

**The Influence of Personal, Social, and Environmental Factors  
on Youths' Engagement in Physical Activity**

by

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## **ABSTRACT**

Social ecological models are recognized for allowing researchers to examine the influence of multiple factors on behaviour, yet to date relatively little research has simultaneously examined the role of personal, social, and environmental factors on youths' physical activity, while giving consideration to the role of different types of neighbourhoods. The current study examined the physical activity of 804 youth aged 10 to 16 years residing in urban high density, suburban, or suburban low density neighbourhoods, by exploring relationships between several personal, social, and environmental factors. Findings revealed that all three factors were significant in explaining youths' physical activity. Differences in participation were found based on gender and neighbourhood; males and youth from suburban low density neighbourhoods were significantly more physically active. Moreover, several variables were found to be important for understanding youth physical activity: sex, age, self-efficacy, encouragement, neighbourhood safety, and the use of a number of neighbourhood facilities.

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## **DEDICATION**

To all my loves in life:  
My family, my friends, my leisure, and my Mikael

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# **CHAPTER ONE**

## **THE DECLINE OF YOUTHS'**

### **PHYSICAL ACTIVITY**

Canadian youth today are plagued with inactive lifestyles and rising obesity rates (Janssen et al., 2005; Plotnikoff, Bercovitz, & Loucaides, 2004; Tremblay & Willms, 2000, 2003). In fact a report by the Standing Committee on Health (2007) determined that the combined prevalence of overweight and obesity among Canadian children and adolescents aged 2 to 17 years rose from 15% in 1978 to 26% in 2004. Furthermore, regional variations in overweight and obesity rates revealed that Ontario's rates were slightly above the national average of 26% at a rate of 27% (Standing Committee on Health, 2007). A major contributor to this alarming rise in overweight and obesity rates is a lack of physical activity; thus, there has been an increased focus on the need to increase physical activity levels among youth (Janssen et al., 2005; Plotnikoff, Bercovitz, & Loucaides, 2004; Standing Committee on Health, 2007).

Physical activity is not only important for curtailing raising rates of overweight and obesity, but is also imperative for obtaining many short and long term health benefits associated with being physically active. Regular physical activity among children and youth, as reported by the Public Health Agency of Canada (PHAC) (2002, 2003), contributes to building strength and bone density (Biddle, Gorely, & Stensel, 2004; Strong et al., 2005), flexibility, cardiovascular fitness, and healthy blood pressure (Hansen, Froberg, Hyldebrandt, & Nielsen, 1991; Strong et al., 2005); maintaining a healthy weight (Biddle et al., 2004); promoting good posture and balance; and overall improved fitness. The Public Health Agency of Canada (PHAC) also reports that regular physical activity can lead to positive social outcomes, such as helping youth meet new friends (Humbert et al., 2006a); improving self-esteem (Boyd & Hrycaiko, 1997; Strauss, Rodzilsky, Burack, & Colin, 2001); increasing relaxation; promoting greater self-efficacy; improving academic and cognitive performance

(Strong et al., 2005); creating greater perceived well-being (Biddle et al., 2004); and enhancing healthy growth and development.

Furthermore, insufficient levels of physical activity not only present an immediate concern for poor health and development outcomes among children and youth, but also present a major concern for their future health and quality of life outcomes. The importance of regular physical activity is well recognized for its long term benefits in relation to the prevention of chronic diseases, such as cardiovascular disease, diabetes, cancer, hypertension, obesity, depression, osteoporosis and premature death (Warburton, Nicol, & Bredin, 2006). In fact, many of these chronic diseases, such as cardiovascular disease, cancer, and type-two diabetes are the primary causes of disability and death in Canada (Health Canada, 2004; Statistics Canada, 2008b), and have serious implications for the Canadian health care system. Consequently in 2001 the economic burden of physical inactivity in Canada resulted in \$1.6 billion in direct costs, and \$3.7 billion in indirect costs related to economic output loss due to illness, injury-related work disability, or premature death (Katzmarzyk & Janssen, 2004). Moreover, obesity contributed an additional \$4.3 billion in direct and indirect costs to Canadian health care in 2001 (Katzmarzyk & Janssen, 2004). The total economic burden of physical inactivity and obesity in Canada represents 2.6% and 2.2%, respectively, of the total health care costs, highlighting the importance of efforts to reverse current physical inactivity and obesity trends in Canada (Katzmarzyk & Janssen, 2004).

Despite all of the known short and long term benefits to being physically active, several studies indicate that Canadian youth are not engaging in adequate amounts of physical activity. Physical activity is defined as "...any bodily movement produced by the contraction of skeletal muscle that increases energy expenditure above the basal level" (Kohl & Hobbs, 1998, p.549); or in other words, some form of activity, planned (e.g., sport) or part of daily living (e.g., chores), which causes sufficient exertion of energy.

The 1998 National Population Health Survey (NPHS) found varying, but high physical inactivity levels among youth 12 to 19 years old across Canada. In fact each province exceeded 49% in the prevalence of physical inactivity, with a national average of 58% inactivity reported (Katzmarzyk & Ardern, 2004). The lack of physical activity, and in turn loss of associated health benefits, was reiterated in the Canadian Physical Activity



Levels Among Youth (CAN PLAY) study which found that 91% of Canadian children and youth did not meet the recommend 90 minutes per day of moderate to vigorous physical activity set by *Canada's Physical Activity Guides for Children and Youth* (Active Healthy Kids Canada, 2007). Moreover, *Canada's Report Card on Physical Activity for Children & Youth – 2008* (Active Healthy Kids Canada, 2008), in its fourth annual overview of physical activity levels for children and youth, has given Canada a “D” for the fourth consecutive year, noting last year that “overall progress towards improving physical activity levels among children and youth has stalled” (Active Healthy Kids Canada, 2007, p.2). The serious need to increased physical activity among children and youth is also highlighted in a report released by the Commons Committee on Health which revealed that, for the first time in recent history, today's children are feared to have poorer health outcomes and a shorter life expectancy than their parents (Standing Committee on Health, 2007). Consequently, as a result of the pervasive inactive lifestyles observed among the Canadian child and youth population, the many health benefits of being physically active are not being acquired.

It is particularly important to gain an understanding of youths' physical activity because of the declining rates of physical activity and increasing rates of obesity observed among youth (approximately 10 to 14 years old), in addition to the fact that physical activity has been found to decrease significantly for both sexes between the ages of 10 to 16 years (Active Healthy Kids Canada, 2008; Strauss et al., 2001). Before age 13 similar levels of physical activity have been found for boys and girls, but after age 13 boys have been found to be significantly more active than girls (Strauss, et al., 2001). Hence, it is particularly important to understand factors which may influence physical activity for this age group.

Physical activity among youth is of further importance when the development of a physically active lifestyle that can track into adulthood is considered. For example, participation in sport during adolescence has been found to be associated with higher levels of physical activity in later life (Tammelin, Nayha, Hills, & Jarvelin, 2003; Temlama, Laakso, Yang, & Viikari, 1997). Such findings demonstrate the importance of getting people physical activity in their youth so that they may track physical activity lifestyles into adulthood. Thus it seems clear that youths' physical activity is fundamental to developing a physically active lifestyle which should in turn lead to beneficial health outcomes and the

prevention of chronic diseases, and a better quality of life. For all of these reasons it is particularly important to focus on and understand youths' physical activity.

Subsequently, in a quest to promote youths' further involvement in physical activity and to develop effective interventions, it is essential to gain an understanding of what factors affect youths' engagement in physical activity. Human behaviour and decision making are complex and are the result of the influence of numerous factors. Hence, the complexity of human behaviour demands an examination of multiple factors which influence people's decisions when seeking an understanding of their influence on physical activity. A social ecological model for health promotion proposed by McLeroy, Bibeau, Steckler, and Glanz (1988) recognizes that there are multiple levels of factors (i.e., intrapersonal factors, interpersonal processes and primary groups, institutional factors, community factors, and public policy) that influence health behaviours. Furthermore, social ecological models recognize that all these levels of factors can influence people's behaviour simultaneously and to various extents (Sallis & Owen, 2002).

In essence, youths' physical activity participation may be influenced to varying degrees by the interaction of personal, social, and environmental factors. As such, personal factors (or intrapersonal factors) which may influence youths' engagement in physical activity include demographic factors, such as age and gender, and psychosocial factors, such as self-efficacy and attitudes towards physical activity. Social factors (or interpersonal factors) may include the encouragement received from parents, siblings, teachers, friends, grandparents and coaches, as well as the extent to which role models are present to support physical activity participation. Environmental factors which provide a context where participation might be facilitated include accessible school playgrounds and indoor facilities, school and community sport, as well as neighbourhood parks, and facilities. Environmental factors are also subject to overall neighbourhood design and its perceived aesthetics, accessibility, and neighbourhood safety.

While ecological models purport the importance of examining the influence of personal, social, and environmental factors on people's engagement in physical activity, much research still needs to be done which examines all three of these factors simultaneously. Knowledge of how all three factors influence the engagement of youth in

physical activity will lead to a better understanding of how best to support and enhance their participation in physical activity, and should thereby lead to healthier life outcomes.

### **1.1 PURPOSE STATEMENT**

The purpose of this study was to examine the influence of personal, social, and environmental factors on youths' levels of engagement in physical activity. By using a social-ecological perspective which integrates all three types of factors into the analysis and by comparing rates of participation in different school/neighbourhood environments (i.e., urban high density, suburban, suburban low density), the study explores the complex interplay among factors that influence youths' physical activity.

### **1.2 RESEARCH QUESTIONS**

The following research questions guided the study in order to gain a greater understanding of the influence that personal, social, and environmental factors had on youths' levels of participation in physical activity.

- Are all factor levels (i.e., personal, social, and environmental) important to explaining youths' physical activity participation?
- What specific variables within each factor level (i.e., personal, social, and environmental), and combination of variables are the most significant in explaining physical activity participation?
- Do certain factors have greater amounts of influence on physical activity participation in different school/neighbourhood environments?

### **1.3 SIGNIFICANCE OF THE STUDY**

The findings from this study reveal which factors (i.e., personal, social and environmental) and what interactions among variables from within those factor levels had the greatest influence on youths' engagement in physical activity. Therefore, the findings from this study provide practitioners with insights into important conditions that need to be present

in order to have the greatest impact on change in physical activity levels among youths. Armed with this knowledge practitioners can make informed decisions based on research with regards to what key areas to target when designing and implementing interventions, in order to achieve the greatest impacts on physical activity behaviours. Moreover, this study furthers the current scholarly understanding of youths' physical activity from a social-ecological perspective. More specifically, it adds knowledge to the literature regarding the interacting role that various personal, social, and environmental factors play in simultaneously influencing youths' physical activity behaviour. This simultaneous examination of the influence of personal, social and environmental factors provides an important perspective on the relationships among these factors and their significance, which is not afforded in the majority of studies which focus on single factors (e.g., self-efficacy) or single factor levels (e.g., environmental factors).

## **CHAPTER TWO**

### **CORRELATES OF YOUTHS’ PHYSICAL ACTIVITY**

A review of key personal, social, and environmental variables related to youths’ physical activity are covered in this chapter. The focus throughout the chapter is on those few select variables that appear to have played a significant role in youths’ physical activity. Hence, important personal factors related to youths’ physical activity to be discussed include age, gender, self-efficacy, and attitudes. Following this, relevant social factors, such as the support and modelling received for physical activity from significant persons in youths’ lives are considered. Finally, relevant environmental factors with respect to youths’ physical activity, such as the accessibility of facilities, and the aesthetics and safety of the neighbourhood environment, among other things are considered.

#### **2.1 PERSONAL FACTORS**

Personal factors involve intrapersonal factors which are considered to be closest to and unique to the individual. There are numerous intrapersonal factors which may influence youths’ physical activity, such as self-esteem, body image and weight, personality, and so on. The intrapersonal factors which are explored in this study are certainly not exhaustive; however, they are highlighted here because they were found to be important factors in youths’ physical activity in previous research.

##### **2.1.1 Age**

One of the most consistent correlates with physical activity is age. Studies with children and adolescents have almost always reported a decline in physical activity coinciding with an increase in age (e.g., Ammouri, Kaur, Neuberger, Gajewski, & Choi, 2007; Neumark-Sztainer, Story, Hannan, Tharp, & Rex, 2003; O’Loughlin, Paradis, Kishchuk, Barnett, & Renaud, 1999; Sallis, Prochaska, & Taylor, 2000; Strauss et al., 2001). The few studies which have found no significant differences between age and physical activity have usually been studies either with young children or with a narrow age range

amongst the study population. As declines in physical activity behaviours tend to develop during the adolescent years, studies on younger children (under 12 years of age) tend to report significant correlations between age and physical activity less often (Sallis et al., 2000; Strauss et al., 2001). In addition, studies which focus on a narrow age range tend to uncover less significant differences between age groups, as can be expected with more homogeneous groups (Deforche, De Bourdeauhuij, Tanghe, Hills, & de Bode, 2004; Lindquist, Reynolds, & Goran, 1999; Ryan & Dzewaltowski, 2002).

Studies have found that physical activity levels decrease significantly in particular between the ages of 10 and 18 years for both males and females (Allison, Adlaf, Dwyer, Lysy, & Irving, 2007; Sallis et al., 2000; Strauss et al., 2001). For example, a study on the time children spend engaged in physical activity revealed that moderate and vigorous physical activity decreased significantly for both males and females between the ages of 10 and 16 years, and furthermore, that preteen girls physical activity levels were 35% higher in comparison to the teenage girls (Strauss et al., 2001). Studies have also found that age is significantly inversely related to participation in vigorous physical activity in physical education classes, in other school activities (e.g., interscholastic sports), and in activities outside of school (Allison, Dwyer, & Makin, 1999; Trudeau & Shephard, 2005).

The consistent decline in physical activity as age increases has been recorded in several other countries including the United States, Finland, and the Netherlands, and consequently is not a unique phenomenon among Canadian youth (Allison et al., 2007). Thus due to this consistent pattern across settings, researchers have proposed that a decline in physical activity may be normative during adolescence (Allison et al., 2007). This suggests that changes over the life course, such as youths developing new interests and pursuits (e.g., beginning to date, getting a driver's license) and experiencing additional pressures (e.g., jobs, schoolwork, chores) may reduce the time available for physical activities, and provide an explanation for the consistent decline in physical activity which is observed cross-culturally (Allison et al., 2007; Covey & Feltz, 1991). Youth in one study, however, have offered some alternative reasons for their decline in physical activity. They indicated that as they matured, their physical activity involvement had become more structured compared to when they were younger, and thus participating in physical activity required a more conscious effort on their part, making it more difficult to participate (Mulvihill, Rivers, & Aggleton, 2000).

As is probably expected, there are likely numerous reasons for a decline in physical activity with an increase in age. This discussion simply provides some potential explanations for this behaviour pattern among youth. Age, however, is clearly a major correlate of youths' physical activity.

### **2.1.2 Gender**

Like age, gender also has a very consistent correlation with youths' physical activity. Females have consistently been found to engage in significantly less physical activity in comparison to males (e.g., Ammouri et al., 2007; Deforche et al., 2004; Kohl & Hobbs, 1998; Lindquist et al., 1999; O'Loughlin et al., 1999; Sallis et al., 2000; Sallis, Zakarian, Hovell, & Hofstetter, 1996; Strauss et al., 2001; Vilhjalmsson & Thorlindsson, 1998). In addition, an interaction effect between sex and age is often observed, with older females in particular demonstrating even lower levels of participation in physical activity (Ammouri et al., 2007; Neumark-Sztainer et al., 2003; Sallis et al., 2000).

However, on the contrary, other studies have found no significant differences between males' and females' physical activity levels (Allison et al., 2007). While other studies have found that differences between males' and females' physical activity do not tend to develop until children enter the adolescent years (Strauss et al., 2001). However, a meta-analysis of the correlates of physical activity for children and adolescents found that males were more active than females in 81% of the studies with children that were reviewed, and in 96% of the studies with adolescents that were reviewed (Sallis et al., 2000). Thus, strong support remains for the fact that females, and in particular older adolescent females, have lower levels of participation in physical activity.

#### ***Gender differences***

Gender differences in the medium through which males and females engage in physical activity also exist. Males have been found to report a significantly higher frequency of participation in vigorous exercise outside of school, in sports teams, and in physical education classes, whereas females reported significantly higher participation in lessons and classes (Sallis, Zakarian et al., 1996). Another study supported these findings that female adolescents participated less frequently than male students in activities outside of school and

in other in-school physical activities (e.g., interscholastic sports); however, this study did not reveal any significant differences between males' and female' participation in physical education classes (Allison et al., 1999).

Differences are also observed between males and females in the physical activities they most frequently choose to engage. The most commonly reported activities for adolescent boys are weight lifting, baseball, basketball, soccer, jogging, and bicycling, and for girls are dance, walking, calisthenics, aerobic dance, and baseball (Mulvihill et al., 2000; Sallis, Zakarian et al., 1996). Thus, not only are there differences in the frequencies of males' and females' engagement in physical activity, but there is also considerable variation in the medium (e.g., physical education classes, outside of school activities, lessons) and types of activities with which males and females engage. Hence, it would seem that physical activity may be experienced quite differently for males and females.

Possible reasons for the gender differences in physical activity participation were offered by Mulvihill et al. (2000) in a qualitative study with youth 11 to 15 years old. The study uncovered that females indicated a preference for non-physical activities, that they felt embarrassed and self-conscious about their bodies, and generally felt lethargic, especially among older adolescent females (Mulvihill et al., 2000). In addition, females reported feeling forced into certain activities and having no choice in activities during physical education classes (Mulvihill et al., 2000). This latter sentiment is not surprising when one considers females' physical activity preferences for various dance classes which do not tend to be part of a traditional physical education curriculum.

Thus, activity and medium preferences may offer some insights into the lower physical activity rates which are consistently observed among females. However, whatever the reasoning behind differences in physical activity participation, the differences between genders in their physical activity participation and experiences undoubtedly exist.

### **2.1.3 Self-Efficacy**

Of the many studied psychosocial correlates of exercise behaviour – self-efficacy – is one of the strongest and most consistent predictors of physical activity (Biddle et al., 2004; Sallis et al., 2000; Van Der Horst, Paw, Twisk, & Van Mechelen, 2007). Self-efficacy is defined as “...an individual's belief in his/her capability of executing the courses of action



necessary to satisfy situational demands” (Sherwood & Jeffery, 2000, p.25). Thus, self-efficacy for physical activity refers to the confidence an individual has in his or her ability to be physically active in a number of different circumstances, or to overcome barriers to exercise (Ryan & Dzewaltowski, 2002; Sherwood & Jeffery, 2000).

### *Types of self-efficacy*

The concept of self-efficacy originally proposed by Bandura in 1977 (cited in DuCharme & Brawley, 1995) has since been applied to different types of efficacy in the literature. The various types that have been examined include efficacy towards engaging in regular physical activity (Reynolds et al., 1990; Ryan & Dzewaltowski, 2002), ability to be active relative to peers (Stucky-Ropp & DiLorenzo, 1993), and perhaps most commonly, self-efficacy for seeking support for physical activity, for overcoming barriers, and for being active despite competing interests (Ryan & Dzewaltowski, 2002; Saunders, et al., 1997; Strauss, et al., 2001). More specifically, regular physical activity efficacy refers to one’s confidence in his or her ability to engage in regular physical activity. Efficacy towards being active relative to one’s peers refers to children’s rating of how active they are compared to other children. Efficacy for seeking support for physical activity refers to the confidence one has to seek support in order to be physically active (support-seeking), such as asking a parent to do physically active things with them. Barriers efficacy refers to the confidence one has to overcome barriers to physical activity, such as the weather, feeling tired, or being busy. Finally, positive alternatives efficacy refers to the confidence one has to be physically active despite competing interests, such as playing video games or watching television.

Other studies have distinguished between self-efficacy for internal barriers or for external barriers, as well as self-efficacy towards social factors (Allison et al., 1999; Deforche et al., 2004). Self-efficacy for internal barriers includes barriers specific to the person, such as not feeling in the mood and being tired. On the other hand, self-efficacy for external barriers includes barriers independent of the person, such as a lack of time due to homework, bad weather, or a lack of available programs (Allison et al., 1999; Deforche et al., 2004). Finally, self-efficacy for social factors, as described in Deforche et al.’s (2004) study, refers to the difficulty with being physically active when, for example, friends visit or when friends want to do other things. Hence, Deforche et al.’s (2004) social factors efficacy is

arguably similar to Saunders et al.'s (1997) positive alternatives efficacy (i.e., the confidence one has to be physically active despite competing interests).

Consequently, even the concept of self-efficacy alone is complex and multifaceted, and can be explored from the various perspectives discussed above. Nevertheless, the consideration of these various forms of self-efficacy has the potential to provide greater insights into the determinants of youths' physical activity.

### *Self-efficacy's relationship with physical activity*

Numerous studies have found positive correlations between self-efficacy and physical activity among the child and adolescent population (e.g., Biddle et al., 2004; Dishman et al., 2004; O'Loughlin et al., 1999; Ryan & Dzewaltowski, 2002; Strauss et al., 2001), and few studies were uncovered which found no or indeterminate correlations (Sallis et al., 2000; Stucky-Ropp & DiLorenzo, 1993). The studies which report a positive relationship between self-efficacy and physical activity found that higher levels of self-efficacy are generally related to higher levels of participation in physical activity among children and adolescents (e.g., Allison et al., 1999; Reynolds et al., 1990; Strauss et al., 2001; Trost, Pate, Ward, Saunders, & Riner, 1999). From another point of view, studies with obese children and adolescents, who were found to participate in significantly less physical activity than their non-obese counterparts, also reported having significantly lower levels of self-efficacy (Deforeche et al., 2004; Trost, Kerr, Ward, & Pate, 2001). Taken together, these studies provide strong support for the significant role that self-efficacy plays in children and youths' physical activity or inactivity. Therefore, youths' perceived confidence to be physically active seems to have a role in the amount of physical activity in which they will subsequently engage.

To that end, perhaps not surprisingly, some studies have found that males reported higher levels of self-efficacy than females (Sallis, Zakarian et al., 1996). Knowing that higher levels of self-efficacy are related to higher levels of physical activity, this finding may offer some insight into the higher levels of physical activity observed among males. Nevertheless, self-efficacy has still been found to be an important correlate of moderate and vigorous physical activity, and participation in sports outside of school for both sexes (e.g., O'Loughlin et al., 1999; Strauss et al., 2001; Trost, Pate, Saunders et al., 1997; Trost, Pate,

Ward et al., 1999). Thus, even though findings vary from study to study with regard to which sex, and with what level of physical activity (i.e., moderate or vigorous) self-efficacy is related, overall the findings indicate that self-efficacy is important for both sexes and levels of activity with respect to youths' physical activity.

### ***The relationship with different types of self-efficacy and physical activity***

Studies which examined different measures of self-efficacy have found different relationships with youths' physical activity participation. For example, a study by Strauss et al. (2001) examining psychosocial correlates of physical activity in children found that all three commonly used measures of self-efficacy (i.e., support-seeking, barriers, positive alternatives) were significantly related to high activity. This suggests that children with higher levels of physical activity perceive themselves to be confident in a variety of situations requiring the use of different types of efficacy to be physically active (Strauss et al., 2001).

A study by Allison et al. (1999) which examined the effects of self-efficacy and barriers to adolescents' participation in vigorous physical activity in three settings, including physical education class, other school-related activity settings (e.g., intramural sports), and outside-of-school activity settings (e.g., community sports), found significant, but mixed relationships between self-efficacy and physical activity. Self-efficacy despite external barriers (e.g., lack of time due to school, costs) to participation was positively and significantly related with physical activity (Allison et al., 1999). On the other hand, self-efficacy to participate despite internal barriers (e.g., not feeling in the mood, lack of energy) was significantly and negatively related with participation in physical activity (Allison et al., 1999). This indicates that self-efficacy appears to be stronger for helping adolescents overcome external barriers to participation, rather than internal barriers to physical activity participation.

#### **2.1.4 Attitudes**

Attitudes towards physical activity, generally speaking, refer to one's beliefs associated with the outcomes of engaging in physical activity and the value that one places on those outcomes. More specifically, "Attitude is a function of the belief that participation

in physical activity will result in certain outcomes, as well as the evaluation or value of these outcomes as having positive or negative consequences” (Deforche, De Bourdeaudhuij, & Tanghe, 2006, p.561). Hence, when a person perceives greater benefits for physical activity relative to any perceived barriers, they are more likely to have a positive evaluation for being physically active, and in turn increased engagement in physical activity is expected to ensue (Deforche et al., 2006). Thus, youths’ attitudes towards physical activity will indicate either a positive or negative evaluation of participating in physical activity, which is then expected to be reflected in their physical activity engagement.

Indeed, findings in the literature generally support this claim. Children and adolescents with a more positive attitude towards physical activity have greater intentions to participate, and do in fact participate more in physical activity (e.g., Craig, Goldberg, Dietz, 1996; Hagger, Chatzisarantis, & Biddle, 2001; Steptoe, et al., 1997; Van Der Horst et al., 2007). Similarly, overweight or obese adolescents, who participate in significantly less sports or physical activities, have significantly less positive attitudes in comparison to their normal-weight peers (De Bourdeaudhuij et al., 2005; Deforche et al., 2006). Thus, attitudes towards physical activity seem to display a positive relationship with youths’ physical activity.

Moreover, studies on children and adolescents’ physical activity have found that: increases in physical activity with increased beliefs about physical activity are consistent cross-culturally (Steptoe et al., 1997); there were no significant differences in the beliefs about the benefits of physical activity between males and females (Sallis, Zakarian et al., 1996) or in adolescents of varying degrees of overweight (Deforche et al., 2006); attitudes are similar across ethnically diverse groups of females (Grieser et al., 2006); and there were no trend changes in attitudes towards physical education and school sport between 1985 and 2004 (Lewis, Dollman, & Dale, 2007). Thus, these studies demonstrate the relevance of attitudes to youths’ physical activity across a number of different situations and for specific populations.

### ***The relationship between attitudes and fun***

One of the most important beliefs for youth to which attitude and physical activity participation has been linked is fun. For example, enjoyment of physical activity has emerged in several studies as a salient predictor of physical activity for both male and female children

(Humbert et al., 2006b; Morgan, 2005; Stucky-Ropp & DiLorenzo, 1993). Furthermore, Hagger et al. (2001) found that doing physical activity for fun accounted for the largest proportion of variance in attitude (37.2%). In addition, qualitative studies have found the importance of fun to be a repeatedly emphasized factor for youths' physical activity participation (Humbert et al., 2006b). Thus, further inquiry into what constituted "fun" revealed that perceived competence, feelings of confidence, and having the skills were essential for students to have fun (Humbert et al., 2006b). Moreover, whether something was deemed fun also had a great influence over youths' participation in physical activity (Humbert et al., 2006b). This suggests that youths' attitudes towards physical activity are dominated by beliefs about the enjoyment of physical activity, which in turn is closely linked to one's perceived competence, confidence, and skills (i.e., self-efficacy).

### ***The relationship with attitudes and physical activity***

While studies on youths' attitudes towards physical activity have typically found a consistent positive relationship with their physical activity, some studies and meta-analyses have found no or indeterminate relationships (Sallis et al., 2000; Strauss et al., 2001). Furthermore, in other studies, after taking into account other factors which may explain children and adolescents' physical activity, attitudes have no longer remained a salient factor in explaining physical activity (Trost et al., 1999). However, numerous studies discussed earlier have illustrated the importance of attitudes in explaining youths' physical activity.

Thus, more research into the relationship between attitudes and physical activity on this population is required, and has been called for in the literature (Kohl & Hobbs, 1998). Hence, by including attitude variables in the current study, an enhanced understanding of the influence which attitudes have on youths' physical activity is afforded.

### ***Personal factors summary***

Sex and age are strong consistent correlates of youths' physical activity. Self-efficacy and attitudes both show positive correlations with youths' physical activity, particularly self-efficacy; however, both have also demonstrated some mixed or inconsistent results. Consequently, there is a need to know more about the relationship which attitudes and self-

efficacy have with youths' physical activity. Hence, the current study helps provide more insights into the roles of self-efficacy and attitudes in explaining youths' physical activity.

While the personal factors discussed previously are undoubtedly important factors in explaining youths' physical activity, certainly there are other influential factors beyond intrapersonal factors which also have an impact on youths' physical activity. For example, support from and modelling of physical activity by family and friends – social factors – also has played a significant role in explaining youths' physical activity.

## **2.2 SOCIAL FACTORS**

Social factors can involve significant people, such as family members and friends, who may have an influence on youths' physical activity. Social influences may occur in the form of social support for physical activity or through role modelling of physical activity behaviours.

### **2.2.1 Social Support**

Social support speaks to the support that a significant other provides for youths' participation in physical activities. There are various kinds of support that a significant other can provide, such as providing encouragement for physical activity participation, participating in physical activities with the child, paying fees, or providing transportation to physical activity opportunities. These significant others, whose social influence and support are most often studied for youths' physical activity, are parents and friends.

There are reasonably consistent findings which suggest that the greater youths' perceptions of support from parents for physical activity, the greater their participation in physical activity (e.g., Ammouri et al., 2007; Motl et al., 2007; O'Loughlin et al., 1999; Sallis, Prochaska, Taylor, Hill, & Geraci, 1999; Van Der Horst et al., 2007). For example, a study of the correlates of physical activity for a national sample of boys and girls in grades four through twelve found that family support for physical activity had a strong and consistent association with physical activity participation (Sallis, Prochaska et al., 1999). Further, overweight adolescents, who engaged in significantly less physical activity in comparison to normal weight adolescents, reported receiving significantly less support from family and friends for physical activity (De Bourdeaudhuij et al., 2005). Taken together,

these studies unveil evidence of a significant relationship between support received from family members and youths' physical activity.

Numerous other studies on social support from family members have been conducted which reveal further insights into how support from family plays out in relation to youths' physical activity. For example, other studies on social support have found that: support was gender specific (i.e., father's encouragement was significant for boys, and mother's for girls) (O'Loughlin et al., 1999); support specifically in the form of transportation to opportunities to be physically active was significant (Sallis, Alcaraz, McKenzie, Melbourne, & Hovell, 1999); social support for physical activity was a correlate of vigorous physical activity only (Strauss et al., 2001); with regards to boys participation in physical activities, parents reported significantly higher levels of support, and perceived importance (Trost et al., 2003); and boys and girls both report a decrease in social support from family and friends as they transition into high school (Garcia, Pender, Antonakos, & Ronis, 1998). Thus, there have been a variety of findings on how family social support relates to youths' physical activity.

One particularly interesting finding is how family support for physical activity not only has a direct influence on youths' physical activity, but family support also has an indirect influence on youths' physical activity through influencing youths' self-efficacy (Motl et al., 2007; Shields et al., 2008; Trost et al., 2003). In other words, studies have found that parental support in addition to having a direct influence on youths' physical activity also had a positive influence on youths' self-efficacy, which in turn had an influence on their physical activity participation. This highlights the importance of both conducting a social-ecological study which looks at the influence of multiple levels of factors, and the significance of family support, particularly as it also relates to promoting youths' self-efficacy – an important determinant of youths' physical activity.

### ***Social support from friends***

Several studies have also investigated the influence of support from friends on youths' physical activity. Friends' support has been found to have a positive relationship with youths' physical activity (e.g., Humbert et al., 2006b; Stucky-Ropp & DiLorenzo, 1993; Van Der Horst et al., 2007; Voorhees et al., 2005). For example, a study on the role of peer social networks in explaining adolescent girls' physical activity found that the more they reported

doing physical activity with friends, the more physical activity they reported (Voorhees et al., 2005). Thus, doing physical activity with friends is particularly important for youths' physical activity.

The importance of friends to youths' physical activity participation was also emphasized by youth who participated in three qualitative studies (Humbert et al., 2006a, 2006b; Mulvihill et al., 2000). In one study, youth spoke about the preference for taking part in physical activities with friends as opposed to family (Mulvihill et al., 2000). Not surprisingly, it seems that as children get older, the amount of physical activity they do with their family tends to decrease and they begin to spend more time with friends. Thus, friends become an increasingly greater influence on the amount of time youth will spend engaged in physical activities.

Furthermore, the importance of friends was revealed by youth who consistently linked participation in physical activity with friends to fun (Humbert et al., 2006a, 2006b). For example, youth described physical activity as fun if it meant they were with friends or meeting new friends (Humbert et al., 2006b). Due to the importance placed on friends, in addition to the link which friends provide to the notion of fun which was found to be an important attitudinal factor earlier, youths' friends have a significant influence on their physical activity.

### ***Social support summary***

Both receiving social support from family members and from friends play an important role in explaining youths' physical activity. While there have been some inconclusive results about the influence of social support from family and friends on youths' physical activity (Sallis et al., 2000), many studies have demonstrated significant positive associations for family and friend support. Moreover, support from family and friends has been shown to have both direct influences on youths' physical activity, and on other factors which are associated with their physical activity (i.e., perceptions of self-efficacy, fun). Beyond family and friends providing encouragement for physical activity, they can also act as role models of physical activity to influence behaviours.



### 2.2.2 Modelling

Modelling generally refers to the engagement in behaviour such that it may encourage the adoption of the behaviour by another party. In other words, “modeling occurs when individuals copy behaviors they see others perform” (Lieberman, Gauvin, Bukowski, & White, 2001, p.216). Thus, in the context of physical activity, modelling refers to the physical activity practices of one’s parents and/or peers, for example, and how their engagement may influence youths’ physical activity. Modelling studies, similarly to studies on social support for physical activity, have often examined the influence of modelling behaviours by family members and friends.

While there seems to be a generally positive association for physical activity modelling (e.g., Trost et al., 1997; Vilhjalmsson & Thorlindsson, 1998), the findings are less consistent and more mixed than for social support (e.g., Sallis et al., 2000; Trost et al., 1999, 2003). For example, some studies have demonstrated very strong support for the association between modelling and youths’ physical activity. One study which specifically examined the influence of parents’ physical activity levels on children’s physical activity found that children who had active mothers were two times more likely to be active compared to those with inactive mothers (Moore et al., 1991). For children of active fathers, their odds of being active were three and a half times greater, and if both parents were active, the children were almost six times more likely to be active in comparison to children of inactive parents (Moore et al., 1991). This study clearly demonstrates strong support for the influence of modelling.

Another study which provided strong support for the influence of modelling by family members examined the influence of various physical, psychological, social and demographic factors on youths’ physical activity. The study found that the physical activity of fathers, mothers, older brothers, and best friends was associated with greater physical activity among adolescents (Vilhjalmsson & Thorlindsson, 1998). Thus, both findings reveal strong evidence for the influence that modelling has on youth’s physical activity.

In contrast, however, other studies have found that modelling is not a significant factor associated with youths’ physical activity. For example, one study examined the influence of a number of demographic, psychosocial, and environmental factors on children’s physical activity and found that the perceived physical activity habits of parents and peers

were not a salient factor in explaining children's physical activity for males or females (Troost et al., 1999). Furthermore, a meta-analysis of the correlates of physical activity for children and adolescents found an indeterminate relationship between modelling and children's physical activity (Sallis et al., 2000). More specifically, the meta-analysis found no influence attributable to the modelling of parents, teachers, coaches, or peers; however, the study did find that sibling physical activity was consistently related to adolescents' physical activity (Sallis et al., 2000). Therefore, there is also some evidence that parental and peer modelling may not be a salient factor with respect to influencing youths' physical activity.

In addition to some studies demonstrating either strong or weak support for family and peer modelling, other studies have uncovered mixed results. For example, some studies have found that parental modelling is only significant for girls (Stucky-Ropp & DiLorenzo, 1993), or that mother's activity levels were only significant for girl's vigorous physical activity participation (Troost et al., 1997). Furthermore, a review of the correlates of physical activity for children and adolescents found parental physical activity modelling to be a significant correlate only for male children (Van Der Horst et al., 2007). Consistent with these mixed findings, McElroy (2002, cited by Biddle et. al, 2004) states that, "results on parental modelling effects are mixed but that positive links may be created through parents instilling perceptions of competence in their children" (p.687). While this statement questions the influence of parental modelling, it supports the role of parents in helping to instil competence, which is closely linked with self-efficacy and a strong correlate with youths' physical activity.

Moreover, some studies, as noted earlier, have found sex differences in the influence of role models. For example, male role models, such as fathers, have been found to have a greater influence on children and adolescents' physical activity than mothers (e.g., Moore et al., 1991; Van Der Horst et al., 2007). In fact the literature has sometimes pointed to the notion that male role models may be more important than female role models in explaining physical activity participation (Van Der Horst et al., 2007). However, the findings from this review do not seem to strongly support this viewpoint (e.g., Troost et al., 1997; Vilhjalmsom & Thorlindsson, 1998). In fact, mothers were repeatedly found to have a significant influence on girl's physical activity (Stucky-Ropp & DiLorenzo, 1993, Troost et al., 1997). Furthermore, current knowledge regarding the influence of modelling is arguably not

consistent enough to draw conclusions concerning the relative influence of male or female guardians.

### ***Social modelling summary***

Current knowledge of the influence of parent and peer modelling on youths' physical activity is mixed. While some studies have demonstrated strong support for the influence of parents and peers, others have not. It appears that modelling does have some association with youths' physical activity, albeit its influence remains somewhat unclear. By including modelling from family and friends in the current study, some further clarity is offered.

### **2.2.3 Social Factors Summary**

Social support for physical activity from both family and friends generally has a positive correlation with youths' physical activity. Modelling, however, exhibits more inconsistent results, and thus the relationship and relative influence which modelling has is somewhat unclear. Perhaps the reason for the mixed results for modelling, and for some of the mixed results for the relative importance of social support from family or friends, is a function of the life stage of this group. This population is transitioning from childhood to adolescence, and thus are likely experiencing transitions with respect to activities they prefer to do (i.e., organized or free-play) and with whom they prefer to do activities (i.e., family or friends). Thus, the mixed results may be a reflection of the varied experiences this population is undergoing as they go through this transition. In any case, social factors on the whole do seem to play a role in explaining youths' physical activity and by including these factors in the current study, a greater understanding of their roles has ensued.

While social factors, in addition to personal factors, seem to influence youths' physical activity, the context within which they exert that influence could serve to facilitate or inhibit youths' physical activity. Hence, beyond social factors, the environment provides a context in which physical activity occurs, and hence it also has an influence on youths' physical activity.

## **2.3 ENVIRONMENTAL FACTORS**

The specific characteristics of the environment, both indoors and outdoors, in which a child lives, may have an impact on their physical activity behaviours. Time that children and adolescents' spend outdoors has been positively associated with physical activity (e.g., Kohl & Hobbs, 1998; Sallis et al., 2000), and thus youths' surrounding environments may influence their ability and desire to be physically active. A number of factors in the environment could potentially influence youths' physical activity participation such as: access to facilities; opportunities for physical activity at school and in the community; methods of commuting to school; perceptions of the neighbourhood; active neighbourhood transportation features; neighbourhood safety; and the neighbourhood setting (e.g., urban, suburban, rural).

### **2.3.1 Access to Facilities**

Access to facilities and spaces to be physically active has been among one of the most researched environmental factors. Access to facilities (e.g., basketball courts, parks) has been measured both objectively and subjectively, and demonstrates a positive relationship with youths' physical activity engagement (e.g., Ammouri et al., 2007; Davison & Lawson, 2006; Evenson et al., 2006; Potwarka, Kaczynski, & Flack, 2008; Utter, Denny, Robinson, Ameratunga, & Watson, 2006). Hence, the greater the actual or perceived access to facilities, the corresponding greater physical activity participation found among youth.

For example, Utter et al. (2006) found that students' who had greater perceived access to opportunities for physical activity within walking distance of their homes were significantly more likely to engage in regular vigorous physical activity, and that most students did in fact perceive there to be some recreational facilities within walking distance of their homes. However, a small yet significant number of students (14% of boys and 17% of girls) reported that there was nothing to do where they lived and correspondingly were significantly less likely to participate in physical activities (Utter et al., 2006). In another study using objectively measured census-block group data to gauge access to facilities, Gordon-Larsen and colleagues (2006) found that higher socioeconomic status block groups had significantly greater odds of having one or more facilities, while high-minority and low socioeconomic status block groups were less likely to have facilities. Furthermore, greater

numbers of facilities were associated with decreased overweight and increased odds of achieving five or more episodes per week of moderate to vigorous physical activity among adolescents (Gordon-Larsen, Nelson, & Popkin, 2006).

