The sampling standard deviations were relatively stable across the time periods. Non-ADHD peaked sampling in the time period 3 (age 12-14 years) and then decreased sampling thereafter. The ADHD group mean for sampling stabilized after time period 4 (age 15-17 years). As can be seen in Table 2 a and b, the sampling data were normal while the physical activity engaged time was generally not normal. The decision criteria was a z score of 1.96 or less calculated as skewness or kurtosis divided by the standard error of the estimate, that produces a score equivalent to z. Thus, for the data analysis involving sampling parametric statistics were appropriate, while the data were ranked for analyses on physical activity engaged time because the data did not meet the assumption of the normal curve (Thomas, Nelson, & Thomas, 1999).

Within group, correlations between the rank of physical activity engaged time (ranked across all 5 time periods) and sampling in the 5 time periods (ages 6-18 years and the previous year in college) were calculated to estimate stability of the measures. These

correlations are presented in Table 3 a and b. As can be seen, the adjacent time periods (e.g., 6-8 years and 9-11 years or 9-11 and 12-14 years) are significant, as are some of the other correlations.

Group Comparisons During Childhood

A 2 by 4 (group by time period) repeated measure (with the repeated measure on the last factor) was completed for sampling. Group had two levels, ADHD and non-ADHD. The between subjects analysis also indicated the groups were different, $F(1,46)=17.94$, $p=.0001$. The ADHD group ($m=5.11$, $sd=2.19$) sampled more than the non-ADHD group ($m=3.31$, $sd=1.88$) (e.s.=.88). For the multivariate analysis $F(3,44)= 21.19$, $p=.0001$ for the repeated measure (time period), while the interaction of group and time period was not significant, $F(3,44)=2.19$, $p=.10$. Follow up tests (see Table 4) indicated that time periods one and two (6-8 years and 9-11 years) were not different from each other, nor were time periods three and four (12-14 years and 15-17 years). The first pair were different from the second pair. These group differences can be observed in Figure 1. A 2 by 4 (group by time period) with repeated measures on the last factor (time period) was calculated for physical activity engaged time (the rank across all 5 time periods). The L statistic was used instead of F because the data were ranked and the critical value of alpha was taken from the Chi^2 table. The means and other descriptive data presented in Table 4 represent the actual data (e.g., hours per week engaged in physical activity), not the ranked data. Time period was significant, $L(3)=34.98$, $p=.0001$, however the time period by group interaction was not significant, $L(3)=4.84$, $p=.30$. Time periods one and two were not different from each other, nor were time periods three and four, however the first two were different from the latter two time periods. The between subjects univariate analysis yielded a significant main effect for

group, $L(1)=9.66$, $p=.01$ (Thomas, et al., 1999). The ADHD group ($m=12.98$, $sd=7.79$) spent significantly more time engaged in physical activity than the non-ADHD group ($m=6.85$, $sd=6.87$) across all four developmental time periods ES=.84). These group differences can be observed in Figure 2.

Physical Activity Engaged Time as an Adult

A MANOVA comparing ADHD to non-ADHD for sampling the previous year in college and the rank of physical activity engaged time the previous year (ranked across all five time periods). This time period was analyzed separately because it represents 1 year, while the previous time periods represent data averaged across 3 years. The analysis yielded a significant main effect for group $L(2)=15.01$, p=.01. Follow up tests indicated that physical activity engaged time was significant, $L(1)=12.33$, $p=.01$, as was sampling $F(1)=23.01$, $p=.0001$. The descriptive data for these effects are located in Table 4. The effect size for physical activity engaged time was greater for the ADHD ($m=19.28$, $sd=8.03$) than the non-ADHD group ($m=10.04$, $sd=8.50$, e.s.=1.12) as was sampling (ADHD $m=5.83$, $sd=2.18$; e.s.=.1.38; non-ADHD $m=2.96$, $sd=1.97$). Physical activity engaged time the previous year in college was significantly correlated with sampling ages 6-8 years (r=.51< $p=.01$) and 9-11 years (r=.41, $p=.01$) no other comparisons were significant. A regression using the stepwise method and entering sampling for each of the four time periods and group as predictor variables to predict physical activity the previous year in college produced a model that accounted for 44% of the variance using sampling at times one (6-8 years) and four (15-17 years) as predictors. Group and the other two time periods did not enter the equation.

Individual versus Team Sports

Activities sampled were categorized as either team (e.g., football, basketball) or individual (e.g., gymnastics, wrestling). The total number of team and individual sports were used as dependent variables in a MANOVA comparing the ADHD to non-ADHD groups. The multivariate effect was significant $L(1)=21.15$, $p=.0001$ showing differences between ADHD and non-ADHD groups. The follow up univariate tests comparing groups produced a significant main effect for individual sports, $L(1)=5.81$, $p=.02$. Team sports were not significantly different. The dependent variables were the sum of team and individual sports tried from 6 years of age through the previous year in college. The ADHD group participated in approximately twice as many individual sports as team sports and twice as many as the non-ADHD group (Figure 3).

Participation in Other Activities

The total number of other activities for the two groups were nearly identical, with ADHD and non-ADHD groups participating in 51 and 50 other activities respectively.

Who Influenced Initiation of Activity

The impact of parents and significant others was evaluated by comparing participants using 2 (ADHD versus non-ADHD) by 5 (family, self, teacher, friends, and coach) Chi-Square (X^2). Chi-square values for physical activities for ADHD and non-ADHD groups were significant, X^2 (4) = 154.13, p = .0001 and X^2 (4) = 62.38, p = .0001 respectively. Giving the 5 groups (family, teacher, self, friends, and coach) an equal chance of influence, the Chi^2 results indicate that only self influenced sport initiation at a rate higher than "chance" in the ADHD group. For the non-ADHD group, the groups all influenced at or below chance. Chi^2 for other activities (music, club, and other) for ADHD and non-ADHD

groups were significant, X^2 (3) = 36.49, p = .0001 and X^2 (3) = 23.10, p = .0001 respectively. Giving the 5 groups (family, teacher, self, friends, and coach) equal chance of influence, only family influenced more than "chance" for both the ADHD and non-ADHD groups.

Comparing the relative influence (in percent) on initiation of activity (Table 5), the two groups were similar for sport, except the non-ADHD group was more likely to be influenced by friends (30% versus 18%) to initiate a sport, and the ADHD group was more likely to start a sport because of their own influence (40%) than the non-ADHD group (27%).

The two groups were equally likely to be involved in other activities (sums of 50 and 51 activities per group). Parents were the primary influence, with self second as can be seen in table 5b.

Discussion

One purpose of this study was to compare sampling and physical activity patterns during childhood and adolescents in ADHD and non-ADHD college students. The ADHD group sampled more and engaged in more physical activity than non-ADHD participants. The main effect for group was significant for both dependent variables while the time period by group interaction was not significant. This suggests that the differences were consistent across the five time periods for both sampling and physical activity engaged time. Males with ADHD may be more active because of the disorder, because significant others encourage them to be active, or as a result of a combination of those explanations.

Sampling and Physical Activity Engaged Time

The hypothesis that sampling during childhood would have a positive impact on time spent in physical activity was supported. Sampling from 6-11 years of age was significantly and positively correlated with physical activity engaged time in college. Sampling was also a

significant predictor of physical activity engaged time. Sampling was higher in the ADHD group than in the non-ADHD group as was physical activity engaged time. Individuals with ADHD may try a variety of activities as a response to the attentional deficit, or their drive for activity --especially individual activity--may contribute to the higher sampling. For example, lack of focus could send a child from activity-to-activity seeking to meet a specific need, or a need for more activity may have demanded participating in a greater variety of activities. Clearly, the two are related, however the cause is still uncertain.

The stability of both sampling and physical activity engaged time is an important finding. Tracking of physical activity across the lifespan has been investigated with mixed results (Malina, & Bauchard,1991, chapter 22). Tracking means an activity level—high, average or low physical activity—remains consistent within a person across the lifespan. Recent studies have indicated a trend toward tracking, while previous studies have not supported tracking. This study supports tracking for the amount of physical activity engaged time and for sampling. Sampling has not been examined for tracking. Since being physically active (more than 7 hours per week of engaged time) has direct health benefits as an adult, this finding suggests the importance of beginning a regime of physical activity early in life. It would appear that the type of activity or changing activities is not important, and in fact, changing or trying a variety of activities may have a positive influence on the amount of time spent in activity as an adult.

Other Activities

ADHD and non-ADHD participants did not differ for non-physical activities in number or hours of participation supporting that hypothesis. This suggests that the ADHD group was more attracted to sport and physical activity than other activities, and thus suggests that the

reason for sampling may have been more a result of the need for increased physical activity rather than loss of focus, or needing to fill time.

Individual versus Team Sports

ADHD participants reported greater time engaged in individual sport and exercise than in team sports supporting that hypothesis. The ADHD group participated in approximately the same number of team sports and twice as many individual sports as the non-ADHD participants. Anecdotally, ADHD participants reported playing positions in team sports where less cooperation was necessary, for example in soccer playing goalie. The literature had hypothesized that ADHD participants would be more comfortable in individual sports, a logical suggestion, however until now no data supported this statement (Alexander, 1990). The greater sampling and the increased physical activity engaged time for the ADHD group is likely explained by the significantly greater number of individual sports.

