2009

The Relationship Between Socioeconomic Status and Physical Activity Among Adolescents

Meredith Laurel Stockie
Wilfrid Laurier University

NOTE TO USERS

This reproduction is the best copy available.

Your file Votre référence
ISBN: 978-0-494-54247-7
Our file Notre référence
ISBN: 978-0-494-54247-7

Running head: SOCIOECONOMIC STATUS AND PHYSICAL ACTIVITY

THE RELATIONSHIP BETWEEN SOCIOECONOMIC STATUS AND PHYSICAL ACTIVITY AMONG ADOLESCENTS

by

Meredith Laurel Stockie

Bachelor of Physical and Health Education, Bachelor of Science, Queen's University, 2006

THESIS

Submitted to Kinesiology and Physical Education, Faculty of Science

In partial fulfillment of the requirements for

Master of Science

Wilfrid Laurier University

Abstract

Background: Many Canadian youth are inactive (Active Healthy Kids Canada, 2009). Socioeconomic status (SES) is one factor that influences youth physical activity (PA) levels; however, the factors involved in this relationship are not well understood. Given that numerous quantitative studies suggest there is a positive relationship between SES and PA among adolescents, but offer little insight into why the given relationship exists, the purpose of the current thesis is to study the factors that influence the relationship between SES and PA among youth aged 12-14 years through a qualitative lens.

Methods: Low (n = 2) and high SES (n = 3) parents and community support liaisons (n = 15) took part in one-on-one interviews to provide insight into how various SES indicators (i.e., income, education, and occupation) influence adolescent PA. The interviews were transcribed verbatim, coded into meaning units, and put into themes that related to smaller sub-themes.

Results: The three major themes were access, time, and awareness and related to the indicators of income, occupation, and education, respectively. For each theme specific sub-themes were identified. Access is related to one's income which impacts adolescent PA by determining whether a parent/family: 1) has money available to cover the direct costs of PA programs, 2) has transportation and travel options available for PA programming, 3) is able to meet basic needs with limited stress, and 4) is eligible to access subsidies or low cost programs. Time is the theme related to one's occupation which impacts one's employment schedule. Awareness is related to both formal and informal education which impacts one's: 1) knowledge of the importance of PA and, 2)

access to resources and exposure to PA, and 3) knowledge of subsidies and low cost programs. Other social-ecological factors also emerged from the data.

Conclusion: The relationship between SES and PA among adolescents is complex; however, the qualitative nature of this study allowed an in-depth analysis of participant's experiences in order to better understand the factors that influence this relationship. The current results provide insight into factors that can be targeted in future PA interventions aiming to equalize PA opportunities between adolescents of varying levels of SES. Although income is related to the greatest number of sub-themes, targeting factors based on occupation and education is also warranted.

Acknowledgements

I would like to thank all of the people who have facilitated the completion of this thesis.

Foremost, I would like to express my sincere appreciation for the contributions of my advisor, Dr. Jennifer Robertson-Wilson and for the countless hours she has dedicated to this thesis and to supporting me as a researcher and a writer. I could not have asked for a better mentor and will be forever grateful for what she has taught me.

I would also like to thank Dr. Paula Fletcher and Dr. Bill McTeer for their contributions to the research process. Their knowledge and experience were very helpful in designing the data collection tools and facilitating the recruitment process.

This thesis would not have been possible without the support of various community organizations that also facilitated the recruitment process. My gratitude goes out to all of the study participants.

Lastly, I would like to thank my parents for always encouraging and supporting my education, and Scott for being the best life partner a woman could ask for.

My graduate work was facilitated by support from the Social Sciences and Humanities Research Council and the Ontario Graduate Scholarship Program.

Table of Contents

List of Tables

List of Figures and Illustrations

Chapter 1: Literature Review

Physical Activity Status

The 2008 *Report Card on Physical Activity in Canadian Youth* suggested that if changes were not made to the general health status of Canadian youth, younger generations may not live as long as their parents (Active Healthy Kids Canada [AHKC], 2008; Olshansky, et al., 2005). For the past three years, Canadian youth (aged 4-19 years) have been graded an 'F' for PA levels, suggesting a desperate need for improvement (AHKC, 2009). The F grade was largely a result of a report suggesting that "87% of children and youth are not meeting Canada's physical activity guidelines of 90 minutes of physical activity a day" (AHKC, p. 24). The Public Health Agency of Canada (2002) recommends children (3-12 years) and adolescents (13-18 years) accumulate 90 minutes of moderate to vigorous PA per day, in addition to their activities of daily living, which is approximately equal to 16,500 steps (Canadian Fitness and Lifestyle Research Institute [CFLRI], 2007). Unfortunately, these inactivity trends are being mirrored in other developed countries across the globe (Katzmarzyk et al., 2008). In addition, researchers find that as objective PA measures begin to replace self-report measures, the objective data show that children and youth are actually less active than previously thought, giving rise to increasing health concerns (AHKC).