### *Appeal of facilities*

Beyond simply having access to facilities, students in grades seven through twelve have indicated the importance of having access to appealing facilities in order to increase their physical activity levels (Humbert et al., 2006a). Students' description of accessible and appealing facilities entailed "...the need for quality outdoor facilities, aesthetically inviting indoor facilities, the proper maintenance and repair of existing facilities, and a safe environment in which to be active" (Humbert et al., 2006a, p.9). In another study, parents also raised similar points with regards to the need for appealing equipment, particularly for older children. Parents noted that play equipment in parks is being designed for younger children, and that older children find parks to be boring because no equipment appeals to them (Veitch, Bagley, Ball, & Salmon, 2006). Therefore, not only is it important for facilities to be accessible, but the appeal of facilities is also important for youths' physical activity.

However, while both students and parents have indicated the importance of facilities being accessible and appealing, rarely has the appeal or perceived quality of facilities been studied. Only one study which objectively assessed the relationship between access and quality of urban green spaces with the physical activity of 40 to 70 year olds was uncovered. The study found no significant associations between physical activity and access to green space related to distance, size of parks, or quality and size of parks (Hillsdon, Panter, Foster, & Jones, 2006). However, it remains unclear whether the results of this study using an older sample, and an objective assessment of the quality of only green spaces, would apply to youth who would likely perceive their environments differently. Indeed, the perceived presence of facilities and their quality may be more indicative of participation levels than an objective measure of the presence of facilities, which lacks any indication of awareness or perceived quality of the facilities. Moreover, awareness and appeal of facilities may be of particular significance to a younger population that is likely to have less freedom of access to other, more appealing environments, and thus the appeal of accessible facilities may turn out to be an important factor in explaining youths' physical activity.

### ***Relative influence of accessibility***

Though research has demonstrated some fairly consistent positive correlations between access to opportunities for physical activity and physical activity participation among youth, it may not explain a large proportion of their physical activity behaviours. For example, relative to psychological, biological, and social variables, physical environmental variables were either found to be secondary to psychological, biological, and social factors, or in other studies to have little or no explanatory power (Giles-Corti & Donovan, 2002; Sallis, Prochaska et al., 1999). Nonetheless, access to facilities determines whether or not people can use them, and in this sense, the physical environment can still significantly support physical activity behaviours by providing an environment rich with physical activity opportunities.

### **2.3.2 School and Community Opportunities for Physical Activity**

The school and local community provide essential opportunities for youth to be physically active through the provision of physical education classes, sports teams, clubs, lessons, and so on. In fact, students' participation in daily physical education classes and use of a community recreation centre have been found to be associated with a greater likelihood of engaging in moderate to vigorous physical activity (Gordon-Larsen, McMurray, & Popkins, 2000). Similarly, studies have found that in comparison to non-obese children, obese children, who participated in significantly less physical activity, were involved in significantly fewer community organizations which involved physical activity (Troost et al., 2001). Thus, community and school opportunities for physical activity seem to provide important opportunities for youths' physical activity.

### ***Physical education classes***

Studies on physical education have frequently found that students who report greater enjoyment of physical education classes also report more physical activity participation (e.g., Sallis, Prochaska et al., 1999; Trost et al., 1997; Van Der horst et al., 2007; Viljalmsson & Thorlindsson, 1998). Hence, physical education classes are an important source of physical activity, which have also been found to correspond with increased physical activity outside of physical education classes (Gordon-Larsen et al., 2000). Thus, enjoyment of physical

education classes is associated with greater physical activity both in and outside of school, demonstrating the significant role it plays in youths' physical activity.

Girls, however, have been found to dislike physical education classes significantly more than boys (e.g., Mulvihill et al., 2000; Sallis, Zakarian et al., 1996). This finding may partly explain why studies consistently report that boys are more physically active than girls. One reason for the greater dislike of physical education classes among girls likely derives from the preferred physical activities of males versus females. Traditional physical education activities do not cater to girls' physical activity preferences as much, resulting in a dislike for activities during physical education classes and boredom among girls (e.g., Mulvihill et al., 2000; O'dea, 2003). Suggestions from students to improve physical education classes included providing competitive team sports and alternative non-competitive activities in order to cater to students' abilities (which is closely linked with fun), and to increase the variety and excitement of classes by including new and unusual programs such as martial arts, Tai Bo, rock climbing, and water sports (Mulvihill et al., 2000; O'dea, 2003).

### ***Community and extra-curricular activities***

Community and extra-curricular sports also provide important opportunities for youths' physical activity. In fact, a study of the correlates of low income, inner-city children's physical activity in Montreal found that 40% of boys and 33% of girls participated in school sports teams, and further, 83% of boys and 75% of girls participated in organized sports outside of school (O'Loughlin et al., 1999). Of note, these participation rates were high despite the low income neighbourhoods involved in this study. Other studies have suggested that children from a higher socioeconomic status background take more activity lessons than children from a lower socioeconomic status background (Sallis, Zakarian et al., 1996). Evidently, community and organized sports outside of physical education classes are of particular importance to youths' physical activity, regardless of socioeconomic status.

Hence, research to date seems to demonstrate that opportunities for physical activity in schools and in the local community play an essential role in youths' physical activity. Furthermore, physical education classes provide an opportunity to be physically active for students; however, physical education classes are disliked at times, particularly among females. On the other hand, extra-curricular school teams and community sports are

extremely valuable for youths' physical activity participation, likely due to the opportunity for students to engage in a preferred activity at which they are skilled and deem to be fun.

### **2.3.3 Commuting to School**

Active commuting to school refers to students using active modes of transportation such as walking or biking to get to school rather than taking a bus or being driven by parents. Studies indicate that the number of students who regularly actively commute to school is low, ranging between approximately 5 and 15%, and thus, the majority of students are inactive commuters (84%) (Evenson et al., 2006; Sirard, Riner, McIver, & Pate, 2005). Furthermore, studies have found that active commuting is more prevalent among males than females (Evenson et al., 2003; Sirard et al., 2005). Active commuting thus does not currently appear to be a significant source of physical activity for most students. Those who are regular commuters, however, have been found to accumulate 3% more moderate to vigorous physical activity during weekdays, which translates into approximately 24 additional minutes of daily physical activity (Sirard et al., 2005). Therefore, active commuting may represent an effective means through which students can accumulate some additional physical activity throughout the day. Moreover, active commuting can also contribute to a healthier environment by eliminating the emission of greenhouse gases when active modes of transportation are used instead of non-active transportation modes.

Actively commuting to school was found to be associated predominately with living within closer proximity of the school (Davidson & Lawson, 2006; Sirard et al., 2005, Timperio et al., 2006), and hence, the majority of regular active commuters were from urban schools (Sirard et al., 2005). Active commuting was also associated with: not having a busy road en route to school; having streets with lights, and fewer crossings and steep inclines; and parent's perceptions of there being more children in the neighbourhood (Timperio et al., 2006), as well as having more walking or biking trails near one's home (Evenson et al., 2006).

Interestingly, despite the low rates of commuting, students have indicated enjoyment with active commuting, noting that it gives them time to socialize with friends and the flexibility to stay after school for sports and other activities (Bauer, Yang, & Austin, 2004). However, parents and school staff have identified safety concerns with students actively



commuting, and thus some studies have indicated that they discouraged active commuting to some extent (Bauer et al., 2004).

Therefore, a small proportion of students actively commute to school on a regular basis, and those who do typically live closer to the school. Research indicates, however, that students enjoy actively commuting due to the flexibility and opportunity to socialize and engage in activities it affords them. However, distance and safety concerns expressed by parents and staff may discourage active commuting. Nevertheless, active commuting does represent an opportunity for youth to accumulate physical activity during their day, and thus this study provides a greater understanding of its role in youths' physical activity, specifically through an exploration of patterns among varying neighbourhood settings (i.e., urban high density, suburban, suburban low density).

#### **2.3.4 Perception of the Neighbourhood**

Perception of the neighbourhood entails the perception not only of the aesthetics of the neighbourhood environment, but also the design (i.e., walkability). Positive aesthetic perceptions of the neighbourhood have been found to be related to intentions to be physically active (De Bruijin et al., 2006) and to actual physical activity behaviour (Evenson et al., 2006). For example, girls who reported that their neighbourhoods had more trees, interesting things to look at, and a lack of garbage, were more likely to report being physically active (Evenson et al., 2006). Furthermore, girls who reported that there were places of interest within walking distance of their homes were also more likely to report being physically active (Evenson et al., 2006). Alternatively, children who believed there were no parks or sports grounds near their homes were found to have a lower likelihood of walking or cycling (Timperio, Crawford, Telford, & Salmon, 2004).

In a study of the perceived environment related to adolescents' physical activity, Fein, Plotnikoff, Wild, and Spence (2004) examined adolescents' perception of the availability of environment resources (i.e., home, neighbourhood, and school environment) and the perceived importance of these resources to their physical activity levels. Their study found that the availability of environmental resources and their perceived importance could only explain a small proportion of the variance in adolescents' physical activity (5% and 8% respectively) (Fein et al., 2004). However, the perceived importance of the school

environment remained significantly associated with adolescents' physical activity, demonstrating that the school environment is a particularly important environment for adolescents' physical activity (Fein et al., 2004).

Specifically, studies of the school environment have found that high levels of physical improvements, such as basketball courts, baseball backstops, and volleyball nets, in combination with access to equipment and high levels of supervision are significantly associated with higher levels of physical activity (Sallis et al., 2001). Another study found that fixed play equipment (e.g., play structures) facilitated children's engagement in the highest percentage of vigorous physical activity (Bell, 2007). The study also found that boys were more physically active than girls on open playing fields and open asphalt, and that girls spent most of their time in moderate activity when they played in green areas (Bell, 2007).

### *Neighbourhood design*

In addition to the aesthetics of the environment, the design of the neighbourhood can also have an impact on physical activity behaviours. In fact, parents who live in highly walkable neighbourhoods (i.e., grid like fashion) reported safety concerns with allowing their children to play in the street due to traffic, which consequently decreased their children's opportunities for active free-play (Veitch et al., 2006). However, in another study where children drew mental maps of places in which to be physically active in their neighbourhood, children living in highly walkable neighbourhoods illustrated more active transportation, such as walking or biking for transportation (Holt, Spence, Sehn, & Cutumisu, 2008). On the other hand, parents who lived in a less walkable neighbourhood (i.e., cul-de-sacs) reported their children playing in the cul-de-sac regularly as they considered it to be safe (Veitch et al., 2006). However, children living in the less walkable neighbourhoods illustrated more non-active transportation, such as using cars for transportation (Holt et al., 2008).

Therefore, both the perception of the aesthetics of the neighbourhood and its design appear to have implications for youths' physical activity. However, research on aesthetics and neighbourhood design related to youths' physical activity is limited, and to date, can account for only a small proportion of youths' physical activity. Nevertheless, youths' perceptions of their environment can directly affect their physical activity and the places

where they play, as well as indirectly through their parents' perceptions, result in restrictions on play spaces.

### **2.3.5 Neighbourhood Safety**

Studies of neighbourhood safety measured both objectively and subjectively and its resultant relationship with youths' physical activity have uncovered mixed results. Some studies have found that higher levels of crime were associated with decreased physical activity (Gomez, Johnson, Selva, & Sallis, 2004; Gordon-Larsen et al., 2000), whereas other studies have found either no association with neighbourhood safety and physical activity, or that physical activity levels were greater in neighbourhoods with higher levels of crime or hazards (Romero et al., 2001; Sallis et al., 2000; Weir, Etelson, & Brand, 2006).

Neighbourhood safety appears to be a more significant factor for females' physical activity than for males (Gomez et al., 2004; Utter et al., 2006). For example, Gomez et al. (2004) found that the density of violent crime within a half a mile of females' homes was significantly negatively associated with girls' outdoor physical activity. Moreover, girls' positive perceptions of the safety of their neighbourhood were associated with higher levels of outdoor physical activity, yet there was no such associations found among boys (Gomez et al., 2004). Another study by Utter et al. (2006) also found that positive perceptions of neighbourhood safety were associated with regular physical activity, and that though most students reported feeling safe in their neighbourhoods, significantly fewer females compared to males reported feeling this way (Utter et al., 2006). Thus, perceptions of neighbourhood safety seem to play an important role in physical activity participation, particularly for females.

Besides youths' perceptions of neighbourhood safety affecting their own participation, parents' perceptions of the safety of the neighbourhood can have a considerable impact on youths' physical activity by restricting their use of play spaces. In fact, in an interview with parents regarding their perceptions of the influences on children's play, an overwhelming majority of parents (94%) raised safety concerns about strangers, teenagers/gangs, or traffic en route to play spaces, which they indicated limited the number of places available for their child's play (Veitch et al., 2006). Youth themselves have also stressed the importance of having a safe environment to participate in physical activities.

They indicated that a lack of safety would cause them to refrain from or reduce their desire to participate, and that adult supervision in the form of a “bouncer” type role (i.e., someone who would remove youths who were causing problems) was a solution they sought to this issue (Humbert et al., 2006a, 2006b).

While the results are unclear with respect to how the actual and/or perceived safety of the neighbourhood environment affects youths’ physical activity, it is clear that a safe neighbourhood is desired by both parents and youth. Satisfying actual and/or perceptions of neighbourhood safety for both could potentially increase physical activity by alleviating anxieties for youth, particularly girls, and for parents, and consequently limitations set on youths’ physical activity.

### **2.3.6 Neighbourhood Environment Settings**

Little research to date has been conducted on how the neighbourhood setting (e.g., urban high density, suburban, suburban low density) affects youths’ physical activity. Not surprisingly then, the current findings on the affects of the neighbourhood settings are indeterminate and mixed. Three reviews of the correlates of children’s and adolescents’ physical activity have noted the little research which has been conducted using neighbourhood settings, and in turn reported mixed results in the association with children and adolescents’ physical activity (Davison et al., 2006; Sallis et al., 2000; Van Der Horst, Wendel-Vos, Kremers, van Lenthe, & Brug, 2006).

Studies that have examined the neighbourhood setting have found that children residing in poorer inner cities engaged in significantly less physical activity than did children of middle class families residing in suburban areas (Weir et al., 2006). In addition, schools located in suburban areas provided greater opportunities for student physical activity (Barnett, O’Loughlin, Gauvin, Paradis, & Hanley, 2006).

A study of adolescents’ physical activity by Nelson, Gordon-Larsen, Song, and Popkin (2006), which broke down neighbourhood settings into six categories as opposed to the typically used three (i.e., urban, suburban, rural), found that adolescents residing in older suburban areas were more likely to be physically active than residents residing in newer suburbs. Furthermore, another study by Loucaides, Plotnikoff, and Bercovitz, (2007) looked at differences between the correlates of physical activity for children and adolescents

attending schools in either urban or rural areas. Their study found more similarities than differences including no significant differences in overall physical activity; however, in the urban model, demographic, psychological, behavioural and social correlates explained 43% of the variance in physical activity, and in rural schools 38% of the variance in physical activity. Loucaides and colleagues (2007) also found that actively commuting to school was unique to urban schools and taking a physical education class unique to rural schools. Thus, while there do not appear to be major differences between youth residing in different neighbourhood settings, some differences in active commuting and taking physical education classes have been observed.

With the little research that exists to date, it seems that major differences between youth who reside in various neighbourhood settings do not exist. Nonetheless, there are some important differences in physical activity patterns between youth who reside in different neighbourhoods that have been uncovered thus far. Clearly, however, there is a need for more research to determine what unique role neighbourhood environments might play.

### **2.3.7 Environmental Factors Summary**

Though the literature seems to suggest that environmental factors may have a relatively small influence on youths' physical activity in comparison to personal and social factors, the environmental context in which physical activity takes place is inescapable; physical activity must occur somewhere. To that end, the environment can therefore be more or less conducive to physical activity, and thus, a better understanding is needed of those aspects of the environment that help to facilitate youths' physical activity participation.

As this review has established, personal, social, and environmental factors all have an influence on youths' physical activity. Therefore, by using a social-ecological model which integrates all three levels of factors into the model, the opportunity to explore the influence that all of the factors have on youths' physical activity is afforded.

## **2.4 SOCIAL ECOLOGICAL MODELS**

The term "ecology" refers to the interrelations between organisms and their environments, and has its early roots grounded in biology (Stokols, 1992). Therefore, from an ecological perspective, there is recognition that human behaviour is complex, and

consequently, is the result of the influence of the interaction between the individual and his or her sociocultural and physical environment.

### ***Social ecological models of health***

The ecological perspective evolved beyond its biological based roots in several other disciplines, including behavioural sciences and public health, to provide an understanding of the nature of people's interactions with their physical and sociocultural surroundings (Stokols, 1992). Social ecological models are unique in that they recognize a variety of levels of influence on human behaviour, such as at the individual, sociocultural, community, institutional, policy, and environmental levels (e.g., Brofenbrenner, 1979; McLeroy, Bibeau, Steckler, & Glanz, 1988; Sallis & Owen, 2002).

Models specific to health behaviour assume that differences in levels of health and well-being are the result of a dynamic interaction among biology, behaviour, and the environment (e.g., Brofenbrenner, 1979; McLeroy et al., 1988, Stokols, 1992; Smedley & Syme, 2000; Sallis & Owen, 2002; Spence & Lee, 2003). Furthermore, social ecological models recognize that various levels of factors can influence people's behaviour simultaneously and to various extents (Sallis & Owen, 2002). Thus, a social ecological perspective recognizes that there are multiple levels of factors (i.e., intrapersonal, sociocultural, environmental) all of which can influence human behaviours. Moreover, these models also recognize that factors at different levels can have greater degrees of influence on behaviour, and that different levels of factors can influence behaviour simultaneously. In other words, from an ecological perspective, "health promotion is viewed not only in terms of the specific health behaviours of individuals, but more broadly as a dynamic transaction between individuals and groups and their sociophysical milieu" (Stokols, 1992, p.8). The perspective afforded by using a social ecological model is of great value as it more accurately reflects the complex interplay of factors which explain physical activity behaviour, going beyond the simple consideration of the influence of a single factor (e.g., self-efficacy) or level (e.g., environmental factors) to the interplay of the entire system. Thus the model has implications for the development of population health interventions which seek to address a variety of factors which influence behaviours.

Social ecological models of this form, therefore, fall under a public health promotion umbrella due to the fact that they are concerned not only with individual-level phenomena, but also with mainstream factors and societal-level phenomena (e.g., population-based interventions and public policies) in order to bring about improvements in population health (Sallis & Owen, 2002; Smedley & Syme, 2000). Furthermore, as Stokols (1992) among others states, the premise of the model presumes that multifaceted interventions are most effective in promoting personal and public health. “The ecological perspective suggests that multifaceted interventions that incorporate complementary environmental and behavioural components and span multiple settings and levels of analysis are more likely to be effective in promoting personal and public health than are those narrower in scope” (Stokols, 1992, p.18). Recognizing this broader understanding of human behaviour, and the utility of interventions which incorporate multiple levels of influence, this model will provide guidance for a better understanding of youths’ physical activity behaviours.

### ***Social ecological model background***

The roots of social ecological models can be traced back to Bronfenbrenner’s (1979) ecological theory of development which gives attention to how both individual and environmental factors affect behaviour. Bronfenbrenner’s theory posits that the individual is surrounded by four environmental levels of influences on behaviour, consisting of the microsystem, mesosystem, exosystem, and macrosystem (Bronfenbrenner, 1979). At the centre of the model lies the individual with his or her unique psychological and physiological characteristics. The microsystem is closest to the individual and is comprised of intimate interactions with persons (e.g., family, peers) in specific settings such as home, school, and playgrounds (Bronfenbrenner, 1979). The mesosystem refers to the interaction between two or more microsystem settings in which an individual is involved (e.g., home, school, community sport league). The third level of influence, the exosystem, “refers to forces within the larger social system in which the individual is embedded” (McLeroy et al., 1988, p. 354). For a child, these include things like a parent’s place of work, parent’s friends, and activities that the local school board provides (Bronfenbrenner, 1979). The final level of influence, the macrosystem, refers to the attitudes and ideologies of a culture, and is the most overarching

concept of the model, containing the nesting of and interconnections among all of the other systems within the model (Brofenbrenner, 1979; McLaren & Hawe, 2005).

### ***Social ecological model for health promotion background***

McLeroy et al. (1988) built on Brofenbrenner's ecological theory and later proposed an ecological model for health behaviour promotion. Their proposed model builds on the conceptual framework of Brofenbrenner's ecological theory with a focus on patterned behaviour as the outcome of interest (McLeroy et al., 1988). In their model for health promotion, behaviour is regarded as being influenced by intrapersonal factors (e.g., attitudes, skills, knowledge), interpersonal processes and primary groups (e.g., family, friends, coworkers), institutional factors (e.g., day care, school, work settings), community factors (e.g., relationships between organizations, institutions, informal networks), and public policy (e.g., laws and policies at the local, state, and national levels) (McLeroy et al., 1988). The implicit assumption was that the five levels of analysis reflected the strategies available for health promotion based on the current beliefs, understandings, and determinants of behaviour at the time. The authors go on to acknowledge that other levels of analysis could be used following changes in our understandings of causes, and potential interventions which might modify health behaviour (McLeroy et al., 1988).

### ***Variations of the social ecological model***

As can be expected, several variations on the social ecological model of health now exist. As stated earlier, Brofenbrenner's (1979) model posits the individual amidst a micro, meso, exo, and macro level system. McLeroy et al. (1988) call for analysis of intrapersonal factors, interpersonal process and primary groups, institutional factors, community factors, and public policy, placing emphasis on the environmental causes of behaviour. Stokols (1992) proposed developing a more environmentally focused version of the ecological approach to health promotion, noting the need for understanding specific environmental leverage points at each level of analysis. However, he still recognized that the social-ecological perspective assumes that effective health-promotion efforts are enhanced through multilevel interventions which combine behavioural and environmental strategies.



Cohen, Scribner, and Farley (2000) built on ecological health behaviour theories by identifying structural mechanisms by which population-level factors were able to effect changes in individual health behaviours. Their perspective was based on the premise that health behaviours are influenced by the attributes of individuals and by the conditions under which they live. The four factors comprising the structural model of population-level health behaviours they identify were: availability/accessibility of consumer products (e.g., availability of products associated with health outcomes, such as fresh food, parks); physical structures (e.g., neighbourhood design); social structures and policies (e.g., laws and policies which require or inhibit behaviour); and media and cultural messages (Cohen et al., 2000). The first three factors directly influence behaviour by either facilitating or constraining behaviours, whereas media and cultural messages may change behaviours by influencing or even shifting individual level attitudes, beliefs, cognitions, and norms (Cohen et al., 2000)

Sallis and Owen (2002) emphasized understanding intrapersonal, sociocultural, policy, and environmental correlates of health behaviours by placing particular attention on understanding the environmental and policy correlates. Spence and Lee (2002) proposed an adaptation of Wachs's (1992) structural model of the environment, which is based upon Bronfenbrenner's ecological systems theory, for describing influences on physical activity behaviour. They suggested four additions to the structural model of the environment which focus on clarifying the roles of biological processes (e.g., predispositions), higher-level mediators (e.g., psychological factors), physical ecology (e.g., climate), and revealing direct versus indirect roles that the environment plays on physical activity (Spence & Lee, 2002).

As this illustrates, there are several different variations of the social ecological model, each of which emphasizes a different aspect of the original model. Consequently, the social-ecological model is best viewed as a broad framework to guide health behaviour research, and the model adapted to suit specific research endeavours.

### ***Principles of the social ecological model***

Despite the variations to the social ecological model that have been introduced over time, some of its core assumptions and principles remain. The essence of social ecological models is the recognition of multiple factors at the individual, social, and environmental levels which influence health behaviours (McLeroy et al., 1988; Sallis & Owen 2002;

Stokols, 1992). Furthermore, a dynamic interplay among all factors is routinely acknowledged in all variants of this model. As such, recognition of interdependent and reciprocal relationships among the factors, and the ability for factors to influence behaviour simultaneously and to varying degrees, distinguishes this approach from others which have typically placed greater focus solely on intrapersonal or interpersonal influences (McLeroy, et al., 1988; Sallis & Owen 2002; Stokols, 1992).

Social ecological models also appreciate the complexity of human environments by acknowledging multiple types of environmental influences, both natural (e.g., climate, geography, weather) and built (e.g., architecture, community design, resources), on behaviour. Furthermore, environmental factors can influence behaviour either directly or indirectly depending on individual perceptions of those factors (Sallis & Owen 2002; Stokols, 1992).

Finally, the social ecological model posits that multilevel interventions are more effective in achieving sustainable effects on behaviour change than are single-level interventions (Sallis & Owen, 2002; Stokols, 1992). Sallis and Owen (2002) provide an example where building sidewalks without any programs to motivate people to use them may be inadequate in changing behaviour. Social ecological models purport that interventions that target combined individual, community, and environmental levels show greater promise for effective behaviour change (Sallis & Owen 2002; Stokols, 1992).

### *Environmental emphasis*

While social ecological models examine the influence of multiple levels of factors on health behaviours, emphasis is often placed on environmental factors for two reasons. Firstly, behaviour change models in health promotion have been dominated by psychology and psychosocial models, therefore less is known about the influence of the environment on health behaviours. Hence, it affords a new avenue of inquiry into understanding behaviours for researchers (Elder et al., 2007; Sallis & Owen 2002; Stokols, 1992). Secondly, social ecological models lie within a health promotion and public health ideology, and as such, are more concerned with population-level as opposed to individual-level behaviour changes (McLeroy et al., 1988). Social ecological models propose "...that it is more efficient to enhance [the] environment rather than change individuals, because enhancing one

environment can have implications for many individuals” (Spence & Lee, 2003, p.9). Hence, supportive environments are available to an entire surrounding population as opposed to just those who are targeted for interventions. Moreover, the enhanced environment remains after an intervention concludes providing the opportunity for greater sustainability of behaviours (Sallis & Owen 2002; Smedley & Smyne, 2000; Spence & Lee, 2003; Stokols, 1992).

This environmental focus in social ecological models is naturally not without its criticisms. McLeroy et al. (1988) suggest, “The purpose of an ecological model is to focus attention on the environmental causes of behaviour and to identify environmental interventions” (p.366). In response, Spence and Lee (2003) advise that a description of an ecological model such as this calls for a revision in definitions. They contend that the model McLeroy et al. (1988) describes should be called an environmental model, whereas a model that situates the individual (including biological and psychological factors) within a broader environmental context should be called an ecological model.

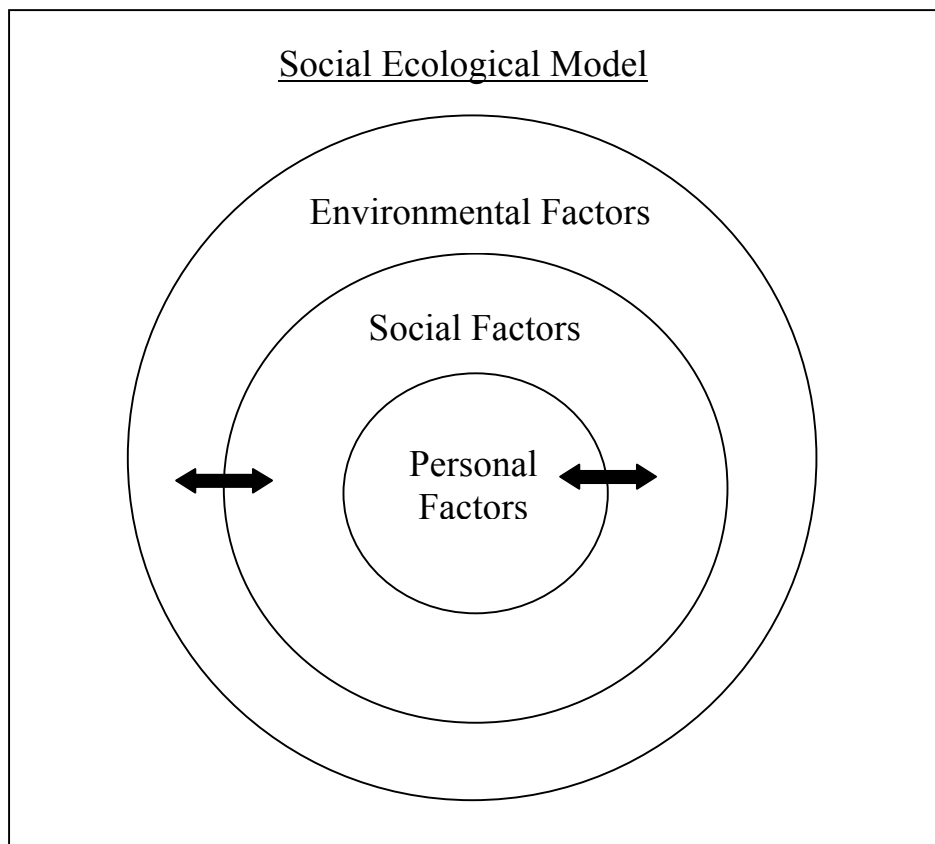
Situating the individual within a broader environmental context was the original intent of ecological models dating back to Bronfenbrenner’s first proposition of ecological theory, and thus the integrity of a social ecological model is only maintained if multiple levels of influence are afforded equal value within the model. However, from a public health perspective, the significance of the environmental component of social ecological models (i.e., for providing population- based supports and interventions) is understandable.

### ***Integrated model***

Based on the perspectives offered in the literature, especially as they pertain specifically to health behaviour, an integrated model that includes the three essential conceptual levels (i.e., intrapersonal, interpersonal, and environmental) and thereby considers the influence of all levels, is used in this study as a guiding empirical framework. The original intent of social ecological models was to integrate multiple levels of influence together into one model to gain an enhanced understanding of human behaviours. Thus, in keeping with the integrity of the original model, intrapersonal, interpersonal, and environmental levels of influence are examined here. Indeed, these levels of influence on behaviour have been identified as important contributors to physical activity (Sallis & Owen 2002; Spence & Lee 2003). Therefore, the specific levels of influence related to physical

activity among youth as a form of human behaviour examined in this study are the *personal* (i.e., the specific focus within the intrapersonal level), the *social* (i.e., the specific focus within the interpersonal level), and the *environmental*. This guiding framework based on an integrated social ecological model framework is illustrated in Figure 1.

**Figure 1 Social Ecological Model**



## **CHAPTER THREE**

### **METHODS**

The following section provides details with respect to the methods employed to conduct this study. Specifically, the survey design, sample population, survey instrument, survey administration, and data analysis are discussed.

#### **3.1 STUDY DESIGN**

A self-administrated questionnaire was used in order to collect data related to the influence of personal, social, and environmental factors associated with youths' physical activity. Schools in the Ottawa-Carleton District Public and Catholic school boards were used to help recruit student participants in grades 6 to 8, for data collection. Thus, the study is cross-sectional in nature as it collected a snapshot of information from participating students at one particular point in time. Using a survey method allowed for the findings to be generalized to a larger population and enabled the gathering of information on numerous constructs and perceptions in a short time frame, and in an economical manner (Creswell, 2003).

In addition to the questionnaire, this study also involved the gathering of general information (i.e., proximity to the city centre; street and neighbourhood density; amount of open space) on the different neighbourhood environments surrounding participating schools. This information was collected to provide an objective classification of the diverse neighbourhoods involved in the study, which would then be used in conjunction with participants' perceptions of their neighbourhoods. By having an objective sense of the diverse neighbourhood environments, along with students' perceptions of those same environments, an understanding of how physically different environments (e.g., urban high density, suburban, suburban low density) are perceived by youth, and how they in turn are related to levels of participation in physical activity is provided.

### **3.2 THE SAMPLE POPULATION**

The sample population was grade 6 to 8 students' roughly 10 to 14 years old, living in the Ottawa Ontario area. The participants in this study were recruited through a two-fold process: (1) school voluntary participation/recruitment, and (2) student voluntary participation. First, following approval by the University of Waterloo's Office of Research Ethics, approval for the project was obtained from the Ottawa-Carleton District School Board's Research Committee. Schools in the Ottawa-Carleton Catholic School Board were then informed of the opportunity to participate in the study, and as a result four schools indicated interest in participating in the study, and were thus subsequently included in the study. Further nine schools agreed to participate in the study when they were contacted by the researcher to invite their school to participate in the study. In the end a total of 13 schools within the Ottawa-Carleton District Public and Catholic School Board volunteered to be a part of the study, and their decision to volunteer ultimately determined the schools which would be included in the study. Considerable effort was made during the recruitment process to gain the participation of schools that were situated in varying neighbourhood environments. For example, the researcher strived to engage the participation of schools which varied in their proximity to the city centre, their street or neighbourhood density, and their amount of open space. Ultimately the 13 schools who participated varied on a number of factors (e.g., geographic locations, grade range, and student population size), thus a representative sample of students in grades 6-8 has been captured.

After the schools who volunteered to participate in the study were identified, students in grades six through eight were invited to participate in the study. In some cases, the school principal volunteered to participate on behalf of the school, and thus the entire student body who qualified to participate in the study were invited. In other cases, only certain teachers volunteered their classes, and thus only students in those classes were invited to participate in the study. Parents of students in the participating schools and classrooms were given information sheets regarding the study (see Appendix A) along with consent forms (see Appendix B) to allow their child's participation. Additionally, students themselves had the choice of participating in the study and terminating their participation at any time.

### **3.3 SURVEY ADMINISTRATION**

As previously mentioned schools and their grade six through eight classrooms that volunteered to participate in the study were provided with information letters (see Appendix A) and consent forms (see Appendix B) to distribute to students in order to obtain parents'/guardians' permission to participate in the study. Consent forms were returned by the students to their respective teachers. Arrangements for a suitable time to visit the classroom to administer the questionnaire were made with individual teachers and principals, most often approximately one week after the distribution of the information letters and consent forms. Once in the classroom, the questionnaire (see Appendix C) was briefly described to the students using a prepared script (see Appendix D), and any questions were answered. Students who did not participate in the study engaged in other activities organized by the classroom teacher. While students completed the questionnaire, answers were given immediately to any questions that arose, thereby ensuring greater response consistency. The survey took students roughly 30 to 35 minutes to complete, and generally did not place excessive demands on class time or students' concentration abilities.

After the data were collected, each of the participating schools was given a feedback letter thanking them for their participation (see Appendix E). Furthermore, once results had been generated, the participating schools were provided with a brief summary of the findings. In addition, upon completion of the full study, the Ottawa-Carleton District School Boards will be provided with a copy of the final report.

### **3.4 SURVEY INSTRUMENT**

The self-administered questionnaire used in this study asked each student to complete a number of questions designed to measure the three levels of the social ecological model: personal factors (i.e., demographic factors, self-efficacy, attitudes); social factors (i.e., encouragement received from family, friends, siblings, grandparents, teachers, and coaches for physical activity participation, and modelling of physical activity from family and friends); and environmental factors (i.e., perceptions of safety and aesthetics in the neighbourhood, opportunities for physical activity at the school and in the community). In addition, a series of behavioural questions about commuting to and from school and,

importantly, weekly physical activity participation were included (see Table 1). Measures are described below and a copy of the questionnaire is located in Appendix C.

In addition to the data gathered in the questionnaire, this study also compiled information on each of the participating school's surrounding neighbourhoods (i.e., the neighbourhood within the school's approximate boundary area) in order to help classify the neighbourhoods as either urban high density, suburban, or suburban low density. Using commercially-available maps and information taken from the Ottawa-Carleton District Public and Catholic School Boards regarding school boundary areas, information regarding proximity to the city centre, street and neighbourhood density, and amount of open space for each school's surrounding neighbourhood was estimated.

Drawing on this information, each school area was rated as low, medium, or high on three characteristics: proximity to the city centre, street and neighbourhood density, and amount of open space. Neighbourhood types were then determined by the combination of ratings a school boundary area received. For example, if a school area received a high rating for proximity to the city centre, a high rating for neighbourhood density, and a medium or low rating for open space, the neighbourhood was classified as being in an urban high density area. Conversely, if the school area received mostly medium ratings for proximity to the city centre, neighbourhood density, and open space, then it was classified as being a suburban area. Finally, if the school boundary was generally characterized by low proximity to the city centre, low neighbourhood density, and high amounts of open space, then the neighbourhood was classified as being a suburban low density area. Based on these estimates, the neighbourhoods in which the schools were located were classified into these three different types for the purpose of this study: (1) urban high density; (2) suburban; and (3) suburban low density. An inspection of census tract data corresponding to the defined neighbourhoods (Statistics Canada, 2008a) affirmed the classifications ultimately used in this study, by reflecting the expected decrease in population density across these neighbourhood groups: urban high density (M=5,245.72, SD=1,309.61); suburban (M=2,421.68, SD=422.97); suburban low density (M=1,900.50, SD=1,982.88). Further, measures of proximity to the city centre and neighbourhood density are among some of the methods that Statistics Canada recommends using to delineate among neighbourhoods, albeit using somewhat more



sophisticated techniques (Statistics Canada, 2008c). Hence, this instils confidence in the use of these measures in the current study to classify the neighbourhood types.

**Table 1**  
**A Summary of Variables Used in the Study**

<b>Research Questions</b>	<b>Items on Survey</b>
Are all factor levels (i.e., personal, social, and environmental) important to explaining youths' physical activity participation?	<ul style="list-style-type: none"> <li>• Demographics – Gender and age</li> <li>• Survey of Participation in Activities – Physical activities section (Smale &amp; Shaw, 1993) - modified.</li> <li>• Self-efficacy &amp; Attitudes scale (Motl et al., 2000).</li> <li>• Survey of Participation in Activities – Physical activity encouragement section (Smale &amp; Shaw, 1993).</li> <li>• School and community support for physical activity – developed (Flack, 2008).</li> <li>• Perceptions of physical environment scales (Evenson et al., 2006) – modified.</li> </ul>
What specific variables within each factor level (i.e., personal, social, and environmental), and combination of variables are the most significant in explaining physical activity participation?	<ul style="list-style-type: none"> <li>• Demographics – Gender and age</li> <li>• Survey of Participation in Activities – Physical activities section (Smale &amp; Shaw, 1993) - modified.</li> <li>• Self-efficacy &amp; Attitudes scale (Motl et al., 2000).</li> <li>• Survey of Participation in Activities – Physical activity encouragement section (Smale &amp; Shaw, 1993).</li> <li>• School and community support for physical activity – developed (Flack, 2008).</li> <li>• Perceptions of physical environment scales (Evenson et al., 2006) – modified.</li> </ul>
Do certain factors have greater amounts of influence on physical activity participation in different school and neighbourhood environments?	<ul style="list-style-type: none"> <li>• Neighbourhood description</li> <li>• Survey of Participation in Activities – Physical activities section (Smale &amp; Shaw, 1993) - modified.</li> <li>• Self-efficacy &amp; Attitudes scale (Motl et al., 2000).</li> <li>• Survey of Participation in Activities – Physical activity encouragement section (Smale &amp; Shaw, 1993).</li> <li>• School and community support for physical activity – developed (Flack, 2008).</li> <li>• Perceptions of physical environment scales (Evenson et al., 2006) – modified.</li> </ul>

### **3.5 SELF-ADMINISTERED PHYSICAL ACTIVITY QUESTIONNAIRE**

#### ***Physical activity***

Physical activity was the outcome measure of interest in this study. The physical activity measure used in this study was a modified version of the physical activity index developed by Smale and Shaw (1993) to assess participation in a number of popular leisure time physical activities. The index was modified to include other types of physical activities that may be more applicable for this study's age group (e.g., skipping, tag) and to include other forms of daily physical activities outside of leisure time pursuits, such as household chores. The index was also modified to ask participants to recall the number of times in the past week they participated in each activity as opposed to the number of times in a typical month. The reasoning behind this was based on other studies that have found preadolescent children to have some difficulty accurately recalling their physical activity, and so, shorter recall periods improve reliability (Sallis, Strikmiller et al., 1996). Thus, students were asked to write in the number of times in the past week they participated in each activity.