Who Is Influential

A purpose of this study was to examine the influence of significant role models (e.g. parents, peers, teacher) as factors related to physical activity in male college students, both ADHD and non-ADHD. Family were significant factors in initiating other activities, but not sport activities. For the ADHD group, self was the significant influence to initiate sport. No consistent pattern emerged for the non-ADHD group, in other words the five sources of influence all influenced around the chance level. Thus the hypothesis that family encouragement would impact both sampling and physical activity engaged time, was not supported.

Time Periods

The four time periods displayed a similar pattern for all participants. Children sampled differently between 6 and 11 years of age than they did as adolescents from 12-17 years of age. Similarly, physical activity engagement increased after age 12 when compared to before age 12 years. This time period was critical in the studies by Côté, Baker, and Abernethy, (2001); Robertson-Wilson, Baker, Derbinshyre, and Côté (in review). While these changes are significant and reliable, the two characteristics do track across time, that is these are relatively stable within an individual. Children are becoming increasingly independent from their parents after age 12 years, and schools begin to offer interscholastic sports. These factors may explain the distinct patterns before and after age 12.

Summary

The ADHD group was more active and sampled more. Both of these were focused on physical activity, while the ADHD group was similar to the non-ADHD group for other activities. This supports the notion of an attraction to physical activity. The higher rate of individual sports sampled suggests the need for activity is accompanied by an attraction to activities that may not demand teamwork and cooperation. The fact that individual sports were preferred also explains why the self was involved in the initiation process more with ADHD than non-ADHD participants.

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Tables and Figures

Table 2a. Descriptive data used to test for normal distribution of the physical activity engaged time data.

	Mean	Sd	Skewness	/se *	Kurtosis	/se ++
Time period 6-8						
ADHD	6.80	3.87	1.03	2.17	.28	.30
Non-ADHD	3.09	3.21	1.48	3.14	1.77	1.93
Time period 9-11						
ADHD	9.83	5.70	1.57	3.32	2.40	2.61
Non-ADHD	4.48	4.30	1.80	3.81	2.97	3.23
Time period 12-14						
ADHD	15.55	7.10	.50	1.07	-.55	-.60
Non-ADHD	8.71	6.12	1.86	3.94	3.47	3.77
Time period 15-17						
ADHD	19.74	6.93	.88	1.88	.97	1.06
Non-ADHD	11.13	9.24	1.20	2.54	.61	.67
Time period pre						
ADHD	19.28	8.03	-.02	-.04	-.31	-.34
Non-ADHD	10.04	8.50	.86	1.81	-.75	-.82

* standard error for Skewness = .472
++ standard error for Kurtosis = .918

Table 2b. Descriptive data used to test for normal distribution of the sampling data.

Sampling	Mean	Sd	Skewness	/se *	Kurtosis	/se ++
Time period 6-8						
ADHD	3.79	1.35	.18	.38	.50	.54
Non-ADHD	2.38	1.71	.54	1.14	-.54	-1.14
Time period 9-11						
ADHD	4.42	1.56	-.02	-.04	.74	.81
Non-ADHD	2.96	1.60	.56	1.19	.13	.14
Time period 12-14						
ADHD	5.92	2.34	.24	.51	.18	.20
Non-ADHD	4.42	1.61	.81	1.72	1.69	1.84
Time period 15-17						
ADHD	6.33	2.33	.66	1.40	-.40	-.44
Non-ADHD	3.50	2.04	.22	.47	-.91	-.99
Time period pre						
ADHD	5.83	2.18	1.11	2.35	.92	1.00
Non-ADHD	2.96	1.97	.25	.53	-1.13	1.23

* standard error for Skewness = .472
++ standard error for Kurtosis = .918

Table3a. Correlations between four time periods rank (above diagonal) of Physical activity engaged time and sampling (below diagonal) for ADHD group.

Physical activity engaged time

Factor	6 – 8	9 – 11	12 – 14	15 – 17	Previous
Time period 6-8	- -	.644**	.373	.459*	.461*
Time period 9-11	.539**	- -	.607**	.125	.214
Time period12-14	.421*	.559**	- -	.371	.386
Time period15-17	.175	.295	.618**	- -	.917**
Time period previous	.431*	.265	.492*	.849**	- -

Sampling

Table3b. Correlations between four time periods rank (above diagonal) of Physical activity engaged time and sampling (below diagonal) for non-ADHD group.

Physical activity engaged time

Factor	6 – 8	9 – 11	12 – 14	15 – 17	Previous
Time period 6-8	- -	.942**	.747**	.422*	.363
Time period 9-11	.829**	- -	.749**	.495*	.443*
Time period12-14	.680**	.765**	- -	.552**	.484*
Time period15-17	.428*	.578**	.607**	- -	.879**
Time period previous	.379	.510**	.499*	.914**	- -

Sampling

Table 4. Descriptive statistics for significant effects for physical activity engaged time and sampling.

	n	Mean	sd	e.s.	Mean	Sd	e.s.
Factor 1	**physical activity engaged time**				**sampling**		
Time period 6-8	48	4.95	3.54	1.04	3.08	1.69	.93
Time period 9-11	48	7.15	5.68	1.07	3.69	1.73	.92
Time period 12-14	48	12.13	7.42	1.03	5.17	2.13	.76
Time period 15-17	48	15.44	9.17	1.06	4.92	2.60	1.29
Time period pre-	48	14.66	9.42	1.11	4.40	2.52	1.37
Group (6-17 years)							
ADHD	24	12.98	7.79	.84	5.11	2.19	.88
Non-ADHD	24	6.85	6.87		3.11	1.88	
Group (previous year)							
ADHD	24	19.28	8.03	1.12	5.83	2.18	1.38
Non-ADHD	24	10.04	8.50		2.96	1.97	

Table 5a. Descriptive data for who influenced sport and physical activity

Factor	ADHD		non-ADHD	
	Sum	%	Sum	%
# of time family	84	38%	46	35%
# of time Self	89	40%	35	27%
# of time Teacher	2	.009%	1	.007%
# of time Friend	41	18%	39	30%
# of time Coach	5	.02%	8	.06%

Table 5b. Descriptive data for who influenced other activities.

Factor	ADHD		non-ADHD	
	Sum	%	Sum	%
# of time Family	27	.53	25	.50
# of time Self	20	.39	13	.26
# of time Teacher	2	.04	2	.04
# of time Friend	2	.04	10	.20
# of time Coach	0	0	0	0
Total	**51**		**50**	

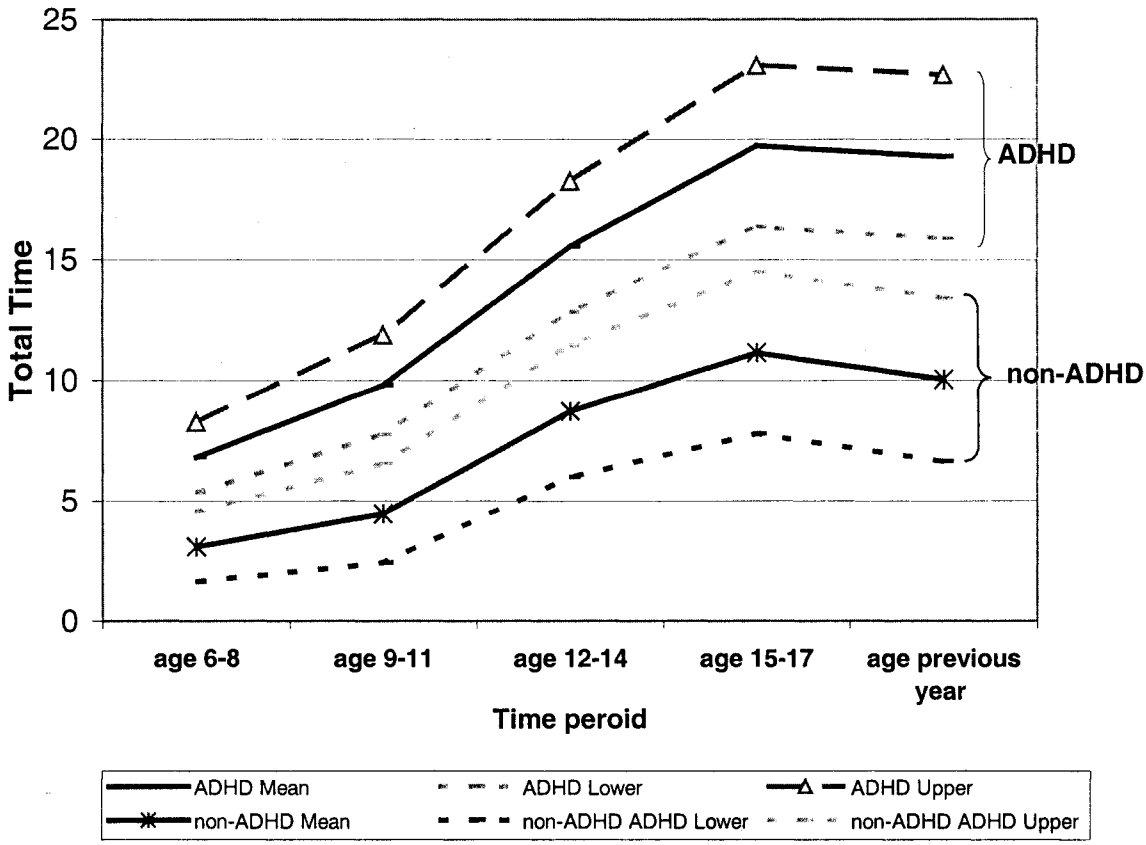

Figure 1. Means and confidence intervals for physical activity engaged time for five time periods