Health Outcomes of Physical Inactivity

A negative outcome of inactivity is an elevated risk of developing obesity at any age (Luke et al., 2004). Childhood obesity has increased substantially in the past 25 years (Tremblay & Willms, 2000; Rogers, 2002), and the combination of increased levels

of obesity and decreased levels of PA put many children and adolescents in danger of developing illnesses such as heart disease, type 2 diabetes, hypertension, stroke, and some cancers (Luke et al.; Rogers, 2002). In addition, it has been well established that activity habits decline with age (Cameron, Wolfe, & Craig, 2007). As a result, inactive youth are at increased risk for inactivity and its associated risks throughout adulthood (Luke et al.). Physical activity is the most modifiable way to increase energy expenditure (Bouchard & Shephard, 1994) and attenuate weight gain due to increased energy input, yet most Canadian youth are not active enough to obtain health benefits that may be independent of excessive weight gain (Tremblay, Barnes, Copeland, & Esliger, 2005).

Ecological Models

Although researchers speculate a myriad of reasons as to why PA levels are not where they should be, social-ecological models provide a useful framework to understand the factors that influence PA behaviour. These models suggest that individual behaviour is determined by many factors that operate across different levels of influence and include intrapersonal factors (e.g., demographics, motivation or desire to be active), social and cultural factors (e.g., social norms, cultural practices), the physical environment (e.g., season or weather, access to facilities and active transportation pathways), and policies (e.g., government initiatives) (Sallis & Owen, 1999, 2002; Sallis et al., 2006; Spence & Lee, 2003). To foster population-wide changes, broadened research and interventions that move beyond a focus on only intrapersonal changes is advocated (Sallis & Owen, 2002; Spence & Lee). For example, when considering a non-modifiable intrapersonal variable such as SES, research may find that because lower SES adolescents are less active, they are an appropriate target population for an intervention

(Sallis & Owen, 1999). However, education at the intrapersonal level about the benefits of activity may be insufficient for behaviour change; after school programs, or the opportunity to participate in activities that fit their social norms may also be required. Ecological models "situate the individual (including biological and psychological factors) within the broader environmental context" (Spence & Lee, p. 18); therefore, creating effective interventions and policy changes that produce long term changes in behaviour requires a clear understanding of how PA behaviour is influenced at multiple levels of one's environment (e.g., individual, social/cultural, political, physical) and how these different environments interact (Sallis & Owen, 2002; Sallis et al., 2006).

Socioeconomic Status

Socioeconomic status (SES) is one non-modifiable factor of interest that may influence PA. Krieger, Williams, and Moss (1997) define socioeconomic position as "an aggregate concept that includes both resource-based and prestige-based measures, as linked to both childhood and adult social class position" (p. 345). Although they suggest that the term SES clouds the distinction between resource-based measures such as income and education, and prestige-based measures such as occupation (Krieger et al., 1997), SES is an appropriate term for the current thesis given the social class measures of interest are both resource-based and prestige-based measures. SES is often considered a personal demographic variable; however, SES can also reflect aspects of an individual's broader environment. As a result, it can be measured at the individual level or the area level (Lynch & Kaplan, 2000). Individual measures of SES such as income, education, and occupation reflect the opportunities and resources people might have (Lynch & Kaplan), and are part of one's intrapersonal environment. For example, occupation might

determine whether someone can afford the time and expense of participation in organized sports. Area level measures are either aggregated individual indicators or can be used to represent contextual effects of SES (Lynch & Kaplan). For example, the average income of a neighbourhood might help to explain the resources that are available or not, to that specific community (Chen et al., 2002). To target low SES populations, and in accordance with ecological models, policies could ensure that community programs are available in under-serviced or lower income neighbourhoods, or that the physical environment is conducive to playing safely (e.g., parks with lights, well-maintained pathways). This would provide youth with a location to be active without the need to participate in fee-based activities. Given that in 2005 10.8% of Canadians were considered of low-income and childhood poverty rates mirror those of adults (Human Resources and Skills Development Canada, 2009), there are a number of children and adolescents who would benefit from no-cost and/or fee-reduced programs.