A question about the amount of time the participant typically spends engaged in each activity (in hours and minutes) was added to the questionnaire in order to obtain an overall estimate of the amount of time participants spend engaged in physical activities in a week. Thus, students were then asked to write in how long they typically spend engaged in each activity in hours and minutes.

Participants were also asked to indicate whether or not they played an activity "really hard". Playing an activity "really hard" was described as having your heart beat fast or being out of breath. This measure was introduced to potentially weight participants' overall measure of time spent in physical activities by using "really hard" as an indicator of greater participation intensity. Ultimately, the weight was not applied in the final analysis because the time spent engaged in physical activity each week provided a suitable and viable indicator of physical activity participation without the need to further modify (or complicate) the outcome measure.

### ***Demographics***

Students were asked to report their sex, age, and grade by checking the appropriate boxes or filling in the blanks. The measure of a participant's sex allowed for comparisons between males and females, which is important as the literature has shown consistent significant differences between males and females physical activity participation (e.g., Sallis et. al., 2000; Strauss et. al., 2001). Age has also been shown to be a consistent correlate with physical activity in the literature, with physical activity decreasing with age, particularly during adolescence (e.g., Sallis et. al., 2000; Strauss et. al., 2001). Therefore, measures of sex and age allowed for an examination of potential variations in physical activity participation among these subgroups within the sample.

### ***Self-efficacy***

The self-efficacy scale was designed to obtain a measure of one's confidence in his or her ability to be successful at being physically active (Saunders et al., 1997). The scale created by Saunders et al. (1997) was modified from the measures of Reynolds et al. (1990) and Sallis et al. (1992) in order to create a measure of self-efficacy that was appropriate for use with pre-adolescent children.

In 2000, a study conducted on the scale by Motl et al. (2000) established its validity and invariance based on a sample of adolescent girls. Furthermore, their study reduced the scale from 17 items to 8, which still measured the three separate self-efficacy factors in Saunders et al.'s (1997) original pre-adolescent self-efficacy scale (i.e., support seeking, barrier, and positive alternatives efficacy). Thus, the current study used the eight-item scale developed by Motl et al. (2000).

This scale includes statements such as "I can be physically active during my free time on most days" and "I can ask my best friend to be physically active with me". Respondents were then asked to select an answer that best suits them on a five-point scale ranging from "never true for me" (value=1) to "always true for me" (value=5).

The self-efficacy variables were grouped together to create composite measures of the three different measures of self-efficacy: (1) the support seeking efficacy measure included: "I can be physically active during my free time on most days", "I can ask my parents or other

adult to do physically active things with me”, “I can ask my best friend to be physically active with me”, and “I have the skills I need to be physically active”; (2) the barrier efficacy measure included: “I can be physically active even if it is hot or cold outside”, and “I can be physically active on most days no matter how busy my day is”; and finally (3) the positive alternatives efficacy measure included: “I can be physically active during my free time on most days even if I could watch TV or play video games instead”, and “I can be physically active even if I have to stay at home”. Higher scores on self-efficacy indicate a more positive perception of one’s confidence directed towards physical activity.

### *Attitudes and Health Beliefs*

The health beliefs scale measures beliefs among pre-adolescent children about the consequences of being physically active (Saunders et al., 1997). The scale by Saunders et al. (1997) is based on an earlier version (1986) of physical activity beliefs, and was modified to be age appropriate for preadolescent children. The scale measures two separate factors: social outcomes and physical outcomes.

Motl et al. (2000) tested the factorial validity and invariance of this scale and found it to be appropriate for use with adolescents. Moreover, again Motl et al. reduced the original 16-item measure to an 8-item measure of attitude. Thus, the scale has been validated further by Motl and colleagues since Saunders et al.’s original (1997) scale, and it captures a reliable measure of various attitudes towards physical activity.

All of the items begin with the statement “If I were to be physically active most days...” and included responses such as “it would get or keep me in shape” and “it would be fun”. Like the self-efficacy scale, respondents were asked to provide an answer that best represents their beliefs on a 5-point scale ranging from “never true for me” (value=1) to “always true for me” (value=5). A higher score on the attitude scale indicates a more positive attitude towards physical activity.

Both the self-efficacy and beliefs scales as developed by Saunders et al. (1997) have been used in other studies with youth. For example, Trost et al. (1999) modelled their self-efficacy, social norms, and beliefs scales on the scales developed by Saunders et al. (1997) in order to examine the correlates of objectively measured physical activity among sixth-grade

students. Hence, there is additional empirical support in the literature for employing these scales in the current study.

### ***Social Influences***

The social influences scale examines the influence that family, friends, teachers, and coaches have on youths' physical activity. The social influences scale utilized in this study was derived from the Smale and Shaw (1993) adolescent recreation participation study. This scale assesses the amount of encouragement participants perceive they receive from a number of significant people (i.e., mother, father, sisters, brothers, friends, teachers, coaches and grandparents).

The scale was modified slightly from a 7-point scale with anchors at each end of the continuum (from “did not encourage me at all” to “really encourage me a lot”) to a 5-point scale with descriptors for each of the points along the scale, again beginning with “do not encourage me at all” (value=1) to “really encourage me a lot” (value=5). Implementing this minor modification simplified the scale for this younger sample. In addition, this modification was used successfully in a previous study by Morgan (2005), which also assessed physical activity among adolescents.

The survey also includes a measure of modelling of physical activity behaviours by friends and family members, by asking participants to indicate if “none”, “some”, or “all” of their friends and/or family members participate in physical activities. This measure allowed for an examination of the influence of modelling on youths' physical activity behaviours, which has previously been found to have a significant influence on physical activity participation in other studies (Barnett et al., 2006).

### ***School and community***

Based on findings in the literature, students' perceptions of the physical features in their neighbourhood environments, as well as their perceptions of available opportunities to participate in physical activities at school and in their community were gathered. The bases for some of these questions were derived from a qualitative study by Bauer, Yang, and Austin (2004) where students indicated what sorts of things they desired to support their engagement in physical activity.

Statements compiled for this study begin with either “At my school...” or “In my community...” and are followed by examples of items such as, “there are enough sports teams I can join” and “there is enough equipment that I can use to participate in physical activities”. A 5-point scale was employed for this measure, with possible responses ranging from “not true at all” (value=1) to “very true” (value=5).

### ***Perceived environment***

Perceptions of the environment consist of participants’ subjective evaluations of their environment, and include a number of constructs (e.g., aesthetics, safety, access to facilities). In a recent study, Evenson et al. (2006) developed and tested a scale using several components to assess youths’ perceptions of physical environment factors and the findings demonstrated sufficient confidence in using this instrument to assess perceptions of the physical environment among young people. Thus, selected components of the Evenson et al. (2006) scale were employed in this study.

The perceived environment components of the scale ask about the aesthetics of the environment, physical activity facilities near the home, safety, and transportation in the neighbourhood. The aesthetics of the environment and safety measures were combined on the survey and both were measured on a 5-point scale ranging from “not at all true” (value=1) to “very true” (value=5). The statements begin with “In my neighbourhood...” and were followed by such things as, “there are lots of trees along the streets” and “it is safe to ride a bike”. A composite measure of safety was subsequently created and included the participants’ responses to: “it is safe to walk or jog”, “it is safe to ride a bike”, “walkers and bikers on the streets can easily be seen by people in their homes”, “there is so much traffic that it makes it hard to walk”, “there is a lot of crime”, “I often see other girls or boys playing outdoors”, “there are lots of loose or scary dogs”, and “streets are well lit at night”. Higher scores on the measure indicate more positive perceptions of safety in the neighbourhood.

A second component of Evenson et al.’s (2006) scale includes questions about transportation around one’s neighbourhood. Questions reflect how difficult it is for participants to get around their neighbourhood and their perceptions of the freedom their parents allow them to have in order to get around independently. The response options range on a 5-point scale from “never true for me” (value=1) to “always true for me” (value=5), and

examples of statements include, “If I wanted to stay after school for an activity, it would be easy for me to get home afterwards” and “My parents allow me to walk in our neighbourhood on my own”.

As these questions in the scale address two different kinds of neighbourhood mobility issues (i.e., the perception of the ease in getting around the neighbourhood and the perceived freedom one has to get around the neighbourhood), the scale was organized into two subscales. The first subscale focused on one’s level of neighbourhood mobility due to parents or guardians support and ultimately the freedom he or she was afforded for mobility around the neighbourhood. Called parental support, this subscale includes the items: “My parents (or guardians) worry about something happening to me if I go somewhere on my own”, “My parents allow me to walk in our neighbourhood on my own”, “My parents allow me to bike on my own”. The second subscale, called environmental support, focused on the perceptions associated with one’s environment and the support it provides for physical activity. It includes the items: “There are many places I like to go within easy walking distance of my home”, “If I stayed after school for an activity, it would be easy for me to get home afterwards”, “If I wanted to do an after-school activity someplace else besides school, it would be easy for me to get there”, and “If I wanted to do an after-school activity someplace else besides school, it would be easy for me to get home afterward”. Higher scores on these composite measures indicate greater perceptions of ease of mobility in one’s neighbourhood.

A third part of the perceived environment survey inquires about access to 13 common physical activity facilities (e.g., basketball court, park). This list of facilities was slightly modified from its original form to eliminate facilities considered to be less relevant to the study area and age group (e.g., beach or lake, golf course) and to include more relevant places such as the school grounds and school gym. Students were then asked simply to check if there is one of these places in their neighbourhood (yes or no).

The second element of this measure, which concerns access to various physical activity facilities, assesses the facilities perceived quality from the participants’ perspective. This element was added to examine students’ perceptions of the quality of the physical facilities in their neighbourhood. Indeed, this may be more influential and indicative of physical activity participation than a solely objective assessment of the availability of facilities. Students’ perceptions of the presence of facilities and their perceived quality

constitute the “reality” of their neighbourhood, and thus could have an impact on their decisions around participation. Hence, students were asked to indicate what each of the facilities they reported was present in their neighbourhood was like, by indicating whether “it’s good”, “it’s ok” or “it’s bad”.

The third element of this measure is a slight modification from the original format which asked participants, “*would they go there*” (emphasis added) as opposed to “if they go there regularly” (yes or no), which was used instead in this study. This modification was made to capture current behaviour as opposed to hypothetical behaviour, and is of greater relevance to this study since current use of facilities could be compared with current physical activity participation, as well as perceptions of the quality of those facilities.

### ***Transportation***

Active commuting to school has been recognized as an area for potentially increasing physical activity in youths’ daily lives, and thus has received more recent attention in the literature (Evenson et al., 2003). In addition to the physical activity benefits of active commuting to school, it has the added benefit of helping the environment by reducing emissions created from alternative modes of transportation to school such as getting driven or taking the bus. Additionally, active commuting to school affords youth the opportunity to socialize with other youth and develop greater independence.

Students were asked to indicate how they get to and from school on most days by checking one of the following response options: “getting a drive”, “walking”, “biking”, or “taking the bus”. This measure allowed for an examination of the relationship between neighbourhood environments and active commuting, as well as active commuting and physical activity levels.

## **3.6 PILOT TESTING**

Though most of the scales used in this study were previously validated for use with children or adolescents, pilot testing was conducted to identify any potential issues, and hence ensure that the final survey was appropriate and easy to comprehend for the study’s age group. The pilot testing used a convenience sample of six boys, all of whom were 12 and 13 years old. The findings lead to a few minor changes to enhance the clarity of wording on



the questionnaire, including changing "...it would help me *cope* with stress" to "...it would help me *deal* with stress". "Deal with stress" was the preferred term the pilot study participants used to explain the concept to each other. Snowboarding was added to downhill/cross-country skiing, and encouragement from grandparents was included in the list of sources of encouragement. In addition, a response option of "does not apply to me" was added to the encouragement section of the survey, to avoid having participants selecting "do not encourage me at all" if, for example, they did not have a sister. Furthermore, in the pilot study, it took the six boys between 20 and 30 minutes to complete the survey, which provided an indication of the amount of classroom time which would be required for students to complete the survey.

### **3.7 DATA ANALYSIS**

Data were analyzed using SPSS versions 15.0 and 16.0. First, descriptive statistics were generated and analyzed to describe the sample and lay the foundation for subsequent analyses. To examine differences between various subgroups within the sample based on sex, age, and neighbourhood environments, t-tests and analyses of variance were used. Correlations were used to determine the strength of relationships between key variables. Ultimately, these analyses lead to several hierarchical regression analyses in order to explore the relative importance and relationships between the variety of personal, social, and environmental variables in explaining variations in physical activity participation among youth.

# **CHAPTER FOUR**

## **CHARACTERISTICS OF YOUTH**

### **AND THEIR SOCIAL AND PHYSICAL ENVIRONMENT**

The results for this study are split into two chapters. This chapter focuses on the characteristics of the youth participating in the study and their social and physical environments, and the next chapter examines those factors associated with youths' physical activity. This chapter includes a profile of the sample and a description regarding their physical activity participation, as well as their perceptions of personal, social, and environmental factors related to their physical activity. Furthermore, an examination of the relationships among personal, social, and environmental factors and physical activity outcomes are explored.

In the next chapter, the relationships and interacting effects among central factors are considered. This is followed by a look at the explanatory power of personal, social, and environmental factors for youths' physical activity.

#### **4.1 SAMPLE PROFILE**

A total of 804 surveys were collected in the spring of 2008 from 13 different elementary and middle schools (grades six to eight) throughout the Ottawa-Carleton District Public and Catholic School Board. Approximately 1325 students attending the 13 schools were invited to participate in the study. A 10% absenteeism or other student commitments rate is quite reasonable to suggest on a typical school day. Thus the overall response rate was 67% with response rates varying among the schools from approximately 19-96%. All but one school had response rates above 60%, hence, the response rates were quite acceptable (Baruch, 1999).

Of the total 804 students surveyed from across 13 different schools in the Ottawa-Carleton District Public and Catholic School Board, 413 were females (51.4%) and 384 were males (47.8%) (see Table 2). Participants in the study ranged in age from 10 to 16 years old, with the plurality being 12 years old. Some age categories were combined as less than six

students in total were under 11 years old or above 14 years. Hence the 10 and 11 year old age category is dominated by 11 year olds, and the 14-16 year old category by 14 year olds.

Most of respondents in this study were in grade six (n=359), representing 44.7% of the sample. This was due to a number of the schools that participated in the study, particularly in the Catholic School Board, only having students up to grade six in their schools, and therefore only this group could be surveyed. The study sample breaks down into 217 participants living in urban high density neighbourhoods (27.0%), 404 living in suburban neighbourhoods (50.2%), and 183 living in suburban low density neighbourhoods (22.8%) (see Table 2).

**Table 2**  
**Characteristics of the Sample**

<b>Characteristics</b>	<b>n</b>	<b>Pct.</b>
<b>Sex</b>		
Females.....	413	51.4
Males .....	384	47.8
<b>Age</b>		
10 -11.....	184	22.9
12.....	258	32.1
13.....	224	27.9
14 -16.....	133	16.5
<b>Grade</b>		
6.....	359	44.7
7.....	198	24.6
8.....	242	30.1
<b>Neighbourhood</b>		
<b>Sex</b>		
<b>Suburban low density .....</b>	<b>217</b>	<b>27.0</b>
<i>Males .....</i>	94	43.3
<i>Females .....</i>	120	55.3
<b>Suburban .....</b>	<b>404</b>	<b>50.2</b>
<i>Males .....</i>	166	41.1
<i>Females .....</i>	237	58.7
<b>Urban high density.....</b>	<b>183</b>	<b>22.8</b>
<i>Males .....</i>	124	67.8
<i>Females .....</i>	56	30.6

Demographically, the three neighbourhoods are fairly similar, however, there are a few differences to note. As can be seen in Table 2, there was a higher proportion of males

who participated in the study from urban high density neighbourhoods, and conversely, a higher proportion of females who participated in the study living in suburban and in suburban low density neighbourhoods.

Turning to the census data for these neighbourhoods, they indicate that the percentage of children aged zero to 14 years increases as one moves further from the city into less densely populated neighbourhoods: urban high density (M=13.66, SD=3.35), suburban (M=19.55, SD=2.81), and suburban low density (M=24.14, SD=4.61). The percentage of persons who are married also increases as one moves further from the city: urban high density (M=28.80, SD=5.01), suburban (M=45.07, SD=2.02), suburban low density (M=48.41, SD=0.77). Though there are not statistically significant differences between the average household incomes among the neighbourhoods ( $F=2.031$ ,  $p=.194$ ), there is higher variability in average household income particularly in the urban high density neighbourhoods: urban high density (M=\$73,662.10, SD=\$17,350.97), suburban (M=\$90,458.07, SD=\$13,413.93), suburban low density (M=\$94,043.38, SD=\$2,365.45) (Statistics Canada, 2008a). Generally speaking, these demographic differences are not surprising, since families tend to live further from the city in the suburbs, and there tends to be greater variation in average household income in city centres. Thus, since the neighbourhoods are not meaningfully different demographically, any variations among the neighbourhoods in physical activity behaviour might be more attributable to differences in the environment itself. This proposition will be examined later.

## **4.2 YOUTH PHYSICAL ACTIVITY BEHAVIOURS**

To determine the physical activity participation of the youth in this study, several indicators were created. First, two activities – “walking” and “downhill skiing/cross-country skiing/snowboarding” – were eliminated from subsequent consideration among the physical activity indicators. In the case of downhill skiing/cross-country skiing/snowboarding, these are seasonal winter activities and the surveys were completed in late May and June of 2008 using a question about participation during the past week. Therefore, essentially no one had participated in these activities. Walking was also eliminated because based on the nature of the results this question was probably interpreted differently by many participants. Approximately 23% reported no walking at all in the past week, another 10% reported more

than 20 hours per week of walking, while a handful even reporting walking 24 hours a day, seven days a week. These results suggest that some participants likely reported all of the time throughout the day during which they actually sporadically walked, and others who reported only the walking they did for exercise. Therefore, by eliminating these two activities, a more reliable indicator of youths' physical activity was generated.

For the remaining 19 activities in the study, to minimize the effect of exaggerated estimates of participation, any single episode was limited to a maximum of 10 hours. This represented only up to 5% of cases for some activities and still included these individuals' high levels of participation in an activity. The total hours of participation in each activity in the past week was then calculated by multiplying the number of episodes in an activity in the past week by the average amount of time they reported spending in the activity during each episode. Each individual activity was then capped at 20 hours of participation for the week, which averages to roughly three hours of participation per day, per activity. Capping the individual activities at 20 hours captured 96 to 100% of participants' responses across all of the activities. This process still retained those individuals with a high level of participation, while providing a reasonable and discriminating estimate of participation in each single activity for the previous week.

Indicators of participation in team sports, individual sports, and physical activities were then calculated using an individual's participation rates across all of the activities that fall into each of these physical activity categories (see Appendix C). After this calculation, between 1% and 5% of the cases still had rather high participation rates due to reporting comparatively higher participation rates across multiple activities. Thus, each activity category (i.e., team sports, individual sports, and physical activities) was capped at 35 hours per week. Again, this limit still reflects the higher levels of participation, but helps bring the skew under control and corrects for any misinterpretations. Finally, an indicator of total physical activity was created by summing participants' total participation time in all three physical activity categories.

The mean participation time in all physical activity, for the course of a week, for the entire sample was 22.08 hours per week, with a standard deviation of 17.30 hours (see Table 3). According to Canada's *Physical Activity Guides for Youth* (Active Healthy Kids Canada, 2007) the recommend 90 minutes per day of moderate to vigorous physical activity translates

into 10.5 hours of moderate to vigorous physical activity per week. Thus, it seems that on average, taken as a whole, the sample is quite active, and are in fact meeting the recommended 90 minutes per day of moderate to vigorous physical activity. However, it is quite conceivable that not all of the activities reported here are being engaged in at a moderate to vigorous level by all individuals in the sample.

Though the sample as a whole seems quite active, the participation rates do vary quite a bit across individuals, as reflected in a standard deviation of 17.30 hours per week of physical activity. Hence, some individuals in the sample are very active, reporting more than 60 hours per week of physical activity, and others very inactive, reporting less than 30 minutes of physical activity per week. Of great concern is the fact that according to Canada's physical activity guidelines, 31.1% of the sample is not getting the recommended 90 minutes per day, or 10.5 hours per week, of moderate to vigorous physical activity. One should note that although the list of activities in the current study was a fairly comprehensive list of common physical activities, it was not an exhaustive list of all activities, and hence, there is a possibility that some individuals who are captured in the 31.1% of insufficiently active youth may in fact be active in other activities not considered in this study. On the other hand, because participants reported participation in all physical activity regardless of whether that activity was at a moderate or vigorous level, it is just as likely that even more than 31.1% of the sample are not meeting the guideline of 90 minutes per day of moderate to vigorous physical activity. Taking both of these viewpoints into consideration, it seems reasonable to suggest that approximately 30% of the sample is not obtaining sufficient physical activity to achieve health benefits, which is a growing concern for today's youth.

Of all the physical activity categories, physical activities yielded the highest participation frequency (92.8%) and participation rate ( $M=10.30$ ,  $SD=10.13$ ), followed by team sports (90.4%) ( $M=9.15$ ,  $SD=8.52$ ), and individual sports (70.9%) ( $M=5.71$ ,  $SD=6.29$ ) (see Table 3). Running/jogging was the most commonly engaged in activity, with 68.8% of the sample reporting participating in the past week, followed by household chores at 65.9%. However, several other activities yielded higher mean rates of participation, such as swimming ( $M=4.97$ ,  $SD=5.18$ ), rollerblading/in-line skating/skateboarding ( $M=4.62$ ,  $SD=6.38$ ), and soccer ( $M=4.52$ ,  $SD=5.07$ ), among others.

**Table 3**  
**Total Hours of Participation in Each Activity among Participants**

Activity Category Activity	Rank order	n	Hours per Week of Participation		
			Pct. <sup>a</sup>	Mean <sup>b</sup>	Std. Dev.
<b>Physical Activities</b>					
Running/Jogging .....	1	553	68.8	2.84	4.17
Household Chores .....	2	530	65.9	4.32	5.38
Bicycling .....	4	442	55.0	4.27	5.61
Active Games .....	5	442	55.0	2.62	4.02
Exercising.....	11	222	27.6	2.75	3.94
Skipping .....	14	205	25.5	1.09	2.16
Rollerblading/In-line .....	16	141	17.5	4.62	6.38
Skating.....	20	29	3.6	4.03	5.25
<b>Total for Physical Activities</b>		<b>746</b>	<b>92.8</b>	<b>10.30</b>	<b>10.13</b>
<b>Team Sports</b>					
Soccer.....	3	517	64.3	4.52	5.07
Basketball.....	6	425	52.9	3.41	4.70
Football .....	9	288	35.8	3.11	4.65
Tennis/Badminton .....	10	260	32.3	2.05	2.73
Baseball/Softball .....	12	220	27.4	3.03	3.83
Ball/Street Hockey .....	15	182	22.6	3.04	4.59
Volleyball.....	17	109	13.6	1.28	2.05
Hockey/Ringette.....	18	105	13.1	3.57	4.33
<b>Total for Team Sports</b>		<b>727</b>	<b>90.4</b>	<b>9.15</b>	<b>8.52</b>
<b>Individual Sports</b>					
Swimming .....	7	308	38.3	4.97	5.18
Track and Field .....	8	303	37.7	2.55	3.04
Gymnastics/Dance.....	13	205	25.5	4.24	5.21
Bowling.....	19	60	7.5	2.54	3.47
<b>Total for Individual Sports</b>		<b>570</b>	<b>70.9</b>	<b>5.71</b>	<b>6.29</b>
<b>Total for All Physical Activity</b>		<b>769</b>	<b>95.6</b>	<b>22.08</b>	<b>17.30</b>

<sup>a</sup> Percentage of sample reporting participation in activity

<sup>b</sup> Mean hours per week of participation in various activities

Soccer was the most commonly engaged in team sport (64.3%) (M=4.52, SD=5.07), and overall, ranked as the third most engaged in activity. Basketball was the second most commonly engaged in team sport (52.9%) (M=3.41, SD=4.70), and ranked sixth for overall engagement. Finally, swimming was the most commonly engaged in individual sport (38.3%) (M=4.97, SD=5.18), and overall, ranked seventh among all activities (see Table 3).

### 4.3 PERSONAL FACTORS

#### 4.3.1 Age

With respect to age, the findings demonstrate that physical activity does generally appear to decline as age increases (see Table 4). Adolescents aged 11 and 12 years have somewhat similar mean total physical activity participation per week (M=23.54, SD=18.23 and M=24.39, SD=18.07 respectively). Physical activity participation then seems to drop off consistently beginning at ages 13 (M=20.46, SD=16.94) and 14 (M=18.93, SD=14.58). This may suggest there is a threshold effect, where physical activity participation remains relatively stable in the pre-teen years then begins to drop off after age twelve. This finding is consistent with the findings in the literature, in particular with studies that found a significant decline in physical activity between ages 10 and 18 years (Allison, et al., 2007; Sallis, et al., 2000; Strauss, et al., 2001).

**Table 4**  
**Physical Activity Participation by Sex and Age (n=804)**

<b>Characteristics</b>	<b>n</b>	<b>Mean<sup>a</sup></b>	<b>Std. Dev.</b>
<b>Sex</b>			
Females.....	395	20.30	16.42
Males .....	368	23.92	18.06
<b>Age</b>			
10-11.....	170	23.54	18.23
12 .....	245	24.39	18.07
13 .....	218	20.46	16.94
14-16.....	126	18.93	14.58

<sup>a</sup> Mean hours of participation per week total physical activity



### 4.3.2 Sex

Males in the study sample reported a higher mean participation rate in total physical activity time in comparison to females. Females reported a mean participation of 20.30 hours per week of total physical (SD=16.42) and males a mean participation rate of 23.92 hours per week (SD=18.06) (see Table 4). Therefore, on average males reported spending approximately three and a half more hours engaged in physical activity in a week in comparison to females. This finding is also consistent with findings in the literature (Sallis et al., 2000; Sallis, Zakarian et al., 1996; Strauss et al., 2001).

### 4.3.3 Self-Efficacy

Participants in the study generally perceived themselves to be fairly positive in their overall self-efficacy towards physical activity (M=3.70, SD=0.74) (see Table 5). Of the self-efficacy sub-scales, participants reported the highest mean scores for support seeking efficacy (M=3.75, SD=0.76), and virtually identical mean scores for positive alternatives efficacy (M=3.66, SD=0.96) and barrier efficacy (M=3.66, SD=0.95). This indicates that youth might have greater confidence in their ability to seek support for physical activity than they do in either their ability to overcome barriers to physical activity or choose from alternative options during their leisure time. What is interesting to note, however, is that despite reporting having the greatest confidence in support seeking efficacy, they reported the lowest mean score of all the self-efficacy items on “asking a parent or other adult to do physically active things with me” (M=3.12, SD=1.23) (see Table 5). This suggests that youth overall have the least amount of confidence (or perhaps simply interest) in asking a parent or adult to do physical active things with them. However, it should be noted that this item also had the highest standard deviation (1.23) indicating greater variation in responses and hence in the confidence among these individuals to ask a parent or adult to participate in physical activities with them.

Having the confidence to “be physically active during my free time on most days even if I could watch TV or play computer/video game instead” received the second lowest mean score (M=3.38, SD=1.11), followed closely by “I can be physically active on most days no matter how busy my day is” (M=3.39, SD=1.14) (see Table 5). This suggests that youth have less confidence in their ability to be physically active when they have the option

of watching television or playing computer and video games instead, or if they have a busy day. On the other hand, youth report the greatest confidence in having the skills they need to be physically active (M=4.24, SD=0.96), in being physically active even if they have to stay at home (M=3.94, SD=1.15), and in being physically active even if it is hot or cold outside (M=3.92, SD=1.05) (see Table 5). Since the factors in which youth report having the most confidence and least confidence cross over all three self-efficacy sub-scales, it would appear that they are not especially more or less confident in a particular type of efficacy (e.g., support seeking).

**Table 5**  
**Self-Efficacy Towards Physical Activity (n=804)**

Type of efficacy Statement	Mean <sup>a</sup>	Std. Dev.
<b>Support seeking efficacy</b>		
I have the skills I need to be physically active	4.24	0.96
I can ask my best friend to be physically active with me .....	3.83	1.14
I can be physically active during my free time on most days .....	3.81	0.93
I can ask my parents or other adult to do physically active things with me .....	3.12	1.23
<b>Overall support seeking efficacy .....</b>	<b>3.75</b>	<b>0.76</b>
<b>Positive alternatives efficacy</b>		
I can be physically active even if I have to stay at home .....	3.94	1.15
I can be physically active during my free time on most days even if I could watch TV or play computer/video game instead .....	3.38	1.11
<b>Overall positive alternatives efficacy .....</b>	<b>3.66</b>	<b>0.96</b>
<b>Barrier efficacy</b>		
I can be physically active even if it is hot or cold outside .....	3.92	1.05
I can be physically active on most days no matter how busy my day is .....	3.39	1.14
<b>Overall barrier efficacy .....</b>	<b>3.66</b>	<b>0.95</b>
<b>Overall Self-efficacy .....</b>	<b>3.70</b>	<b>0.74</b>

<sup>a</sup> Based on 5-point scales where higher scores reflect a greater degree of self-efficacy

#### 4.3.4 Attitudes

Overall, the youth report having quite positive attitudes towards physical activity (M=3.79, SD=0.65) (see Table 6). The belief that being physically active most days “would get or keep one in shape”, and “would be fun” received the highest mean scores and lowest standard deviations (M=4.42, SD=0.89 and M=4.24, SD=.088 respectively) (see Table 6). This suggests that most youth consistently agreed in their identification with these beliefs. The belief that physical activity most days “would make one more attractive” and “would help one deal with stress” attained the lowest mean scores (M=3.12, SD=1.35 and M=3.09, SD=1.24 respectively) (see Table 6). These latter two beliefs also had the highest variability signifying that even though youth agreed less with these beliefs overall, there was also greater discrepancy in the degree to which they identified with these beliefs.

**Table 6**  
**Physical Activity Attitudes (n=804)**

<b>“Physical activity most days...”</b>	<b>Mean<sup>a</sup></b>	<b>Std. Dev.</b>
Would get or keep me in shape.....	4.42	0.89
Would be fun .....	4.24	0.88
Would make me better in sports, dance, or other activities.....	4.22	1.00
Would make me hot and sweaty .....	4.02	1.02
Would give me energy.....	3.83	1.15
Would help me make new friends .....	3.31	1.20
Would make me more attractive.....	3.12	1.35
Would help me deal with stress.....	3.09	1.24
<b>Overall physical activity beliefs.....</b>	<b>3.79</b>	<b>0.65</b>

<sup>a</sup> Based on 5-point scales where higher scores reflect more positive beliefs towards physical activity.

## 4.4 SOCIAL FACTORS

### 4.4.1 Modelling

With respect to modelling of physical activity from friends and family members, in both cases “some of my friends” (56.5%) and “some of my family” (63.6%) were the most common responses to how many of your friends and how many of your family members participate in sports or physical activities (see Table 7). In both cases, and in particular for modelling by friends, few of the youth reported having none of their friends (0.9%) or no one among their family members (7.5%) who participated in sports or physical activities (see Table 7). Thus, the majority of youth seem to be receiving at least some role modelling for physical activity behaviours from friends and family members.

**Table 7**  
**Physical Activity Modelling by Friends and Family**  
**(n=804)**

<b>Physical Activity Participation</b>	<b>n</b>	<b>Pct.</b>
<b>Friends</b>		
All of my friends.....	336	41.8
Some of my friends.....	454	56.5
None of my friends.....	7	0.9
<b>Family</b>		
My whole family .....	224	27.9
Some of my family .....	511	63.6
No one in my family.....	60	7.5

### 4.4.2 Encouragement

Youth rated the overall amount of encouragement they received for physical activity from a variety of sources fairly highly ( $M=3.60$ ,  $SD=.80$ ) (see Table 8). Coaches were clearly rated as the source from which the most encouragement for physical activity was provided ( $M=4.36$ ,  $SD=1.07$ ), which is not surprising given their role. Encouragement from one’s father/guardian ( $M=3.99$ ,  $SD=1.12$ ) and mother/guardian ( $M=3.95$ ,  $SD=1.06$ ) was rated almost equally, and these were the next two most important sources of encouragement for physical activity (see Table 8). Siblings were rated the lowest for providing encouragement, with brothers ( $M=3.03$ ,  $SD=1.47$ ) receiving a slightly higher rating, but also higher variability, than sisters ( $M=2.97$ ,  $SD=1.36$ ) (see Table 8). With the potential for some of the

youth in this study to have had younger siblings who may be too young to be providing their older siblings with encouragement, this finding may not be too surprising either.

**Table 8**  
**Physical Activity Encouragement from Others**

<b>Source of Encouragement</b>	<b>n</b>	<b>Mean<sup>a</sup></b>	<b>Std. Dev.</b>
Individuals			
<b>Significant adults</b>			
Coach(es) .....	617	4.36	1.07
Teacher(s) .....	769	3.40	1.25
<b>Overall significant adults .....</b>	<b>780</b>	<b>3.81</b>	<b>1.02</b>
<b>Family</b>			
Father (guardian) .....	744	3.99	1.12
Mother (guardian) .....	779	3.95	1.06
Grandparents .....	666	3.15	1.33
<b>Overall family .....</b>	<b>793</b>	<b>3.72</b>	<b>0.97</b>
<b>Friends .....</b>	<b>767</b>	<b>3.56</b>	<b>1.16</b>
<b>Siblings</b>			
Brother(s) .....	484	3.03	1.47
Sister(s) .....	469	2.97	1.36
<b>Overall siblings .....</b>	<b>733</b>	<b>3.07</b>	<b>1.20</b>
<b>Overall Encouragement .....</b>	<b>797</b>	<b>3.60</b>	<b>0.80</b>

<sup>a</sup> Based on 5-point scales where higher scores reflect greater encouragement for physical activity

## 4.5 ENVIRONMENTAL FACTORS

### 4.5.1 School Opportunities

Overall, across all of the surveyed schools, youth rated the opportunities at their schools quite positively (M=3.85, SD=0.70) (see Table 9). In particular, they were most satisfied with there being “enough places to be physically active” (M=4.19, SD=0.91) and with there being “enough equipment for physical activity” (M=3.96, SD=0.96). On the other hand, they were comparatively least satisfied with there being “enough time given to physical education class” (M=3.46, SD=1.26) and with “enough chances to play competitive sports” (M=3.73, SD=1.64). These latter two items also had the highest degree of variability, meaning that there was greater disagreement among the participants as to whether schools

assigned enough time to physical education classes and provided enough opportunities to play competitive sports.

**Table 9**  
**Perceptions of School Opportunities (n=804)**

<b>School opportunity</b>	<b>Mean<sup>a</sup></b>	<b>Std. Dev.</b>
There are enough places to be physically active .....	4.19	0.91
There is enough equipment for physical activity .....	3.96	0.96
There is enough supervision for physical activity.....	3.92	0.97
There are enough chances to play intramural sports .....	3.85	1.08
There are enough chances to play competitive sports.....	3.73	1.64
There is enough time given to physical education class .....	3.46	1.26
<b>Overall school opportunity .....</b>	<b>3.85</b>	<b>0.70</b>

<sup>a</sup>Based on 5-point scale where higher scores reflect greater school opportunities

#### 4.5.2 Community Opportunities

Once again, youth reported being quite satisfied with the opportunities available in their communities for physical activity (M=4.06, SD=0.85) (see Table 10). In fact, they reported having slightly greater satisfaction on average with their community opportunities for physical activity (M=4.06, SD=0.85) than with their school opportunities for physical activity (M=3.85, SD=0.70).

**Table 10**  
**Perceptions of Community Opportunities (n=804)**

<b>Community opportunity</b>	<b>Mean<sup>a</sup></b>	<b>Std. Dev.</b>
There are enough places to be physically active .....	4.34	0.92
There are enough sports teams to join .....	3.92	1.18
There are enough individual sports programs to join .....	3.91	1.13
<b>Total community opportunity .....</b>	<b>4.06</b>	<b>0.85</b>

<sup>a</sup>Based on 5-point scales where higher scores reflect greater community opportunities

The community opportunity for physical activity that youth rated most positively was that there were “enough places to be physically active” (M=4.34, SD=0.92). This item also had the lowest variability, suggesting that even though participants were from a variety of neighbourhood environments, they were generally quite satisfied with the number of places in which to be physically active in their community. However, there was comparatively less satisfaction and greater disagreement on whether there were enough individual (M=3.91, SD=1.13) and team programs (M=3.92, SD=1.18) available in the community (see Table 10).

### 4.5.3 Neighbourhood Facilities

#### *Facility Awareness*

With respect to their awareness of 13 different neighbourhood facilities, on the whole, the youth seem to be aware of a fair number of facilities, just over eight, available to them (M=8.25, SD=3.49) (see Table 11).

**Table 11**  
**Number of Neighbourhood Facilities with which Youth are Aware and Use**  
**(n=804)**

<b>Neighbourhood facilities characteristics</b>	<b>Mean<sup>a</sup></b>	<b>Std. Dev.</b>
Overall measure of neighbourhood facility awareness.....	8.25	3.49
Overall measure of neighbourhood facility use.....	3.77	2.89

<sup>a</sup> Mean number of neighbourhood facilities with which individual is aware and uses

More specifically at the individual facility level, the majority of youth reported being aware of at least one park in their neighbourhood, with parks being the neighbourhood facility of which most of the youth were aware (88.7%) (see Table 12). Over 70% of youth also reported being aware of at least one soccer/football field (76.5%); walking, biking, or hiking path or trail (74%); school ground (73.8%); and basketball court (71.9%) in their neighbourhood (see Table 12). However, less than half of the sample reported being aware of a recreation centre or YMCA/YWCA (42.4%); track (34.3%); or dance or gymnastics club

(31.7%) in their neighbourhood (see Table 12). It is possible that some responses to facilities, such as basketball courts and swimming pools, might be referring to the presence of private facilities on one's property, as opposed to public facilities available to the entire community.

**Table 12**  
**Percentage of Youth Aware of Neighbourhood Facilities (n=804)**

<b>Neighbourhood facility</b>	<b>n</b>	<b>Pct.</b>
Park .....	713	88.7
Soccer/football field.....	615	76.5
Walking, biking, or hiking path or trail .....	595	74.0
School grounds .....	593	73.8
Basketball court .....	578	71.9
School gym .....	553	68.8
Skating rink (ice or in-line).....	549	68.3
Baseball diamond.....	540	67.2
Swimming pool.....	486	60.4
Tennis court .....	486	60.4
Recreation centre or YMCA/YWCA.....	341	42.4
Track .....	276	34.3
Dance or gymnastic club .....	255	31.7

### *Facility Use*

With regards to the regular use of the 13 facilities, despite youth being aware of about eight facilities at their disposal, they report using just under four ( $M=3.77$ ,  $SD=2.89$ ) facilities in their neighbourhood on a regular basis (see Table 11). Parks were not only the facility with which these youth were most aware in their neighbourhoods, but also the facility that received use by the largest percentage of them (52.0%), which demonstrates the importance of having parks in our neighbourhoods (see Table 13). Following parks in usage were walking, biking, or hiking path or trail (45.8%), school grounds (42.8%), and school gyms (40.4%) (see Table 13). Mirroring the youths' comparatively low levels of awareness for specific neighbourhood facilities, recreation centres or YMCA/YWCAs (11.7%), tracks (10.8%), and dance or gymnastic clubs (9.5%) also received regular use by the lowest percentages of youth (see Table 13). However, it is interesting to note that all of the neighbourhood facilities, with the exception of parks, were used by less than half of the



sample (see Table 13). Of course, one cannot use a facility in one's neighbourhood regularly if it does not exist or if one is simply not aware of its existence, but as shown earlier in the discussion of awareness of neighbourhood facilities – and by inference, the presence of neighbourhood facilities – awareness is consistently quite a bit higher than use. This may suggest a few things. Youth are aware of a number of facilities in their neighbourhoods, but are not physically active, and hence, simply do not use them. They might be aware of a number of facilities in their neighbourhood, but use other facilities outside of their neighbourhood. Or they are aware of a number of facilities in their neighbourhood, but only use certain facilities of interest to them. In this latter instance, when only those who reported being aware of the facility are considered the reported percentage of users of each facility type increases (see Table 13). Thus, the contrast between awareness of neighbourhood facilities and use of them may be understandable.