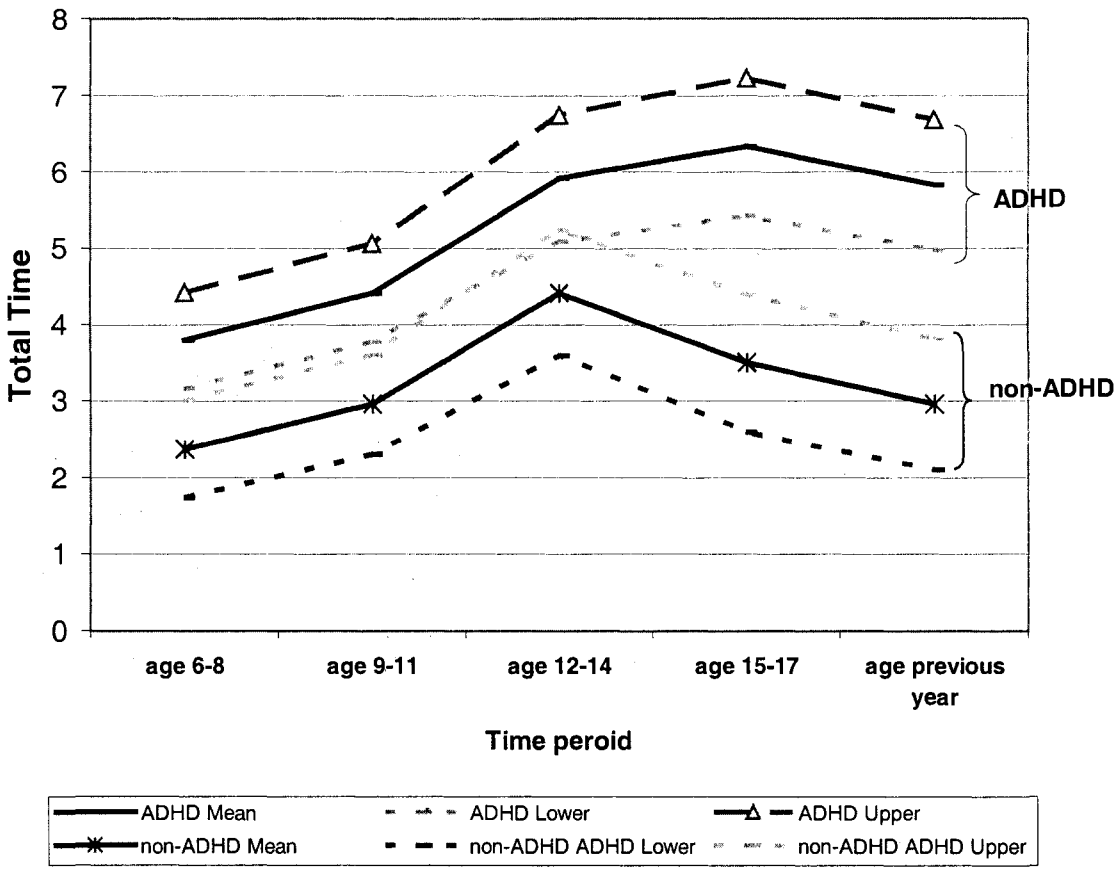

Figure 2. Means and confidence intervals for sampling in the five time periods

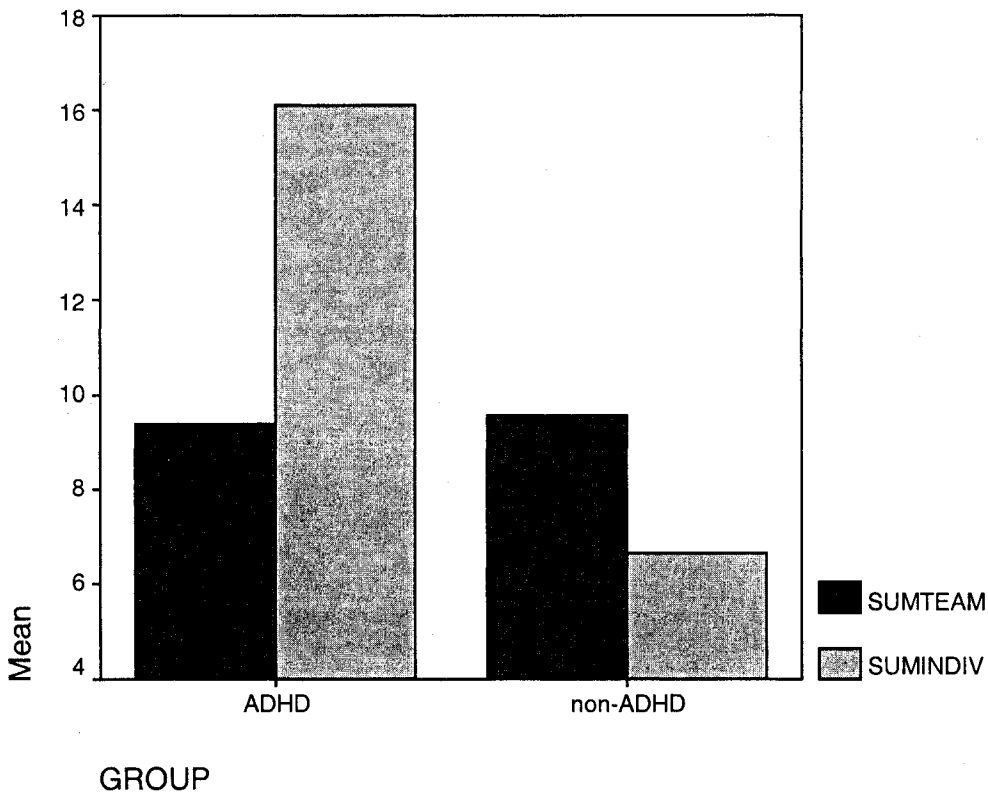

Figure 3. Mean number of team and individual sports across all five time periods by group.

CHAPTER 3.

Physical Activity and Sampling:

Antecedents to Becoming a Physical Education Teacher

Introduction

Numerous careers have been created or evolved related to physical activity, including the teaching of physical education. The focus of physical education programs--and therefore the teaching of physical education-- has shifted from physical fitness and sport during the 60's, 70's and 80's to programs that promote physically active lifestyles. Physical activity has become an important part of both the prevention and treatment of many diseases At least 60 minutes of daily physical activity is recommended to reduce health risks, 30 minutes of which should be moderate to vigorous (U. S. Department of Health & Human Services, 2000). Thus, an understanding of the antecedents to a physically active lifestyle is important.

Teaching physical education demands a personally active lifestyle. Further, this career has the goal of helping others become and remain physically active. Thus, individuals preparing to teach physical education provide a unique opportunity to examine early life experiences that may impact decisions about physical activity engaged time during adulthood. Many factors influence an individual's decision to join the physical education profession. Health risk reduction and other benefits of physical activity may, of course, have a positive impact on people's regard for physical education and their decision to enter the field. Additional factors include love of physical education and movement, liking children and people, desire for continued association with sport, being physically fit, or a combination of all these and other reasons (McCullick, 2001). Clearly, an individual's decision to enter

physical education is typically linked to the influence of a variety of socialization experiences and agents.

Certainly personal interests, likes, and dislikes influence one's decision to enter the teaching profession in general. Many choose to teach physical education because of their love for sport and perhaps the desire to transmit this love to others. The opportunity to be outdoors, to work out and stay physically fit, and to have fun are often given as reasons for entering the teaching profession (Huchinson & Buschner, 1996; McCullick, 2001). Early sport situations act concurrently with personal attributes (such as family background and academic performance) to influence some young people to participate in sport and later to make decisions about entering sport-related occupations (Dodds, Placek, Doolittle, Pinkham, Ratliffe, & Portman, 1991). Many prospective physical education teachers have extensive backgrounds in sports and physical activity prior to teacher training (Dodds, et al., 1991). Dodds, et al. (1991) compared teaching / coaching majors with other sport occupations (e.g., fitness, sport management) using a four part questionnaire. They found small differences between the two groups in the number of high school and college sports in which the groups participated. They reported 8-9 activities for the teachers / coaches group and fewer sports in both college and high school for the other sport occupations group. The two groups were different on gender proportions and high school academics background that may have influenced the results.