When examining the SES and health relationships among children and adolescents, PA being the health behaviour topic of discussion, parent SES indicators of education, income, wealth or occupational status often determine how youth are categorized according to SES. Interestingly, Starfield and colleagues (2002) suggest that the influence of parental SES likely varies from childhood to early and late adolescence as a child's high level of independence shifts to a point of independence by late adolescence. Of particular interest then is understanding: 1) if and when SES is related to PA of children and adolescents and 2) the factors underlying such a relationship. The former point warrants investigation to identify the specific target group most in need of a PA intervention. According to Sallis and Owen (1999), non-modifiable variables such as

SES direct interventionists to groups who are in need of a PA intervention. Furthermore, identifying when along the developmental trajectory SES is influential on PA behaviour is important for determining the ages that require interventions. For instance, if SES is related to PA among children but not adolescents, interventions are required for low SES children but may not be required for low SES adolescents. If a relationship between SES and PA is found for children and/or adolescents, the latter point speaks to the need to identify what components should specifically be addressed in an intervention to increase PA for a particular target group. For instance, should certain groups receive free gym memberships, do children require transportation to PA venues, or do parents need a tax break on their child's PA registrations? These two issues will be investigated below.

Investigating the Evidence of a Relationship Between SES and PA for Children and Adolescents

According to Chen and colleagues (2002), "childhood is a time of dramatic developmental changes, and these changes may result in different SES associations in early childhood compared to late adolescence" (p. 298). Thus, it appears that regardless of how SES is measured, it may influence PA differently across the child-adolescent lifespan. Chen and colleagues (2002) propose three developmental models to explain how the relationship between SES and health might change as one transitions from childhood to adolescence: the childhood-adolescent persistent model, the childhood limited model, and the adolescent-emergent model (Figure 1). Of current interest is which model applies specifically to PA.

The childhood-persistent model "posits that SES differences are established early in life and remain constant throughout childhood [and adolescence]" (Chen et al., 2002,

p. 298). For example, if a low SES child had fewer resources throughout his or her development compared to a high SES child, there would be a similar discrepancy between PA levels across her/his developmental lifespan. The childhood limited model "suggests that SES effects initially are large, but gradually decrease over time and are most modest during the teenage years" (Chen et al., p. 299). In other words, the influence of parent SES decreases as the child reaches adolescence and spends more time at school and with peers. The adolescent-emergent model "posits that SES effects initially are modest but gradually increase over time and are most apparent during the teenage years" (Chen et al., p. 299). Although there may be SES differences during childhood, the PA gradients may not be apparent until the child grows and has been exposed to the negative effects of reduced opportunities for an extended period of time. Chen and colleagues provided "preliminary support" (p. 315) to suggest that the adolescent-emergent model might explain the relationship between SES and PA. However, their analysis was restricted to studies including participants in early or in late adolescence; out of the 11 reviewed studies published between 1966 and 1999, only three included children below the age of 10 years and two of these studies measured physical fitness as opposed to PA. Therefore, of the reviewed studies that measured PA specifically, age 9 was the youngest age included in the review (Chen et al.). In addition, the model was supported by cross-sectional research only, suggesting the need for longitudinal studies in the future.

In light of these limitations, a further review of recent literature was undertaken to assess evidence for the adolescent-emergent model. In addition to the short review published by Chen and colleagues, five reviews were conducted that examined the

relationship between SES and PA among youth (Table 1). First, Sallis, Prochaska, and Taylor (2000) reviewed 108 studies conducted between 1970 to 1998 in order to summarize multiple correlates (i.e., demographic and biological; psychological, cognitive, and emotional; behavioural; social and cultural; and physical environmental) of PA among children aged 4-12 years and adolescents aged 13-18 years. They included nine studies specifically measuring the association between SES and PA for children and another six studies measuring the association for adolescents. The authors also reported whether PA measures were subjective (e.g., self-report) or objective (e.g., accelerometer) but did not provide detail as to how SES was being defined or measured in each of the included papers. The authors concluded that there was no consistent overall association between SES and PA for either age group regardless of whether PA was measured subjectively or objectively (Sallis et al., 2000).