**Table 13**  
**Percentage Who Use Neighbourhood Facilities (n=804)**

<b>Neighbourhood facility</b>	<b>n</b>	<b>Pct. of Total</b>	<b>Pct. of Those Aware</b>
Park.....	418	52.0	58.6
Walking, biking, or hiking path or trail.....	368	45.8	61.9
School grounds.....	344	42.8	58.0
School gym.....	325	40.4	58.8
Soccer/football field.....	317	39.4	51.5
Swimming pool.....	258	32.1	53.1
Skating rink (ice or in-line).....	224	27.9	40.8
Basketball court.....	215	26.7	37.2
Baseball diamond.....	137	17.0	25.4
Tennis court.....	134	16.7	27.6
Recreation centre or YMCA/YWCA.....	94	11.7	27.6
Track.....	87	10.8	31.5
Dance or gymnastic club.....	76	9.5	29.8

***Facility Quality***

An index was created to assess youths' perceptions of the quality of the facilities in their neighbourhoods by averaging their evaluations of all of the facilities present in their neighbourhood

on whether they were “good”, “O.K.”, or “bad”. The results indicate that on average, they rated the quality of the facilities in their neighbourhood generally as “O.K.” (M=2.11, SD=.84). The facilities which were rated most positively by being perceived as “good” by the most youth were: parks (47.6%); soccer/football fields (46.8%); and walking, biking, or hiking path or trail (42.4%) (see Table 14). Hence, the facilities with which youth have the greatest awareness and highest usage rate, they also perceive as being of good quality. Conversely the facilities which received the highest percentage of “bad” ratings were: basketball courts (9.5%); school grounds (8.2%); and parks (7.7%) (see Table 14). Clearly, a relatively low number of youth reported the facilities in their neighbourhood to be “bad” (under 10%), and thus the majority report the facilities in their neighbourhood to be either of O.K or good quality. It is interesting to note, however, that parks were rated as the highest (47.6%) and also as one of the lowest quality facilities (7.7%). Hence there seems to be some variation in the perceived quality of parks, the most used facility, in youths’ neighbourhoods.

**Table 14**  
**Perceived Quality of Neighbourhood Facilities (n=804)**

<b>Facilities quality</b>	<b>n</b>	<b>Pct.</b>
<b>Park</b>		
Good .....	383	47.6
OK .....	233	29.0
Bad .....	62	7.7
<b>Soccer/football field</b>		
Good .....	376	46.8
OK .....	212	26.4
Bad .....	23	2.9
<b>Walking, biking, or hiking path or trail</b>		
Good .....	341	42.4
OK .....	189	23.5
Bad .....	35	4.4
<b>Skating rink (ice or in-line)</b>		
Good .....	276	34.3
OK .....	212	26.4
Bad .....	55	6.8
<b>School grounds</b>		
Good .....	236	29.4
OK .....	264	32.8
Bad .....	65	8.1

**Table 14 Continued**

<b>Basketball court</b>		
Good.....	196	24.4
OK.....	299	37.2
Bad.....	76	9.5
<b>Baseball diamond</b>		
Good.....	255	31.7
OK.....	218	27.1
Bad.....	55	6.8
<b>School gym</b>		
Good.....	256	31.8
OK.....	211	26.2
Bad.....	45	5.6
<b>Swimming pool</b>		
Good.....	278	34.6
OK.....	142	17.7
Bad.....	47	5.8
<b>Tennis court</b>		
Good.....	297	36.9
OK.....	116	14.4
Bad.....	33	4.1
<b>Recreation centre or YMCA/YWCA</b>		
Good.....	192	23.9
OK.....	105	13.1
Bad.....	41	5.1
<b>Track</b>		
Good.....	122	15.2
OK.....	128	15.9
Bad.....	52	6.5
<b>Dance or gymnastic club</b>		
Good.....	131	16.3
OK.....	87	10.8
Bad.....	43	5.3

#### 4.5.4 Neighbourhood Characteristics

##### *Neighbourhood Safety*

Overall, youth reported that they perceived their neighbourhoods to be quite safe (M=4.00, SD=0.60) (see Table 15). They most strongly agreed with feeling it was safe to ride a bike (M=4.20, SD=.90) and walk or jog (M=4.10, SD=.97) in their neighbourhoods. In contrast, they agreed less that the streets were well lit at night (M=3.49, SD=1.13) and that

they often saw other girls or boys playing outdoors (M=3.95, SD=1.07), albeit they still rated these aspects of neighbourhood safety relatively positively (see Table 15).

### ***Home Equipment***

Youth responded quite positively to having enough sports equipment available to them at home to use for physical activities (M=3.97, SD=1.07) (see Table 15). This finding suggests that access to sporting equipment at home for physical activity is likely not a barrier to being physically active for most youth.

### ***Neighbourhood Aesthetics***

With respect to the neighbourhood aesthetics, youth perceived them on the whole to be a slightly above average (M=3.55, SD=0.72) (see Table 15). Cleanliness items such as the lack of many “exhaust fumes and bad smells when walking around” (M=3.89, SD=1.10) and “usually clean, (not much garbage)” (M=3.56, SD=1.10) received the most positive scores. Meanwhile, items regarding the presence of aesthetically pleasing features, such as “many interesting things to look at while walking” (M=3.28, SD=1.12); and “there are lots of trees along the streets” (M=3.46, SD=1.17) received the lowest scores. However, the fairly high variability across the items signifies that there is some variation in how these youth perceive the aesthetics of their neighbourhoods.

### ***Active Neighbourhood Transportation Features***

Active neighbourhood transportation features, similarly to neighbourhood aesthetics, received an overall slightly above average rating (M=3.54, SD=1.04) (see Table 15). Not surprisingly, neighbourhoods were rated more positively for having “sidewalks on most of the streets” (M=3.63, SD=1.28), than they were for having “enough bicycle or walking trails” (M=3.46, SD=1.26). The variability on these two items is relatively high, once again implying that youths’ perceptions of their neighbourhoods varied a fair bit on the presence of sidewalks and bicycling and walking trails.

**Table 15**  
**Perceptions of Neighbourhood Characteristics (n=804)**

<b>Neighbourhood Characteristics</b>	<b>Mean<sup>a</sup></b>	<b>Std. Dev.</b>
<b>Safety</b>		
It is safe to ride a bike .....	4.20	0.90
It is safe to walk or jog .....	4.10	0.97
There is so much traffic that it makes it hard to walk [R].....	4.08	1.06
There are lots of loose or scary dogs [R] .....	4.05	1.04
Walkers and bikers on the streets can easily be seen by people in their homes .....	4.03	0.99
There is a lot of crime [R] .....	3.99	1.14
I often see other girls or boys playing outdoors .....	3.95	1.07
Streets are well lit at night.....	3.49	1.13
<b>Overall neighbourhood safety .....</b>	<b>4.00</b>	<b>0.60</b>
<b>Home equipment</b>		
Have enough sports equipment at home to use for physical activity .....	3.97	1.07
<b>Aesthetics</b>		
When walking around, there are a lot of exhaust fumes or bad smells [R].....	3.89	1.10
It's usually clean (not much garbage) .....	3.56	1.10
There are lots of trees along the streets .....	3.46	1.17
There are many interesting things to look at while walking ...	3.28	1.12
<b>Overall neighbourhood aesthetics.....</b>	<b>3.55</b>	<b>0.72</b>
<b>Transportation</b>		
There are sidewalks on most of the streets.....	3.63	1.28
There are enough bicycle or walking trails .....	3.46	1.26
<b>Overall neighbourhood transportation .....</b>	<b>3.54</b>	<b>1.04</b>

<sup>a</sup> Based on 5-point scales where higher scores reflect more positive views of the neighbourhood characteristic

Note: [R] represents a reverse coded variable.

#### **4.5.5 Commuting**

The majority of youth commute to (52.0%) and from (53.2%) school on most days by bus (see Table 16). This is followed by walking (23.1 and 27.2%), getting a drive (12.2 and 5.8%), and finally, biking (6.2 and 6.6%). Clearly, the more non-active forms of transportation to and from school are used by the majority of youth. However, there are no significant differences in physical activity between youth who actively or non-actively commute ( $t= 1.744, p=.082$ ).

**Table 16**  
**Commuting to and from School (n=804)**

<b>Commuting direction</b>		
Form of commuting	<b>n</b>	<b>Pct.</b>
<b>To school</b>		
Taking the bus.....	418	52.0
Walking.....	186	23.1
Getting a drive .....	98	12.2
Biking .....	50	6.2
<b>From school</b>		
Taking the bus.....	428	53.2
Walking.....	219	27.2
Getting a drive .....	47	5.8
Biking .....	53	6.6

#### 4.5.6 Neighbourhood Mobility

Neighbourhood mobility factors were separated into two sub-scales which comprised the original overall scale measuring the ability to get around the neighbourhood. One sub-scale was based on items that had to do with one’s perceptions of neighbourhood mobility due to parents’ or guardians’ support (called *parental support*), and the other sub-scale was based on items concerned with the perceptions associated with aspects of the neighbourhood environment (called *environmental support*).

Youth generally reported their overall neighbourhood mobility to be slightly above average (M=3.57, SD=0.76) (see Table 17). More specifically, youth perceived their environmental support (M=3.61, SD=0.97) to be generally better than their parental support (M=3.51, SD=0.95) for neighbourhood mobility.

In particular, for parental support, “my parents allow me to bike on my own” (M=4.04, SD=1.23) and “my parents allow me to walk on my own” (M=3.92, SD=1.19), received the highest scores (see Table 17). However, with regards to parental support, many youth felt it was quite true that “my parents or guardians worry about something happening to me if I go somewhere on my own” (M=2.58, SD=1.19). This would appear to be a sentiment that many youth can relate to, as this item was rated to be “often true” for most youth (see Table 17).

For environmental support, “there are many places I like to go within easy walking distance of my home” (M=3.93, SD=1.15) was rated as most true by youth (see Table 17).

Comparatively, getting to someplace else besides school to do an activity (M=3.46, SD=1.24) and then getting home afterward (M=3.45, SD=1.24) were perceived to be somewhat more challenging, but not overly difficult for youth (see Table 17).

**Table 17**  
**Perceptions of Neighbourhood Mobility (n=804)**

<b>Neighbourhood mobility factor</b>	<b>Mean<sup>a</sup></b>	<b>Std. Dev.</b>
Mobility items		
<b>Environmental Support</b>		
There are many places I like to go within easy walking distance of my home .....	3.93	1.15
If I stayed after school for an activity, it would be easy for me to get home afterwards.....	3.61	1.39
If I wanted to do an after-school activity someplace else besides school, it would be easy for me to get there .....	3.46	1.21
If I wanted to do an after-school activity someplace else besides school, it would be easy for me to get home afterward .....	3.45	1.24
<b>Overall environmental support .....</b>	<b>3.61</b>	<b>0.97</b>
<b>Parental Support</b>		
My parents allow me to bike on my own .....	4.04	1.23
My parents allow me to walk in our neighbourhood on my own...	3.92	1.19
My parents or guardians worry about something happening to me if I go somewhere on my own [R].....	2.58	1.19
<b>Overall parental support.....</b>	<b>3.51</b>	<b>0.95</b>
<b>Overall Neighbourhood Mobility .....</b>	<b>3.57</b>	<b>0.76</b>

<sup>a</sup> Based on 5-point scales where higher scores reflect greater perceived mobility around the neighbourhood.

Note: [R] represents a reverse coded variable.

## 4.6 SEX DIFFERENCES

### 4.6.1 Physical Activity

In accordance with most studies on physical activity, males in this study reported being significantly more physical active overall in comparison to females ( $t=2.89$ ,  $p=.004$ ) (see Table 18). In fact, males and females were significantly different in their engagement across all physical activity categories. Males reported engaging more in physical activities (M=11.69, SD=10.71) than females (M=9.04, SD=9.42), and in particular, they are engaging more in team sports (M=11.08, SD=9.44) than females (M=7.21, SD=6.98). However,

females reported engaging significantly more in individual sports (M=6.60, SD=6.63) than their male counterparts (M=4.42, SD=5.58) (see Table 18).

**Table 18**  
**Sex Differences in Weekly Participation in Physical Activities**

Physical Activity Category	Frequency of Participation			t	p
Sex	n	Mean <sup>a</sup>	Std. Dev.		
<b>Physical Activities</b>					
Males .....	354	11.69	10.71	<b>3.56</b>	<b>&lt;.001</b>
Females .....	386	9.04	9.42		
<b>Team Sports</b>					
Males .....	354	11.08	9.44	<b>6.25</b>	<b>&lt;.001</b>
Females .....	386	7.21	6.98		
<b>Individual Sports</b>					
Males .....	232	4.42	5.58	<b>-4.24</b>	<b>&lt;.001</b>
Females .....	334	6.60	6.63		
<b>Total Physical Activity</b>					
Males .....	368	23.92	18.06	<b>2.89</b>	<b>.004</b>
Females .....	395	20.30	16.42		

<sup>a</sup> Mean hours per week of participation in various activities.

When comparing the top ten activities in which the greatest number of males and females reported participating, one can see that there is quite a bit of overlap in these activities although there are some differences in their rank order (see Table 19 & Table 20). The main differences are more males report participating in football and ball/street hockey, and more females report participating in gymnastics/dance, and tennis/badminton.

On the other hand, when one examines differences in the top ten activities in which males and females spend the most time engaged per week, we see different activities arise in comparison to the most common activities discussed above. This suggests that even though the majority of youth are participating in these more common activities, a fewer number of them are spending a lot of time engaged in other physical activities (see Table 21 & Table 22). Again, there is a fair bit of overlap in the activities in which males and females spend the most time engaged, with some differences in their rank order (see Table 21 & Table 22).

The main differences are that males report spending more time participating in rollerblading/in-line skating/skateboarding, ball/street hockey and football, and females



report spending more time participating in ice skating, gymnastics/dance, and exercising (see Table 21 & Table 22). Thus, there seems to be some differences in the activities in which males and females prefer to spend their time engaged. As one might expect to see here, the males' mean scores overall tend to be higher than the females' mean scores, which reflects the fact that, overall, males reported spending more time engaged in physical activity (see Table 21 & Table 22).

**Table 19**  
**Most Common Physical Activities for *Males***

<b>Rank Order</b>	<b>Activity</b>	<b>n</b>	<b>Pct.</b>
1	Running/Jogging.....	260	67.7
2	Soccer .....	244	63.5
3	Household Chores.....	235	61.2
4	Basketball .....	232	60.4
5	Bicycling.....	221	57.6
6	Active Games.....	204	53.1
7	Football .....	172	44.8
8	Track and Field .....	136	35.4
9	Swimming.....	118	30.7
10	Ball/Street Hockey.....	113	29.4

**Table 20**  
**Most Common Physical Activities for *Females***

<b>Rank Order</b>	<b>Activity</b>	<b>n</b>	<b>Pct.</b>
1	Running/Jogging.....	291	70.5
2	Household Chores.....	290	70.2
3	Soccer .....	269	65.1
4	Active Games.....	237	57.4
5	Bicycling.....	217	52.5
6	Basketball .....	189	45.8
7	Swimming.....	187	45.3
8	Gymnastics/Dance .....	173	41.9
9	Track and Field .....	165	40.0
10	Tennis/Badminton.....	160	38.7

**Table 21**  
**Physical Activities in which *Males* Spend the Most Time Engaged**

Rank Order	Activity	Frequency of Participation		
		n	Mean <sup>a</sup>	Std. Dev.
	Rollerblading/In-line			
1	Skating/Skateboarding.....	82	6.05	7.36
2	Bicycling.....	221	5.44	6.50
3	Swimming.....	118	4.92	5.34
4	Household Chores .....	235	4.68	5.81
5	Soccer .....	244	4.58	5.12
6	Basketball .....	232	4.24	5.13
7	Ball/Street Hockey.....	113	4.19	5.40
8	Football.....	172	3.97	5.44
9	Hockey/Ringette.....	69	3.86	4.62
10	Baseball/Softball.....	98	3.66	4.33

<sup>a</sup> Mean hours per week of participation

**Table 22**  
**Physical Activities in which *Females* Spend the Most Time Engaged**

Rank Order	Activity	Frequency of Participation		
		n	Mean <sup>a</sup>	Std. Dev.
1	Ice Skating.....	14	5.26	5.55
2	Swimming .....	187	4.99	5.10
3	Gymnastics/Dance .....	173	4.60	5.30
4	Soccer.....	269	4.41	4.98
5	Household Chores .....	290	4.09	5.04
6	Bicycling .....	217	3.15	4.28
7	Hockey/Ringette.....	36	3.00	3.70
8	Track and Field .....	165	2.63	3.10
9	Baseball/Softball .....	120	2.54	3.32
10	Exercising.....	129	2.47	3.45

<sup>a</sup> Mean hours per week of participation

## 4.7 SEX DIFFERENCES ON PERSONAL FACTORS

### 4.7.1 Self-Efficacy

There were no significant differences between males and females on their overall perceptions of their self-efficacy ( $t=-1.73$ ,  $p=.085$ ) (see Table 23). However, males and

females did differ significantly in positive alternatives self-efficacy. Females were significantly more confident with positive alternatives efficacy ( $t=-3.99$ ,  $p<.001$ ), and in particular, they were significantly more confident in being physically active during their free time even if they had to stay at home ( $M=4.14$ ,  $SD=1.03$ ) than the males ( $M=3.71$ ,  $SD=1.24$ ) ( $t=-5.396$ ,  $p<.001$ ). Females were also significantly more confident with asking their parents or another adult to do physically active things with them ( $M=3.31$ ,  $SD=1.22$ ) than the males were ( $M=2.91$ ,  $SD=1.20$ ) ( $t=-4.57$ ,  $p<.001$ ). However the males were significantly more confident about having the skills they needed to be physically active ( $M=4.31$ ,  $SD=.97$ ) compared to females ( $M=4.17$ ,  $SD=.94$ ) ( $t=2.07$ ,  $p=.039$ ). Hence, while it seems that male and female youth are not overly different in their overall self-efficacy, they do appear to be more apt at certain forms of self-efficacy.

**Table 23**  
**Sex Differences in Self-Efficacy**

Self-efficacy Type	Frequency of Participation			t	p
Sex	n	Mean <sup>a</sup>	Std. Dev.		
<b>Support Seeking</b>					
Males.....	383	3.71	.77	-1.39	.166
Females.....	411	3.78	.74		
<b>Barrier</b>					
Males.....	383	3.69	.99	1.04	.298
Females.....	412	3.62	.92		
<b>Positive Alternatives</b>					
Males.....	383	3.52	1.03	<b>-3.99</b>	<b>&lt;.001</b>
Females.....	412	3.79	.87		
<b>Overall Self-efficacy</b>					
Males.....	382	3.65	.77	-1.73	.085
Females.....	408	3.74	.71		

<sup>a</sup> Higher scores represent greater self-efficacy towards physical activity

#### 4.7.2 Attitudes Towards Physical Activity

Females, for the most part, reported having more positive attitudes towards various aspects of physical activity, and they were significantly different ( $M=3.84$ ,  $SD=.61$ ) from the males ( $M=3.72$ ,  $SD=.69$ ) in their overall attitude towards physical activity ( $t=-2.71$ ,  $p=.007$ ) (see Table 24). Specifically, females were significantly more positive than males on four of

the eight beliefs, including that being physically active on most days would get or keep them in shape ( $t=-2.29$ ,  $p=.022$ ), would give them energy ( $t=-2.74$ ,  $SD=.006$ ), would help them deal with stress ( $t=-3.33$ ,  $p=.001$ ), and would help them make new friends ( $t=-3.52$ ,  $p<.001$ ) (see Table 24). Clearly, female youth generally have more positive attitudes toward physical activity even if they do not participate as much as male youth.

**Table 24**  
**Sex Differences in Physical Activity Attitudes**

Attitude Sex	Frequency of Participation			t	p
	n	Mean <sup>a</sup>	Std. Dev.		
<b>Help me deal with stress</b>					
Males .....	382	2.94	1.29	<b>-3.33</b>	<b>.001</b>
Females.....	409	3.23	1.18		
<b>Would be fun</b>					
Males .....	384	4.23	.94	-.53	.597
Females.....	412	4.26	.82		
<b>Help me make new friends</b>					
Males .....	378	3.15	1.19	<b>-3.52</b>	<b>&lt;.001</b>
Females.....	411	3.45	1.20		
<b>Get or keep me in shape</b>					
Males .....	383	4.35	.96	<b>-2.29</b>	<b>.022</b>
Females.....	409	4.49	.79		
<b>Make me more attractive</b>					
Males .....	372	3.12	1.37	.072	.943
Females.....	396	3.11	1.33		
<b>Give me energy</b>					
Males .....	378	3.71	1.22	<b>-2.74</b>	<b>.006</b>
Females.....	410	3.93	1.08		
<b>Make me hot and sweaty</b>					
Males .....	380	4.06	1.03	1.21	.229
Females.....	410	3.98	1.02		
<b>Make me better at sports, dance, or other activities</b>					
Males .....	384	4.18	1.05	-1.23	.219
Females.....	412	4.27	.95		
<b>Overall Attitudes</b>					
Males .....	384	3.72	.69	<b>-2.71</b>	<b>.007</b>
Females.....	413	3.84	.61		

<sup>a</sup> Higher scores represent more positive attitudes towards physical activity

## 4.8 SEX DIFFERENCES ON SOCIAL FACTORS

### 4.8.1 Modelling

There are significant differences between the sexes with respect to family members' role modelling through their participation in physical activity ( $X^2=12.649$ ,  $p= .002$ ) (see Table 25). Females reported more often that a greater proportion of their family members engage in physical activity, or in other words, provide greater role modelling for physical activity than would be expected. Conversely, males tended to report that fewer family members than expected provided role modelling for physical activity (see Table 25).

**Table 25**  
**Sex Differences in Family Member Modelling of Participation in Physical Activity**

Sex	Degree of Modelling		
	No Family	Some Family	All Family
Males .....	35 (9.3)	258 (68.3)	85 (22.5)
Females .....	25 (6.1)	249 (60.6)	137 (33.3)
<b>Total .....</b>	<b>60 (7.6)</b>	<b>507 (64.3)</b>	<b>222 (28.1)</b>

<sup>a</sup> row percentage shown in parentheses  
 $X^2=12.649$ ;  $df=2$ ;  $p= .002$

With regards to friends engagement in, or role modelling of, physical activity, virtually none of the youth ( $n=7$ , 0.8%) reported having “no friends” participating in physical activity and thus most had at least some friends who were physically active. Once again, significant differences between the sexes and role modelling for physical activity were found ( $X^2=21.179$ ,  $p<.001$ ) (see Table 26). However, as opposed to the pattern that was observed above with females reporting greater role modelling from family members, males report having a greater than expected proportion of all of their friends participating in physical activity, and thereby potentially providing more modelling of participation in physical activity (see Table 26). Perhaps this pattern offers some explanation for the lower levels of

females' participation in physical activity. Parents appear to be more of a role model for females' physical activity, and as females get older and naturally want to do more things with friends, they might not have as many friends who are physically active, and thus their participation may consequently drop off.

**Table 26**  
**Sex Differences in Friends' Modelling of Participation in Physical Activity**

Sex	Degree of Modelling	
	Some Friends	All Friends
Males .....	183 (40.8)	193 (57.4)
Females .....	265 (59.2)	143 (42.6)
<b>Total.....</b>	<b>448 (57.1)</b>	<b>336 (42.9)</b>

<sup>a</sup> row percentage shown in parentheses  
X<sup>2</sup>=21.179; df=1; p= <.001

#### 4.8.2 Encouragement

For both males and females, family members, which include mothers, fathers, and/or guardians, and grandparents, as well as other significant adults, such as teachers and coaches, provided the greatest amount of encouragement for physical activity (see Table 27). Overall, females reported receiving more encouragement for physical activity from all sources with the exception of friends where males reported receiving marginally more encouragement. There were no significant differences found between males and females in the overall encouragement they received for physical activity (t=-1.51, p=.131) (see Table 27). The only specific group which was found to reveal significant differences in the encouragement it provided to males and females was other significant adults (t=-2.11, p=.036) with the females receiving greater encouragement (M=3.88, SD=.97) for physical activity from them in comparison to males (M=3.73, SD=1.06).

When individual sources of encouragement were examined as opposed to the groupings, the females reported receiving significantly more encouragement from their

mothers or guardians (Females: M=4.02, SD=1.05 and Males: M=3.87, SD=1.07;  $t=-1.99$ ,  $p=.047$ ), from their sisters (Females: M=3.19, SD=1.30 and Males: M=2.76, SD=1.38;  $t=-3.40$ ,  $p=.001$ ), and from their teachers (Females: M=3.52, SD=1.18 and Males: M=3.29, SD=1.32;  $t=-2.59$ ,  $p=.010$ ). Thus, while males and females both report receiving at least some encouragement to participate in physical activities from all sources to similar degrees, it appears the female youth did receive generally more encouragement than males and significantly more so from selected sources. As with modelling participation, despite this encouragement, female youth are not participating in physical activity as often as male youth and perhaps this is why they receive more encouragement to do so.

**Table 27**  
**Sex Differences in Encouragement Received from Others**

Source of Encouragement	Encouragement			t	p
Sex	n	Mean <sup>a</sup>	Std. Dev.		
<b>Family</b>					
Males .....	379	3.71	1.00	-.388	.698
Females.....	407	3.74	.94		
<b>Siblings</b>					
Males .....	346	2.93	1.39	-1.56	.118
Females.....	380	3.09	1.31		
<b>Friends</b>					
Males .....	361	3.57	1.20	.288	.774
Females.....	399	3.55	1.13		
<b>Other Significant Adults</b>					
Males .....	369	3.73	1.06	<b>-2.11</b>	<b>.036</b>
Females.....	405	3.88	.97		
<b>Overall Encouragement</b>					
Males .....	380	3.55	.84	-1.51	.131
Females.....	410	3.64	.76		

<sup>a</sup> Based on a 5-point scale where higher scores represent greater encouragement for physical activity

## 4.9 SEX DIFFERENCES ON ENVIRONMENTAL FACTORS

### 4.9.1 Perceptions of School Opportunities

With regards to opportunities at schools for physical activity, females tended to perceive their opportunities more positively than males, with the exception of having enough

opportunity to participate in competitive sports, which showed males (M=3.82, SD=1.21) to perceive these as significantly more available than females (M=3.64, SD=1.12) ( $t=2.15$ ,  $p=.032$ ) (see Table 28). In contrast, females reported significantly greater school-based opportunities for having access to enough equipment for physical activity, there being enough time devoted to physical education class, and there being enough places to be physically active (see Table 28). Thus, while overall, both males and females generally regarded there to be sufficient opportunities for school-based physical activity, the females perceived that they were even more available than did the males ( $t=-2.78$ ,  $p=.007$ ). The only school-based opportunities that the male and female youth perceived to be similarly available were intramural sports and supervision of physical activity.

**Table 28**  
**Sex Differences in Perceptions of School Opportunities**

School Opportunity	Perceptions				
Sex	n	Mean <sup>a</sup>	Std. Dev.	t	p
<b>Enough intramural sports</b>					
Males .....	375	3.84	1.09	-.27	.788
Females.....	409	3.86	1.07		
<b>Enough competitive sports</b>					
Males .....	379	3.82	1.21	<b>2.15</b>	<b>.032</b>
Females.....	411	3.64	1.12		
<b>Enough equipment</b>					
Males .....	377	3.88	1.01	<b>-2.24</b>	<b>.025</b>
Females.....	409	4.04	.90		
<b>Enough supervision</b>					
Males .....	376	3.87	1.01	-1.46	.146
Females.....	407	3.97	.93		
<b>Enough physical education</b>					
Males .....	372	3.18	1.32	<b>-5.97</b>	<b>&lt;.001</b>
Females.....	407	3.71	1.16		
<b>Enough places for physical activity</b>					
Males .....	377	4.08	1.01	<b>-3.25</b>	<b>.001</b>
Females.....	410	4.29	.79		
<b>Overall School Opportunity</b>					
Males .....	379	3.78	.73	<b>-2.78</b>	<b>.007</b>
Females.....	411	3.92	.66		

<sup>a</sup>Based on a 5-point scale where higher scores represent greater satisfaction with school opportunities



#### 4.9.2 Community Opportunities

Males and females both generally rated the opportunities for physical activity in their communities quite positively with mean scores at or near 4.0 on a 5-point scale. Despite these higher perceptions, female youth nevertheless did perceive the availability overall of community-based opportunities for physical activity significantly higher than the male youth ( $t=-2.16$ ,  $p=.031$ ) (see Table 29). Males and females similarly perceived there to be enough places for physical activity in their community as well as enough sports teams to join, but they did however differ significantly on their perception of there being enough individual sports programs to join in their community ( $t=-5.29$ ,  $p<.001$ ), males perceived such opportunities as significantly less available. This outcome is quite interesting because individual forms of physical activity were the only activities that males participated in significantly less often than females.

**Table 29**  
**Sex Differences in Perceptions of Community Opportunities**

Community Opportunity Sex	n	Perceptions		t	p
		Mean <sup>a</sup>	Std. Dev.		
<b>Enough sports teams to join</b>					
Males.....	373	3.96	1.21	.82	.415
Females.....	403	3.89	1.15		
<b>Enough individual sport programs</b>					
Males.....	372	3.70	1.19	<b>-5.29</b>	<b>&lt;.001</b>
Females.....	403	4.12	1.02		
<b>Enough places for physical activity</b>					
Males.....	376	4.32	.97	-.79	.431
Females.....	405	4.37	.85		
<b>Overall Community Opportunity</b>					
Males.....	376	3.99	.90	<b>-2.16</b>	<b>.031</b>
Females.....	406	4.13	.80		

<sup>a</sup> Based on a 5-point scale where higher scores represent greater satisfaction with community opportunities

### 4.9.3 Neighbourhood Facilities

#### *Facility Awareness*

In order to examine differences between males' and females' awareness of neighbourhood facilities, each individual's level of awareness of the number of facilities in their neighbourhoods was categorized as either low, medium, or high. Low awareness was characterized by awareness of zero to four neighbourhood facilities, medium as awareness of five to eight facilities, and finally, high awareness as awareness of nine to thirteen facilities in one's neighbourhood. Though there are small differences between males' and females' awareness levels of the community facilities in their neighbourhoods, with the females appearing to be aware of slightly more, these differences are not significant ( $X^2=2.055$ ,  $p=.358$ ) (see Table 30). Hence, sex differences in physical activity participation do not seem to be attributable to awareness of neighbourhood facilities.

**Table 30**  
**Sex Differences in Awareness of Neighbourhood Facilities**

Sex	Level of awareness of neighbourhood facilities		
	Low Awareness	Medium Awareness	High Awareness
Males.....	66 (17.5)	117 (31.0)	194 (51.5)
Females .....	62 (15.0)	118 (28.6)	233 (56.4)
<b>Total .....</b>	<b>128</b> <b>(16.2)</b>	<b>235</b> <b>(29.7)</b>	<b>427</b> <b>(54.1)</b>

<sup>a</sup> row percentage shown in parentheses  
 $X^2=2.055$ ;  $df=2$ ;  $p=.358$

#### *Facility Use*

Similarly to the categorization of one's awareness of neighbourhood facilities, the number of neighbourhood facilities that each individual reported using was also categorized as low, medium, or high. Again, a low number of facilities used was characterized as zero to four neighbourhood facilities, a medium number of facilities used was five to eight facilities,

and a high number of facilities used was nine to thirteen facilities. In contrast to awareness of neighbourhood facilities, there are significant differences between males and females in the number of different facilities that they used in their neighbourhoods ( $X^2=10.091$ ,  $p= .006$ ) (see Table 31). Contrary to what one might anticipate, more males than expected fell into the low category of the number of neighbourhood facilities used, and fewer males than expected were in the medium category (see Table 31). Conversely, fewer females than expected fell into the low category of the number of neighbourhood facilities used, while more females than expected were in the medium category. Thus, females seem to use a greater number of different neighbourhood facilities more so than do males; however, it should be noted that this does not necessarily mean that they are participating *more often* than males at the facilities they use. Nevertheless, access to a greater number of neighbourhood facilities may be especially important for females' physical activity participation, whereas it would appear that males tend to use fewer facilities or might use other facilities outside their neighbourhoods.

**Table 31**  
**Sex Differences in Number of Neighbourhood Facilities Used**

Sex	Number of Neighbourhood Facilities Used		
	Low Use	Medium Use	High Use
Males .....	253 (67.5)	96 (25.6)	26 (6.9)
Females.....	234 (57.4)	147 (36.0)	27 (6.6)
<b>Total .....</b>	<b>487</b> <b>(62.2)</b>	<b>243</b> <b>(31.0)</b>	<b>53</b> <b>(6.8)</b>

<sup>a</sup> row percentage shown in parentheses  
 $X^2=10.091$ ;  $df=2$ ;  $p= .006$

### ***Facility Quality***

As discussed previously, a 3-point index was created to assess the perceived quality of the facilities in one's neighbourhood. Females reported greater overall satisfaction with the quality of their neighbourhood facilities ( $M=2.18$ ,  $SD=.83$ ) in comparison to males

(M=2.03, SD=.84) and this difference was significant ( $t=-2.558$ ,  $p=.011$ ) (see Table 32). Therefore, taken as a whole, the number of different neighbourhood facilities used by youth does not appear to be significantly related to their knowledge (awareness) of neighbourhood facilities but might be linked somewhat to perceived quality. Being female is related to more positive perceptions of the quality of neighbourhood facilities and might lead to use of a greater number of neighbourhood facilities.

**Table 32**  
**Sex Differences in Perceived Quality of Neighbourhood Facilities**

Sex	Perceived Quality of Facilities			t	p
	n	Mean <sup>a</sup>	Std. Dev.		
Males.....	365	2.03	.84	-2.558	.011
Females.....	395	2.18	.83		

<sup>a</sup> Based on an index where higher scores reflect greater perceived quality of neighbourhood facilities

#### 4.9.4 Neighbourhood Characteristics

##### *Neighbourhood Safety*

There are no significant differences between males and females in their ratings of overall neighbourhood safety ( $t=-.722$ ,  $p=.470$ ) nor on all but one of the specific aspects related to perceived safety (see Table 33). Female youth generally reported more positive perceptions of neighbourhood safety in comparison to males and their perception of often seeing other girls or boys playing outdoors was significantly higher ( $t=-2.256$ ,  $p=.024$ ) (see Table 33). Therefore, overall it would appear that male and female youth have fairly similar overall perceptions of their neighbourhood's safety. These results suggest that perceptions of safety might not be linked to participation in physical activity, although this direct relationship will be explored later.

**Table 33**  
**Sex Differences in Perceptions of Neighbourhood Safety**

Neighbourhood Safety Sex	Perception			t	p
	n	Mean <sup>a</sup>	Std. Dev.		
<b>Safe to walk or jog</b>					
Males .....	377	4.10	1.02	.019	.985
Females .....	412	4.10	.91		
<b>Safe to bike</b>					
Males .....	375	4.17	.98	-.785	.433
Females .....	411	4.22	.81		
<b>Walkers/bikers on streets easily seen by people in their homes</b>					
Males .....	375	4.06	.98	.695	.487
Females .....	408	4.01	.98		
<b>So much traffic it makes it hard to walk [R]</b>					
Males .....	370	4.08	1.12	-.188	.851
Females .....	409	4.10	1.00		
<b>A lot of crime [R]</b>					
Males .....	369	3.99	1.21	-.373	.710
Females .....	408	4.02	1.05		
<b>Often see other girls or boys playing outdoors</b>					
Males .....	376	3.86	1.11	<b>-2.256</b>	<b>.024</b>
Females .....	410	4.03	1.03		
<b>Lots of loose or scary dogs [R]</b>					
Males .....	372	4.07	1.05	.357	.721
Females .....	411	4.05	1.01		
<b>Streets well lit at nights</b>					
Males .....	369	3.48	1.16	-.220	.826
Females .....	404	3.50	1.10		
<b>Overall Neighbourhood Safety</b>					
Males .....	377	3.98	.62	-.722	.470
Females .....	412	4.01	.57		

<sup>a</sup> Based on a 5-point score where higher scores represent a more positive perception of neighbourhood safety

Note: [R] represents a reverse coded variable

### *Home Equipment*

With respect to the availability of enough equipment at home to use for physical activities, there are no significant differences between males and females ( $t=-.034$ ,  $p=.973$ )

(see Table 34). Furthermore, males and females both generally agree that they have access to enough equipment for physical activity (see Table 34).

**Table 34**  
**Sex Differences in Perceptions of Availability of Home Equipment**

Sex	n	Perception		t	p
		Mean <sup>a</sup>	Std. Dev.		
Males .....	371	3.97	1.10	-.034	.973
Females .....	411	3.98	1.05		

<sup>a</sup> Based on 5-point scale where higher scores represent greater access to sports equipment at home for physical activities

### *Neighbourhood Aesthetics*

With respect to neighbourhood aesthetics, there is no significant differences between males and females in their overall perceptions ( $t=-1.359$ ,  $p=.174$ ) (see Table 35). While females tended to have more positive perceptions of their neighbourhood aesthetics in comparison to males, the only aspect on which they differed significantly was there being many interesting things to look at while walking around ( $t=-2.528$ ,  $p=.012$ ) (see Table 35). Hence, females agreed more with there being many interesting things to look at while walking around, which might be a reflection of the fact that more females lived in less dense neighbourhoods in this study.

### *Active Neighbourhood Transportation Features*

Differences between males and females on their overall assessment of the presence of active neighbourhood transportation features was statistically significant ( $t=1.933$ ,  $p=.054$ ). In particular, males assessments of there being sidewalks on most of the streets was significantly greater than females ( $t=2.471$ ,  $p=.014$ ), which may be a reflection of the neighbourhoods in which the majority of males and females resided (see Table 36). In contrast, males and females felt similarly about there being enough bicycle or walking trails in their neighbourhoods ( $t=.543$ ,  $p=.587$ ).

**Table 35**  
**Sex Differences in Perceptions of Neighbourhood Aesthetics**

Neighbourhood Aesthetics Sex	Perception			t	p
	n	Mean <sup>a</sup>	Std. Dev.		
<b>Lots of trees along the streets</b>					
Males.....	372	3.44	1.17	-.341	.733
Females.....	409	3.47	1.17		
<b>Many interesting things to look at while walking</b>					
Males.....	369	3.18	1.16	<b>-2.528</b>	<b>.012</b>
Females.....	409	3.38	1.07		
<b>When walking around, there are a lot of exhaust fumes or bad smells [R]</b>					
Males.....	376	3.85	1.17	-1.089	.277
Females.....	413	3.94	1.02		
<b>It's usually clean (i.e., not much garbage)</b>					
Males.....	373	3.59	1.12	.649	.517
Females.....	410	3.54	1.07		
<b>Overall Neighbourhood Aesthetics</b>					
Males.....	373	3.51	.76	-1.359	.174
Females.....	413	3.58	.68		

<sup>a</sup> Based on 5-point scale where higher scores represent a more positive perception of neighbourhood aesthetics

Note: [R] represents a reverse coded variable

**Table 36**  
**Sex Differences in Perceptions of Neighbourhood Transportation Features**

Neighbourhood Transportation Sex	Perception			t	p
	n	Mean <sup>a</sup>	Std. Dev.		
<b>Sidewalks on most of the streets</b>					
Males.....	374	3.75	1.25	<b>2.471</b>	<b>.014</b>
Females.....	410	3.53	1.29		
<b>Enough bicycling or walking trails</b>					
Males.....	374	3.49	1.31	.543	.587
Females.....	409	3.44	1.21		
<b>Overall Neighbourhood Transportation</b>					
Males.....	376	3.62	.99	<b>1.933</b>	<b>.054</b>
Females.....	413	3.48	1.07		

<sup>a</sup> Based on a 5-point scale where higher scores represent a more positive perception of the availability of neighbourhood transportation

#### 4.9.5 Commuting to and from School

The results related to commuting to school and from school were almost identical, therefore only those concerning commuting to school will be discussed here. As can be seen in Table 37, there are significant differences between males and females on the methods they typically use to commute to school ( $X^2=20.497$ ,  $p<.001$ ). More specifically, males use active forms of commuting, such as walking and biking more than expected and in turn, sedentary forms of commuting less than expected (see Table 37). In contrast, females use sedentary forms of commuting more than expected, such as taking the bus and getting a drive, and consequently, they engage less than expected in the two more active forms of commuting (see Table 37). Thus, these significant differences in how males and females typically commute to school might reflect one source of lower participation in physical activity among female youth; however given that more females in this study resided in less dense neighbourhoods with potentially greater distances to their schools, this finding may not be too surprising.