There are three primary phases of teacher socialization: recruitment into teaching, professional preparation, and the influence of the school setting and other related educational agencies (Hutchinson, 1993; Graber, 1989; Lortie, 1975). Future teachers --regardless of the field in which they wish to teach--begin making the decision about a teaching career early in

life. As students in grades k-12, future teachers consider teaching as a career. This is referred to as recruitment into teaching. Being comfortable in school settings, observation, significant adults, a desire to contribute to society, influence by significant others, time and economic compatibility are among the factors contributing to the decision. All future teachers are influenced by these factors. Physical education teachers are undoubtedly influenced by these same socialization factors, however physical education teachers are likely influenced by other factors that are unique to physical education. For example, physical education teachers may be influenced by enjoyment of physical activity and sport and related career goals such as coaching. Thus, physical education recruits appear at the campus gates with beliefs about teaching physical education already developed (Belka, Lawson, & Lipnickey, 1991; Doolittle, Dodds, & Placek, 1993; Hutchinson & Buscher 1996). Early socialization experiences in elementary and secondary physical education apparently provide recruits with a wealth of information about physical education and help recruits form beliefs about physical education as a school subject (Placek, Dodds, Doolittle, Portman, Ratliffe & Pinkham, 1995).

Further, family influences regarding a career choice can be positive, negative, or both. Parents may persuade their children to pursue a career on which they place a high value. Many times parents have forbidden their children to major in physical education because they viewed it as frivolous, nonacademic, or not prestigious enough. On the other hand, parents may push their children into a career in sports because of their own rewarding past experiences (Lumpkin, 2002).

Early research on sampling and specialization in sport focused on the impact of these variables on expertise in sport. The impact of specializing - - practicing and playing one sport

- - was examined by Côté, Baker, and Abernethy (2001). Sampling represents the number of different activities a person tried. For example, during a year a child might participate in 1-2 sports each season and be a "high" sampler. Another child might specialize and participate in one sport across the four seasons, this child would be low in sampling. A common belief is that elite athletes specialize at young ages and without this specialization the chance of becoming an elite athlete is reduced. Clearly, this belief could result in discouraging sampling and encouraging early specialization. However, Côté et al. found that elite athletes did not specialize until after age 12 years. Robertson-Wilson, Baker, Derbinshyre, and Côté (in press) were the first to identify sampling as an important factor in active versus inactive adolescent girls. Girls were selected and separated into active and inactive groups by the amount of activity reported during their senior year in high school (e.g., inactive reported 5 or less hours, active reported 25 or more hours per week). Active girls participated in a significantly greater variety of activities than inactive girls (e.g., sampled more). Active girls increased in the number of participation hours from ages 6-18 years. However, active and inactive girls did not differ on the number of artistic (art and dance) or club activities. The results indicate that parents of both active and inactive females were the most influential factor in initiating physical activity. Parents of active females initiated more physical activity involvement in their daughters than did parents of inactive females. The results also illustrate that certain periods in childhood and adolescence appear to be critical for developing long-term physical activity habits. Whitehead and Corbin (1997) also argue that there is a correlation between confidence and competence in childhood and adult physical activity. They maintain that more confident and competent (skilled) children show greater physical activity as adults. Competence in this instance is motor skill. Similarly, Robertson-Wilson et

al. (in review) established a relationship between participation in various sports and physical activity in girls. These three predictors of adult activity—sampling, confidence and competence—are likely related while independent factors impacting physical activity engaged time. For example, confidence increases as skill increases, skill is a result of trying an activity and persisting in that activity so that skill develops. No sampling or sampling with low engaged time would likely have a negative impact on competence which in turn would result in low confidence. Thus each of the three predictors is independent while related. Yet, no previous research has attempted to examine sampling and career choice, nor to compare sampling between the genders. Gender differences increase in physical activity across age with small differences during childhood favoring the males. Large differences appear around puberty, as girls (10-12 years of age) decrease amount of activity. Males maintain or increase in physical activity and fitness during this time while both decrease in females. Clearly the decrease for females increases potential health risk (Thomas, Gallagher, & Thomas 2001). Males may engage in more physical activity because they sampled more as children, while girls may sample less than males which may negatively impact their adult physical activity engaged time.

In summary, early experience in school influences some students to enter the teaching profession. A subset of those individuals are influenced to become physical education teachers. Among several factors influencing that decision is previous experience with sport and physical activity. Parents are significant factors in the decision to teach and to engage in physical activity and sport. At this time no one has examined the impact of previous physical activity on the choice to teach physical education. Nor has anyone examined the physical activity patterns of physical education teaching majors. Further the role of parents and

significant others in these decisions is of continuing interest. The present study was conducted using Côté, Ericsson, and Beamer's (in review) retrospective interview procedure.

The Purpose of the Study

The purpose of this study was to:

- Examine early sport and physical activity experience as a factor in selecting physical teaching as a career
- determine who influences children to engage in physical activity
- quantify the amount of physical activity during childhood and as young adults and compare physical activity engagement to sampling
- compare gender patterns in physical activity engagement and sampling.

Therefore, secondary education teaching majors were compared to physical education teaching majors on sampling, physical activity engagement and persons influencing activity decisions. Education students should be similar to physical education teaching majors in some motivations to teach, for example, liking children and wanting to make a contribution. The major differences should be content. Thus, previous physical activity experience may have impacted career choices and adult physical activity patterns differently when comparing the two groups.

The Hypotheses of the Study

1. Physical education teaching majors (PETM) participated in a greater variety of physical activities than secondary education teaching majors (SETM) (i.e., PETM sampled more from 6-11 years of age).
2. PETM spent more time in physical activity than SETM, as children and during the previous year in college.

3. PETM and SETM share the same role models (e.g., both influenced by teachers, coaches, and family).
4. Males spend more time in physical activity than females at all ages, with large differences appearing at age 12 years.
5. Males do more sampling than females.

Limitations of the Study

The study used a retrospective questionnaire to gather longitudinal data about early physical activity for years 6-18 and for the immediately previous year in college, and about persons influencing the participants' initiation of activities. Two limitations of the study have been identified. First, the participants may not have been able to recall past activities accurately. Second, the participants were undergraduate students who might change their major or who may not teach after graduation.

Methods

Participants

Two groups of male and female college students (n = 52, 13 male and 13 female per group) participated in this study. [1]Secondary education teaching majors (SETM) were the control group (n = 26). The control group was selected to match, as closely as possible, the age, gender, and credit hours of the physical education teaching majors (PETM) as can be seen in Table 1. The control group planned to teach in the following specializations English (n=10), chemistry (n=8), secondary education (n=5), and math (n=3). All participants were in good standing academically. The number of participants was determined using an effect size of 1.25 calculated from the Robertson-Wilson, et al., data, and a power of .8. Thus, 25 participants were necessary to detect differences between groups at the .05 level.

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[1] The first analysis compared five participants in the physical education teaching majors (PETM) group to the other students in that group. This was done because five students reported being professional or intercollegiate (National Collegiate Athletic Association [NCAA] Division I) athletes. One might assume that athletes would be engaged in physical activity more than non-athletes and might sample less as they have specialized. The purpose was to determine if their pattern of sampling and activity time was different than the other students in that group. A 2 x 4 (athlete or non-athlete by time period) MANOVA with repeated measures on time period with physical activity engaged time as dependent variables was conducted. The repeated measure factor was significant F (3,22) =19.94, p = .0001 , athlete versus non-athlete was not significant in the multivariate interaction (time period by group) $F(3,22)=.066$, $p=.98$ or the between subjects univariate test $F(1,24)=.14$, $p=.72$. Non-athletes spent an average of 15.26 hours per week engaged in physical activity (upper confidence boundary=18.28 and lower confidence boundary=12.36) while athletes who were also PETM spent an average of 16.49 hours per week activity (upper confidence boundary=22.69 and lower confidence boundary=10.30). These averages were calculated across all four time periods (6-18 years of age). Time periods 1 and 2 (6-8 and 9-11 years) were not different from each other, nor were time periods 3 and 4 (12-14 and 15-17 years). However, the first two time periods were different from the last two time periods. For the second dependent variable of sampling, time period was significant $F(3,22)=10.18$, $p=.0001$, the interaction of time period and athlete versus non-athlete was not significant, $F(3,22)=1.54$, $p=.23$. The within subjects test was similar to the previous findings, with athlete versus non athlete not significant $F(1,24)=.015$, $p=.91$. The non-athletes averaged 4.83 sports per time period (upper confidence boundary=5.71 and lower confidence boundary=3.96) and athlete PETM averaged 4.95 sports per time period (upper confidence boundary=6.79 and lower confidence boundary=3.16). Time period one (6-8 years) was different from time periods 3 and 4 (12-14 and 15-18 years), no other time period comparisons were different. Sampling increased with each time period from an average of 3 sports in three years at time one to 6 at time four. Based on these analyses, athletes were included in the PETM group in the remaining analyses.