Unlike Sallis et al. (2000) who included multiple correlates of youth PA, Gustafson and Rhodes (2006) chose to focus on the correlates of parent and child PA in order to provide insight into potential factors that describe how parents influence their children's PA. Of 34 studies reviewed, six measured the relationship between parental employment and/or education and five of these studies were also included in the review by Sallis et al. (Gustafson & Rhodes). Included articles were published between 1985 and 1997 and study populations ranged from 4-18 years of age but were not separated into children and adolescents. The authors suggested that "family SES may be positively correlated to a child's PA pattern", however warned that, "the validity for this group of studies is potentially compromised and caution should be used in interpreting these results" (Gustafson & Rhodes, p. 91).

In contrast, van der Horst and colleagues (2006) updated the review of Sallis and colleagues (2000), again summarizing multiple correlates of PA for children and adolescents aged 4-12 years and 13-18 years, respectively. Included articles were published between 1999 and January 2005. Indicators of SES appeared in four studies with children and eight studies with adolescents. For children, the four studies (yielding seven samples, since some studies separated results by gender), showed no consistent association between parent education and PA. Among adolescents, parent education was used in six samples and SES (undefined) was used in eight samples. Overall, parent education was positively associated with PA among adolescents; however, SES was unrelated to PA in the majority of studies (van der Horst et al.).

Ferreira et al. (2006) also updated the review by Sallis et al. (2000), considering a variety of environmental correlates of PA in youth; SES was classified as part of the economic environment. They included 11 of the same articles relating SES to PA as Sallis et al. and 51 additional articles (Ferreira et al.). There was also overlap between one additional article in the reviews by Ferreira and colleagues and van der Horst and colleagues (2006). Articles were restricted to those published between January 1980 and December 2004 and youth were grouped as children (aged 3-12 years) or adolescents (aged 13-18 years). Child/adolescent PA was the dependent variable and economic environment of either individuals or neighbourhoods was at least one of the predictor variables. The individual economic environment for children aged 3-12 years was measured differently across studies. These measures included: parental SES, parental occupational status, father's occupational status, mother's occupational status, parental education, father's education level, and mother's education level, number of parents

working full time, and house owned (Ferreira et al.). Given certain studies used multiple indicators for SES (with no specific definition) and often separated results by gender, the summary table provided by Ferreira et al. reported associations by sample instead of study. Twenty nine studies yielded 96 independent samples; however, as was reported in the Sallis et al. review, there was no consistent association between different indicators of SES and children's PA (Ferreira et al.). A neighbourhood SES/education level correlate was included as part of the neighbourhood economic environment. Four studies yielded six additional samples but again, did not show a consistent association between neighbourhood SES and children's PA (Ferreira et al.).

The individual economic environment indicators for adolescents aged 13-18 years were parental SES, occupational status of household head, father's occupational status, mother's occupational status, parents' educational level, father's education level, mother's education level, family (per capita) income, number of parents working full time, and adolescent's paid work/pocket money (Ferreira et al., 2006). Thirty-six studies reviewed by Ferreira et al. yielded 100 independent samples. Although most measures of SES were generally unrelated to adolescent's PA, maternal education and family income were positively associated with adolescent PA levels (Ferreira et al.). There were only two studies that included neighbourhood economic correlates; therefore, the authors did not find it appropriate to specify any type of association (Ferreira et al.).

In contrast to the three previous studies that measured multiple correlates of PA, Hanson and Chen (2007) reviewed studies conducted between 1970-2007 to summarize the relationship between SES and a variety of health behaviours (e.g., diet, smoking, PA) among adolescents 10-21 years of age. Included studies for PA behaviour were from the

previous 15 years, with one exception. Of the 28 studies that used an individual level measure of SES a positive association between SES and PA was reported for 21 studies, three studies reported a negative association, and four studies reported no association (Hanson & Chen, 2007). Although the specific SES indicators such as family income, parental education and occupation were reported, the studies were not divided into samples or classified based on indicators of SES as in the previously mentioned reviews by Ferreira et al. (2006) and van der Horst et al. (2006). Overall, a positive association was found between PA and all SES measures; however, of 15 studies that could be separated by early and late adolescence (specific ages not identified by authors), Hanson and Chen noted that three out of seven studies during early adolescence and nine out of 10 in late adolescence reported positive associations. A further six studies used an area level measure of SES (e.g., % of students on free school lunch) whereby five studies reported a positive association and one reported no association (Hanson & Chen).