**Table 37**  
**Sex Differences in Commuting To School**

Sex	Commuting Method <sup>a</sup>			
	Getting a drive	Taking the bus	Walking	Biking
Males.....	42 (11.7)	180 (50.3)	101 (28.2)	35 (9.8)
Females.....	56 (14.5)	236 (61.0)	82 (21.2)	13 (3.4)
<b>Total.....</b>	98 (13.2)	416 (55.8)	183 (24.6)	48 (6.4)

<sup>a</sup> row percentage shown in parentheses  
 $X^2=20.497$ ;  $df=3$ ;  $p<.001$

#### 4.9.6 Neighbourhood Mobility

Across all aspects concerned with neighbourhood mobility, with the exception of the item “there are many places I like to go within easy walking distance of home”, males reported greater positive perceptions than females (see Table 38). Indeed, for overall



neighbourhood mobility, male youth were significantly more positive ( $M=3.68$ ,  $SD=.74$ ) than female youth ( $M=3.47$ ,  $SD=.77$ ) with respect to their perceptions of being able to get around the neighbourhood ( $t=3.977$ ,  $p<.001$ ) (see Table 38).

There are significant differences between males and females in the overall parental support they receive for their neighbourhood mobility, with males perceiving that they receive significantly greater support in comparison to females ( $t=5.389$ ,  $p<.001$ ) (see Table 38). For example, males reported receiving greater support from their parents to allow them to walk ( $t=5.533$ ,  $p<.001$ ) and to bike ( $t=5.797$ ,  $p<.001$ ) in their neighbourhood on their own (see Table 38). What is particularly interesting about this finding is that this perceived difference in being allowed to walk and bike in one's neighbourhood on one's own contrasts with the no significant differences in male and female youth perception of how much their parents worry about something happening to them if they go somewhere on their own ( $t=1.453$ ,  $p=.147$ ) (see Table 38). Furthermore, as discussed earlier, males and females perceived their neighbourhoods to be similarly safe, and despite feeling the same about whether their parents worry about them if they go somewhere on their own, males feel they have greater parental freedom to walk and bike on their own in their neighbourhood significantly more so than females.

There are no significant differences between the males and females in their perceptions of environmental support for neighbourhood mobility ( $t=1.550$ ,  $p=.122$ ) (see Table 38). There was, however, a significant difference between them in one aspect with males responding more positively that, if they wanted to do an after-school activity someplace else besides school, it would be easy to get home afterward ( $t=1.052$ ,  $p=.293$ ). This is not surprising given the perception among females of less parental support for their neighbourhood mobility discussed above, and given that more females in this study reside in less dense neighbourhoods where it might be harder to get around. Hence, overall it does seem to be more difficult for females to get around their neighbourhoods, which may make it more difficult for females to engage in physical activity.

**Table 38**  
**Sex Differences in Perceptions of Neighbourhood Mobility**

Neighbourhood Mobility Sub-components Sex	Perceptions			t	p
	n	Mean <sup>a</sup>	Std. Dev.		
<b><i>Parental Support</i></b>					
<b>Parents worry about something happening if I go somewhere on my own [R]</b>					
Males .....	381	2.65	1.17	1.453	.147
Females.....	411	2.53	1.21		
<b>Parents allow me to walk in our neighbourhood on my own</b>					
Males .....	379	4.16	1.09	<b>5.533</b>	<b>&lt;.001</b>
Females.....	408	3.71	1.23		
<b>Parents allow me to bike on my own</b>					
Males .....	368	4.31	1.11	<b>5.797</b>	<b>&lt;.001</b>
Females.....	406	3.81	1.29		
<b><i>Overall Parental Support</i></b>					
Males .....	383	3.69	.85	<b>5.389</b>	<b>&lt;.001</b>
Females.....	412	3.34	1.00		
<b><i>Environmental Support</i></b>					
<b>Many places I like to go within easy walking distance of home</b>					
Males .....	377	3.91	1.17	-.536	.592
Females.....	411	3.95	1.14		
<b>If stayed after-school for an activity, it would be easy to get home afterwards</b>					
Males .....	375	3.73	1.36	<b>2.222</b>	<b>.027</b>
Females.....	407	3.51	1.40		
<b>If wanted to do after-school activity someplace else besides school, it would be easy to get there</b>					
Males .....	381	3.55	1.23	1.882	.060
Females.....	411	3.38	1.19		
<b>If wanted to do an after-school activity someplace else besides school, it would be easy to get home afterward</b>					
Males .....	380	3.51	1.282	1.052	.293
Females.....	412	3.41	1.190		
<b><i>Overall Environmental Support</i></b>					
Males .....	381	3.67	.98	1.550	.122
Females.....	412	3.56	.97		
<b><i>Overall Neighbourhood Mobility</i></b>					
Males .....	382	3.68	.74	<b>3.977</b>	<b>&lt;.001</b>
Females.....	412	3.47	.77		

<sup>a</sup> Based on 5-point scale where higher scores represent a more positive perception of neighbourhood mobility.

Note: [R] represents a reverse coded variable.

## 4.10 NEIGHBOURHOOD DIFFERENCES

### 4.10.1 Physical Activity

With respect to the relationship between the types of neighbourhoods in which the youth live and their participation in various physical activities, some differences do exist. First, youths' total participation in all physical activity increases as one moves to progressively less dense neighbourhoods: urban high density (M=18.90, SD=16.01); suburban (M=22.36, SD=16.83); and suburban low density (M=24.26, SD=18.88) (see Table 39). In fact, youths' physical activity participation was significantly different between those residing in urban high density neighbourhoods and suburban low density neighbourhoods (F=4.672, p=.010) (see Table 39).

**Table 39**  
**Neighbourhood Type Differences on Physical Activity**

Physical Activity Category Neighbourhood Type	Participation*			F	p
	n	Mean	Std. Dev.		
<b>Team sports</b>					
Urban high density .....	167	8.50	8.35	.627	.534
Suburban .....	374	9.37	8.65		
Suburban low density .....	186	9.26	8.43		
<b>Individual sports</b>					
Urban high density .....	109	3.87 <sup>a</sup>	5.10	<b>9.436</b>	<b>&lt;.001</b>
Suburban .....	312	5.62 <sup>b</sup>	6.11		
Suburban low density .....	149	7.25 <sup>c</sup>	7.05		
<b>Physical Activities</b>					
Urban high density .....	161	9.58	9.89	2.328	.098
Suburban .....	386	9.93	9.84		
Suburban low density .....	199	11.61	10.78		
<b>Total Physical Activity</b>					
Urban high density .....	175	18.90 <sup>ab</sup>	16.01	<b>4.672</b>	<b>.010</b>
Suburban .....	393	22.36 <sup>b</sup>	16.83		
Suburban low density .....	204	24.26 <sup>bc</sup>	18.88		

\* Hours per week of participation in various physical activities

Note: Superscripts indicate contexts significantly different from each other (p<.05)

Interestingly, as noted earlier, males are significantly more physically active than females and because urban high density neighbourhoods had quite a few more males, one might have expected urban high density neighbourhoods would show significantly more physical activity participation. However, we find the opposite to be true. Urban high density neighbourhoods report the lowest total physical activity, and suburban and in particular suburban low density neighbourhoods report more physically active despite having a higher proportional representation from females. This seems to indicate quite strongly that one's neighbourhood matters more to physical activity participation than one's sex.

Despite each of the three physical activity categories also generally following this pattern of greater participation in progressively less dense neighbourhoods, there are no significant differences between the neighbourhoods and the participation of youth in team sports ( $F=.627$ ,  $p=.534$ ) and in physical activities ( $F=2.328$ ,  $p=.098$ ) (see Table 39). There are, however, significant differences among the neighbourhoods and the youths' participation in individual sports ( $F=9.436$ ,  $p<.001$ ) (see Table 39). In fact, all three neighbourhood types are significantly different from one another in the amount of time the youth spend participating in individual sports, with participation once again increasing as one moves into less dense neighbourhoods: urban high density ( $M=3.87$ ,  $SD=5.10$ ), suburban ( $M=5.62$ ,  $SD=6.11$ ), and suburban low density ( $M=7.25$ ,  $SD=7.05$ ) (see Table 39).

Hence, an interesting point to note here is that if one recalls that males participate significantly more in team sports and females significantly more in individual sports, then it seems that one's neighbourhood may not be as critical to males' physical activity participation, at least in team sports, but one's neighbourhood might be significant in facilitating females' physical activity participation in individual sports.

#### **4.10.2 Neighbourhood Differences On Personal Factors**

##### ***Self-Efficacy***

There are significant differences in the level of self-efficacy for physical activity possessed by the youth based on the neighbourhoods they reside in. For the three self-efficacy types as well as for the overall measure of self-efficacy, youth residing in urban high

density neighbourhoods were consistently significantly lower in self-efficacy from youth residing in suburban and suburban low density neighbourhoods (see Table 40). Thus, youth in urban high density neighbourhoods have significantly less support seeking, barrier, and positive alternatives self-efficacy, as well as significantly less overall self-efficacy (see Table 40).

**Table 40**  
**Neighbourhood Type Differences on Self-Efficacy**

Self-Efficacy Type Neighbourhood Type	Self-Efficacy*			F	p
	n	Mean	Std. Dev.		
<b>Support Seeking</b>					
Urban high density .....	182	3.52 <sup>a</sup>	.79	<b>10.981</b>	<b>&lt;.001</b>
Suburban .....	403	3.80 <sup>b</sup>	.75		
Suburban low density .....	216	3.83 <sup>b</sup>	.71		
<b>Barrier</b>					
Urban high density .....	183	3.41 <sup>a</sup>	1.07	<b>9.013</b>	<b>&lt;.001</b>
Suburban .....	403	3.70 <sup>b</sup>	.89		
Suburban low density .....	216	3.79 <sup>b</sup>	.91		
<b>Positive Alternatives</b>					
Urban high density .....	183	3.25 <sup>a</sup>	1.03	<b>23.472</b>	<b>&lt;.001</b>
Suburban .....	403	3.75 <sup>b</sup>	.90		
Suburban low density .....	216	3.83 <sup>b</sup>	.90		
<b>Overall Self-Efficacy</b>					
Urban high density .....	180	3.42 <sup>a</sup>	.78	<b>18.077</b>	<b>&lt;.001</b>
Suburban .....	403	3.76 <sup>b</sup>	.71		
Suburban low density .....	214	3.82 <sup>b</sup>	.71		

\* Measured on a 5-point scale where higher scores reflect greater self-efficacy towards physical activity

Note: Superscripts indicate contexts significantly different from each other (p<.05)

As mentioned earlier, males are more physically active than females and the urban high density neighbourhoods have a higher representation of males, yet these neighbourhoods have the lowest level of participation in physical activity. Moreover, and intriguingly, we also find here that all types of self-efficacy are significantly lower for the urban high density neighbourhood in comparison to the other two neighbourhoods. This suggests that one's self-efficacy is in part related to the neighbourhood in which one resides,

and in turn, may have an impact on the amount of physical activity in which one engages. This seems to provide a strong indication for the important role that self-efficacy and one's neighbourhood play in youths' physical activity participation.

### *Attitudes*

Youth residing in different types of neighbourhoods had significantly different attitudes towards physical activity ( $F=9.674$ ,  $p<.001$ ) (see Table 41). Youths who resided in urban high density neighbourhoods ( $M=3.61$ ,  $SD=.72$ ) had significantly less positive attitudes towards physical activity in comparison to youth living in suburban ( $M=3.86$ ,  $SD=.58$ ) or suburban low density neighbourhoods ( $M=3.79$ ,  $SD=.71$ ) (see Table 41). Once again, these less positive attitudes towards physical activity among youth from urban high density neighbourhoods may provide some indication for the lower levels of physical activity found among this group, despite there being more males in these neighbourhoods.

**Table 41**  
**Neighbourhood Type Differences on Physical Activity Attitudes**

Neighbourhood Type	Physical Activity Attitudes*			F	p
	n	Mean	Std. Dev.		
Urban high density .....	183	3.61 <sup>a</sup>	.72	<b>9.674</b>	<b>&lt;.001</b>
Suburban.....	404	3.86 <sup>b</sup>	.58		
Suburban low density .....	217	3.79 <sup>b</sup>	.71		

\* Measured on a 5-point scale where higher scores reflect more positive beliefs towards physical activity

Note: Superscripts indicate contexts significantly different from each other ( $p<.05$ )

### **4.10.3 Neighbourhood Differences On Social Factors**

#### *Modelling*

There are significant differences between the types of neighbourhoods in which the youth live and the amount of role modelling for physical activity they report having received ( $X^2=10.761$ ,  $p=.029$ ) (see Table 42). It seems that youth in suburban neighbourhoods have

more family members participating in physical activity than expected, and conversely, that youth in urban high density neighbourhoods have fewer family members participating in physical activity than expected (see Table 42).

**Table 42**  
**Neighbourhood Type Differences on**  
**Family Participation in Physical Activity**

Neighbourhood Type	Degree of Modelling		
	No Family	Some Family	All Family
Urban high density .....	18 (10.0)	127 (70.6)	35 (19.4)
Suburban .....	27 (6.7)	245 (61.1)	129 (32.2)
Suburban low density .....	15 (7.0)	139 (65.0)	60 (28.0)
<b>Total.....</b>	60 (7.5)	511 (64.3)	224 (28.2)

<sup>a</sup> row percentage shown in parentheses  
 $X^2=10.761$ ;  $df=4$ ;  $p=.029$

With respect to the modelling of physical activity by friends, there are no significant differences between the neighbourhoods ( $X^2=2.384$ ,  $p=.304$ ) (see Table 43). Given that at least some and often all of their friends are engaged in physical activity, the modelling they provide to youth is present to some degree to everyone. Consequently, all of the youth are exposed to the modelling of physical activity by their friends and the extent to which it is present does not differ.

### ***Encouragement***

In regards to the encouragement that youth report receiving from others to participate in physical activity, there are significant differences among neighbourhood types on all sources of encouragement. Firstly, considering the overall encouragement which youth receive from a variety of sources, significant differences are found among neighbourhoods ( $F=11.101$ ,  $p<.001$ ) (see Table 44). Youth residing in suburban low density neighbourhoods

report receiving significantly less overall encouragement for physical activity (M=3.39, SD=.87), which is interesting when one considers that they are the most physically active neighbourhood.

**Table 43**  
**Neighbourhood Type Differences in**  
**Friends' Participation in Physical Activity**

<b>Neighbourhood Type</b>	<b>Amount of Modelling</b>	
	<b>Some Friends</b>	<b>All Friends</b>
Urban high density .....	107 (60.1)	71 (39.9)
Suburban .....	218 (54.8)	180 (45.2)
Suburban low density.....	129 (60.3)	85 (39.7)
<b>Total</b> .....	<b>454</b> <b>(57.5)</b>	<b>336</b> <b>(42.5)</b>

<sup>a</sup> row percentage shown in parentheses  
 $X^2=2.384$ ;  $df=2$ ;  $p=.304$

Secondly, encouragement from family members, constituting parents and grandparents, is significantly higher for youth in suburban neighbourhoods (see Table 44). With respect to encouragement from other significant adults, principally coaches and teachers, those youth residing in suburban low density neighbourhoods reported receiving significantly less encouragement from these individuals (see Table 44). When examining encouragement from friends, suburban and suburban low density neighbourhoods were significantly different, with suburban low density youths reporting the least amount of encouragement for physical activity from friends (see Table 44). Only for encouragement provided from siblings were there no significant differences in the amount of encouragement provided depending on the type of neighbourhood in which the youth resided (see Table 44). Therefore, there is clearly some variation in the amount of encouragement youth report receiving depending on the neighbourhood in which they reside. However, the variation in encouragement is not consistent across neighbourhoods. Encouragement seems to be provided more or less strongly from different sources depending on the type of



neighbourhood. In general, however, overall encouragement does not appear to be an overly important factor in physical activity for the suburban low density neighbourhood – the most physically active neighbourhood – perhaps because it is less needed.

**Table 44**  
**Neighbourhood Type Differences in Perceptions of Encouragement**

Source of Encouragement Neighbourhood Type	Perceived Encouragement*			F	p
	n	Mean	Std. Dev.		
<b>Family</b>					
Urban high density .....	177	3.59 <sup>a</sup>	1.08	<b>9.721</b>	<b>&lt;.001</b>
Suburban.....	402	3.87 <sup>b</sup>	.90		
Suburban low density .....	214	3.55 <sup>a</sup>	.97		
<b>Siblings</b>					
Urban high density .....	151	3.14	1.41	<b>3.183</b>	<b>.042</b>
Suburban.....	351	3.05	1.30		
Suburban low density .....	197	2.85	1.40		
<b>Significant Adults</b>					
Urban high density .....	172	3.96 <sup>a</sup>	1.03	<b>9.989</b>	<b>&lt;.001</b>
Suburban.....	397	3.88 <sup>a</sup>	.97		
Suburban low density .....	211	3.55 <sup>b</sup>	1.05		
<b>Friends</b>					
Urban high density .....	167	3.46 <sup>ab</sup>	1.24	<b>4.991</b>	<b>.007</b>
Suburban.....	391	3.69 <sup>a</sup>	1.07		
Suburban low density .....	209	3.40 <sup>b</sup>	1.24		
<b>Overall Encouragement</b>					
Urban high density .....	179	3.60 <sup>a</sup>	.82	<b>11.101</b>	<b>&lt;.001</b>
Suburban.....	403	3.71 <sup>a</sup>	.73		
Suburban low density .....	215	3.39 <sup>b</sup>	.87		

\* Measured on a 5-point scale where higher scores reflect greater encouragement for physical activity  
Note: Superscripts indicate contexts significantly different from each other (p<.05)

#### 4.10.4 Neighbourhood Differences In Environmental Factors

##### *School Opportunity*

When examining opportunities for physical activity at schools across different neighbourhood types, youth from suburban neighbourhoods overall are significantly more

satisfied than those youth from both other neighbourhood types ( $F=14.130$ ,  $p<.001$ ) (see Table 45).

**Table 45**  
**Neighbourhood Type Differences in Perceptions of School Opportunities**

School Opportunity Neighbourhood Type	School Opportunity*			F	p
	n	Mean	Std. Dev.		
<b>Enough intramural sports</b>					
Urban high density .....	175	3.78 <sup>ab</sup>	1.15	<b>7.161</b>	<b>.001</b>
Suburban.....	402	3.98 <sup>a</sup>	.99		
Suburban low density .....	214	3.65 <sup>b</sup>	1.14		
<b>Enough competitive sports</b>					
Urban high density .....	179	3.67	1.28	.859	.424
Suburban.....	402	3.79	1.10		
Suburban low density .....	216	3.69	1.18		
<b>Enough equipment for physical activity</b>					
Urban high density .....	178	3.79 <sup>a</sup>	.94	<b>9.033</b>	<b>&lt;.001</b>
Suburban.....	399	4.11 <sup>b</sup>	.92		
Suburban low density .....	216	3.85 <sup>a</sup>	1.00		
<b>Enough supervision for physical activity</b>					
Urban high density .....	176	3.78 <sup>a</sup>	.99	<b>7.360</b>	<b>.001</b>
Suburban.....	399	4.05 <sup>b</sup>	.92		
Suburban low density .....	215	3.79 <sup>a</sup>	1.01		
<b>Enough time given to physical education classes</b>					
Urban high density .....	175	3.14 <sup>a</sup>	1.34	<b>10.625</b>	<b>&lt;.001</b>
Suburban.....	398	3.64 <sup>b</sup>	1.24		
Suburban low density .....	213	3.38 <sup>a</sup>	1.17		
<b>Enough places to be physically active</b>					
Urban high density .....	177	3.99 <sup>a</sup>	1.02	<b>10.091</b>	<b>&lt;.001</b>
Suburban.....	401	4.32 <sup>b</sup>	.84		
Suburban low density .....	216	4.10 <sup>a</sup>	.90		
<b>Overall School Opportunity</b>					
Urban high density .....	178	3.70 <sup>a</sup>	.76	<b>14.130</b>	<b>&lt;.001</b>
Suburban.....	403	3.98 <sup>b</sup>	.66		
Suburban low density .....	216	3.74 <sup>a</sup>	.68		

\* Based on a 5-point scale where higher scores represent greater satisfaction with school opportunities

Note: Superscripts indicate contexts significantly different from each other ( $p<.05$ )

In particular, youth from suburban neighbourhoods reported being significantly more satisfied with the availability of the amount of equipment, supervision for physical activity at school, the amount of time devoted to physical education classes, and places to be physically active (see Table 45). The only opportunity for which there were no significant differences among neighbourhoods was with respect to there being enough chances to play competitive sports ( $F=.859$ ,  $p=.424$ ) (see Table 45). With regards to having enough chances to play intramural sports, however, the significant difference was just between suburban and suburban low density neighbourhoods ( $F=7.16$ ,  $p=.001$ ). Youth from suburban neighbourhoods ( $M=3.98$ ,  $SD=.99$ ) reported that there are enough chances to participate in intramural sports at school significantly more than youth from suburban low density neighbourhoods ( $M=3.65$ ,  $SD=1.14$ ). Youth from urban high density neighbourhoods were not significantly different from youth living in either of the other two types of neighbourhoods ( $M=3.78$ ,  $SD=1.15$ ) (see Table 45). Thus, on the whole, youth from suburban neighbourhoods appear to be more satisfied with their opportunities for physical activity at school.

#### **4.10.5 Community Opportunity**

Youth from all three neighbourhood types rated the overall opportunities for physical activity in their community significantly differently ( $F=15.915$ ,  $p<.001$ ) (see Table 46). Those residing in urban high density neighbourhoods ( $M=3.79$ ,  $SD=.92$ ) perceived having the least community-based opportunities for physical activity, followed by suburban low density neighbourhoods ( $M=4.01$ ,  $SD=.90$ ); meanwhile, youth living in suburban areas ( $M=4.21$ ,  $SD=.76$ ) reported the greatest community opportunity (see Table 46). The fact that youth from urban high density neighbourhoods, who are the least physically active despite being made up of mostly males, perceived having the least community opportunities demonstrates that one's environment may play an important role in their ability to participate in physical activity.

However, not all of the specific community opportunities followed the same pattern described above for community opportunities overall. In particular, youth living in urban high density neighbourhoods perceived they had significantly less available sports teams in the community they could join in comparison to both suburban and suburban low density

youth ( $F=16.218$ ,  $p<.001$ ) (see Table 46). Urban high density ( $M=3.63$ ,  $SD=1.20$ ) neighbourhood youth also perceived having not enough individual sports programs in the community to join. However in this case, they only differed significantly with youth from suburban neighbourhoods who perceived having the greatest opportunity for these programs ( $M=4.06$ ,  $SD=1.03$ ) (see Table 46).

**Table 46**  
**Neighbourhood Type Differences in Perceptions of Community Opportunities**

Community Opportunity Neighbourhood Type	Community Opportunity*			F	p
	n	Mean	Std. Dev.		
<b>Enough sports teams to join</b>					
Urban high density .....	174	3.48 <sup>a</sup>	1.30	<b>16.218</b>	<b>&lt;.001</b>
Suburban.....	397	4.07 <sup>b</sup>	1.11		
Suburban low density .....	212	4.02 <sup>b</sup>	1.12		
<b>Enough individual sports programs to join</b>					
Urban high density .....	174	3.63 <sup>a</sup>	1.20	<b>9.496</b>	<b>&lt;.001</b>
Suburban.....	395	4.06 <sup>b</sup>	1.03		
Suburban low density .....	212	3.87 <sup>ab</sup>	1.19		
<b>Enough places to be physically active</b>					
Urban high density .....	176	4.23 <sup>a</sup>	1.03	<b>9.676</b>	<b>&lt;.001</b>
Suburban.....	398	4.48 <sup>b</sup>	.81		
Suburban low density .....	213	4.17 <sup>a</sup>	.96		
<b>Overall Community Opportunity</b>					
Urban high density .....	176	3.79 <sup>a</sup>	.92	<b>15.915</b>	<b>&lt;.001</b>
Suburban.....	399	4.21 <sup>b</sup>	.76		
Suburban low density .....	214	4.01 <sup>c</sup>	.90		

\* Based on a 5-point scale where higher scores represent greater satisfaction with community opportunities

Note: Superscripts indicate contexts significantly different from each other ( $p<.05$ )

It is interesting to note how youth in urban high density neighbourhoods perceived their opportunities to join sports teams and individual programs as least available because one might assume that there would be greater opportunities in areas of more concentrated population, as opposed to in less dense areas. Perhaps there are issues of access to programs

and especially facilities, as well as other issues involving access, such as ability to pay and transportation issues.

Turning to perceptions of the availability of places for physical activity, youth from suburban neighbourhoods ( $M=4.48$ ,  $SD=.81$ ) felt there were significantly more places to be physically active in their community compared to youth from both urban high density ( $M=4.23$ ,  $SD=1.03$ ) and suburban low density ( $M=4.17$ ,  $SD=.96$ ) neighbourhoods (see Table 46). This finding is not too surprising, as suburban neighbourhoods have the luxury of having more open space than higher density areas, as well as enough population to have parks, sports fields, and other facilities. They also tend to be more mature neighbourhoods, and hence, more parks, trails, and sports fields, among other places for physical activity, are likely to exist there.

#### **4.10.6 Neighbourhood Facilities**

##### *Facility Awareness*

There are significant differences among the neighbourhoods in which the youth reside and their awareness of neighbourhood facilities ( $X^2=46.187$ ,  $p<.001$ ) (see Table 47). Youth from suburban neighbourhoods are aware of more facilities in their neighbourhoods than expected whereas youth from urban high density and suburban low density neighbourhoods generally have lower levels of awareness of neighbourhood facilities (see Table 47). The presumption here of course is that levels of awareness generally reflect the actual availability of facilities in one's neighbourhood, suggesting that youth in suburban neighbourhoods have greater access to facilities in comparison to youth residing in urban high density and suburban low density neighbourhoods.

##### *Facility Use*

Just as we saw differences with youths' awareness of neighbourhood facilities based on the type of neighbourhood in which they reside, we also see differences in their use of neighbourhood facilities ( $X^2=13.570$ ,  $p=.009$ ) (see Table 48). Once again, youth in suburban

neighbourhoods use a greater number of neighbourhood facilities than expected, and youth from urban high density and especially from suburban low density neighbourhoods use fewer of the facilities than expected (see Table 48).

**Table 47**  
**Neighbourhood Differences in**  
**Levels of Awareness of Neighbourhood Facilities**

Neighbourhood Type	Awareness of Neighbourhood Facilities		
	Low Awareness	Medium Awareness	High Awareness
Urban high density .....	46 (25.7)	55 (30.7)	78 (43.6)
Suburban .....	37 (9.2)	105 (26.2)	259 (64.6)
Suburban low density .....	47 (21.9)	75 (34.9)	93 (43.3)
<b>Total.....</b>	<b>130</b> <b>(16.4)</b>	<b>235</b> <b>(29.6)</b>	<b>430</b> <b>(54.1)</b>

<sup>a</sup> row percentage shown in parentheses  
 $X^2=46.187$ ;  $df=4$ ;  $p<.001$

**Table 48**  
**Neighbourhood Differences in Number of Neighbourhood Facilities Used**

Neighbourhood Type	Use of Neighbourhood Facilities		
	Low Use	Medium Use	High Use
Urban high density .....	114 (64.4)	49 (27.7)	14 (7.9)
Suburban.....	225 (56.5)	144 (36.2)	29 (7.3)
Suburban low density .....	151 (70.9)	51 (23.9)	11 (5.2)
<b>Total.....</b>	<b>490</b> <b>(62.2)</b>	<b>244</b> <b>(31.0)</b>	<b>54</b> <b>(6.9)</b>

<sup>a</sup> row percentage shown in parentheses  
 $X^2=13.570$ ;  $df=4$ ;  $p=.009$

Interestingly, the urban high density neighbourhood group had a higher than expected number of youth reporting use of a high number of neighbourhood facilities, although the numbers are quite low. A potential reason for this may be that there are generally fewer facilities in these neighbourhoods, and hence, overall fewer opportunities for use, yet a few youth in these neighbourhoods are fortunate to have, and use, a number of facilities in their neighbourhood regularly.

***Facility Quality***

With respect to the quality of the facilities in the neighbourhood, there are significant differences among neighbourhoods ( $F=12.510$ ,  $p<.001$ ) (see Table 49). Youth from urban high density neighbourhoods ( $M=1.86$ ,  $SD=.93$ ) rated the quality of their neighbourhood facilities as significantly poorer than did their suburban ( $M=2.23$ ,  $SD=.76$ ) and suburban low density ( $M=2.08$ ,  $SD=.85$ ) counterparts.

Thus, a pattern seems to be emerging for suburban neighbourhoods. The youth in these neighbourhoods report having the greatest levels of awareness of neighbourhood facilities, higher quality facilities, and the highest numbers of facilities used. This may demonstrate a significant role for facilities in the physical activity engagement of youth in specific types of neighbourhoods.

**Table 49**  
**Neighbourhood Type Differences in Perceived Quality of Neighbourhood Facilities**

Neighbourhood Type	Perceived Facilities Quality*			F	p
	n	Mean	Std. Dev.		
Urban high density.....	171	1.86 <sup>a</sup>	.93	<b>12.510</b>	<b>&lt;.001</b>
Suburban.....	386	2.23 <sup>b</sup>	.76		
Suburban low density .....	207	2.08 <sup>b</sup>	.85		

\* Based on a 3-point index where higher scores reflect greater average perceived quality of neighbourhood facilities

Note: Superscripts indicate contexts significantly different from each other ( $p<.05$ )

Interestingly, both urban high density and suburban low density neighbourhoods report having lower awareness of neighbourhood facilities, yet individual sport participation, which tends to be more dependent on facilities such as swimming pools or studios, is highest among suburban low density neighbourhoods. This may imply that there are issues with access to suitable facilities. Urban high density neighbourhoods also rated their facilities as poorest in quality, so perhaps youth residing in suburban low density neighbourhoods have an easier time accessing (e.g., paying for and getting to) quality facilities that are not readily located in their neighbourhood.

#### **4.10.7 Neighbourhood Characteristics**

##### ***Neighbourhood Safety***

There are significant differences among neighbourhoods in their perceived safety. Overall, youth residing in urban high density ( $M=3.79$ ,  $SD=.66$ ) neighbourhoods reported their neighbourhood to be significantly less safe than did youth residing in suburban ( $M=4.08$ ,  $SD=.56$ ) and suburban low density ( $M=3.98$ ,  $SD=.59$ ) neighbourhoods (see Table 50). Compared to both of these latter neighbourhoods, urban high density youth again reported their neighbourhoods to be significantly less safe for engaging in walking or jogging ( $F=6.613$ ,  $p=.001$ ) and for biking ( $F=9.516$ ,  $p<.001$ ) (see Table 50).

Not surprisingly given the nature of the environment, there are significant differences between suburban and suburban low density neighbourhoods in walkers and bikers being easily seen by people in their homes, often seeing other boys and girls playing outdoors, and the streets being well lit at night (see Table 50). Interestingly, traffic does not seem to play more of a role in certain neighbourhoods such that it might make it more difficult to walk ( $F=2.542$ ,  $p=.079$ ) (see Table 50).

Perceptions of crime are significantly different across all three neighbourhood types, with the perception of there being a lot of crime in one's neighbourhood decreasing significantly as one moves towards less dense neighbourhoods (see Table 50).



**Table 50**  
**Neighbourhood Type Differences in Perceptions of Neighbourhood Safety**

Safety Characteristic		Neighbourhood Safety*			F	p
		n	Mean	Std. Dev.		
Neighbourhood	Type					
<b>Safe to walk or jog</b>						
	Urban high density .....	176	3.86 <sup>a</sup>	1.09	<b>6.613</b>	<b>.001</b>
	Suburban .....	404	4.16 <sup>b</sup>	.92		
	Suburban low density .....	215	4.17 <sup>b</sup>	.93		
<b>Safe to bike</b>						
	Urban high density .....	175	3.94 <sup>a</sup>	1.07	<b>9.516</b>	<b>&lt;.001</b>
	Suburban .....	402	4.27 <sup>b</sup>	.83		
	Suburban low density .....	215	4.26 <sup>b</sup>	.83		
<b>Walkers/bikers on streets easily seen by people in their homes</b>						
	Urban high density .....	176	3.95 <sup>ab</sup>	1.06	<b>4.297</b>	<b>.014</b>
	Suburban .....	399	4.13 <sup>a</sup>	.91		
	Suburban low density .....	213	3.91 <sup>b</sup>	1.04		
<b>So much traffic it makes it hard to walk [R]</b>						
	Urban high density .....	172	3.96	1.17	2.542	.079
	Suburban .....	399	4.16	.98		
	Suburban low density .....	213	4.03	1.11		
<b>A lot of crime [R]</b>						
	Urban high density .....	171	3.42 <sup>a</sup>	1.37	<b>33.529</b>	<b>&lt;.001</b>
	Suburban .....	400	4.07 <sup>b</sup>	1.05		
	Suburban low density .....	212	4.32 <sup>c</sup>	.92		
<b>Often see other girls or boys playing outdoors</b>						
	Urban high density .....	177	3.92 <sup>ab</sup>	1.16	<b>5.162</b>	<b>.006</b>
	Suburban .....	401	4.06 <sup>a</sup>	.96		
	Suburban low density .....	214	3.77 <sup>b</sup>	1.15		
<b>Lots of loose or scary dogs [R]</b>						
	Urban high density .....	172	3.84 <sup>a</sup>	1.16	<b>4.914</b>	<b>.008</b>
	Suburban .....	404	4.13 <sup>b</sup>	1.00		
	Suburban low density .....	213	4.06 <sup>ab</sup>	.99		
<b>Streets well lit at night</b>						
	Urban high density .....	173	3.45 <sup>ab</sup>	1.11	<b>6.792</b>	<b>.001</b>
	Suburban .....	398	3.62 <sup>a</sup>	1.05		
	Suburban low density .....	208	3.27 <sup>b</sup>	1.25		
<b>Overall Neighbourhood Safety</b>						
	Urban high density .....	176	3.79 <sup>a</sup>	.66	<b>13.917</b>	<b>&lt;.001</b>
	Suburban .....	404	4.08 <sup>b</sup>	.56		
	Suburban low density .....	215	3.98 <sup>b</sup>	.59		

\* Based a 5-point scale where higher scores reflect a more positive perception of neighbourhood safety

Note: [R] represents a reverse coded variable

Note: Superscripts indicate contexts significantly different from each other (p<.05)

### *Home Equipment*

With respect to youths' accounts of having enough sports equipment at home that they can use for physical activities, one's neighbourhood of residence mattered. Youth from urban high density neighbourhoods reported having significantly less access to enough sports equipment at home than youth living in either of the other neighbourhood types (see Table 51). There could be a number of reasons for this finding, such as the ability to pay or having less access to neighbourhood facilities to use the equipment.

**Table 51**  
**Neighbourhood Type Differences in Availability of Home Equipment**

Neighbourhood Type	Home Equipment*			F	p
	n	Mean	Std. Dev.		
Urban high density.....	172	3.64 <sup>a</sup>	1.13	<b>10.918</b>	<b>&lt;.001</b>
Suburban.....	401	4.05 <sup>b</sup>	1.02		
Suburban low density .....	215	4.08 <sup>b</sup>	1.07		

\* Based on a 5-point scale where higher scores represent greater access to sports equipment at home for physical activities

Note: Superscripts indicate contexts significantly different from each other (p<.05)

### *Neighbourhood Aesthetics*

Perceptions of the overall aesthetics of their neighbourhoods are significantly more positive for those youth living in suburban neighbourhoods, than for those living in urban high density neighbourhoods (F=4.636, p=.010) (see Table 52). Youth from suburban neighbourhoods (M=3.66, SD=1.04) also perceive their neighbourhoods to be significantly more clean than do those living in urban high density neighbourhoods (M=3.33, SD=1.23) (see Table 52). Expectedly, there are also significantly more reports of exhaust fumes and bad smells when walking around in urban high density neighbourhoods (F=8.882, p<.001), but, interestingly, no significant differences between neighbourhood ratings on there being lots of trees along the streets (F=1.119, p=.327) and many interesting things to look at while walking around (F=.445, p=.641) (see Table 52). This suggests that even though such amenities are perceived to be similarly present, they do not appear to affect the perceived quality of air and cleanliness of the neighbourhoods.

**Table 52**  
**Neighbourhood Type Differences in Neighbourhood Aesthetics**

Aesthetic Characteristic		Neighbourhood Aesthetics*			F	p
Neighbourhood	Type	n	Mean	Std. Dev.		
<b>Lots of trees along the streets</b>						
	Urban high density .....	173	3.53	1.13	1.119	.327
	Suburban.....	400	3.48	1.16		
	Suburban low density .....	214	3.36	1.20		
<b>Many interesting things to look at while walking</b>						
	Urban high density .....	173	3.21	1.23	.445	.641
	Suburban.....	399	3.31	1.05		
	Suburban low density .....	212	3.30	1.17		
<b>When walking around, there are a lot of exhaust fumes or bad smells [R]</b>						
	Urban high density .....	176	3.60 <sup>a</sup>	1.23	<b>8.882</b>	<b>&lt;.001</b>
	Suburban.....	404	4.01 <sup>b</sup>	1.01		
	Suburban low density .....	215	3.92 <sup>ab</sup>	1.11		
<b>It's usually clean (i.e., not much garbage)</b>						
	Urban high density .....	173	3.33 <sup>a</sup>	1.23	<b>5.549</b>	<b>.004</b>
	Suburban.....	402	3.66 <sup>b</sup>	1.04		
	Suburban low density .....	214	3.56 <sup>ab</sup>	1.06		
<b>Overall Neighbourhood Aesthetics</b>						
	Urban high density .....	174	3.42 <sup>a</sup>	.79	<b>4.636</b>	<b>.010</b>
	Suburban.....	403	3.61 <sup>b</sup>	.67		
	Suburban low density .....	215	3.54 <sup>ab</sup>	.74		

\* Based on a 5-point scale where higher scores reflect a more positive perception of neighbourhood aesthetics

Note: [R] represents a reverse coded variable

Note: Superscripts indicate contexts significantly different from each other (p<.05)

### ***Active Neighbourhood Transportation Features***

In regards to features which enable active transportation around the neighbourhood, not surprisingly, youth living in suburban low density neighbourhoods report having significantly less positive active neighbourhood transportation features (F=22.679, p<.001) (see Table 53). Having sidewalks on most of the streets in the neighbourhood declined

consistently and significantly as one progressed from urban high density neighbourhoods to suburban low density neighbourhoods (see Table 53). There were also significant differences among neighbourhoods in having enough bicycling or walking trails ( $F=7.348$ ,  $p=.001$ ). In this case, however, suburban neighbourhood youth reported significantly greater satisfaction with the number of trails available in comparison to urban high density and suburban low density residents (see Table 53).