Instruments

The questionnaire (see appendix A) developed by Côté, et al. (in review) was used to gather retrospective longitudinal data about early physical activity for years 6-18 and for the immediately previous year in college. This instrument is valid and reliable (Côté, et al., in review). Validity was established by correlation of parent to child reports. All correlations were significant at all ages (years) from 5 – 30, except age 23, with correlation from .53 to 1.0 between athletes and their parents (Côté, Ericsson, & Beamer, in review). Reporting of time in training was therefore, reliable. In a comparison of deliberate practice, deliberate play and organized play, athletes were also consistent with parents (.99, .70, and .88 respectively).

Procedure

Participants were informed of their rights and signed informed consent. The research was approved by the Institutional Review Board (IRB) that reviews research involving human subjects. All participants reported their major, gender, age, credits earned, and stated that they were in academic good standing (see appendix). The questionnaire was administered individually. There were three steps to administering the survey (see appendix). First, participants were asked to recall activities (e.g., sport, clubs, lessons, music, art) in which they participated. Second, participants identify the person most responsible for initiating the activity (e.g., mother, teacher, coach, peer). Third, participants were questioned to determine the years, months, and hours of participation in each activity from age 6-18 years and the previous year in college.

Design

This is a descriptive study with independent variables of group (2 levels, physical education teaching majors and secondary education teaching majors) and gender (2 levels,

male and female). The dependent variables are the number of physical activities per 3 year period yielding 4 time periods, hours of physical activity per time period, club and artistic participation per time period, and significant others who encouraged initiation. Sampling and physical activity engaged time was also reported for the previous year in college, this represented adult physical activity patterns.

Results

The first analysis of the entire data set was done to determine whether or not the data met the assumption of a normal distribution. The distribution of data was non-normal for both physical activity time and sampling based upon the skewness and kurtosis of the data (Table 2, a & b). The test used was to divide skewness and kurtosis by their standard errors. Most of the values obtained were greater than 1.96, which is considered significantly non-normal at $p < .05$. Thus the data will be ranked for further analysis, or non-parametric techniques will be used (see Thomas, Nelson, & Thomas, 1999).

To determine the stability of sampling and engagement (physical activity time), correlations were calculated for each dependent variable within group. The results are presented in Table 3a and b. Adjacent time periods (adjacent 3 year intervals) were significantly correlated. The correlations for non-adjacent time periods were lower, however some were significant. These correlations suggest that both sampling and physical activity engagement time are relatively stable across time periods.

A 2 x 2 x 4 (group, gender, and time period) MANOVA with the repeated measures factor as time period and physical activity engaged time as dependent variable was completed. As we are using ranked data the L statistic was calculated and replaces F in the analyses (Thomas, et al., 1999), significance is tested using the Chi^2 table of significance. For

the multivariate analysis the repeated measures factor (time period) was significant L (3) = 40.34, $p < .01$. Time periods 6-8 and 9-11 are not different from each other, nor are time periods 12-14 and 15-17. However, the two first two time periods are different from the last two time periods. The descriptive data for this effect is presented in Table 4. The repeated measure by group interaction was significant, L (3) = 8.21, $p < .05$. The pattern within the PETM group was the same as the time period main effect (one and two not different, three and four not different, but the first pair different from the second pair). For the SETM no time periods were different from each other. Further, the engaged time for SETM at all four time periods did not differ from the first two time periods for the PETM and were different from the last two times for the PETM. For the between subjects analysis, the groups were significantly different $L(1)=19.53$, $p=.001$. The effect size comparing groups was (es=1.36) with PETM more active (m = 15.50, sd = 9.53) than secondary education teaching majors (SETM) (m = 6.52, sd = 3.72) comparing hours engaged in physical activity per week averaged across the weeks and years from age 6 through 18 years. Gender was not significant $L(1)=1.73$, $p=.2$. The average hours per week of activity ages 6 through18 years for males was 12.82 hours (sd = 7.63) and for females was 9.19 hours (sd = 5.64), producing a moderate effect size (es=.55). These data are presented in Figure 1.

A 2 x 2 x 4 (group, gender, and time period) MANOVA with repeated measures with time period as the repeated measure and sampling (number of activities) as dependent variables was conducted. For the multivariate analysis the repeated measures factor was significant, L (3) = 30.65, $p < .001$ as was the group by the repeated measure interaction, L (3) = 8.31, $p < .01$. Sampling for time periods 6-8 and 9-11 are not different from each other, nor are sampling time periods 12-14 and 15-17. However, the first two sampling time periods

are different from the last two sampling time periods. Group by the repeated measure was also significant, F (3,144) = 3.27, p = .023. Time one (6-8 years) was significantly lower than all other times for both groups, all other comparisons in the time period by group comparison were not different. These data are presented in Figure 2. Only group was significant for the between subjects analysis L (1) = 4.39, $p < .05$. PETM (m = 4.86, sd = 1.08) sampled nearly twice as much as other SETM (m = 2.30, sd = .71). Males (m = 3.66, sd = .85) sampled nearly the same as females (m = 3.49, sd = .88) when comparing the average of sampling for a week ages 6 through18 years.

A group by gender MANOVA on the previous year in college yielded significant differences $L(2)=45.65$, $p=.0001$. In the follow up univariate tests the PETM group was significantly more active during the previous year in college than the SETM group, $L(1)=24.67$, $p=.0001$. The PETM group averaged 29.5 (sd=14.98) hours per week of activity, while the SETM group averaged 10.05 hours (sd=11.5). Sampling was also significantly different $L(1)=22.64$, $p=.0001$ during the previous year. PETM sampled an average of 5.2 (sd=2.34) activities, while the SETM sampled 2.12 (sd=1.7) activities.

Physical activity engaged time was significantly correlated with sampling during time period 1 (6-8 years) and time period 2 (9-11 years), with r(52)=.54, $p=.0001$ and r(52)=.50, p=.0001 respectively. Physical activity engaged time was not significant correlated with sampling in time periods 3 or 4 (12-14 or 15-17). Linear regression using the stepwise method was significant, accounting for 44% of the variance of physical activity engaged time during the previous year in college with group as the only significant predictor. The prediction equation was significant at the .0001 level. Sampling time one and two were the next best predictors.

The impact of parents and significant others was evaluated by comparing participants within group (PETM or SETM) using Chi-Square (X^2). Chi-square values for physical activities for PETM and SETM groups were significant, (X^2 (4) = 84.04, p= .0001 and X^2 (4) = 71.81, p = .0001 respectively). Giving the 5 influences (family, teacher, self, friends, and coach) equal chance of influence, the Chi-square results indicate that only family and friends influenced more than "chance". Chi-square for other activities (music, club, and other) for PETM and SETM groups were significant, X^2 (3) = 36.94, p = .0001 and X^2 (3) = 58.97, p = .0001 respectively. Giving the 5 groups (family, teacher, self, friends, and coach) equal chance of influence, only family and self influenced more than "chance".

A 2 by 2 (major by gender) with dependent variables of sampling and physical activity engaged time was done to compare sampling and activity in the participants during the previous year in college. The descriptive data are presented in Table 4. Group was significant in the multivariate test $L(1)=45.65$, $p=.001$, gender was not significant. The univariate tests revealed significant group effects for both physical activity engaged time [$L(1)=23.75$, $p=.001$] and sampling [$L(1)=47.94$, $p=.001$] during the previous year.

The descriptive data of the two groups on the physical education experience are presented in Table 5. This Table shows the number of days and hours of physical education classes per week from kindergarten to grade 12. It also shows the gender of the physical education teachers of both groups at the different educational stages. Inspection of the table indicates that there are differences between the PETM and SETM groups for the days, and hours of physical education classes nor the gender of the physical education teachers. A linear regression using the stepwise method to enter gender, hours and days of physical education kindergarten through grade 12, and sampling time periods one and two, to predict

group (PETM versus SETM) was significant at the .0001 level. The only significant predictor variable was sampling time period one (6-8 years of age), which accounted for 30% of the variance.

Discussion

A purpose of this study was to quantify the amount of physical activity during childhood and as young adults and compare physical activity engagement to sampling. Physical education teaching majors (PETM) were more active as adults based on their previous year in college than other secondary education teaching majors (SETM). Both groups continued to sample during college, however the PETM sampled more than the SETM. These effects are clearly increased by the choice of major, where PETM are required to participate in approximately 2 physical activities each year as part of their course work. However, this would explain only a small portion of the sampling and about 4 hours per week of physical activity engaged time. The SETM were relatively active with an average of 10 hours per week during the previous year. However, 58% of the SETM were inactive (less than 7 hours per week), and none of the PETM would be categorized as inactive. Thus, some of the SETM were very active while others were sedentary as evidenced by a minimum engaged time of zero hours. The minimum for the PETM was 9 hours, well above the one hour per day recommendation. Beyond the obvious difference in preference, what would explain these differences in activity patterns in adults?

Time Periods

Sampling and physical activity engaged time were relatively stable across time periods suggesting that these characteristics track within an individual. When physically active lifestyles are the goal, early sampling and the resulting physical activity engaged time seem

to be important precursors. That is, if we want adults to be active, we should encourage trying a variety sports and other physical activities beginning as early as 6 years of age. The number of activities tried increases during childhood and adolescence as does the engaged time. A clear distinction exists in what and how much children do before and after 12 years of age. The time periods before 12 were not different from each other and the times after age 12 were not different regardless of the level of physical activity engaged time or sampling. This is similar to the critical time reported by Côté et al. (2001) for expert athletes, who sampled before age 12 and specialized after. This is also similar to the critical time for adolescent girls when physical activity engaged time decreased dramatically. Twelve years of age seems to be an important time. Clearly children are maturing and becoming more independent during this time. This window in time needs more study.

PETM versus SETM

One purpose of this study was to examine early sport and physical activity experience as a factor in selecting physical teaching as a career. One hypothesis was that physical education students spent more time in physical activity than other education students, as children and during the previous year in college. This hypothesis was supported by the data. The PETM participated in a greater variety of physical activities than other education students (e.g., physical education students sampled more from 6-11 years of age). The less active SETM did not sample often as young children and started to sample later (after 9 years of age) than the more active physical education majors. The PETM were more active after age 12 than before age 12. The SETM physical activity engaged time during all five time periods was not different from the PETM at ages 6-11 years of age. This pattern is important, as the children who are going to be most active (PETM) sample more from 6-8 years of age,

and increase in sampling. The children who are going to be least active do very little sampling from 6-8 years of age, begin sampling later (9-11 years of age) and sample less. This same group spends significantly less time engaged in physical activity, during childhood and as young adults.

Gender

A purpose of this study was to compare gender patterns in physical activity engagement and sampling. Both hypotheses predicted gender differences with males more active at all ages and sampling more. Gender was not a significant factor in this study, although the expected trends were present. Two possible explanations of this are, first the differences between the groups for activity and sampling were so large and the associated variance so great, the gender differences did not reach significance. An example is that the effect size between males and females was moderate for the non-significant comparison of males and females on physical activity engaged hours. Another explanation is that the females in the PETM group increased the average activity and sampling and masked the differences in the more general population.

Who is Influential on Sampling

One of the purposes of this study was to determine who influences children and adolescents to engage in physical activity. Family members (mother, father, siblings and a combination of these family members) were the most influential encouraging the participants to initiate all types of activities from music to sport. However, friends were also a significant factor for initiating sport and physical activities. This is consistent with the youth sport literature that reports the three most important factors in sport participation as having fun, being with friends and learning new skills (not in rank order). For other activities (e.g., clubs,

music) self was an important influence in addition to family. These results suggest that families can have a lasting impact on the physical activity patterns of children and adolescents. Families who encourage children to sample appear to have a positive impact on sampling. The hypothesis that physical education teaching majors and other secondary education teaching majors share the same role models (e.g., both influenced by teachers, coaches and parents) was supported. However, the role models outside of the family who influence sport and other activities were not the same.

Athletes

Athletes and non-athletes (see footnote 1)within the PETM group had similar patterns of sampling, average sampling increased from 6 to 18 years of age for athletes and non-athletes. The perception that athletes must specialize early for success was not evident in these athletes. Physical activity engaged time followed a similar pattern with time each week increasing for both athletes and non-athletes from age 6-18 years of age. The athletes averaged no more than two additional hours of engaged time when compared to non-athletes. While the number of athletes is small and this was not a purpose of this study, this finding does support the findings of Côté et al. (2001). In their work athletes did not specialize until at least 12 years of age. The career choice may interact with being an athlete with a result of increasing sampling even after age 12. Clearly, in these athletes sampling did not interfere with athlete participation at the elite level.

The best predictor of whether a participant would teach physical education or in another secondary area was the sampling done ages at 6-8. Since PETM sampled more during this time, and increased at a faster rate after this time, this is not surprising. PETM sample more at an early age and appear to be attracted to the sports, which may be related to their career

choice. This is consistent with the finding from Dodds et al. (1991). PE teachers were tried more sports and were more athletic than other students in sport related professions.

Summary

Family members do influence children to initiate physical activity programs, so do peers. Sampling a variety of activities early (6-8 years of age) is associated with continued sampling and with greater physical activity engaged time. Students selecting physical education teaching as a major in college did more sampling from age 6 through the previous year in college than other education majors. PETM were also more engaged in physical activity than other SETM. This supports the notion that physical education teaching students were active in sport and physical activity, and that this was a positive factor in career selection.

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Tables and Figures

Table 1. Descriptive data for the two groups, physical education teaching majors (PETM) and secondary education teaching majors (SETM).

		Age		Credit	
Group	**N**	**Mean**	**sd**	**Mean**	**sd**
PETM	26	22.4	2.6	112.1	29.6
SETM	26	22.5	3.3	109.5	31.3
Total	52	22.4	2.9	110.8	30.2

Table 2a. Descriptive data used to test for normal distribution of the sampling data.

Sampling	Mean	Sd	Skewness	/se *	Kurtosis	/se ++
Time period 6-8						
PETM	3.78	2.37	1.04	2.28	1.13	1.27
SETM	1.42	1.06	.97	2.13	1.03	1.16
Time period 9-11						
PETM	4.35	2.33	.97	2.13	.23	.26
SETM	2.19	1.52	1.27	2.77	2.63	2.97
Time period 12-14						
PETM	5.73	2.20	1.13	2.47	.342	.38
SETM	3.15	1.46	.21	.46	1.03	1.16
Time period 15-17						
PETM	5.77	1.86	.73	1.60	-.328	-.37
SETM	2.42	1.42	.53	1.17	.525	.59
Time period pre						
PETM	5.23	2.34	.94	2.06	.23	.26
SETM	2.12	1.70	1.22	2.68	1.46	1.65

* standard error for Skewness = .65
++ standard error for Kurtosis = .33

Table 2b. Descriptive data used to test for normal distribution of the physical activity engaged time data.

	Mean	Sd	Skewness	/se *	Kurtosis	/se ++
Time period 6-8						
PETM	5.83	5.04	1.90	4.16	4.91	5.54
SETM	2.62	3.70	2.14	4.69	3.87	4.36
Time period 9-11						
PETM	9.69	8.53	2.37	5.20	7.43	8.38
SETM	4.32	4.64	1.50	3.29	1.42	1.60
Time period 12-14						
PETM	19.66	9.68	1.08	2.38	1.80	2.03
SETM	8.36	5.33	.35	.76	-.88	-.99
Time period 15-17						
PETM	26.80	10.16	.25	.54	-.21	.24
SETM	10.78	10.12	1.40	3.05	1.60	1.81
Time period pre						
PETM	29.50	14.98	1.60	3.52	3.59	4.05
SETM	10.05	11.53	1.37	3.01	.99	1.12

* standard error for Skewness = .456
++ standard error for Kurtosis = .887

Table 3a and b. Stability estimates for physical activity engaged time and sampling within each group (physical education teaching major and secondary education teaching majors). The correlations for time are presented in the upper portion and for sampling in the lower portion of the table.

Table 3a. Physical activity engaged time and sampling for physical education teaching majors.

	6 – 8	9 – 11	12 – 14	15 – 17	Previous
Time period 6-8		.84**	.22	.15	.3
Time period 9-11	.84**		.35	.21	.20
Time period12-14	.30	.52**		.81**	.64**
Time period15-17	.41*	.51**	.73**		.82**
Time period pre	.46*	.43*	.52**	.75**	

All adjacent correlations are significant.
** Correlation is significant at the .01 level (two-tailed).
* Correlation is significant at the .05 level (two-tailed).

Table 3b. Physical activity engaged time and sampling secondary education teaching majors.

	6 – 8	9 – 11	12 – 14	15 – 17	Previous
Time period 6-8		.88**	.59**	.60**	.54**
Time period 9-11	.83**		.70**	.61**	.55**
Time period12-14	.47*	.67**		.73**	.63**
Time period15-17	.53**	.42*	.47*		.92**
Time period pre	.44*	.26	.34	.85**	

All adjacent correlations are significant.
** Correlation is significant at the .01 level (two-tailed).
* Correlation is significant at the .05 level (two-tailed).

Table 4. Descriptive statistics for significant effects for time and sampling. [2]

	n	Mean	sd		Mean	sd
Time period sampling	**physical activity engaged time**					
Time period 6-8	52	4.22	4.67		2.50	2.12
Time period 9-11	52	7.00	7.32		3.27	2.23
Time period 2-14	52	14.01	9.61		4.44	2.26
Time period 15-17	52	18.79	12.89		4.10	2.35
Group						
PETM	26	15.50	9.53	PETM	4.86	1.08
SEM	26	6.52	3.72	SEM	2.30	.61
Gender						
Male	26	12.82	7.63			
Female	26	9.19	5.64			

[2] Time period by group was significant. Those means and standard deviations are in table 2 a and b.

Table 5. Descriptive data of physical education teacher and program grades K-12 by group.