**Table 53**  
**Neighbourhood Type Differences in Perceptions of Neighbourhood Transportation**

Transportation Characteristic Neighbourhood Type	Neighbourhood Transportation*			F	p
	n	Mean	Std. Dev.		
<b>Sidewalks on most of the streets</b>					
Urban high density .....	176	4.11 <sup>a</sup>	1.11	<b>40.354</b>	<b>&lt;.001</b>
Suburban.....	400	3.74 <sup>b</sup>	1.16		
Suburban low density .....	214	3.04 <sup>c</sup>	1.40		
<b>Enough bicycling or walking trails</b>					
Urban high density .....	175	3.33 <sup>a</sup>	1.33	<b>7.348</b>	<b>.001</b>
Suburban.....	401	3.63 <sup>b</sup>	1.17		
Suburban low density .....	213	3.26 <sup>a</sup>	1.32		
<b>Overall Neighbourhood Transportation</b>					
Urban high density .....	177	3.71 <sup>a</sup>	.97	<b>22.679</b>	<b>&lt;.001</b>
Suburban.....	403	3.68 <sup>a</sup>	.95		
Suburban low density .....	215	3.15 <sup>b</sup>	1.15		

\* Based on a 5-point scale where higher scores reflect a more positive perception of the availability of neighbourhood transportation features

Note: Superscripts indicate contexts significantly different from each other ( $p<.05$ )

#### 4.10.8 Commuting

There are significant differences among neighbourhoods types and the method of commuting to school used most frequently ( $X^2=105.781$ ,  $p<.001$ ) (see Table 54). In urban high density neighbourhoods, more youth than expected walked to school, and to a lesser degree, more received drives (see Table 54). Conversely, in suburban low density neighbourhoods, a larger proportion of youth than expected reported taking the bus over all other forms of commuting, all of which were reported less frequently than expected. These findings make sense when one considers the distance, density, and environment that youth

must negotiate to travel to and from school, and reflect earlier findings in the literature (e.g., Sirard et al., 2005).

**Table 54**  
**Neighbourhood Type Differences in Commuting To School**

Neighbourhood Type	Commuting Method <sup>a</sup>			
	Getting a drive	Taking the bus	Walking	Biking
Urban high density .....	33 (19.9)	46 (27.7)	75 (45.2)	12 (7.2)
Suburban .....	41 (10.8)	212 (56.1)	98 (25.9)	27 (7.1)
Suburban low density .....	24 (11.5)	160 (76.9)	13 (6.3)	11 (5.3)
<b>Total .....</b>	<b>98 (13.0)</b>	<b>418 (55.6)</b>	<b>186 (24.7)</b>	<b>50 (6.6)</b>

<sup>a</sup> row percentage shown in parentheses  
 $X^2=105.781$ ;  $df=6$ ;  $p<.001$

#### 4.10.9 Neighbourhood Mobility

With respect to youths' mobility in their neighbourhoods, those residing in suburban low density neighbourhoods rated their overall mobility significantly more poorly ( $F=6.846$ ,  $p=.001$ ) as well as the overall support they perceived receiving from aspects of their environment ( $F=19.223$ ,  $p<.001$ ) (see Table 55). These youth find it significantly more difficult to get around their neighbourhood, which is not surprising given the nature of these neighbourhoods, which have typically greater distances to traverse. Thus, we find a consistent pattern with youth from suburban low density neighbourhoods rating all of the individual environmental support aspects significantly more poorly in comparison to youth from suburban and urban high density neighbourhoods (see Table 55).

This pattern, however, does not hold up when considering the parental support for mobility. There are significant differences among neighbourhoods in how much youth perceive their parents to worry about something happening to them if they go somewhere on their own ( $F=6.372$ ,  $p=.002$ ) (see Table 55). Here, youth from suburban neighbourhoods perceived their parents to worry significantly more so than youth from suburban low density

neighbourhoods. Interestingly, however, these significant differences in the extent to which parents were perceived to worry did not translate into significant differences in being allowed to walk or bike in one's neighbourhood on one's own. Nor is this result consistent with the youths' perceptions of neighbourhood safety reported earlier, where those from urban high density neighbourhoods reported their neighbourhood to be significantly less safe (see Table 50).

**Table 55**  
**Neighbourhood Type Differences in Perceptions of Neighbourhood Mobility**

Neighbourhood Mobility Neighbourhood Type	Perceptions *			F	p
	n	Mean	Std. Dev.		
<b><i>Parental Support</i></b>					
<b>Parents worry about something happening if I go somewhere on my own [R]</b>					
Urban high density .....	178	2.57 <sup>ab</sup>	1.25	<b>6.372</b>	<b>.002</b>
Suburban.....	401	2.46 <sup>a</sup>	1.16		
Suburban low density .....	216	2.82 <sup>b</sup>	1.17		
<b>Parents allow me to walk in our neighbourhood on my own</b>					
Urban high density .....	176	4.02	1.22	.836	.434
Suburban.....	399	3.91	1.16		
Suburban low density .....	215	3.87	1.20		
<b>Parents allow me to bike on my own</b>					
Urban high density .....	170	3.94	1.41	.761	.468
Suburban.....	396	4.06	1.23		
Suburban low density .....	211	4.09	1.09		
<b><i>Overall Parental Support</i></b>					
Urban high density .....	179	3.50	1.00	1.013	.363
Suburban.....	403	3.47	.94		
Suburban low density .....	216	3.58	.93		
<b><i>Environmental Support</i></b>					
<b>Many places I like to go within easy walking distance of home</b>					
Urban high density .....	177	3.95 <sup>a</sup>	1.08	<b>11.828</b>	<b>&lt;.001</b>
Suburban.....	402	4.09 <sup>a</sup>	1.06		
Suburban low density .....	212	3.62 <sup>b</sup>	1.31		
<b>If stayed after school for an activity, it would be easy to get home afterwards</b>					
Urban high density .....	176	3.85 <sup>a</sup>	1.37	<b>19.078</b>	<b>&lt;.001</b>
Suburban.....	397	3.76 <sup>a</sup>	1.32		
Suburban low density .....	212	3.12 <sup>b</sup>	1.40		

**Table 55 Continued**

<b>If wanted to do an after-school activity someplace else besides school, it would be easy to get there</b>					
Urban high density .....	179	3.61 <sup>a</sup>	1.23		
Suburban.....	402	3.54 <sup>a</sup>	1.15	<b>8.451</b>	<b>&lt;.001</b>
Suburban low density .....	214	3.17 <sup>b</sup>	1.25		
<b>If wanted to do an after-school activity someplace else besides school, it would be easy to get home afterward</b>					
Urban high density .....	179	3.60 <sup>a</sup>	1.27		
Suburban.....	403	3.54 <sup>a</sup>	1.16	<b>8.147</b>	<b>&lt;.001</b>
Suburban low density .....	213	3.16 <sup>b</sup>	1.31		
<b>Overall Environmental Support</b>					
Urban high density .....	179	3.76 <sup>a</sup>	.99		
Suburban.....	403	3.73 <sup>a</sup>	.89	<b>19.223</b>	<b>&lt;.001</b>
Suburban low density .....	214	3.27 <sup>b</sup>	1.03		
<b>Overall Neighbourhood Mobility</b>					
Urban high density .....	179	3.65 <sup>a</sup>	.81		
Suburban.....	403	3.62 <sup>a</sup>	.73	<b>6.846</b>	<b>.001</b>
Suburban low density .....	215	3.41 <sup>b</sup>	.77		

\* Based on a 5-point scale where higher scores represent more positive perceptions of neighbourhood mobility

Note: [R] represents a reverse coded variable

Note: Superscripts indicate contexts significantly different from each other (p<.05)

## 4.11 RELATIONSHIPS IN PHYSICAL ACTIVITY PARTICIPATION

### 4.11.1 Relationships among Physical Activity Categories

The majority of physical activity types are significantly correlated with other types of physical activity (see Table 56). Thus, those youth who reported higher levels of participation in one category of physical activity also reported engaging more often in other categories of physical activity. This would imply that youth tend to engage in a variety of physical activities. There is, however, one exception. There is no significant correlation between participating in team sports and participating in individual sports ( $r=.060$ ,  $p=.167$ ) (see Table 56). Therefore, it appears that youth who participate in team sports do not necessarily participate to the same extent in individual sports, and vice versa. If we recall that females participated significantly more in individual sports and males significantly more in

team sports, then we might infer that their preference for these categories of physical activity has to do with their little engagement in the other form. If so, this offers an interesting implication for those attempting to increase the physical activity of youth, as sex specific approaches might be warranted.

**Table 56**  
**Relationships Among Participation in Physical Activity Types**

<b>Type of Physical Activity</b>	<b>Type of Physical Activity</b>		
	Team Sports	Individual Sports	Physical Activities
Individual Sports .....	.060 (.167)		
Physical Activities.....	<b>.402</b> <b>(&lt;.001)</b>	<b>.243</b> <b>(&lt;.001)</b>	
Total Physical Activity.....	<b>.712</b> <b>(&lt;.001)</b>	<b>.518</b> <b>(&lt;.001)</b>	<b>.838</b> <b>(&lt;.001)</b>

Note: Correlations are reported above with probability in parenthesis below  
Significant relationships at the .05 level are signified in **bold**

#### **4.11.2 Personal Factor Relationships with Physical Activity Participation**

Self-efficacy is significantly related to participation in all types of physical activity. In fact, all forms of self-efficacy, as well as overall self-efficacy, were significantly and positively related to all types of physical activity participation, with one exception. Positive alternatives self-efficacy was not significantly related to participation in individual sports ( $r=.051$ ,  $p=.222$ ) (see Table 57). Hence, having a positive sense of one’s self-efficacy in various capacities is positively associated with participation in physical activities, and in team and individual sports, as well as overall physical activity among youth.

Positive attitudes towards physical activity are also significantly related to participation in team sports, physical activities, and overall physical activity (see Table 57). However, a positive attitude toward physical activity is not significantly related to participation in individual sports ( $r=.051$ ,  $p=.228$ ).

Finally, with respect to age, there is a significant negative relationship between age and participation in team sports ( $r=-.075$ ,  $p=.043$ ), physical activities ( $r=-.130$ ,  $p<.001$ ), and



overall physical activity ( $r=-.108$ ,  $p=.003$ ) (see Table 57). These results indicate that participation in most forms of physical activity decline as youth get older, even within this relatively narrow age range. Once again, the only exception was between age and participation in individual sports, which was unrelated (see Table 57). This outcome suggests that the nature of individual sports and their participants, which were mainly females, are inherently different somehow from other types of physical activity as youth get older.

**Table 57**  
**Relationships Among Personal Factors and Participation in Physical Activity**

Personal Factors Sub-scales	Type of Physical Activity			
	Team Sports	Individual Sports	Physical Activities	Total Physical Activity
<b>Self-efficacy</b>				
Support seeking.....	<b>.216</b> ( <b>&lt;.001</b> )	<b>.100</b> ( <b>.017</b> )	<b>.210</b> ( <b>&lt;.001</b> )	<b>.283</b> ( <b>&lt;.001</b> )
Barrier .....	<b>.202</b> ( <b>&lt;.001</b> )	<b>.130</b> ( <b>.002</b> )	<b>.218</b> ( <b>&lt;.001</b> )	<b>.274</b> ( <b>&lt;.001</b> )
Positive alternatives.....	<b>.128</b> ( <b>.001</b> )	.051 (.222)	<b>.194</b> ( <b>&lt;.001</b> )	<b>.214</b> ( <b>&lt;.001</b> )
<b>Overall Self-efficacy.....</b>	<b>.216</b> ( <b>&lt;.001</b> )	<b>.110</b> ( <b>.009</b> )	<b>.239</b> ( <b>&lt;.001</b> )	<b>.300</b> ( <b>&lt;.001</b> )
<b>Attitudes.....</b>	<b>.110</b> ( <b>.003</b> )	.063 (.132)	<b>.167</b> ( <b>&lt;.001</b> )	<b>.200</b> ( <b>&lt;.001</b> )
<b>Age.....</b>	<b>-.075</b> ( <b>.043</b> )	.051 (.228)	<b>-.130</b> ( <b>&lt;.001</b> )	<b>-.108</b> ( <b>.003</b> )

Note: Correlations are reported above with probability in parenthesis below  
Significant relationships at the .05 level are signified in **bold**

#### 4.11.3 Social Factor Relationships with Physical Activity Participation

For all types of physical activity, overall encouragement was significantly related to participation by youth, with the exception of individual sports (see Table 58). Thus, encouragement from a variety of sources seems to be important for participation in various physical activities.

For participation in team sports, encouragement from all sources was significantly related to participation, particularly encouragement from siblings ( $r=.180$ ,  $p<.001$ ) (see Table 58). For individual sports, on the other hand, only encouragement from other significant adults was significantly related to participation ( $r=.105$ ,  $p=.013$ ) (see Table 58). Hence, coaches and teachers are particularly influential to the participation of youth in individual sports, and thus indirectly to females, who engage significantly more in these activities.

**Table 58**  
**Relationships Among Social Factors and Participation in Physical Activity**

Social Factors Sub-components	Type of Physical Activity			
	Team Sports	Individual Sports	Physical Activities	Total Physical Activity
<b>Encouragement</b>				
Family .....	<b>.167</b> ( <b>&lt;.001</b> )	.017 (.690)	<b>.103</b> ( <b>.003</b> )	<b>.138</b> ( <b>&lt;.001</b> )
Siblings.....	<b>.180</b> ( <b>&lt;.001</b> )	.042 (.338)	<b>.141</b> ( <b>&lt;.001</b> )	<b>.177</b> ( <b>&lt;.001</b> )
Friends .....	<b>.153</b> ( <b>&lt;.001</b> )	.074 (.083)	<b>.131</b> ( <b>&lt;.001</b> )	<b>.181</b> ( <b>&lt;.001</b> )
Significant adults .....	<b>.120</b> ( <b>.001</b> )	<b>.105</b> ( <b>.013</b> )	.066 (.076)	<b>.135</b> ( <b>&lt;.001</b> )
<b>Overall Encouragement.....</b>	<b>.186</b> ( <b>&lt;.001</b> )	.057 (.176)	<b>.112</b> ( <b>.002</b> )	<b>.182</b> ( <b>&lt;.001</b> )

Note: Correlations are reported above with probability in parenthesis below  
Significant relationships at the .05 level are signified in **bold**

For physical activities, encouragement from all sources was significantly related to participation, with the exception of that received from other significant adults ( $r=.066$ ,  $p=.076$ ) (see Table 58). This finding is not too surprising as many of the activities which comprise the physical activities category are ones in which youth would likely engage individually or casually with friends, and hence, are activities that are less likely to involve a coaching role.

Overall, when one examines total participation in all physical activity, encouragement from all sources is significantly related to participation among the youth (see Table 58). The

one anomaly is participation in individual sports, which is unrelated to most encouragement that these youth might be receiving.

#### **4.11.4 Environmental Factor Relationships with Physical Activity Participation**

A variety of different environmental factors are related to participation in different forms of physical activity, but no consistent patterns emerge (see Table 59). In other words, the significant relationships between individual environmental factors and specific forms of physical activity participation are distinctive and not necessarily generalizable across all types of participation. Nevertheless, environmental factors do appear to play a significant role in the participation of youth in physical activity.

School opportunities for physical activity were related to participation in individual sports and overall physical activity. Community opportunities for physical activity were also significantly related to participation in individual sports and total physical activity in addition to team sports (see Table 59). Having access to equipment for physical activities is significantly related with participation in team sports ( $r=.164$ ,  $p<.001$ ), physical activities ( $r=.081$ ,  $p=.028$ ), and total physical activity ( $r=.159$ ,  $p<.001$ ), but interestingly, not individual sports ( $r=.026$ ,  $p=.542$ ) (see Table 59). Presumably, many of the activities comprising the team sports and physical activities categories require equipment such as skates, bikes, balls, racquets, and so on, whereas the activities which comprise the individual sports category require facility resources such as a pool, a track, or a studio, and is much less reliant on access to personal equipment.

Interestingly, neither neighbourhood safety nor neighbourhood aesthetics were significantly related with any type of physical activity participation (see Table 59). Similarly, active neighbourhood transportation (i.e., having sidewalks and trails in one's neighbourhood) appears to be of less importance as it was only significantly related, but not compellingly, to participation in team sports ( $r=.087$ ,  $p=.020$ ) (see Table 59).

Neither awareness of the number of neighbourhood facilities nor the perceived quality of them were significantly related to participation in any form of physical activity, although, awareness was only somewhat related to individual sports ( $r=.081$ ,  $p=.054$ ) and to overall physical activity ( $r=.070$ ,  $p=.053$ ) (see Table 59). In contrast, the use of a greater

number of neighbourhood facilities was significantly related to participation in team sports, in physical activities, and in overall physical activity, but not individual sports (see Table 59).

**Table 59**  
**Relationships Among Environmental Factors and Participation in Physical Activity**

Environmental Factors Sub-components	Type of Physical Activity			
	Team Sports	Individual Sports	Physical Activities	Total Physical Activity
<b>School Opportunity</b> .....	.030 (.428)	<b>.092</b> <b>(.029)</b>	.059 (.110)	<b>.097</b> <b>(.007)</b>
<b>Community Opportunity</b> .....	<b>.157</b> <b>(&lt;.001)</b>	<b>.087</b> <b>(.039)</b>	.035 (.338)	<b>.149</b> <b>(&lt;.001)</b>
<b>Neighbourhood Safety</b> .....	-.042 (.264)	.046 (.279)	-.043 (.242)	-.010 (.774)
<b>Neighbourhood Aesthetics</b> .....	.018 (.637)	.034 (.418)	-.023 (.533)	.021 (.559)
<b>Neighbourhood Transportation</b> .....	<b>.087</b> <b>(.020)</b>	.029 (.496)	.004 (.916)	.064 (.076)
<b>Home Equipment</b> .....	<b>.164</b> <b>(&lt;.001)</b>	.026 (.542)	<b>.081</b> <b>(.028)</b>	<b>.159</b> <b>(&lt;.001)</b>
<b>Awareness of Neighbourhood Facilities</b> .....	.028 (.448)	.081 (.054)	-.007 (.850)	.070 (.053)
<b>Quality of Neighbourhood Facilities</b> .....	-.070 (.064)	-.054 (.209)	-.040 (.289)	-.055 (.139)
<b>Use of Neighbourhood Facilities</b> .....	<b>.134</b> <b>(&lt;.001)</b>	.062 (.143)	<b>.132</b> <b>(&lt;.001)</b>	<b>.199</b> <b>(&lt;.001)</b>
<b>Neighbourhood Mobility</b>				
Parental support .....	<b>.098</b> <b>(.009)</b>	.015 (.720)	<b>.125</b> <b>(.001)</b>	<b>.114</b> <b>(.002)</b>
Environmental support .....	<b>.141</b> <b>(&lt;.001)</b>	<b>.097</b> <b>(.021)</b>	.059 (.107)	<b>.140</b> <b>(&lt;.001)</b>
<b>Overall Neighbourhood Mobility</b> ....	<b>.154</b> <b>(&lt;.001)</b>	.077 (.065)	<b>.110</b> <b>(.003)</b>	<b>.163</b> <b>(&lt;.001)</b>

Note: Correlations are reported above with probability in parenthesis below  
Significant relationships at the .05 level are signified in **bold**

Of course, not every neighbourhood has every facility; thus, for individual sports dependent on larger facilities, this likely means that some youth must travel outside of their neighbourhoods to access some facilities. This relationship between the use of more neighbourhood facilities and team sports, physical activities, and totally physical activity does, however, demonstrate the importance of having accessible facilities for youths' physical activity participation.

As noted above, of particular interest is that across all types of physical activity, there were no significant relationships with the perceived quality of neighbourhood facilities (see Table 59). It would appear that the perceived quality of neighbourhood facilities is irrelevant to youths' participation in physical activity. As we saw earlier, youth do perceive there to be significant differences in the quality of facilities in their neighbourhoods, yet perhaps it does not have an impact on their participation.

With regards to neighbourhood mobility, parental support for neighbourhood mobility was significantly and positively related to participation in team sports, physical activities, and overall physical activity (see Table 59). Parental support for neighbourhood mobility was not related to individual sports likely because females participate significantly more than males in individual sports, and females also report significantly less parental support for their mobility in the neighbourhood. Environmental support for neighbourhood mobility is also significantly related to participation in team sports and overall physical activity, and unlike parental support, to individual sports (see Table 59). Environmental support for neighbourhood mobility is not significantly related to participation in physical activities perhaps because they constitute a greater variety of activities in which one can engage individually at home or near home. Thus, being able to get to or from somewhere in the neighbourhood is not as important for engaging in this type of physical activity.

## **4.12 RELATIONSHIPS AMONG PERSONAL, SOCIAL, AND ENVIRONMENTAL FACTORS**

### **4.12.1 Relationships Among Personal Factors**

All three self-efficacy sub-scales and the composite measure of overall self-efficacy were positively and significantly related (see Table 60). Attitudes towards physical activity

were also positively and significantly related with all three self-efficacy sub-scales and the overall measure of self-efficacy. Age, on the other hand, while *negatively* and significantly, related with all three self-efficacy sub-scales and the overall measure of self-efficacy, the relationship was less strong (see Table 60). This indicates that self-efficacy towards physical activity decreases as youth get older. As we have seen, self-efficacy is an important factor in youths' physical activity participation, and if it decreases with age, then these results may offer some explanation for the decrease in participation as youth get older. However, attitudes towards physical activity appear to be unrelated to the youths' age (see Table 60).

**Table 60**  
**Relationships Among Personal Factors**

Personal Factors Sub-components	Self-Efficacy Type				Attitudes
	Support seeking	Barrier	Positive alternatives	Overall Self-efficacy	
<b>Self-efficacy</b>					
Barrier .....	<b>.621</b> ( <b>&lt;.001</b> )				
Positive alternatives .....	<b>.629</b> ( <b>&lt;.001</b> )	<b>.576</b> ( <b>&lt;.001</b> )			
<b>Overall Self-efficacy.....</b>	<b>.914</b> ( <b>&lt;.001</b> )	<b>.827</b> ( <b>&lt;.001</b> )	<b>.828</b> ( <b>&lt;.001</b> )		
<b>Attitudes.....</b>	<b>.545</b> ( <b>&lt;.001</b> )	<b>.479</b> ( <b>&lt;.001</b> )	<b>.456</b> ( <b>&lt;.001</b> )	<b>.581</b> ( <b>&lt;.001</b> )	
<b>Age.....</b>	<b>-.069</b> ( <b>.051</b> )	<b>-.094</b> ( <b>.008</b> )	<b>-.096</b> ( <b>.007</b> )	<b>-.100</b> ( <b>.005</b> )	.034 (.341)

Note: Correlations are reported above with probability in parenthesis below  
Significant relationships at the .05 level are signified in **bold**

#### 4.12.2 Relationships Among Social Factors

Encouragement from all sources in the study was positively and significantly correlated (see Table 61). In particular, there was an especially strong relationship between encouragement received from siblings and that received from family members ( $r=.699$ ,  $p<.001$ ), which may suggest that families as a whole tend to be fairly similar in the amount of

encouragement they provide (see Table 61). Perhaps encouragement is modelled within the family in the same way the physical activity participation is considered to be.

**Table 61**  
**Relationships Among Social Factors -- Encouragement**

<b>Source of Encouragement</b>	Family	Siblings	Friends
Siblings .....	<b>.699</b> ( <b>&lt;.001</b> )		
Friends .....	<b>.330</b> ( <b>&lt;.001</b> )	<b>.389</b> ( <b>&lt;.001</b> )	
Significant adults .....	<b>.386</b> ( <b>&lt;.001</b> )	<b>.366</b> ( <b>&lt;.001</b> )	<b>.370</b> ( <b>&lt;.001</b> )

Note: Correlations are reported above with probability in parenthesis below  
Significant relationships at the .05 level are signified in **bold**

#### 4.12.3 Relationships Among Environmental Factors

Many of the environmental factors are significantly and consistently, positively related with other environmental variables, which speaks to the likelihood that ensuring a blend of several features is important to creating an environment that facilitates physical activity participation among youth. The only factor that is not relatively consistent in its positive relationship with other environmental factors is parental support for mobility within the neighbourhood (see Table 62). Presumably, despite the types of features that might be present in the neighbourhood to facilitate physical activity participation, the youth had inconsistent perceptions of the extent to which parental support facilitated their mobility.

In contrast, both school opportunity and community opportunity are significantly, positively related to all of the other environmental factors. Neighbourhood safety is also significantly related to all other environmental factors. In particular, there is a fairly strong relationship between neighbourhood aesthetics and neighbourhood safety ( $r=.507, p<.001$ ); hence, the more positively the neighbourhood aesthetics were rated, the more positively neighbourhood safety is perceived to be (see Table 62). Neighbourhood aesthetics are not, however, related to either neighbourhood facility awareness or use. Active neighbourhood transportation features are correlated with several other environmental variables, notably

with environmental support for neighbourhood mobility and neighbourhood safety. This reaffirms that having sidewalks and trails in one's neighbourhood makes it easier for youth to get to and from places, and hence, to be physically active. Active neighbourhood transportation features are not, however, related to the quality of neighbourhood facilities.

Having access to equipment at home for physical activity is significantly related with all other environmental variables (see Table 62). This suggests that having the opportunity to join teams, engage in programs, and have spaces in which to be physically active is related to also having the necessary equipment to use in those places.

Awareness of neighbourhood facilities is strongly related to the use of neighbourhood facilities in particular ( $r=.411$ ,  $p<.001$ ), but not, as we have seen, with parental support for neighbourhood mobility or to neighbourhood aesthetics (see Table 62). Use of a greater number of neighbourhood facilities is, not surprisingly, related fairly strongly with awareness of neighbourhood facilities, suggesting that building awareness might lead to increased participation in physical activity. Even though the perceived quality of neighbourhood facilities is significantly related to several other environmental variables, including awareness and the use of neighbourhood facilities, it is not, however, significantly related to active neighbourhood transportation features or to any of the neighbourhood mobility variables.

Interestingly, parental support for neighbourhood mobility and environmental support for neighbourhood mobility, which were combined into a single measure in the original study (Evenson et al., 2006), are significantly related, but not as strongly as one might have expected ( $r=.242$ ,  $p<.001$ ) (see Table 62). Hence, this might suggest an inherent difference in these two indicators of mobility support and the need to consider them separately.



**Table 62**  
**Relationships Between Environmental Factors**

Environmental Factors Sub-scales	School Opport.	Commun. Opport.	Nbhood. Safety	Nbrhood. Aesthetics	Nbrhood. Transpor.	Home Equip.	Awarenes s Nbrhood. Facilities	Quality Nbrhood. Facilities	Use Nbrhood. Facilities	Parental support	Environ. support
<b>Community Opportunity</b> .....	<b>.386</b> ( <b>&lt;.001</b> )										
<b>Neighbourhood Safety</b> .....	<b>.278</b> ( <b>&lt;.001</b> )	<b>.234</b> ( <b>&lt;.001</b> )									
<b>Neighbourhood Aesthetics</b> .....	<b>.254</b> ( <b>&lt;.001</b> )	<b>.224</b> ( <b>&lt;.001</b> )	<b>.507</b> ( <b>&lt;.001</b> )								
<b>Neighbourhood Transportation</b> .....	<b>.227</b> ( <b>&lt;.001</b> )	<b>.321</b> ( <b>&lt;.001</b> )	<b>.348</b> ( <b>&lt;.001</b> )	<b>.260</b> ( <b>&lt;.001</b> )							
<b>Home Equipment</b> .....	<b>.265</b> ( <b>&lt;.001</b> )	<b>.367</b> ( <b>&lt;.001</b> )	<b>.251</b> ( <b>&lt;.001</b> )	<b>.225</b> ( <b>&lt;.001</b> )	<b>.159</b> ( <b>&lt;.001</b> )						
<b>Awareness of Neighbourhood Facilities</b> .....	<b>.119</b> ( <b>&lt;.001</b> )	<b>.364</b> ( <b>&lt;.001</b> )	<b>.089</b> ( <b>.012</b> )	<b>.030</b> ( <b>.403</b> )	<b>.266</b> ( <b>&lt;.001</b> )	<b>.165</b> ( <b>&lt;.001</b> )					
<b>Quality of Neighbourhood Facilities</b> .....	<b>.152</b> ( <b>&lt;.001</b> )	<b>.218</b> ( <b>&lt;.001</b> )	<b>.247</b> ( <b>&lt;.001</b> )	<b>.163</b> ( <b>&lt;.001</b> )	<b>.067</b> ( <b>.063</b> )	<b>.129</b> ( <b>&lt;.001</b> )	<b>.262</b> ( <b>&lt;.001</b> )				
<b>Use of Neighbourhood Facilities</b> .....	<b>.188</b> ( <b>&lt;.001</b> )	<b>.278</b> ( <b>&lt;.001</b> )	<b>.089</b> ( <b>.012</b> )	<b>.054</b> ( <b>.128</b> )	<b>.255</b> ( <b>&lt;.001</b> )	<b>.235</b> ( <b>&lt;.001</b> )	<b>.411</b> ( <b>&lt;.001</b> )	<b>.235</b> ( <b>&lt;.001</b> )			
<b>Neighbourhood Mobility</b>											
Parental Support .....	.061 .084	<b>.083</b> <b>.020</b>	<b>.157</b> ( <b>&lt;.001</b> )	.054 (.127)	.015 (.670)	<b>.092</b> ( <b>.010</b> )	.035 (.322)	.008 (.834)	.049 .167		
Environmental Support .....	<b>.289</b> ( <b>&lt;.001</b> )	<b>.358</b> ( <b>&lt;.001</b> )	<b>.240</b> ( <b>&lt;.001</b> )	<b>.122</b> ( <b>.001</b> )	<b>.355</b> ( <b>&lt;.001</b> )	<b>.262</b> ( <b>&lt;.001</b> )	<b>.328</b> ( <b>&lt;.001</b> )	.059 (.103)	<b>.305</b> ( <b>&lt;.001</b> )	<b>.242</b> ( <b>&lt;.001</b> )	
<b>Overall Neighbourhood Mobility</b> .....	<b>.245</b> ( <b>&lt;.001</b> )	<b>.305</b> ( <b>&lt;.001</b> )	<b>.257</b> ( <b>&lt;.001</b> )	<b>.117</b> ( <b>.001</b> )	<b>.269</b> ( <b>&lt;.001</b> )	<b>.238</b> ( <b>&lt;.001</b> )	<b>.256</b> ( <b>&lt;.001</b> )	.047 (.197)	<b>.249</b> ( <b>&lt;.001</b> )	<b>.708</b> ( <b>&lt;.001</b> )	<b>.856</b> ( <b>&lt;.001</b> )

Note: Correlations are reported above with probability in parenthesis below  
Significant relationships at the .05 level are signified in **bold**

# **CHAPTER FIVE**

## **FACTORS ASSOCIATED WITH**

### **YOUTHS' PHYSICAL ACTIVITY PARTICIPATION**

This chapter builds on the findings in the previous chapter to examine the relationships and interacting effects among factors which were central to this study. Thus, the relationships and interacting effects of gender and neighbourhood environments on various physical activity outcomes are discussed. This is followed by a series of analyses, guided by the socio-ecological framework built on personal, social and environmental systems of factors, to explore the contribution of these various factors in explaining youths' physical activity participation.

#### **5.1 RELATIONSHIPS AND INTERACTIONS WITH PHYSICAL ACTIVITY**

When looking at the effects that gender and type of neighbourhood environment has on youths' overall physical activity participation, one finds that both factors appear to contribute to their overall physical activity participation. Based on a factorial analysis of variance, gender had a significant main effect on overall physical activity participation ( $F=9.776$ ,  $p=.002$ ) with male youth, as was previously demonstrated, engaging in more overall physical activity than female youth. The neighbourhood environment also has a significant effect on youths' overall physical activity participation ( $F=5.837$ ,  $p=.003$ ), reflecting earlier findings that participation in overall physical activity increases as the neighbourhood environment becomes less densely populated. There is no interaction effect between gender and the neighbourhood environment ( $F=.746$ ,  $p=.475$ ), indicating that the effect of each factor operates independently of the other in facilitating physical activity participation.

Significant main effects for gender and the type of neighbourhood environment are also found for youths' individual sports participation. However, the significant effect of gender for individual sports participation ( $F=6.662$ ,  $p=.010$ ), contrary to its effect on overall physical activity, reveals that female youth are more active than male youth in individual

sports. In addition, living in a less dense neighbourhood is significantly related to participation in individual sports ( $F=7.345$ ,  $p=.001$ ). Once again there is no interaction effect so gender and the type of neighbourhood environment have independent effects on participation in individual sports.

Turning to youths' participation in team sports, gender again has a significant main effect on youth participation, however, the type of neighbourhood environment in which they live does not. The main effect for gender is highly significant ( $F=33.621$ ,  $p<.001$ ), and male youth participate more than females in team sports. The type of neighbourhood environment, while showing some marginal influence, does not have a statistically significant main effect ( $F=2.815$ ,  $p=.061$ ) on team sport participation. Again, there is no interaction effect between gender and the neighbourhood environment in explaining differences in team sports participation among the youth.

Similarly to team sport participation, youths' participation in physical activities showed a significant main effect for gender but not for the type of neighbourhood environment. Males participate significantly more than females in physical activities ( $F=10.848$ ,  $p=.001$ ), whereas participation does not differ significantly across neighbourhood environments ( $F=2.592$ ,  $p=.076$ ). Once again, no interaction effect was found between gender and the type of neighbourhood environment so only gender appears to be related to being more or less engaged in physical activities.

In summary, gender is consistently related to all types of physical activity participation, with males being more physically active overall and across all types of physical activity, with the exception of individual sport participation where females' participation is greater. Though the role of the type of neighbourhood environment within which the youth live is not significant across all specific types of physical activity, it does have an effect on youths' overall physical activity and their individual sport engagement. In every instance, no interaction effects were found so the effects of gender and neighbourhood environment operate independently in their relationship with youths' participation in various types of physical activity. In other words, youths' physical activity behaviours are not amplified by being of a certain gender and living in a particular type of neighbourhood environment.

## **5.2 TESTING A SOCIO-ECOLOGICAL FRAMEWORK FOR PHYSICAL ACTIVITY PARTICIPATION**

In order to test a socio-ecological framework for explaining participation by youth in physical activity, all potential personal, social, and environmental variables were entered into a hierarchical regression model, in that order. All potential variables were investigated to ensure due diligence and explore the influence of all of the variables that were introduced in this study, and which may thus have an impact on youths' physical activity behaviour. Consistent with the socio-ecological framework described earlier, personal, social, and environmental variables were entered into the regression model in this order to begin with an examination of factors closest to a person and then move to factors further from the person, whose influence presumably follows. In addition, such an approach reveals whether each factor level (i.e., personal, social, environmental) is significant in explaining physical activity participation.

### **5.2.1 A Model for Overall Physical Activity Participation**

The initial hierarchical regression model explained 17.0% of youths' overall physical activity participation (Overall  $F=5.243$ ,  $p<.001$ ). All three factor levels (i.e., personal, social, and environmental) made significant contributions in explaining youths' overall physical activity participation, and consequently, all three factors are important to understanding youths' physical activity behaviours (see Table 63). This means that once personal factors had explained an initial 11.0% of the variance in physical activity participation ( $F=11.912$ ,  $p<.001$ ), social factors could explain a further 1.9% of participation ( $F=3.109$ ,  $p=.015$ ), and that after considering this additional variance that social factors could explain, environmental factors could still explain an additional 4.1% of participation ( $F=2.336$ ,  $p=.006$ ). Therefore, clearly, all three factor levels make important contributions to understanding youths' physical activity participation and provide some initial support for the socio-ecological conceptual framework as a model for understanding their behaviour. The results of this model of overall participation also suggest that all factors should continue to be examined in future physical activity research.

Among the specific aspects in the regression model, the number of facilities that the youth used in their neighbourhood, an environmental factor, was the most important factor in explaining physical activity participation ( $\beta=.146$ ,  $p=.002$ ) (see Table 63). Hence, more so than any other factor, the greater the number of facilities that youth reported using, the more they participated in physical activity. Having access to facilities in the neighbourhood which youth can use makes an important contribution to their subsequent physical activity engagement.

**Table 63**  
**A Model of Factors Explaining Youth Participation in Overall Physical Activity**

<i>Factors</i>	$R^2$	$R^2$	$F$ change	$\beta$	$p$
Components	Change	Total $R^2$			
<b>1. Personal</b>	.110	.110	11.912		<b>&lt;.001</b>
Sex (male).....				<b>.110</b>	<b>.008</b>
Age.....				-.075	.071
Support Seeking Efficacy .....				.036	.557
Barrier Efficacy .....				<b>.105</b>	<b>.054</b>
Positive Alternatives Efficacy .....				.087	.122
Attitudes.....				.046	.360
<b>2. Social</b>	.019	.129	3.109		<b>.015</b>
Family Encouragement.....				-.030	.619
Significant Adult Encouragement .....				.035	.442
Sibling Encouragement .....				.078	.157
Friends Encouragement.....				.069	.122
<b>3. Environmental</b>	.041	.170	2.336		<b>.006</b>
School Opportunity .....				.007	.876
Community Opportunity .....				.017	.734
Neighbourhood Safety.....				<b>-.142</b>	<b>.004</b>
Neighbourhood Aesthetics .....				.025	.590
Neighbourhood Transportation .....				-.013	.776
Enough Equipment to use for Physical Activity .....				.034	.463
Knowledge of Neighbourhood Facilities (Awareness) .....				.025	.623
Number of Neighbourhood Facilities Used.....				<b>.146</b>	<b>.002</b>
Quality of Neighbourhood Facilities.....				-.064	.125
Parental Support for Neighbourhood Mobility .....				.051	.227
Environmental Support for Neighbourhood Mobility.....				.007	.890
Active Commuting to School.....				.006	.882

Note:  $\beta$  and  $p$  represent overall model  
Significant BETA ( $\beta$ ) values are represented in **bold**

Puzzling and seemingly counter intuitive, the perceived safety of the neighbourhood was revealed as the next most important and significant variable in explaining overall physical activity participation ( $\beta=-.142$ ,  $p=.004$ ), again an environmental factor (see Table 63). This finding was particularly puzzling because earlier results indicated that there were no significant relationships between the perceived safety of the neighbourhood and any types of physical activity, including overall physical activity participation (see Table 59). One would therefore not expect to see a significant relationship in the regression analysis with no previous evidence; hence, this finding is unusual. It is also counter intuitive because the regression coefficient is negative, meaning that an increase in the perception of neighbourhood safety corresponds with a decrease in participation in physical activity. A potential explanation for what is happening here is that the youths who are physically active and who are out interacting with their neighbourhoods to a greater extent have a more intimate understanding of their neighbourhood, and hence, they have an increased familiarity with its safety risks. In other words, increased interaction and familiarity with the neighbourhood afforded for physically active youth may lead them to have a heightened awareness of the risks in their neighbourhoods simply because they are actually more familiar with the neighbourhood (e.g., knowing the risks involved in riding a bike or walking in the neighbourhood).

Gender, a personal factor, also was significantly related to physical activity participation ( $\beta=.110$ ,  $p=.008$ ) (see Table 63). Hence, just being male explained a significant proportion of youths' overall physical activity. Further, barrier efficacy was almost significantly related to youths' physical activity participation ( $\beta=.105$ ,  $p=.054$ ) in this model (see Table 63). Thus, youth who have more confidence in their ability to be physically active no matter how busy their day is or how hot or cold it is outside, are significantly more physically active. Therefore, helping youth to be confident in these areas may prove to facilitate their physical activity participation.

Social factors in the form of encouragement from various people to be physically active explained a significant proportion of youths' physical activity participation ( $R^2=.019$ ,  $F=3.109$ ,  $p=.015$ ), however no single social factor variable was significant (see Table 63). Encouragement from friends ( $\beta=.069$ ,  $p=.122$ ) and siblings ( $\beta=.078$ ,  $p=.157$ ) do appear to be the relatively more important factors perhaps signifying the transition to adolescence where

people of a similar age (i.e., peers and siblings) have a more significant role in the lives of the youth and their physical activity participation (see Table 63).

In summary, this model demonstrates that each level of factors (i.e., personal, social, and environmental), as well as several variables within each factor, contributes significantly to youths' overall physical activity participation. Moreover, the hierarchical form of the regression model showed that once personal, followed by social factors had been taken into account, environmental factors still made a significant contribution to explaining youths' overall physical activity over and above the contribution of the other factors.