Group		N	Mean	Sd.	PET	
					Male	Female
PEDK2	PETM	26	2.54	.89	14	12
	SETM	26	2.33	1.14	15	9
PEHK2	PETM SETM	26	2.09	.96		
		26	2.27	1.18		
PED3-5	PETM SETM	26	2.69	.83	16	11
		26	2.40	1.12	12	12
PEH3-5	PETM SETM	26	2.29	.94		
		26	2.37	1.15		
PED6-8	PETM SETM	26	2.79	.64	21	5
		26	2.81	.83	19	7
PEH6-8	PETM SETM	26	2.67	.84		
		26	2.85	.81		
PED9-11	PETM SETM	26	3.19	.98	17	9
		26	2.83	.90	18	8
PEH9-11	PETM SETM	26	3.19	.98		
		26	2.87	.89		
PED12	PETM SETM	26	3.27	1.04	18	9
		26	2.79	1.44	20	3
PEH12	PETM SETM	26	3.27	1.04		
		26	2.77	1.44		
Total	PETM SETM				86	46
					84	39

PET: physical education teacher.
PEDK2: physical education days per week from kindergarten to K- 2.
PEHK2: physical education hours per week from kindergarten to K- 2.
PED3-5: physical education days per week from K-3 to K- 5.
PEH3-5: physical education hours per week from K-3 to K- 5.
PED6-8: physical education days per week from K-6 to K- 8.
PEH6-8: physical education hours per week from K-6 to K- 8.
PED9-11: physical education days per week from K-9 to K- 11.
PEH9-11: physical education hours per week from K-9 to K- 11.
PED12: physical education days per week for K-12.
PEH12: physical education hours per week for K-12.

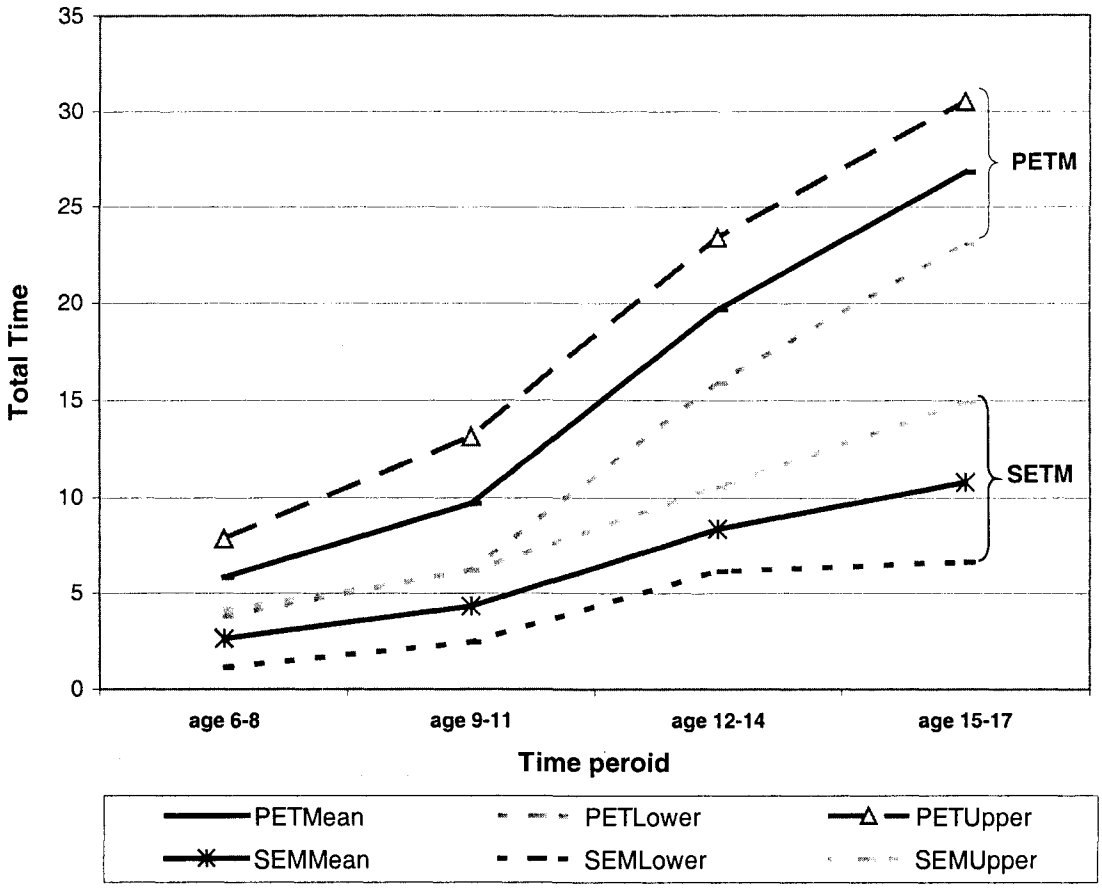

Figure 1. Means and confidence intervals for physical activity engaged time for four time periods.

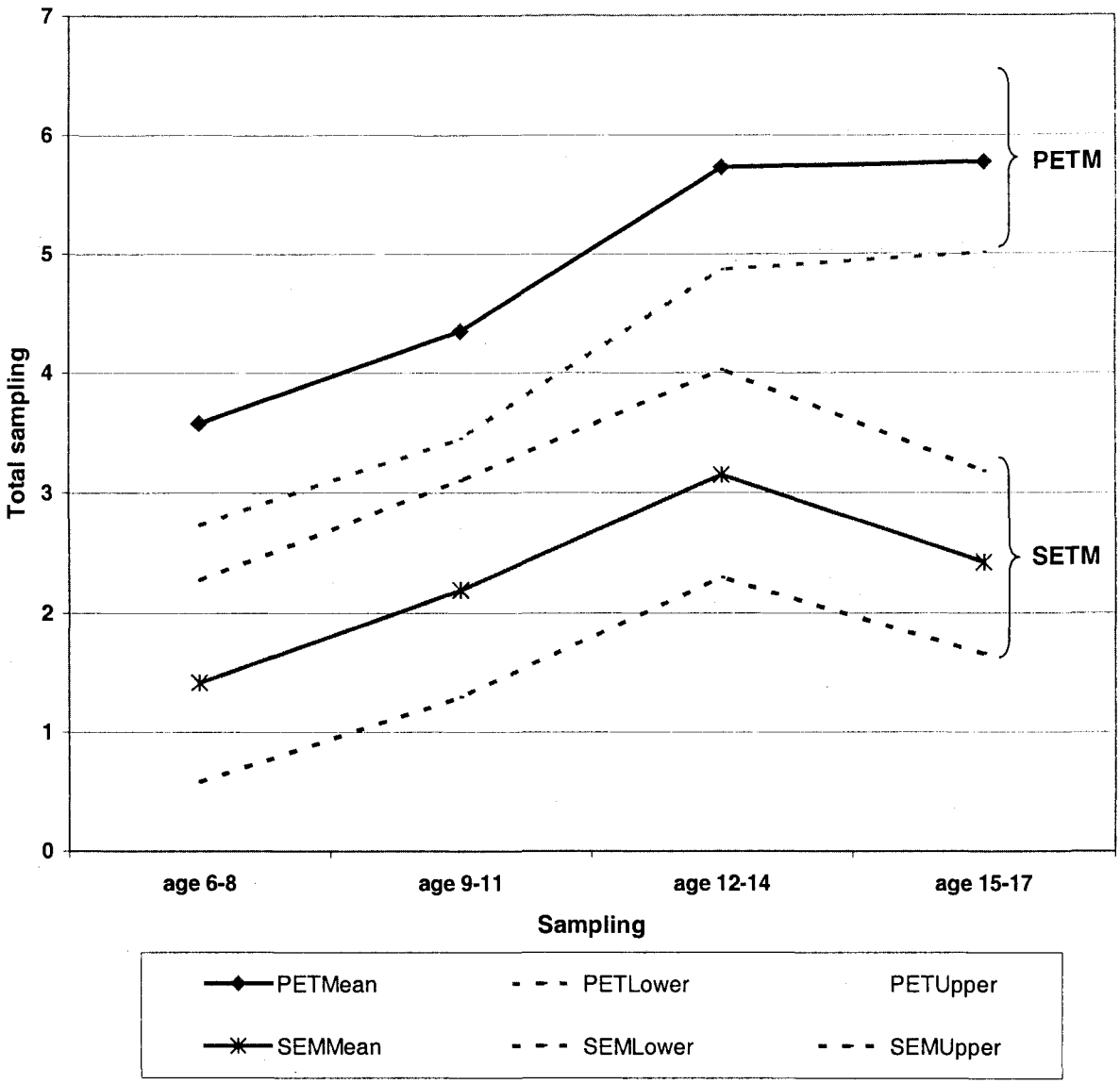

Figure 2. Means and confidence intervals for sampling in the four time periods.

CHAPTER 4.

General Discussion

Several similarities exist in the results of the two studies even though the participant groups were different. These similarities suggest robust factors. Further comparing the two studies may provide insights unavailable within a study.

Time Periods

In both studies, for both dependent variables (physical activity engaged time and sampling) 12 years of age appeared to be a critical time. This is consistent with the earlier work of Côté, Baker, and Abernethy (2001) where specializing in sport occurred after age 12 years. Several factors are likely influencing the dramatic differences before and after age 12. First, biological maturation--puberty--is a factor. Maturation at age 12 for boys provides a temporary advantage, but for some boys this will be a disadvantage. For example, being large at 12 --but full grown--may help a boy dominate in a sport, but by 15 the other boys will be larger because they have grown for more years. For girls, maturation is usually a physical disadvantage for sport as girls gain fat during this time. The contribution of biology may be small, but could be a contributing factor to the decision to reduce physical activity and sampling, thus adopting a sedentary lifestyle. Another factor at age 12 is growing independence from parents and family. If parents were a significant influence before 12 to be active, that influence is likely to diminish after age 12 years. During this time of independence many activities and interests compete for the adolescent's time, sport and physical activity may not win this competition. Finally, interscholastic sport becomes increasingly available, selective and demanding after age 12 years. Thus, while it offers

opportunity, that opportunity may be limited to the best skilled adolescents. Other factors, for example cognitive decision making, also changes at this critical time and may explain part of the differences before and after age 12. Certainly this age is of critical interest and worthy of further study.

Sampling and Physical Activity Engaged Time

Adult physical activity engaged time was related to sampling in all of the groups. Sampling from 6-8 years was important to those who would eventually decide to teach physical education and be the most active. Sampling from 6-11 was predictive to some extent in all groups--high samplers were more active, low samplers were less active. High sampling, especially in individual sports, was evident in ADHD males who were more active than their matched controls. Sampling seems an important factor in developing physically active lifestyles. The fact that sampling and physical activity time were stable in both studies and in all groups of participants supports the notion that physical activity engaged time tracks across age. Children who are active are more likely to stay active, those who are less active are likely to remain in active. There has been some evidence supporting tracking, however the data has not been overwhelming. This is an important finding in this study. Certainly it supports the need for quality programs for young children that offer a variety of activities such as elementary physical education.

Who Was Influential?

Children in youth sport report "being with friends" as one of three important reasons for participation. Thus, it is not surprising that friends become an important influence for some children as they consider initiating an activity. This was true for physical education students. Family was also a significant influence for sport participation for education majors (physical

education and secondary education). However, for children who have ADHD and perhaps seeking physical activity--without the stress of cooperation and dependence--friends are not an influence. That is likely because those children are selecting individual sports and team sports are the place where peers are most likely to have influence because of the interactive nature of team sports. The ADHD control group did not present a clear pattern of influence for sport. Family influenced children to try "other" activities in the ADHD participants and their matched controls. For education majors (physical education and other secondary education) the influence for "other" activities was from both family and self. Taken all together, to increase the chances of a physically active lifestyle, parents should encourage sampling of sport early (6-8 years of age) and often with the goal of 4-6 activities tried over a three year period.

What is unknown is the number of times a parent suggested or encouraged a child and the child did not try the activity. In other words we do not know how successful parents were when they encouraged children to try sports. This would be an interesting topic for further research.

Controls to Secondary Education Teaching Majors

The control participants for the ADHD study and the male secondary education teaching majors represent the general male population, thus can provide insight into the relationship between sampling and physical activity. This has not been done in previous studies, so comparing the results lends more weight to the conclusion from the individual studies. The descriptive data and effect sizes for these two groups of males (n=13 and n=24) are presented in Table 6, with effect sizes. Sampling increased as can be seen in the increasing means during times one, two and three. The means and standard deviations

increased for physical activity engaged time for the four time periods and were stable in the previous year. Sampling decreased after time period three (12-14 years of age). Only one effect size was moderate, all others were small. This suggests the similarity of the males in the two studies and the potential to generalize these results. The one moderate effect size was for the non-ADHD males, who sampled one more activity on average over three year periods than the males SETM. These results are consistent with Côté who found sampling decreased after 12 years of age.

Summary

Three major ideas have emerged as a result of these two studies. First, the results are consistent with previous research. Sampling before age 12 is positively related to being physically active as an adult. Second, while there are differences among different populations (e.g., males, ADHD, females, experts) these groups of participants are more alike than different. The trends are consistent. Third, family and peers can influence children to initiate physical activities and should be encouraged to do so to promote physically active lifestyles.

Table

Table 6. Descriptive data for sampling engaged time by time period and by group with effect sizes

Group	N	Mean	Sd.	Effect size
Sampling				
Time period 6-8				
Non-ADHD male	24	2.37	1.71	
SETM (male)	13	1.70	1.32	.13
Time period 9-11				
Non-ADHD male	24	2.95	1.60	
SETM (male)	13	2.62	1.85	.19
Time period 12-14				
Non-ADHD male	24	4.41	1.61	
SETM (male)	13	3.23	1.74	.70
Time period 15-17				
Non-ADHD male	24	3.50	2.04	
SETM (male)	13	2.70	1.65	.43
Time period pre				
Non-ADHD male	24	2.95	1.97	
SETM (male)	13	2.46	2.07	.24
Physical activity engaged time				
Time period 6-8				
Non-ADHD male	24	3.08	3.21	
SETM (male)	13	3.24	4.32	.04
Time period 9-11				
Non-ADHD male	24	4.48	4.30	
SETM (male)	13	5.49	4.82	.22
Time period 12-14				
Non-ADHD male	24	8.71	6.12	
SETM (male)	13	8.69	5.84	.00
Time period 15-17				
Non-ADHD male	24	11.13	9.24	
SETM (male)	13	12.64	11.08	.14
Time period pre				
Non-ADHD male	24	10.04	8.50	
SETM (male)	13	12.62	12.92	.24

APPENDIX

The Survey of the Two Studies

Attachment 1

Demographic Participant ID # _____

1) Sign an informed consent Yes ☐ No ☐

2) Age in years _____

3) Gender[3] Male ☐ Female ☐

4) Major _____

5) Credit hours _____

6) Are you currently in good standing? Yes ☐ No ☐

7) Is your GPA below 2.00 ☐

2.00 – 2.50 ☐

2.51 – 3.00 ☐

3.01 – 3.50 ☐

Above 3.50 ☐

8) Documentation of ADHD? Yes ☐ No ☐

[3] This part of the survey was used only in the second study "Physical Activity and Sampling: Antecedents to Becoming a Physical Education Teacher". And part 8 was used only in the first study "Attention Deficit Hyperactivity Disorder and Physical Activity".

Attachment 2

This survey is administered individually to each participant. Answers are recorded on charts 1 and 2. The script is used to question the participant.

Introduction

Early Activities: (record responses on chart 1).

"First, I would like to focus on the activities that you were involved in when you were young. I would like you to list your involvement outside of mandatory school activities, for example music, dance, play and other domains of activity. I am also interested in your early sport involvement. Looking back over your entire life please tell me of any type of activity that you engaged in on a regular basis. What musical, sport, play and artistic activities, if any, were you participating in? Please list all of these activities, such as piano, dance, drawing, etc. Did you decide to specialize in a sport or other activity?"

1) "Tell me any activities you did"

- Sport.
- Artistic (e.g. music, dance).
- Organized play (e.g. game of street basketball).
- Clubs (e.g. boy scouts, boy/girl club clubs).
- Other.

2) Who influenced or encouraged you to do _____ (each one listed in chart 1).

3) If YES: how old were you when you first got started? How long have you kept up the involvement? Please tell me about any periods when your involvement was stopped.

4) For each of the activities that you have provided, can you recall the number of hours per week and months per year you were regularly involved.

(Fill in hours/months per year in chart 2).

5. Any other activity that consumed large amount of your time (e.g. watching sport on TV, jogging, lifting weights, playing computer games).

   If YES: how old were you when you first got started? How long have you kept up the involvement? Please tell me about any periods when your involvement was stopped.

6. How many days/week did you have physical education in your school? (Fill in chart 3).

7. Was your teacher male or female? (Fill in chart 3).

	Yes	No
8. Did you decide to specialize in a sport or other activity?	☐	☐

9. If YES, what was the kind of activity you specialize?

Participant ID # _____

Activities and Ages

Chart 1. **Age Started (0)** **Age Stopped (0)**

Activities	Who? 1*	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Previous Year

1* Peers, mother, father, teachers, coaches, other.

Chart 2: Hours per week and months per year involved in activities (provided in chart 1).

Activities	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Previous Year

Chart 3. Physical Education Experience.

Grade	Day/week	Hours/week	Teacher (Male or female)
K			
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

About the Researcher

Omar Suleiman Hindawi earned his Ph.D. degree in Health and Human Performance from Iowa State University with an emphasis on adapted physical activities. His M.A. in sport training for basketball players with motor disabilities was from the Jordanian University in 1995.

Mr. Hindawi coached Jordanian National Wheelchair Basketball Team. He combined his love of basketball and his commitment to individuals with disabilities. He traveled with the team to several countries of the world such as Italy and Algeria. He taught at Yarmouk University before registering for the Ph.D. program at Iowa State University.

His research in Jordan concentrated on motor disabilities and the attitude of the community towards disabled people. Recently he added a new focus on soft disabilities and children, for example mental disabilities, attention deficit hyperactivity disorder, behavior disorders and mental illness. In the future, he would like to focus on the disabled and children's physical activities and sports. While in the United States Mr. Hindawi worked with young children with disabilities and those who were identified as "at risk". He also assisted physical education teaching majors during their field experience working with young children and elementary aged children.