### **5.2.2 A Modified Model for Overall Physical Activity Participation**

After having explored the effect which all potential variables in the study could have on youths' overall physical activity, a few select variables were removed from the regression model. These variables were removed in order to develop a more simplified model without some of the variables which were found to be insignificant in earlier analyses.

None of the variables within the personal or social factor levels of the model were removed as all these variables were found in earlier analyses to be significantly related to physical activity participation (see Table 57 & Table 58). Four environmental variables, however, were removed to create a simplified regression model. The variables associated with neighbourhood aesthetics and with the perceived quality of facilities in the neighbourhood were not significantly related to participation in any types of physical activity or overall physical activity (see Table 59), and were therefore removed for the simplified regression model. Active neighbourhood transportation features (i.e., having sidewalks and trails in the neighbourhood) was only significantly related with team sport participation ( $r=.087$ ,  $p=.020$ ) (see Table 59), thus it too was removed from this simplified regression model of overall physical activity participation. Active commuting to school was removed as well because it was insignificant in the initial regression model ( $\beta=.006$ ,  $p=.882$ ), plus no significant differences between youth who actively or non-actively commuted to school were previously found ( $t= 1.744$ ,  $p=.082$ ). Though neighbourhood safety was not related to participation in any of the physical activity types or in overall physical activity in earlier analyses, it was kept in the simplified regression model due to its highly significant

relationship with physical activity participation in the initial full model ( $\beta=-.142$ ,  $p=.004$ ) (see Table 63). In the end, the variables which were used in the simplified regression model, and employed in subsequent analyses, can be seen in Table 64.

The simplified model explains 16.7% of youths' participation in overall physical activity, and this is highly significant ( $F=6.943$ ,  $p<.001$ ) (see Table 64). Moreover, as was true for the earlier, comprehensive regression model, all three factor levels (i.e., personal, social, and environmental) are significant in explaining youths' overall physical activity participation (see Table 64).

**Table 64**  
**A Simplified Model of Factors Explaining Participation in Overall Physical Activity**

<i>Factors</i>	<b>R<sup>2</sup></b>	<b>Total R<sup>2</sup></b>	<b>F change</b>	<b><math>\beta</math></b>	<b>p</b>
Components	Change				
<b>1. Personal</b>	.117	.117	14.006		<b>&lt;.001</b>
Sex (male).....				<b>.125</b>	<b>.002</b>
Age.....				<b>-.093</b>	<b>.017</b>
Support Seeking Efficacy .....				.083	.154
Barrier Efficacy .....				<b>.115</b>	<b>.027</b>
Positive Alternatives Efficacy .....				.042	.423
Attitudes.....				.034	.473
<b>2. Social</b>	.015	.133	2.795		<b>.025</b>
Family Encouragement.....				-.053	.349
Significant Adult Encouragement .....				.033	.449
Sibling Encouragement .....				.075	.158
Friends Encouragement.....				.063	.143
<b>3. Environmental</b>	.034	.167	3.215		<b>.001</b>
School Opportunity .....				.023	.597
Community Opportunity .....				.009	.851
Neighbourhood Safety.....				<b>-.133</b>	<b>.001</b>
Enough Equipment to use for Physical Activity .....				.034	.453
Knowledge of Neighbourhood Facilities (Awareness) .....				.010	.825
Number of Neighbourhood Facilities Used.....				<b>.125</b>	<b>.004</b>
Parental Support for Neighbourhood Mobility .....				.068	.087
Environmental Support for Neighbourhood Mobility.....				.025	.567

Note:  $\beta$  and p represent overall model  
Significant BETA ( $\beta$ ) values are represented in **bold**

In this model, neighbourhood safety turns up as the most important variable in explaining youths' overall physical activity participation ( $\beta= -.133$ ,  $p=.001$ ), and again as



having a negative relationship. This outcome suggests, as was proposed earlier, that youth who are more physically active, perhaps have a heightened awareness of the safety risks within their neighbourhood due to their increased interaction with the neighbourhood environment. Next, the second most important factors for youths' physical activity participation, and with the same degree of influence, are gender (i.e., being male is associated with increased participation) ( $\beta=.125$ ,  $p=.002$ ), and the number of facilities in the neighbourhood that youth report using (i.e., the greater the number of facilities used, the more participation) ( $\beta=.125$ ,  $p=.004$ ) (see Table 64). Barrier efficacy was again the only significant type of efficacy in explaining youths' physical activity participation ( $\beta=.115$ ,  $p=.027$ ). Interestingly, age, which was not quite significant in the previous model, is revealed to be significant and negative in this regression model ( $\beta=-.093$ ,  $p=.017$ ), which indicates that an increase in age corresponds with a decrease in physical activity engagement. Again, social factors (i.e., encouragement from various peoples to be physically active) explained a significant proportion of youths' physical activity participation ( $R^2=.015$ ,  $F=2.795$ ,  $p=.025$ ) with no single social variable alone being significant (see Table 64). Encouragement from friends ( $\beta=.063$ ,  $p=.143$ ) and siblings ( $\beta=.075$ ,  $p=.158$ ) were comparatively more important in explaining youths' physical activity participation.

In conclusion, the simplified regression model revealed some minor differences from the previous comprehensive regression model; yet, we find once again that all three factor levels (i.e., personal, social, and environmental) are significant in explaining youths' physical activity participation. Moreover, essentially the same pattern was observed where the same environmental factors were significant in explaining overall physical activity participation, as were the same personal factors, and finally, the collective contribution of the social factors. Thus, the essential factors in explaining youths' physical activity participation are still being captured in this more parsimonious model.

Hence, this somewhat simplified hierarchical regression model is used in the subsequent analyses to explore its application to different types of physical activity (i.e., team sports, physical activities, and individual sports), and to different neighbourhood environments (i.e., urban high density, suburban, and suburban low density).

## 5.3 TESTING A SOCIO-ECOLOGICAL FRAMEWORK FOR PARTICIPATION IN DIFFERENT TYPES OF PHYSICAL ACTIVITY

### 5.3.1 A Model for Team Sports Participation

The simplified regression model for team sports explained 19.0% of the variance in youths' participation ( $F=7.640$ ,  $p<.001$ ) (see Table 65). All three factor levels (i.e., personal, social, and environmental) were significant, and hence, all are important to understanding youths' team sports participation. One of the more important variables was gender, which was significant ( $\beta=.251$ ,  $p<.001$ ) (see Table 65); in fact, simply being a male youth has a clear connection to increased participation in team sports. Clearly, gender is especially influential in how much youth engage in team sports.

**Table 65**  
**A Simplified Model of Factors Explaining Participation in Team Sports**

<i>Factors</i>	$R^2$				
Components	Change	Total $R^2$	F change	$\beta$	p
<b>1. Personal</b>	.130	.130	14.865		<b>&lt;.001</b>
Sex (male).....				<b>.251</b>	<b>&lt;.001</b>
Age.....				-.038	.330
Support Seeking Efficacy .....				<b>.120</b>	<b>.035</b>
Barrier Efficacy .....				.084	.103
Positive Alternatives Efficacy .....				.015	.773
Attitudes.....				-.041	.394
<b>2. Social</b>	.022	.152	3.771		<b>.005</b>
Family Encouragement.....				-.005	.926
Significant Adult Encouragement .....				.075	.097
Sibling Encouragement .....				.077	.147
Friends Encouragement.....				.035	.411
<b>3. Environmental</b>	.039	.190	3.502		<b>.001</b>
School Opportunity .....				-.043	.336
Community Opportunity .....				.080	.076
Neighbourhood Safety.....				<b>-.151</b>	<b>&lt;.001</b>
Enough Equipment to use for Physical Activity .....				.078	.085
Knowledge of Neighbourhood Facilities (Awareness) .....				-.047	.299
Number of Neighbourhood Facilities Used.....				<b>.094</b>	<b>.034</b>
Parental Support for Neighbourhood Mobility .....				.042	.296
Environmental Support for Neighbourhood Mobility.....				.030	.494

Note:  $\beta$  and p represent overall model  
Significant BETA ( $\beta$ ) values are represented in **bold**

In this model, as in the previous two, we find a significant, negative relationship between neighbourhood safety and team sports participation ( $\beta=-.151$ ,  $p<.001$ ) (see Table 65). Interestingly, support seeking efficacy was the next most important factor for team sport participation ( $\beta=.120$ ,  $p=.035$ ). Previously, for overall physical activity participation, barrier efficacy was the only significant form of efficacy, which suggests that support seeking efficacy (e.g., having the skills to be physically active, asking a parent or friend to be physically active) is particularly important for team sports participation. The number of facilities used in the neighbourhood was significant for team sport participation, as it too was for overall physical activity, but was relatively less important overall ( $\beta=.094$ ,  $p=.034$ ) compared to its more prominent role in the overall physical activity participation model ( $\beta=.125$ ,  $p=.004$ ) (see Table 64 & Table 65).

Similarly to the overall physical activity model, the social factor level was significant overall in explaining team sport participation ( $F=3.771$ ,  $p=.005$ ) without having a single individual variable being significant on its own (see Table 65). In this case, however, encouragement from other significant adults such as coaches and teachers ( $\beta=.075$ ,  $p=.097$ ) rather than from friends came closest to being statistically significant. This finding makes sense because some form of a coaching role is typically involved in team sports.

In conclusion, when compared to the model of youths' participation in overall physical activity, there are far more similarities than differences in the results. Among the minor differences were: the degree to which being male explains participation; that age is not significantly related to participation in team sports; and that support seeking efficacy rather than barrier efficacy is an important explanatory factor for team sports participation. Interestingly, these are all personal factor variables, and had they not been considered in this study, would have gone undetected and potentially presumed unimportant for understanding team sport participation.

### **5.3.2 A Model for Physical Activities Participation**

With respect to youth participation in physical activities, the model explained 13.8% of the variance ( $F=5.353$ ,  $p<.001$ ) (see Table 66), which suggests that the previous model explaining team sport participation was somewhat better. Personal and environmental factors

were significant in this model; however, the social factor level was not able to explain a significant proportion of the variation in participation in physical activities (see Table 66). Thus, it would seem that encouragement from others is not particularly salient to youths' participation in physical activities. Since physical activities tend to be activities which one may carry out alone (e.g., skipping, exercising), perhaps this finding indicates that participating in them is more intrinsically motivated.

As was seen previously with overall physical activity participation, neighbourhood safety was the strongest factor associated with participation in physical activities among youth ( $\beta=-.146$ ,  $p<.001$ ) (see Table 66). This factor was followed closely by the importance of gender in explaining participation in physical activities ( $\beta=.143$ ,  $p<.001$ ); that is, being male was associated with higher rates of participation in physical activities.

**Table 66**  
**A Simplified Model of Factors Explaining Participation in Physical Activities**

<i>Factors</i>	$R^2$				
Components	Change	Total $R^2$	F change	$\beta$	p
<b>1. Personal</b>	.094	.094	10.613		<.001
Sex (male).....				<b>.143</b>	<.001
Age.....				<b>-.120</b>	<b>.003</b>
Support Seeking Efficacy .....				.035	.543
Barrier Efficacy .....				.062	.241
Positive Alternatives Efficacy .....				<b>.133</b>	<b>.013</b>
Attitudes.....				.048	.325
<b>2. Social</b>	.009	.103	1.577		.179
Family Encouragement.....				-.009	.877
Significant Adult Encouragement .....				-.033	.470
Sibling Encouragement .....				.073	.183
Friends Encouragement.....				.044	.321
<b>3. Environmental</b>	.035	.138	3.031		<b>.002</b>
School Opportunity .....				.032	.476
Community Opportunity .....				-.056	.227
Neighbourhood Safety.....				<b>-.146</b>	<.001
Enough Equipment to use for Physical Activity .....				-.007	.878
Knowledge of Neighbourhood Facilities (Awareness) .....				-.036	.426
Number of Neighbourhood Facilities Used.....				<b>.089</b>	<b>.044</b>
Parental Support for Neighbourhood Mobility .....				<b>.100</b>	<b>.015</b>
Environmental Support for Neighbourhood Mobility.....				-.002	.969

Note:  $\beta$  and p represent overall model  
Significant BETA ( $\beta$ ) values are represented in **bold**

Positive alternatives efficacy (i.e., being physically active even if one must stay home, or even if one could watch television, or play video and computer games in one's free time instead) is the next most important factor in explaining participation in physical activities ( $\beta=.133$ ,  $p=.013$ ) (see Table 66). This is a different finding than the significance found earlier for barrier efficacy in the overall physical activity model and for support seeking efficacy in the team sports model (see Table 64, Table 65 & Table 66). Consequently, it would seem that different kinds of self-efficacy are important for participation in different types of physical activity.

A negative relationship between age and participation in physical activities reappears in this model ( $\beta=-.120$ ,  $p<.001$ ), as was seen earlier in the overall physical activity models (see Table 64 & Table 66). Thus, an increase in age is associated with a decrease in participation in physical activities. In this model, having parental support to get around one's neighbourhood ( $\beta=.100$ ,  $p=.015$ ) also was significant in explaining youths' physical activities engagement (see Table 66). For example, an increase in the perception that parents allow these youth to walk and bike in their neighbourhood on their own is associated with an increase in the amount of participation in physical activities (see Table 66). Hence, providing youth with the freedom to roam around their neighbourhoods on their own seems to be particularly important for free play type physical activities, which would typically take place in and around one's neighbourhood.

Finally, the number of facilities in the neighbourhood youths' used was significant in explaining participation in physical activities ( $\beta=.089$ ,  $p=.044$ ). However, it appears that it is not quite as important in explaining participation in physical activities as it was in explaining participation in both team sports and overall physical activity (see Table 64, Table 65 & Table 66).

In this regression model for participation in physical activities, we have seen a slight departure from the factors and variables which were significant in the models for team sports and overall physical activity. Most notably, age resurfaces as important, positive alternatives efficacy arises as significant, and perceiving that one has parental support to get around one's neighbourhood reveals itself to be significant for the first time. For participation in physical

activities, it would seem that, in general, personal factors might be more important in explaining participation, followed closely by environmental factors.

### **5.3.3 A Simplified Model for Individual Sports Participation**

The regression model for individual sports explains 8.3% of the variance in participation (overall  $F=2.313$ ,  $p=.002$ ); thus, while the model was significant in explaining individual sport participation, the models were clearly better at explaining team sports, physical activities, and overall physical activity participation (see Table 67). In this regression analysis, only the personal factor level of the model was significant in explaining participation ( $R^2=.053$ ,  $F=4.379$ ,  $p<.001$ ), hence social and environmental factors do not seem to contribute any additional explanation for individual sport participation beyond what personal factors can explain (see Table 67).

Barrier efficacy was the single most important personal variable in explaining individual sport participation ( $\beta=.194$ ,  $p=.002$ ). The significance of barrier efficacy appears in this model as it did in the overall physical activity model, reiterating that different types of self-efficacy are important for participation in different types of physical activity (see Table 64 & Table 67). In this instance, the more youth perceive they can overcome certain barriers to participate in individual sports, the more they will. The second significant variable was gender ( $\beta=-.186$ ,  $p<.001$ ), but contrary to the pattern we have been seeing thus far, being *female* was associated with greater participation in individual sports.

In summary, the findings from the regression model for participation in individual sports take quite a departure from the earlier models focused on team sports, physical activities, and overall physical activity. Firstly, only the personal factor level and individual personal variables were significant in explaining individual sport participation. Secondly, the model for individual sports appeared to be the least significant in explaining participation. And thirdly, being female as opposed to being male was associated with higher rates of participation in individual sports. These differences highlight the uniqueness of individual sports participation and demonstrate the need to understand the various influences on different types of physical activity.

**Table 67**  
**A Simplified Model of Factors Explaining Participation in Overall Individual Sports**

<i>Factors</i>	<b>R<sup>2</sup></b>				
Components	<b>Change</b>	<b>Total R<sup>2</sup></b>	<b>F change</b>	<b><math>\beta</math></b>	<b>p</b>
<b>1. Personal</b>	.053	.053	4.379		<b>&lt;.001</b>
Sex (male).....				<b>-.186</b>	<b>&lt;.001</b>
Age.....				.049	.300
Support Seeking Efficacy .....				-.023	.741
Barrier Efficacy .....				<b>.194</b>	<b>.002</b>
Positive Alternatives Efficacy .....				-.062	.321
Attitudes.....				-.031	.585
<b>2. Social</b>	.012	.065	1.510		.198
Family Encouragement.....				-.082	.237
Significant Adult Encouragement .....				.045	.411
Sibling Encouragement .....				.001	.993
Friends Encouragement.....				.066	.208
<b>3. Environmental</b>	.018	.083	1.142		.334
School Opportunity .....				.053	.323
Community Opportunity .....				-.017	.752
Neighbourhood Safety.....				.025	.615
Enough Equipment to use for Physical Activity .....				-.035	.523
Knowledge of Neighbourhood Facilities (Awareness) .....				.087	.108
Number of Neighbourhood Facilities Used.....				-.012	.825
Parental Support for Neighbourhood Mobility .....				-.006	.903
Environmental Support for Neighbourhood Mobility.....				.076	.154

Note:  $\beta$  and p represent overall model  
Significant BETA ( $\beta$ ) values are represented in **bold**

In conclusion, the differences found between the regression models for participation in various types of physical activity suggest that different factors and variables are important depending on the types of physical activities involved. Since we have seen differences based on type of physical activity and differences in participation between male and female youth, it is evident that physical activity should be examined from different perspectives if we hope to have a more complete understanding of youths' physical activity behaviour. Given the differences observed earlier in physical activity participation among the three types of neighbourhoods in which youth live, examining the models for each neighbourhood type would reveal whether or not the same factors and variables are significant in explaining variations in physical activity participation. Hence, this is the focus of the next series of analyses.

## 5.4 TESTING A SOCIO-ECOLOGICAL FRAMEWORK FOR PARTICIPATION IN PHYSICAL ACTIVITY BY TYPE OF NEIGHBOURHOOD

### 5.4.1 Physical Activity Participation in Urban High Density Neighbourhoods

The regression model applied to youth who reside in urban high density neighbourhoods (n=183) explained 16.3% of the variance in physical activity, however the overall model was not significant in explaining physical activity (overall  $F=1.167$ ,  $p=.301$ ) (see Table 68). Only the personal factor level of the model was significant in explaining variations in participation in physical activity ( $R^2=10.4$ ,  $F=2.315$ ,  $p=.038$ ) (see Table 68). However, no individual variable was significantly associated with the participation of youth living in urban high density neighbourhoods and their physical activity (see Table 68).

**Table 68**  
**A Simplified Model of Factors in Urban High Density Neighbourhoods**  
**Explaining Participation in Overall Physical Activity**

<i>Factors</i>	$R^2$				
Components	Change	Total $R^2$	F change	$\beta$	p
<b>1. Personal</b>	.104	.104	2.315		<b>.038</b>
Sex (male).....				.101	.318
Age.....				-.174	.080
Support Seeking Efficacy .....				.085	.592
Barrier Efficacy .....				.018	.880
Positive Alternatives Efficacy .....				.108	.425
Attitudes.....				.017	.884
<b>2. Social</b>	.018	.122	.601		.663
Family Encouragement.....				.063	.628
Significant Adult Encouragement .....				.058	.617
Sibling Encouragement .....				-.145	.278
Friends Encouragement.....				.111	.286
<b>3. Environmental</b>	.041	.163	.660		.726
School Opportunity .....				.014	.909
Community Opportunity .....				-.045	.701
Neighbourhood Safety.....				-.042	.691
Enough Equipment to use for Physical Activity .....				-.075	.531
Knowledge of Neighbourhood Facilities (Awareness) .....				-.040	.723
Number of Neighbourhood Facilities Used.....				.160	.131
Parental Support for Neighbourhood Mobility .....				.080	.426
Environmental Support for Neighbourhood Mobility.....				.109	.386

Note:  $\beta$  and p represent overall model  
Significant BETA ( $\beta$ ) values are represented in **bold**



Those variables which had previously been significant still seem to be among the most important here, albeit none are statistically significant. At the personal factor level, age ( $\beta=-.174$ ,  $p=.080$ ) and gender ( $\beta=.101$ ,  $p=.318$ ) again had the highest coefficients (see Table 68). Similarly, other variables which were previously important and were relatively more important here, but not significant, included the number of facilities in the neighbourhood that youth reporting using ( $\beta=.160$ ,  $p=.131$ ), not receiving encouragement from siblings ( $\beta=-.145$ ,  $p=.278$ ), and receiving encouragement from friends ( $\beta=.111$ ,  $p=.286$ ) (see Table 68).

It would seem that the variables explored in this study are not particularly relevant to physical activity participation for youth residing in urban high density neighbourhoods. There may be unique variables which influence their physical activity, which future researchers should explore. However, this does demonstrate why it is important to consider the role of the environment when studying physical activity, and additionally why generalizing findings from one type of environment to others should be discouraged.

#### **5.4.2 Physical Activity Participation in Suburban Neighbourhoods**

In stark contrast to the results for urban high density neighbourhoods, for suburban neighbourhoods, the model explained 23.9% of the variance in youths' physical activity participation ( $n=404$ , overall  $F=5.612$ ,  $p<.001$ ) (see Table 69). Furthermore, all three factor levels (i.e., personal, social, environmental) made significant contributions in explaining participation among youth living in suburban neighbourhoods (see Table 69).

For the most part, the same variables which were found to be significant in earlier models were significant in this model, with a few exceptions. The first exception is that encouragement from siblings ( $\beta=.187$ ,  $p=.009$ ) was the most important factor associated with physical activity participation among youth residing in suburban neighbourhoods (see Table 69). This indicates that receiving encouragement from their siblings to be physically active contributes to higher levels of participation among youth living suburban areas. In addition, neighbourhood safety ( $\beta=-.172$ ,  $p=.002$ ), which has appeared in several previous models, once again had a significant, negative relationship with physical activity participation (see Table 69). Barrier efficacy ( $\beta=.144$ ,  $p=.040$ ), which was significant in the overall physical

activity model, resurfaces as significant in explaining suburban youths' physical activity engagement (see Table 69). This suggests that a higher level of barrier efficacy among suburban youth is associated with increased physical activity participation.

**Table 69**  
**A Simplified Model of Factors in Suburban Neighbourhoods**  
**Explaining Participation in Overall Physical Activity**

<i>Factors</i>	$R^2$		<b>F change</b>	$\beta$	<b>p</b>
Components	<b>Change</b>	<b>Total <math>R^2</math></b>			
<b>1. Personal</b>	.147	.147	9.530		<b>&lt;.001</b>
Sex (male).....				<b>.106</b>	<b>.047</b>
Age.....				<b>-.102</b>	<b>.052</b>
Support Seeking Efficacy .....				.101	.176
Barrier Efficacy .....				<b>.144</b>	<b>.040</b>
Positive Alternatives Efficacy .....				-.045	.501
Attitudes.....				.079	.218
<b>2. Social</b>	.038	.185	3.832		<b>.005</b>
Family Encouragement.....				-.135	.083
Significant Adult Encouragement .....				.095	.114
Sibling Encouragement .....				<b>.187</b>	<b>.009</b>
Friends Encouragement.....				.062	.301
<b>3. Environmental</b>	.055	.239	2.891		<b>.004</b>
School Opportunity .....				.000	.996
Community Opportunity .....				.022	.706
Neighbourhood Safety.....				<b>-.172</b>	<b>.002</b>
Enough Equipment to use for Physical Activity .....				.019	.751
Knowledge of Neighbourhood Facilities (Awareness) .....				-.016	.774
Number of Neighbourhood Facilities Used.....				.102	.075
Parental Support for Neighbourhood Mobility .....				.088	.101
Environmental Support for Neighbourhood Mobility.....				<b>.120</b>	<b>.038</b>

Note:  $\beta$  and p represent overall model  
Significant BETA ( $\beta$ ) values are represented in **bold**

Environmental support for getting around the neighbourhood (e.g., being able to easily get to and from places to be physically active after-school) appears for the first time as being significant in explaining physical activity ( $\beta=.120$ ,  $p=.038$ ). This suggests that a neighbourhood environment which is conducive to youth easily getting around contributes positively to their physical activity participation. This finding has important implications for how neighbourhoods are designed in order to support ease of mobility. Finally, being male

( $\beta=.106$ ,  $p=.047$ ) and arguably being younger ( $\beta=-.102$ ,  $p=.052$ ) were also significant in explaining physical activity for suburban residing youths (see Table 69).

To summarize, the analysis revealed that the model explained a substantial proportion of the variance in suburban youths' physical activity participation (23.9%), and furthermore, that all three factor levels (i.e., personal, social, and environmental) made significant contributions to explaining physical activity. Interestingly, encouragement from siblings turned out to be the most important variable in this model ( $\beta=.187$ ), even though a social factor has thus far been the least significant factor level in explaining participation. As this model appeared to be the best in explaining physical activity, and the majority of the significant variables in this model were the same as those found to be significant earlier, this would seem to indicate that there are certain key variables that are consistently important to understanding youths' physical activity participation, such as gender, neighbourhood safety, and self-efficacy. However, there are two variables which are unique to suburban youths' physical activity – sibling encouragement and environmental support for getting around the neighbourhood.

### **5.4.3 Physical Activity Participation in Suburban Low Density Neighbourhoods**

With regards to physical activity participation for youth living in suburban low density neighbourhoods, the model explained 16.7% of the variance and was significant ( $n=217$ , overall  $F=1.731$ ,  $p=.039$ ) (see Table 70). However, only the personal factor level contributed significantly to explaining physical activity ( $R^2=.100$ ,  $F=3.098$ ,  $p=.007$ ), which is a similar outcome to the model for urban high density neighbourhoods. In the case of youth in suburban low density neighbourhoods, gender ( $\beta=.202$ ,  $p=.014$ ) is the only significant variable explaining physical activity participation (see Table 70). Thus, being male is the only variable that is associated with higher physical activity participation for youth residing in suburban low density neighbourhoods. One other variable, the number of facilities in the neighbourhood that youth reported using ( $\beta=.175$ ,  $p=.065$ ) did come close to being significant, and is thus likely playing some role in their physical activity engagement (see Table 70). In other words, the greater the number of facilities in the neighbourhood that youth used, the higher their participation in physical activity.

**Table 70**  
**A Simplified Model of Factors in Suburban Low Density Neighbourhoods**  
**Explaining Participation in Overall Physical Activity**

<i>Factors</i>	<b>R<sup>2</sup></b>				
Components	<b>Change</b>	<b>Total R<sup>2</sup></b>	<b>F change</b>	<b><math>\beta</math></b>	<b>p</b>
<b>1. Personal</b>	.100	.100	3.098		<b>.007</b>
Sex (male).....				<b>.202</b>	<b>.014</b>
Age.....				.028	.734
Support Seeking Efficacy .....				.054	.664
Barrier Efficacy .....				.029	.792
Positive Alternatives Efficacy .....				.120	.312
Attitudes.....				.021	.853
<b>2. Social</b>	.007	.107	.327		.859
Family Encouragement.....				-.029	.814
Significant Adult Encouragement .....				.020	.829
Sibling Encouragement .....				.056	.630
Friends Encouragement.....				.059	.529
<b>3. Environmental</b>	.060	.167	1.398		.201
School Opportunity .....				.092	.284
Community Opportunity .....				-.026	.793
Neighbourhood Safety.....				-.126	.138
Enough Equipment to use for Physical Activity .....				.070	.427
Knowledge of Neighbourhood Facilities (Awareness) .....				.086	.379
Number of Neighbourhood Facilities Used.....				.175	.065
Parental Support for Neighbourhood Mobility .....				-.004	.960
Environmental Support for Neighbourhood Mobility.....				-.045	.635

Note:  $\beta$  and p represent overall model  
Significant BETA ( $\beta$ ) values are represented in **bold**

Once again, similar to the results for urban high density neighbourhoods, the suburban low density neighbourhood is also in stark contrast with the results for suburban neighbourhoods. In contrast to the results for urban high density neighbourhoods where only the personal factor level was significant in explaining physical activity, in this model for suburban low density neighbourhoods, the personal factor level is not only significant in explaining participation, but moreover, an individual variable, gender, was significant. As the personal factor level is the only significant factor explaining physical activity among youth living in suburban low density neighbourhoods, the results might also indicate that the variables investigated in this study were not particularly salient for explaining physical activity participation specifically in either suburban low density or urban high density

neighbourhoods. Yet, why were many of these same factors significantly related to participation in suburban neighbourhoods? Once again, this reiterates the importance of exploring the influence of different variables in different environments.

As was uncovered in the analyses above, personal factors were the only indicators that were significant in explaining participation in physical activity across all three neighbourhood types. The model was particularly effective in explaining youths' physical activity participation in suburban neighbourhoods, and less so in urban high density and suburban low density neighbourhoods. This is interesting because youth living in these latter two neighbourhoods reported on average the least (urban high density) and most (suburban low density) participation in physical activity. Further, as was discussed in the previous chapter, youth residing in suburban neighbourhoods rated their environment the most positively (e.g., as having the greatest school and community opportunity, and the most and highest quality facilities). Thus, it appears that having an environment which is conducive to physical activity may have an important effect on youth participation in physical activity.

This analysis has made it evident that depending on the type of neighbourhood environment, different factors levels and individual variables play more or less important roles in facilitating physical activity participation among youth. This again suggests that differences in the environments in which youth live ought to be explored in greater detail to better understand youths' physical activity behaviour.

## **5.5 THE ROLE OF ENVIRONMENTAL FACTORS IN PHYSICAL ACTIVITY PARTICIPATION**

A final model was conducted to explore the influence of environmental factors on physical activity participation by using only environmental variables. This was done to determine the influence that environmental variables alone would have on physical activity behaviours, without the consideration of personal and social factors, which replicates an approach frequently used in many physical activity studies.

The analysis revealed that the environmental factors explain a significant 8.7% of the variance in youths' overall physical activity participation ( $R^2=.087$ ,  $F=5.207$ ,  $p<.001$ ) (see Table 71). Five of the twelve individual variables are significant in explaining physical

activity participation, which is more than were found in any of the earlier regression models. The number of neighbourhood facilities used by youth ( $\beta=.207$ ,  $p<.001$ ) was the most important of the environmental factors associated with participation in physical activity, and then each of the other significant factors were relatively similar in importance in their relationship to physical activity: perceptions of neighbourhood safety ( $\beta=-.101$ ,  $p=.032$ ), perceived quality of the neighbourhood facilities ( $\beta=-.097$ ,  $p=.019$ ), sufficient availability of equipment for physical activity ( $\beta=.095$ ,  $p=.024$ ), and perceived parental support for getting around the neighbourhood ( $\beta=.092$ ,  $p=.018$ ) (see Table 71).

**Table 71**  
**Environmental Factors Explaining Youth Participation in Overall Physical Activity**

<i>Factors</i>	<b>R<sup>2</sup></b>	<b>Total R<sup>2</sup></b>	<b>F</b>	<b><math>\beta</math></b>	<b>p</b>
Components	Change				
<b><i>Environmental</i></b>	.087	.087	5.207		<b>&lt;.001</b>
School Opportunity .....				.031	.461
Community Opportunity .....				.075	.103
Neighbourhood Safety .....				<b>-.101</b>	<b>.032</b>
Neighbourhood Aesthetics .....				.012	.788
Neighbourhood Transportation .....				-.019	.657
Enough Equipment to use for Physical Activity .....				<b>.095</b>	<b>.024</b>
Knowledge of Neighbourhood Facilities (Awareness) .....				-.039	.404
Number of Neighbourhood Facilities Used.....				<b>.207</b>	<b>&lt;.001</b>
Quality of Neighbourhood Facilities .....				<b>-.097</b>	<b>.019</b>
Parental Support for Neighbourhood Mobility .....				<b>.092</b>	<b>.018</b>
Environmental Support for Neighbourhood Mobility.....				.025	.583
Active Commuting .....				.005	.896

Note:  $\beta$  and p represent overall model  
Significant BETA ( $\beta$ ) values are represented in **bold**

Although this study has clearly demonstrated that the environment is undoubtedly an important part of understanding youths' physical activity behaviours, it has also hopefully shown the importance of various personal and social factors in youths' physical activity. The reason this is important to note is that many studies, especially those in the public health literature, have tended to focus exclusively on environmental factors related to physical activity. This focus is likely due to their primary concern with population-level behavioural change as opposed to that at the individual level. In this view, the belief is that by making changes to the environment, positive outcomes are available to all of the surrounding

population. While having a supportive environment, and the benefits of public health research and practice in this area are certainly beneficial, this study demonstrates that we should not lose sight of the important role that personal and social factors also play in youths' participation in physical activity. Thus, as researchers and practitioners, we should be careful not to lose sight of the forest for the trees, so to speak. Indeed, as the results of the previous analyses have demonstrated, a social ecological model approach with its multilevel interventions is more effective in achieving sustainable effects on behaviour change than are single-level interventions (Sallis & Owen, 2002; Stokols, 1992).

## **CHAPTER SIX**

### **DISCUSSION**

The following chapter will reiterate and discuss some of the key and interesting findings arising from this study. Implications for practitioners, including city planners, municipal parks and recreation practitioners, public health officials, school board members, principals, teachers, and parents are discussed. Limitations to this study are also considered in this chapter. Finally, as more questions than answers have arose out of this study, suggestions for future research are offered.

#### **6.1 SUMMARY OF KEY FINDINGS**

##### **6.1.1 Personal Factors**

In many ways, this study reflects what many other physical activity researchers have previously found. This study found that males were significantly more active than females (Sallis et al., 2000), that physical activity tends to decline with age (Strauss et al., 2001), and that self-efficacy is an important correlate of youths' physical activity (Van Der Horst, et.al, 2007). The findings around self-efficacy were particularly interesting. Virtually all forms of self-efficacy were related to participation in all types of physical activity as well as overall physical activity, which highlights its importance to youths' physical activity participation. Interestingly, females' participation was particularly influenced when it came to being physically active even if they had to stay home or ask their parents to do something physically active and males when it came to having the skills they needed to be physically active. Curiously, all forms of self-efficacy were significantly lower in urban high density neighbourhoods, which also had the lowest levels of physical activity. Perhaps this outcome suggests that a certain amount of self-efficacy is a prerequisite to youths' physical activity participation. Furthermore, interestingly, different types of self-efficacy were significant in explaining participation in different types of physical activity (i.e., support seeking for team sport, barrier for individual sport, and positive alternatives efficacy for physical activities),



and thus different forms of efficacy are uniquely relevant to different types of physical activity. Findings of this nature were not uncovered in previous research, and hence these findings offer additional insights into the relationships between different types of self-efficacy and the gender, neighbourhood environments, and various types of physical activity participation of youth.

Some differences were found in the types of activities which males and females engaged, complementing earlier research which also found differences in activity preferences between males and females (Mulvihill et al., 2000; Sallis, Zakarian et al., 1996). In this study, while there were differences between males and females on specific physical activities preferences, the main difference was that males engaged much more in team sports, and females much more in individual sports.

Attitudes towards physical activity, which seemed to be playing a role in youths' physical activity as they were related with participation in all types of physical activity, except for individual sports, did not in fact turn out to be particularly important to explaining youths' physical activity participation when several other factors were considered. Thus, contrary to other studies which found attitudes to be an important factor in explaining youths' physical activity, attitudes did not turn out to be an overly salient factor in explaining youths' physical activity participation in this study (Hagger et al., 2001; Van Der Horst et al., 2007). Interestingly, the neighbourhood in which youth reside and the combination of gender and the neighbourhood in which they reside had an effect on attitudes towards physical activity. While males' attitudes were fairly stable across neighbourhoods, females who lived in urban high density neighbourhoods had significantly poorer attitudes towards physical activity. This indicates that the environments in which females live have a more significant influence on their attitudes towards physical activity. Furthermore in regards to attitudes, one attitudinal variable, fun, was uncovered in the literature to be particularly important to youths' physical activity participation (Hagger et al., 2001; Humbert et al., 2006b). The current study does seem to support the importance of fun, since there was a significant relationship between youths' physical activity participation and their feeling that being physically active on most days was fun. Thus, although youths' attitudes did not turn out to be particularly salient in explaining their physical activity participation, they still do seem to be having an influence to some extent.

### 6.1.2 Social Factors

Encouragement from various people offered some support for findings in earlier research. Previous research has found that support from family members and friends have a strong influence on youths' physical activity participation (Sallis, Prochaska et al., 1999; Voorhees et al., 2005). The findings in the current study generally concur with this notion that youth who feel more supported tend to be more physically active. Moreover, the good news is that, for the most part, males and females both felt quite encouraged to be physically active by various people in their lives, with females feeling even greater encouragement from other significant adults, such as teachers and coaches. Yet peculiarly, neighbourhood differences were found for encouragement in this study, with youth from suburban neighbourhoods feeling more encouraged by friends and family (i.e., mother, father, grandparents) and youth from suburban low density neighbourhoods feeling significantly less encouraged by other significant adults (i.e., teachers, coaches). However, despite these differences encouragement overall, from all people, turned out to be significant in explaining youths' physical activity participation in the several of the analyses, although most of the time no specific encouragement provider was identified as being particularly important in explaining participation. In fact, encouragement from siblings was the only individual variable which was significant in explaining participation among youth living in suburban neighbourhoods. In the various analyses, however, even though they were not significant, each of the individual sources of encouragement did approach significance (e.g., significant adult encouragement for team sport participation). This indicates that receiving encouragement from a variety of sources, including friends, family, teachers, and coaches, is important for youths' physical activity participation.

Findings for modelling indicate that males had more physically active friends and females more physically active families. As previously mentioned, because this is an age where a transition tends to take place to spend more time with friends, this may explain the decline in females' physical activity participation, especially if they are spending more time with friends who are less physically active. The neighbourhood in which youth reside does not appear to matter for their friend's participation however it does appear to make a difference in their families' physical activity participation. Hence, suburban youth report having more family role modelling, and urban high density youth having significantly less

family role modelling. The literature suggests that the significance of modelling on youths' physical activity participation is mixed (e.g., Trost et al., 1999; Vilhjalmsson & Thorlindsson, 1998), and moreover, studies that examined whether there were differences in modelling in different types of neighbourhoods were not uncovered. The findings in this study show significant differences between neighbourhoods and modelling, and seem to support the role of modelling because less physical activity participation in urban high density neighbourhoods coincided with having less family role modelling for physical activity. Perhaps exploring the differences in role modelling in different types of environments affords a new avenue of research for physical activity researchers.

### **6.1.3 Environmental Factors**

Researchers who have looked at the influence that the neighbourhood might have on physical activity will find some findings mirrored in this study. For example, the findings from this study might be consistent with those that have reported that youth residing in (poorer) inner cities engaged in significantly less physical activity than did children (from middle class families) residing in suburban areas (Weir et al., 2006).

With respect to opportunities available in the community for physical activity (e.g., availability of team and individual sport programs), youth overall seemed to be quite satisfied; however, there were differences in satisfaction between youth living in different neighbourhoods. Youth residing in suburban neighbourhoods, not surprisingly, were the most satisfied and those living in urban high density neighbourhoods were the least satisfied with community opportunities afforded to them. Community opportunity did not play out to be of any great importance to youths' physical activity participation, which may be an indication that the availability of team and individual sport programs, as well as places in the community to be physically active, are not as important relative to other things. However, if we recall that youth in this sample were generally quite satisfied with their community opportunities, this may indicate that they presently feel they have sufficient access to physical activity programs, and thus, community opportunity did not come out as a salient factor in this study. Previous research has suggested that opportunities to be physically active outside of school provide important opportunities for youths' physical activity (O'Loughlin

et al., 1999), and hence, it seems that at least maintaining an adequate amount of opportunities for physical activity in the community is necessary.

With respect to school opportunities for physical activity, more differences were uncovered than for community opportunities. In this instance, youth across different types of neighbourhoods differed significantly in their views on school opportunities, with youth from suburban neighbourhoods typically being more satisfied. This finding indirectly supports the findings of another study which found that schools located in suburban areas provided greater opportunities for student physical activity (Barnett et al., 2006). Males and females also differed significantly in their views of there being enough supervision, equipment, places, and in particular, time provided for physical activity at school. Females were significantly more satisfied with there being enough of these things. The discrepancy between males' and females' satisfaction with time provided for physical education class may be a reflection of earlier findings which have indicated that females prefer different activities not typically part of traditional physical education, and hence, dislike and boredom towards physical education ensues (e.g., Mulvihill et al., 2000; O'dea, 2003). Therefore, this may offer some explanation as to why females may be more satisfied with there being enough current time devoted to physical education. Overall however, school opportunity did not seem to play a big role in explaining youths' physical activity participation.

Findings concerned with perceptions of neighbourhood safety in this study were especially interesting. A few differences were found between males and females on their perceptions of the safety of their neighbourhoods, with females having more positive perceptions of the safety of their neighbourhoods. However, many more differences in perceptions of neighbourhood safety were found between youth residing in different types of neighbourhoods. Sadly, youth from urban high density neighbourhoods typically reported significantly less positive perceptions of the safety of their neighbourhoods. Further analyses confirmed that the type of neighbourhood had an impact on their perceptions of neighbourhood safety, but that their gender did not. However, the combined effect of gender and neighbourhood type had an impact on their perception of neighbourhood safety. More specifically, in urban high density neighbourhoods being female would lead one to have an even less positive perception of this already more negatively perceived environment. In

contrast, being female in a suburban low density neighbourhood would lead one to have more positive perceptions of the safety of the neighbourhood.

Most strange and intriguingly about the findings around neighbourhood safety, however, were that having a more positive perception of neighbourhood safety was associated with a decrease in participation in physical activity. While this finding is somewhat bewildering, other studies that have examined neighbourhood safety have also found a negative relationship, so this finding may not be entirely unique. In fact, a study by Romero et al. (2001) with fourth grade students from a variety of economic backgrounds asked them about neighbourhood hazards among other things and reported similar findings to this study. Specifically, the researchers found that contrary to their hypothesis, the perception of more neighbourhood hazards was positively related to students' reported physical activity. While the interpretation that perceptions of safety were tied to greater familiarity with the neighbourhood may present a possible explanation for this negative relationship, further in depth research into neighbourhood safety and youths' physical activity would prove useful to understand what is happening.

The influence of youths' awareness of several facilities in their neighbourhood, the perceived quality of those facilities, and their use of them also deserves consideration. Earlier research, such as a study by Utter et al. (2006) has drawn attention to the importance of having access to facilities for physical activity. Their findings demonstrated that students who had greater perceived access to opportunities for physical activity within walking distance of their homes were significantly more likely to engage in regular vigorous physical activity. Findings from this study largely support the importance of having access to quality facilities, however, a number of interesting findings were also uncovered related to differences among sub-groups. First, despite earlier analyses revealing differences between males and females on their use and their perceptions of the quality of neighbourhood facilities, as well as differences among neighbourhoods on the awareness, use, and perceived quality of neighbourhood facilities, in most cases, only the type of neighbourhood turned out to matter. Hence, in regards to being aware of a number of facilities in one's neighbourhood, only the neighbourhood in which youth lived was significantly related to participation. Living in a suburban neighbourhood meant youth were significantly more aware of a greater number of facilities in their neighbourhood, thereby suggesting that they might have more

facilities available for physical activity. Similarly, findings from this study also indicated that with respect to the perceived quality of neighbourhood facilities, only the type of neighbourhood in which the youth lived mattered. Once again, living in a suburban neighbourhood was linked to perceptions of having access to higher quality facilities, whereas living in an urban high density neighbourhood was tied to perceptions of having access to the poorer quality facilities. Interestingly, with respect to the actual use of a greater number of facilities in one's neighbourhood, both the type of neighbourhood in which the youth lived and being a female mattered. Hence, across all neighbourhoods, females used neighbourhood facilities significantly more than males did, and youth residing in suburban neighbourhoods used facilities more, while suburban low density residing youth used them the least. This indicates that having access to facilities may be particularly important for female youths' physical activity participation.

One of the outcomes that was especially curious in this study was whether youths' perceived quality of their neighbourhood facilities would be related to their use of those neighbourhood facilities and their physical activity, particularly because little research to date had looked at these relationships among youth. Largely it seems that youths' perceptions of the quality of neighbourhood facilities does not matter because they were not related to any types of physical activity participation, nor did they make any significant contribution towards explaining youths' overall physical activity. Thus, initially it seemed like youths' perceptions of neighbourhood facilities did not matter for their physical activity. However, for several reasons the quality of neighbourhood facilities might still be playing some role in youths' physical activity participation. Firstly, youth residing in suburban and suburban low density neighbourhoods reported having the highest quality facilities, and in fact, these were the two most physically active neighbourhoods. Secondly, youth residing in suburban neighbourhoods rated the quality of their neighbourhood facilities the most positively and also reported the highest use of neighbourhood facilities. Thirdly, although not statistically significant, the relationships between the perceived quality of facilities and all types of physical activity participation were negative. Thus, similarly to what was proposed earlier for the negative relationship between neighbourhood safety and youths' physical activity, the same concept may be occurring with respect to the quality of neighbourhood facilities and physical activity participation; that is, youth who are more physically active and who in

turn interact more with facilities in their neighbourhoods, have a better understanding of the quality of the facilities in the neighbourhood, including their shortfalls. This hypothesis would seem to be supported because for individual sport participation (which tends to be more facility dependent) in urban high density neighbourhoods (which were rated as having the lowest quality facilities) a significant negative relationship was found. In other words, youth who reported greater rates of participation and interaction with the facilities in their neighbourhoods also reported them to be of lesser quality, which of course lead to a coincident rating of there being poorer quality facilities with greater engagement.

These results should not be interpreted as indicating that by creating poorer quality facilities, allowing them to decay, or by losing concern for the safety of neighbourhoods will it lead to an increase in youths' physical activity participation. On the contrary, what all these findings seem to suggest is that physically active youth are quite aware of the safety risks in their neighbourhood, which is arguably a good thing when they are out in their neighbourhoods. Moreover, this also suggests that youth are quite aware of the quality of the facilities which they use in their neighbourhood. Since we observed that facilities in suburban neighbourhoods had the highest perceived quality and the highest use, this would imply that in fact the quality of facilities is very important and these negative relationships may simply be a more accurate reflection of the quality of the facilities and safety of the neighbourhoods in which youth live.

While the relationships concerning the quality of neighbourhood facilities are still somewhat cloudy at this point, the importance of youths' use of neighbourhood facilities was quite clear. Their greater reported use of neighbourhood facilities was significant in explaining youth participation in physical activity in several contexts. In fact, the use of a number of neighbourhood facilities was among the most salient factors in explaining overall physical activity participation among youth. This reflects the important role, which other studies have also found, for access to facilities for youth to use for physical activity (Ammouri et al., 2007; Davison et al., 2006). Moreover, perhaps this indicates the importance of youth having access to facilities in their neighbourhoods beyond their physical presence, to include access considerations such as the ability to pay, ability to get to and from these facilities, and the availability of programs which will be of interest to youth.

With respect to youth mobility or ease in getting around their neighbourhoods, these factors are related to the things that were parental (e.g., being allowed to walk in the neighbourhood on one's own) and environmental (e.g., it being easy to get to and from places for after-school activities) in nature and were considered separately in this study. While this separation was not made in the original scale, it proved to be a useful means of getting at distinct concepts in this study. With regards to the support which the neighbourhood environment provides for youth to get around the neighbourhood, as one might expect, the type of neighbourhood in which youth reside makes a difference. Suburban low density neighbourhoods offered the least environmental support for youth to be able to get around their neighbourhoods easily. Since these youth were also the most physically active group, perhaps they are receiving drives or using public transportation to get to places to be physically active or were simply being physically active in nearby spaces. As environmental support for neighbourhood mobility by youth did turn out to be one of several salient factors in explaining their participation in physical activity, having an environment that makes it easier for youth to get to and from places for physical activity does appear to be important for their physical activity.

In regards to parental support for youths' neighbourhood mobility, typically only gender appeared to matter. However, with specific reference to the perception that parents worry about something happening to them if they went somewhere on their own, the neighbourhood did make a difference – parents worrying about their children tended to decline in lower density neighbourhoods. Interestingly, despite this and that males and females felt there were no differences in their perceptions of their parents worrying about them, males felt they were allowed to walk and bike on their own in their neighbourhoods more so than females, regardless of the neighbourhood in which they lived. However, females living in lower density neighbourhoods did also report being allowed to bike on their own more. Thus, although perceived parental support for neighbourhood mobility by youth did not turn out to be an especially salient factor in explaining physical activity participation, it appears to nonetheless play a role. Parental support was salient for youths' participation in physical activities, which tended to be activities in which youth would engage freely in their neighbourhoods, thus their ability to experience the neighbourhood on their own seems to at least have an influence on their free play type of physical activities. With growing concerns



for children's loss of free play and over programming (Burdette & Whitaker, 2005), this may offer additional insights. Moreover, screen time which refers to time spent watching television or on the computer or playing video games, has become an area which has received greater attention both academically and anecdotally for explaining declines in youths' physical activity. Hence there is concern that excessive screen time is contributing to insufficient levels of physical activity among youth. While excessive screen time may indeed offer some explanation for lower levels of physical activity, perhaps 'low' levels of parental support for youth neighbourhood mobility is contributing to both less physical activity engagement and greater screen time. If youth do not receive their parents support to be in their neighbourhood on their own, then their opportunities to be physically active may be limited to times when their parents shuttle them to places for physical activity or supervise their physical activity. With the majority of families having two working parents this may put significant limits on youths' opportunities to be physically active. Furthermore, spending more time in the home, where it is safe, due to having limits on mobility in the neighbourhood may lead to increased time spent in front of a screen. Therefore excessive screen time may in part be a by product of having less freedom to do other things outside of the home, as opposed to being the reason for engaging in less physical activity. In conclusion, further research into parents support for their children's play in the neighbourhood may provide new insights into youth physical activity participation.

In summary, this study has revealed that personal, social, and environmental factors are all an essential part of understanding youths' physical activity participation. This demonstrates the importance of using a social ecological model approach as it allowed for an integrated and more complete understanding of the complexity of youth physical activity behaviour, which would not have been afforded had this study used a more conventional approach and only examined one factor (e.g., attitudes) or factor level (e.g., personal factors). In this study, several variables within each factor level were found to be important, mainly gender, various forms of self-efficacy, encouragement to be physically active from a variety of sources, neighbourhood safety, and the use of a number of neighbourhood facilities. Additionally, many differences were uncovered in this study between males and females, and between different types of neighbourhoods, thus highlighting the complexity of research on

human behaviour and the importance of delving deeper in our exploration of these differences to enhance our understanding of youths' physical activity.

The findings from this study revealed which factor levels (i.e., personal, social and environmental) and what interactions among variables from within those factor levels had the greatest influence on youths' engagement in physical activity in different types of environments, which has important implications for both practitioners and academic researchers. They offer insights that could assist a variety of practitioners regarding the important conditions that can be put in place when trying to help facilitate greater physical activity among youth. Moreover, the social-ecological framework used in this study furthers the current scholarly understanding of the interacting roles and relative importance that various personal, social, and environmental factors play in simultaneously influencing youths' physical activity behaviour. This framework affords a valuable perspective on the relationships among these factors and their significance for understanding youth physical activity.

## **6.2 IMPLICATIONS FOR PRACTITIONERS**

The findings from this study offer many implications for practitioners, be they for parents, municipal recreation professionals, youth programmers, school principals and teachers, school board members, public health officials, or city planners. Firstly, throughout this study we saw that there were many differences between neighbourhoods and in the end also in the factors which were important in explaining youths' physical activity participation in different neighbourhoods. This discovery emphasizes the need for practitioners to consider the context of youths' lives when trying to encourage them to partake in more physical activity. For example, consideration should be given to the facilities and activities which youths in certain neighbourhoods can access (physically and financially), the safety of the neighbourhood, how easy it is for youth to get to places around the neighbourhood (i.e., neighbourhood design), and to differences in their personal and social outlooks.

Secondly, many differences were found between males and females in this study, which may merit the use of gender specific strategies. Males preferred team sports and females preferred individual sports. Hence by leading, offering programs, or making

equipment/facilities more available to youth to engage in activities which will appeal to them, practitioners should be able to make physical activity more enjoyable and in turn a more desirable activity in which to engage. Along these lines, perhaps physical education classes, intramural activities, after-school clubs, and municipal recreation programs can offer a mixture of activities such as soccer, football, hockey, basketball, active games, dance, gymnastics, and baseball to appeal to both males and females. Furthermore, as was found again here, females tend to engage in physical activity less than males do and thus there may be a need for a specific focus on increasing females' physical activity. For any practitioners trying to do just this, activities should incorporate and emphasize the opportunity to make new friends. One of the biggest differences between males and females was whether being physically active would help them to make new friends, with females believing more so this to be the case. Thus, females seem to enjoy the social aspect of physical activity, which practitioners can incorporate into their activities to make them more attractive to females. For example, useful strategies could include offering a social component to the actual activity, or emphasizing that by participating, they will get the opportunity to meet new friends.

Self-efficacy was important for youths' physical activity participation, and what is more, different types of self-efficacy were important for participation in different kinds of physical activity. Thus, practitioners can help and support youth to feel confident in their abilities to be physically active, in order to in turn help them be more physically active. Practitioners working with youth may choose to emphasize competence related to a particular type of self-efficacy that is most important for participation in the type of activity in which youth are involved (e.g., for dance – an individual sport – work on competence in barrier efficacy). Doing this may help support youth in sustaining their participation in the activity, and hopefully create overflow into other types of self-efficacy, since all types of self-efficacy are strongly related, and thereby generate even greater confidence in one's ability to be physically active.

Make physical activity fun! Youth who thought that being physically active on most days was fun were significantly more physically active. Thus, some ideas for practitioners could be to offer, or better yet, let youth select activities that they think are fun, incorporate social aspects to make activities more fun for females in particular, and give them the

opportunity to play with friends because friends seem to be particularly important to this age group. In addition, give youth the opportunity to engage in unstructured free play time.

All sources of encouragement are important for youths' physical activity, so mothers, fathers, grandparents, siblings, teachers, coaches, and friends should all encourage youth to be physically active. For example, parents, teachers, and coaches can talk to, participate with, and encourage youths to be physically active. Siblings and friends can invite each other to do physically active things together, and encourage and support each other in their participation in these activities. Encouraging females to choose to do physically active things together may be especially important in encouraging them to be more physically active. Thus, perhaps programs, opportunities, and ideas for physically active things which girls could do together or with their more physically active male counter parts could be made available.

Neighbourhood environments should be designed to be more supportive of youth being physically active. We have seen the significant role that the environment plays in this study; therefore, we need city planners to keep in mind that the kinds of neighbourhoods and spaces that they create have an impact on youths' physical activity. For example, having a number of facilities in the neighbourhood is important for youths' physical activity, thus neighbourhoods that have facilities within reasonable proximity, and or are easy to access, should help make the neighbourhood more physical activity friendly. In addition, by helping to make neighbourhoods easier for youth to get around, through the incorporation of things like paths, trails, and crosswalks which encourage walking or biking to easily get from place to place, this may also lead to greater physical activity participation.

Changes are needed to make it easier for youth to access facilities to be physically active. Using a greater number of facilities in one's neighbourhood was important for youths' physical activity, thus by providing greater access to facilities to use, youth are likely to be more physically active. For example, municipal recreation departments along with others can help ensure youth are aware of the facilities available to them in and around their neighbourhoods. Municipal recreation professionals and city planners could also help youth access facilities by having services in place to help make programs more financially accessible and by giving careful consideration to the placement of programs and services around neighbourhoods so as to facilitate ease of access for youth. Perhaps municipal recreation professionals, city planners, and youth programmers could give special

consideration to making facilities more accessible to females who tend to use facilities more, and for all youth who do not live in suburban neighbourhoods, and thus may not have easy access to nearly as many facilities.

Hosting after-school programs for youth living in urban high density neighbourhoods specifically should be considered. Youth living in urban high density neighbourhoods reported the least amount of physical activity and had the most positive perceptions of their environmental mobility. In other words, youth residing in urban high density neighbourhoods reported that getting to and from places to be physically active after-school does not pose a challenge for them. Thus, this offers after-school clubs, youth programmers, schools or anyone who may have an interest in increasing the physical activity of youth a distinct advantage. These youth can easily get to places and get home from places to be physically active, thus some hurdles to their participation are already removed.

As noted above, neighbourhoods should be designed to make it easier for youth, especially females, to walk and bike. Being able to walk and bike in the neighbourhood seems to be important for youths' physical activity, and perhaps especially for participation in free play physical activities. Thus, by making it easier for youth to walk and bike in their neighbourhoods on their own, they may have more opportunity to be physically active. For example, city planners should consider the impact of having things like sidewalks and trails throughout the neighbourhood for youth to use and to encourage parents to feel more secure in letting their children out alone. Moreover, parents can discuss concerns with their children about walking and biking on their own in the neighbourhood, including perhaps a discussion of the safety risks involved, and come to solutions which provide youth with the freedom to be physically active, and parents with some ease of mind regarding their child's safety.

### **6.3 STUDY LIMITATIONS**

This study did not ask youth about their participation in all physical activities, thus it was not possible to get a precise measure of their total participation in physical activity. In addition, walking – which is probably the most popular physical activity – had to be eliminated from consideration in this study thereby losing a significant proportion of youths' total physical activity. Having said this, a fairly comprehensive list of activities in which

youth might typically engage was used in this study, and thus, a reasonably good indication of their overall participation was likely still captured.

Youths' participation in physical activity was self-reported, as opposed to measured using, for example, a pedometer or other device, and thus, how accurate their self-reports of physical activity actually were must be taken into consideration. However, while the use of a device designed to measure youths' physical activity may have been more accurate, assuming it was used properly, self-reported physical activity has still shown to provide reasonably reliable estimates of participation. In other words, having a reliable and discriminating measure of participation to understand variations was more important than achieving accuracy in reporting.

The specific geographic location of residence of the youth could not be gathered in this study, thus it was not possible to determine precisely the type of neighbourhood in which each youth resided for distinctions to be made in this study. This lack of precision meant that *perceived* access to neighbourhood opportunities could not be judged against objective measures of physical distance. However, the approximations of the school boundary areas used in this study did fairly accurately capture the areas of residence, from which neighbourhood distinctions were made. Along similar lines, upon reflection, despite identifying logical neighbourhoods around schools, youth may have considered more than one neighbourhood when responding to questions about their "neighbourhood". For example, youth who have separated parents living in different neighbourhoods might have regarded both areas as their neighbourhood. Thus, while this may have created some discrepancies between the neighbourhood youth considered when completing the survey and the type of neighbourhood into which they were later categorized, this likely represents a relatively small number of cases. The youth involved in the study were attending schools around which the neighbourhoods were created and they completed the questionnaire while in school, so there is a reasonable likelihood that they considered that to be their neighbourhood, as they likely spend more of their time in these neighbourhoods, particularly during the school week.

Neither socio-economic status nor ethnicity were considered in the current study, and they may have played some role in the differences found in youths' physical activity participation. For example, differences among neighbourhoods may have also been a reflection of differences in socio-economic status, since socio-economic status tends to be

fairly homogenous in neighbourhoods, or in ethnicity should a large percentage of a particular subgroup reside in a particular area. However, for the purpose of this study and based on the dominant foci of the literature, these were not variables considered for inclusion. Furthermore, both of these variables would likely have been extremely difficult for this sample of younger children to provide any accurate information.

A final limitation to the study, a limitation in comprehensiveness, ought also to be considered. Even though this study explored a number of variables which were previously found to be, or were thought to be, important for youths' physical activity, not all potentially relevant variables could naturally be explored in one study. Such a study would necessarily involve a questionnaire much too cumbersome for the youth participants to complete. Having said this, the reader should note that the variables used in this study do not represent an exhaustive list of variables which could be explored to understand youths' physical activity participation. As one might imagine, therefore, there are many avenues which can still be explored to further our collective understanding of youths' physical activity behaviour.

#### **6.4 IMPLICATIONS FOR FUTURE RESEARCH**

Based on the findings in this study, a few suggested directions for future researchers to investigate are offered. Many differences were found in this study between males and females, and between different types of physical activity (e.g., teams sports, individual sports). Future researchers should continue to explore these differences so that we can better understand the unique character of each type of physical activity and how different groups of youth respond to them. Such studies would in turn generate information to better support youths' physical activity participation, and for future research to build on.

As has been demonstrated by the findings in this study for different types of neighbourhoods, several different factors and variables play out as being important. These findings warrant future research to examine physically different environments because the findings may not be generalizable to all youth living in all types of environments.

This study has also demonstrated the significance of personal, social, and environmental factors in explaining physical activity, and hence, the use of a social ecological framework to assist in conceptualizing the nature of the relationships. Future

research should continue to examine these and other factors and factor levels (e.g., self-esteem, socio-cultural factors) which may influence youths' physical activity participation. For example the influence of socio-cultural factors, including the role of societal and cultural factors, is another level of factors which may play an important role in youth physical activity behaviours. This research may offer insights concerning the lower levels of physical activity observed among females in this study despite their reporting of positive attitudes towards physical activity, and positive perceptions of a variety of opportunities for physical activity. Hence, research of this nature will help researchers and practitioners develop a better understanding of other factors which also influence youths' physical activity.

This study revealed how examining different levels of factors simultaneously provides a richer understanding of physical activity behaviour and the relative role which various factors play. This provides researchers with a valuable perspective that affords them a more genuine understanding of the importance of factors to people's physical activity behaviours. Hence, future research should examine the influence of multiple levels of factors simultaneously on people's physical activity to enhance our current understanding. With more focused research of this nature, which would of course also be extremely beneficial to our understanding of physical activity behaviour, researchers will better be able to uncover and acknowledge the influence that other significant factors in people's lives may be playing.

Finally, future researchers should explore in further depth what seems to be taking place with respect to neighbourhood safety and youths' physical activity participation. Perhaps a more qualitative approach to research, which can delve more deeply into youths' thoughts and experiences with neighbourhood safety and physical activity, may lend itself well to helping researchers understand what is taking place.



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## **Appendix A**

### **Information Letter for Parents**

<date>

Dear Parent(s) or Guardian(s),

We are writing to ask your permission for your child to participate in a University of Waterloo research project being conducted by Andrea Flack, a graduate student in the Department of Recreation and Leisure Studies, under the supervision of Dr. Bryan Smale. The study focuses on the factors associated with physical activity participation among children and adolescents, and will be conducted at your child's school during the next couple of weeks. Specifically, the purpose of the project is to examine students' physical activity participation in relation to personal factors such as, their attitude towards physical activity, and ability to overcome barriers to physical activity, and social factors such as their perceptions of the encouragement they receive from family and friends. We will also be asking about the availability of places to be physically active in their neighbourhood. Our project will help us understand more about a variety of important conditions that need to be present in order to support children and adolescents' participation in physical activity in the future.

As we are sure you know, regular participation in physical activity by children and adolescents has several well known benefits, such as better fitness, strength, weight maintenance, and overall healthy growth and development. Physical activity also leads to positive social outcomes such as, improved self-esteem, academic performance, sense of well-being, and help with meeting new friends. However, children and adolescents' rates of participation in physical activity have been declining in recent years, and thus these benefits they can receive from physical activity are in jeopardy. Consequently, it is very important to discover what factors are associated with children and adolescents' physical activity participation in order to help encourage them to be more active.

The project in which your child has been invited to participate is expected to be an enjoyable experience and will require only about 30 minutes. However, the decision about participation is yours. To help you in making this decision, here is what we are asking each child to do. After describing what the project is about and answering any questions students might have, we will ask each child to complete a self-administered questionnaire. The questionnaire has a number of standardized questions which requires them to fill in blanks or check boxes indicating how they feel about certain issues, but each child can certainly decline to answer any of the questions if he or she chooses. Specifically, the questionnaire will gather information about the physical activities in which they participate and how often, their attitude towards physical activity, their ability to overcome barriers, the encouragement they receive from family and friends, as well as their perception of the supportiveness of their school and neighbourhood environment for their participation in physical activities, in addition to a few personal characteristics such as their gender, age, and grade level.

All of the children's responses on the questionnaires are considered *completely confidential* and in fact, they never need to identify themselves on the questionnaires they complete. The responses of individual children will *not* be shared with school staff or anyone else. A summary of the results based on the entire group of participants only will be provided to the school. To maintain student's confidentiality questionnaires will be stored in a locked cabinet in the Department of Recreation and Leisure Studies for one year, and then destroyed. Children in grades 6 through 8 who have parental permission, and who themselves agree to participate, will be involved in the study. Also, children or parents may withdraw their permission at any time during the study without penalty by indicating this decision to the researcher. There are no known or anticipated risks to participation in this study.

We would like to assure you that this study has been reviewed and received ethics clearance through the Office of Research Ethics at the University of Waterloo. In addition, it has been approved by the Ottawa-Carleton District School Board Research Advisory Committee, and has the support of the principal at your child's school. Nevertheless, the final decision about your child's participation rests with you. Should you have any concerns or comments resulting from your child's participation in this study, please contact Dr. Susan Sykes in the Office of Research Ethics at (519) 888-4567, ext. 36005.

We would very much appreciate if you would permit your child to participate in this project, as we believe it will contribute to furthering our understanding of the factors that may encourage children and adolescents' greater involvement in physical activity. Please complete the attached permission form, whether or not you give permission for your child to participate, and return it to the school by the end of next week.

If you have any questions about the study, or if you would like additional information to assist you in reaching a decision, please feel free to call either one of us at the University of Waterloo.

Thank you in advance for your interest and support of this project!

Yours sincerely,

Andrea Flack  
M.A. Candidate  
Phone: (519) 888-4567, ext. 33894  
e-mail: aflack@ahsmail.uwaterloo.ca

Bryan Smale, Ph.D.  
Professor  
Phone: (519) 888-4567, ext. 35664  
e-mail: smale@uwaterloo.ca

/enclosures

## Appendix B

### Parental Consent Form for Child's Participation

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I have read the information letter concerning the research project entitled, "The influence of personal, social, and environmental factors on children and adolescent's engagement in physical activity", being conducted by Andrea Flack and Dr. Bryan Smale of the Department of Recreation and Leisure Studies at the University of Waterloo. I have had the opportunity to ask any questions and receive any additional details I wanted about the study.

I acknowledge that all information gathered on this project will be used for research purposes only and will be considered confidential. I am aware that permission may be withdrawn at any time without penalty by advising the researchers. If you or your child chooses not to participate, no academic penalty or any other negative consequences will be imposed.

I realize that this project has been reviewed by, and received ethics clearance through the Office of Research Ethics at the University of Waterloo, and that I may contact this office at (519) 888-4567, ext. 36005 if I have any comments or concerns about my son's or daughter's involvement in this study.

---

Child's Name: \_\_\_\_\_

Child's Birth Date: \_\_\_\_\_

Sex of Child:       Male                       Female

Permission decision:  **Yes**, I would like my child to participate in this study

**No**, I would not like my child to participate in this study

Signature of Parent/Guardian: \_\_\_\_\_

Date: \_\_\_\_\_

## Appendix C Questionnaire

# Physical Activity and You!



We would like you to tell us about your physical activity, and what you think about physical activity at your school and in your neighbourhood.

With your help, we will be able to offer advice to schools and cities on the kinds of things that are important for your physical activity!



## Your Participation in Physical Activities

For each activity listed below, please write in the **number of times in past week** you did that activity. For *just those activities that you played in the past week*, write in **how much time you usually spend** doing that activity. Also, for each activity that *you played really hard* (that is, your heart was beating fast, you were out of breath), please **check the square** under “Yes, I do!”



		How many times in the past week did you participate in this activity?	Each time you participated, how long did you typically spend doing this activity?		When you participate in this activity, do you usually play really hard? Yes, I do!
Activities:		↓	Hours	Minutes	
<b>Team Sports</b>	Basketball .....	_____	_____	_____	<input type="checkbox"/>
	Volleyball .....	_____	_____	_____	<input type="checkbox"/>
	Hockey/Ringette.....	_____	_____	_____	<input type="checkbox"/>
	Football.....	_____	_____	_____	<input type="checkbox"/>
	Soccer .....	_____	_____	_____	<input type="checkbox"/>
	Baseball/softball .....	_____	_____	_____	<input type="checkbox"/>
	Ball/street hockey .....	_____	_____	_____	<input type="checkbox"/>
	Tennis/badminton.....	_____	_____	_____	<input type="checkbox"/>
<b>Individual Sports</b>	Swimming .....	_____	_____	_____	<input type="checkbox"/>
	Track and field .....	_____	_____	_____	<input type="checkbox"/>
	Downhill/cross-country skiing/snowboarding .....	_____	_____	_____	<input type="checkbox"/>
	Bowling .....	_____	_____	_____	<input type="checkbox"/>
	Gymnastics/Dance .....	_____	_____	_____	<input type="checkbox"/>
<b>Physical Activities</b>	Skipping .....	_____	_____	_____	<input type="checkbox"/>
	Active games (e.g., Tag).....	_____	_____	_____	<input type="checkbox"/>
	Running/Jogging .....	_____	_____	_____	<input type="checkbox"/>
	Walking .....	_____	_____	_____	<input type="checkbox"/>
	Bicycling .....	_____	_____	_____	<input type="checkbox"/>
	Exercising (e.g., Aerobics).....	_____	_____	_____	<input type="checkbox"/>
	Ice skating (not including hockey) .....	_____	_____	_____	<input type="checkbox"/>
	Rollerblading/In-line skating/skateboarding.....	_____	_____	_____	<input type="checkbox"/>
Household chores (e.g., yard work, vacuuming) .....	_____	_____	_____	<input type="checkbox"/>	



## *My Friends' and Family's Physical Activity*

How many of your *friends* participate in *sports or physical activities*? (check *one* of the squares)

- All of my friends
- Some of my friends
- None of my friends



How many *members of your family* participate in *sports or physical activities*? (check *one* of the squares)

- My whole family
- Some of my family
- No one in my family

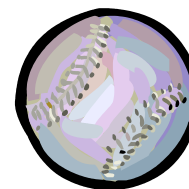


## *Your Beliefs About Physical Activity*

Below we have listed some things that people believe about being physically active. Begin each statement with, *“If I were to be physically active on most days...”*, and then *check the one square that best describes how true that statement is for you.*

<i>“If I were to be physically active on most days...”</i>	<i>Never true for me</i> ↓	<i>Rarely true for me</i> ↓	<i>Sometimes true for me</i> ↓	<i>Often true for me</i> ↓	<i>Always true for me</i> ↓
it would help me deal with stress .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
it would be fun .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
it would help me make new friends .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
it would get or keep me in shape.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
it would make me more attractive.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
it would give me energy.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
it would make me hot and sweaty.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
it would make me better in sports, dance, or other activities.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## Your Thoughts About Your Physical Activity



Here we would like to know what you think about your physical activity. Read all of the statements which begin with, “*I think...*”, and then **check the one square that best describes how true it is for you** when you think about participating in physical activities.

<i>“I think...”</i>	<i>Never true</i> for me ↓	<i>Rarely true</i> for me ↓	<i>Sometimes true</i> for me ↓	<i>Often true</i> for me ↓	<i>Always true</i> for me ↓
I can be physically active during my free time on most days .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I can ask my parents or other adult to do physically active things with me .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I can be physically active during my free time on most days even if I could watch TV or play video games instead .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I can be physically active even if it is hot or cold outside .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I can ask my best friend to be physically active with me .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I can be physically active even if I have to stay at home .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have the skills I need to be physically active ....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I can be physically active on most days no matter how busy my day is .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



## Encouragement from Your Family and Friends

Please tell us how much each of the people below has **encouraged you to participate in physical activities** by checking the square that best describes how you feel.

	<i>Do not encourage me at all</i> ↓	<i>Hardly ever encourage me</i> ↓	<i>Sometimes encourage me</i> ↓	<i>Regularly encourage me</i> ↓	<i>Really encourage me a lot</i> ↓	<i>Does not apply to me</i>
Mother (guardian) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Father (guardian) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Grandparent(s).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sister(s) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Brother(s) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Friends.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Teacher(s).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coach(es).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



### About Your School and Community

We would like you to tell us about the chances that you have in your school and community to do physical activities. Read each statement and then **check the one square that best describes how true** it is for your school or community.

<b>“At my school...”</b>	<i>Not true at all</i> ↓	<i>Not true</i> ↓	<i>A little bit true</i> ↓	<i>True</i> ↓	<i>Very true</i> ↓
there are enough chances for me to play <i>intramural</i> sports .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
there are enough chances for me to play <i>competitive</i> sports .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
there is enough equipment that I can use to participate in physical activities .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
there is enough supervision for physical activities.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
there is enough time given to physical education class.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
there are enough places to be physically active (e.g., fields, basketball court).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>“In my community...”</b>					
there are enough <i>sports teams</i> I can join (e.g., hockey, soccer).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
there are enough <i>individual sports</i> programs I can join (e.g., swimming, dance, martial arts classes) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
there are enough places to be physically active (e.g., parks, sports fields).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### Going To and From School

On most days, I **get to school** by...

- Getting a drive     
  Walking     
  Biking     
  Taking the bus



On most days, I **get home from school** by...

- Getting a drive     
  Walking     
  Biking     
  Taking the bus

## Places To Be Physically Active In Your Neighbourhood



In the list below are places where people go to be physically active which might be in your neighbourhood. For each of the places listed, **check the square under “Yes, there is”** if there is **one of these places in your neighbourhood**, and leave it blank if there is *not* one in your neighbourhood. Then, for each place you have in your neighbourhood, please tell us **what you think the place is like** by checking one of “It’s good”, “It’s OK”, or “It’s bad”. Finally, for those places that are in your neighbourhood, **if you go and play there regularly**, check the square under “Yes, I do”, and leave it blank if you do *not* go there regularly.

Facilities in your neighbourhood...	Is there at least one of these places in your neighbourhood?	What is this place like?			Do you go to one of them regularly?
	Yes, there is	It’s good	It’s OK	It’s bad	Yes, I do
Basketball court .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Swimming pool.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Soccer/football field .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Baseball diamond .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Park.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Recreation centre or YMCA/YWCA.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Track.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Skating rink (ice or in-line) ....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Walking, biking, or hiking path or trail .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tennis court .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dance or gymnastic club .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
School grounds .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
School gym .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## *About Your Neighbourhood*

Now, we would like to find out what you think about your neighbourhood. For each of the statements below that begin with, ***“In my neighbourhood...”*** please ***check the one square that best describes how true*** it is for your neighbourhood.



<b><i>“In my neighbourhood...”</i></b>	<i>Not true at all</i> ↓	<i>Not true</i> ↓	<i>A little bit true</i> ↓	<i>True</i> ↓	<i>Very true</i> ↓
it is safe to walk or jog .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
it is safe to ride a bike .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
walkers and bikers on the streets can easily be seen by people in their homes .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
there is so much traffic that it makes it hard to walk.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
there is a lot of crime.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I often see other girls or boys playing outdoors.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
there are lots of loose or scary dogs .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
streets are well lit at night .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
there are lots of trees along the streets .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
there are many interesting things to look at while walking.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
when walking around, there are a lot of exhaust fumes or bad smells .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
it’s usually clean (i.e., not much garbage) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
there are sidewalks on most of the streets .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
there are enough bicycle or walking trails .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b><i>“When I am at home...”</i></b>					
I have enough sports equipment I can use for physical activities.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



## *Getting around in your neighbourhood*

Now we have a few questions for you about how easy it is for you to get to places in your neighbourhood. Look over each of the statements below, and then ***check the one square that best describes how true the statement is for you*** for getting around your neighbourhood.

	<i>Never true</i> for me ↓	<i>Rarely true</i> for me ↓	<i>Sometimes</i> <i>true</i> for me ↓	<i>Often true</i> for me ↓	<i>Always</i> <i>true</i> for me ↓
My parents (or guardians) worry about something happening to me if I go somewhere on my own...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My parents allow me to walk in our neighbourhood on my own .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My parents allow me to bike on my own.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There are many places I like to go within easy walking distance of my home .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If I stayed after school for an activity, it would be easy for me to get home afterwards.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If I wanted to do an after-school activity someplace else besides school, it would be easy for me to get there .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If I wanted to do an after-school activity someplace else besides school, it would be easy for me to get home afterward .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### *And finally, a little bit about you...*

Are you:      Male       or      Female

What is your age?      \_\_\_\_\_ years old

What grade are you in? 6       7       8



***Thank You Very Much for Your Help!***

## **Appendix D**

### **Classroom Script**

Good morning/afternoon, my name is Andrea Flack and I am a graduate student at the University of Waterloo. I work in the Department of Recreation and Leisure Studies, and I'm here today to find out about your physical activity. For example, I am interested in the kinds of activities you do, what you think about physical activity, who encourages you to be physically active, and what your school and neighbourhood is like for doing physical activities. Your parents have allowed me to talk to you about this project that I am working on, so I am going to spend a few minutes telling you about the project, and then if you decide you do not want to participate in the project you can just let me know.

If you decide to take part in this study, I have a questionnaire that I would like you to fill out. For some of the questions, you will have to check a box that you think is the best at describing how you feel, and in other questions, you simply have to fill in a blank line with your answer. There are no right or wrong answers, just what you think. Overall, the whole questionnaire should only take you about 30 minutes to do.

Why am I interested in hearing from you about these things? Because with the answers that you give, I hope we will be able to tell schools and cities what things they should provide for children and adolescents like you, so that you can have safe, healthy and enjoyable physical activity experiences!

If there are any questions on the questionnaire that you do not want to answer, you do not have to answer them. You also do not need to put your name on the questionnaire so no one will know that those answers are yours. I will not let anyone see your answers or any other information about you. Your teachers, the principal, and your parents will never see the answers you give. Not even I will know who filled out each questionnaire after you have completed it and handed it in, so please be as honest as you can when you answer each question. As far as we know, being in this study will not hurt you or make you feel badly.

If you decide you don't want to be in this study no one will get angry or upset with you. Just tell me that you don't want to be in the study. Remember, if you decide to be in the study, but change your mind later, you can also tell me you do not want to be in the study anymore.

So before we get started does anyone have any questions? [*Answer any questions*]. I'm going to stay here while you fill out the questionnaire so you can ask me questions at any time. Ok if there's no more questions I'm going to hand out the questionnaires, and when you're done please place them on the desk at the front.

Thank you very much for helping me with this project!

## **Appendix E Feedback Letter**

Date

Dear *<name of School Board contact/School Principal/Classroom teacher>*,

I would like to take this opportunity to thank you for welcoming me into your *<school/classroom>* in order to conduct my study. As a reminder, the purpose of this study is to examine children and adolescents physical activity and those factors that are related to their participation in physical activity. In particular, we are interested in the extent to which physical activity participation among children and adolescents is related to a number of personal, social, and environmental factors, such as attitudes towards physical activity, encouragement received from family and friends to be physically active, and access to places to be physically activity in the neighbourhood.

The data collected from the questionnaires, completed by the students, will contribute to a better understanding of the factors that lead to children and adolescent's participation in physical activities. With these findings, we hope to provide school boards, teachers, cities, and parents with suggestions for encouraging the development of healthy physical activity practices among young people.

Please remember that any data pertaining to the students as individual participants will be kept completely confidential. Once all the data are collected and analyzed for this project, I plan on providing you with a brief summary of the findings, highlighting what I believe will be the most interesting and important outcomes. I hope to also share my findings with the research community through seminars, conferences, presentations, and journal articles. If you are interested in receiving more information regarding the results of this study, or if you have any questions or concerns, please contact me at either the phone number or e-mail address listed at the bottom of the page.

As with all University of Waterloo projects involving human participants, this project was reviewed by, and received ethics clearance through, the Office of Research Ethics at the University of Waterloo. Should you have any comments or concerns resulting from your participation in this study, please feel free to contact Dr. Susan Sykes in the Office of Research Ethics at 519-888-4567, ext. 36005.

Thank you again!

Sincerely,

Andrea Flack  
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e-mail: [andreaflack@ahsmail.uwaterloo.ca](mailto:andreaflack@ahsmail.uwaterloo.ca)