Therefore, across the five reviews the majority of studies did not find a significant statistical relationship between SES and PA among children; yet, it appears that there is a positive relationship between SES and PA among adolescents. Given that children aged 3-12 were not the focus in the most recent (1970-2007) review of literature for SES-PA (Hanson & Chen, 2007), it was deemed appropriate to conduct a search of additional articles to fill this gap. Thirteen articles published between February 2005 and March 2008 that measured the relationship between SES and PA among children aged 3-12 years were retrieved using Pubmed and PsycInfo databases and are included in this supplemental review. All studies used a cross-sectional design including one article that

published baseline data from a longitudinal study. A summary of the included studies is presented in Tables 2 and 3.

Of the 13 articles meeting inclusion criteria for the additional review, three included separate analyses for different age groups, two reported results for multiple datasets, and two analyzed boys and girls separately, thus yielding 22 separate sample populations[1]. Of these sample populations, 15 were classified into SES categories based on individual measures of SES and the seven remaining populations were classified based on area level measures of SES. One study that included three separate age populations included a school SES measure in addition to individual measures. Accelerometers were used to measure PA for nine samples and pedometers were used for one sample. In five study samples, parents reported their children's PA and in the remaining seven samples, PA was self-reported by children.

When multiple individual level SES indicators and PA outcome measures were considered (Table 2), 15 samples yielded 40 independent associations[2] to be considered based on the number of samples and type of SES and PA indicators assessed in each study. Of these 40 observations, a positive association was found between PA and parent education and occupation among 9 to 11 year olds (boys and girls combined) (Bellisle, Rolland-Cachera, & the Kellogg Scientific Advisory Committee, 2007), maternal education among 6 year olds (boys and girls separately) (Hesketh, Crawford, & Salmon, 2006), maternal employment among 11 year olds (boys and girls separately) (Hesketh et

[1] A sample population represents a group of participants that were analyzed as a subsample of the total population.

[2] A sample population may be included in multiple associations if the analysis included multiple indicators of SES or PA outcome measures for the same population. For example, if a study separated the analysis for boys and girls (two sample populations) and also had three SES indicators for each gender (e.g., income, education, occupation) there would be six association in total (i.e., three associations for each gender; 2x3=6).

al., 2006), head of household occupation among 6 to 10 year olds (boys and girls combined) (Lioret, Maire, Volatier, & Charles, 2007), parents' education among 6 year olds (boys and girls combined) (Stenhammer, Sarkadi, & Edlund, 2007), and combined parent education and income among 7 year olds (boys and girls combined) (Ziviani et al., 2006). A positive association was also found when the mothers of 6 year old boys worked part time as opposed to full time or not at all (Hesketh et al., 2006). The only inverse association reported at the individual level was for mother's partner's education and PA among 11 year olds (boys and girls combined) (Riddoch et al., 2007). While there were 10 positive associations reported, the majority of observations (n = 29) found between SES and PA among children were not statistically significant.

Among 12 associations (from seven sample populations) that used an area level measure of SES (Table 3), nine were classified at the school level and three were classified based on neighbourhood affluence. Area level SES was positively associated with self-reported time spent in overall PA among 12 year olds (Villard, Ryden, & Stahle, 2007), self-reported school physical education and school sports among 9-13 year olds (Salmon & Timperio, 2005), and self-reported days per week of vigorous exercise in 11-12 year old girls (Henning Broderson et al., 2005). Salmon and Timperio (2005) also reported a negative association between area SES and active transport to school. In two sample populations of 8 to 10 year olds, schools were ranked low, middle, or high SES, and PA was measured objectively. In one sample (data from 1997), students of middle SES were significantly more active than those of low or high SES; however, there was no

statistically significant association between SES and PA in the other sample (data from 2003) (Kristensen et al., 2007)[3].

The additional review of recent studies found weak and few statistically significant relationships between SES-PA for children. Thus, at first glance the results of this review are in accordance with previous reviews that specifically looked at children aged 3-12 years (Ferreira et al., 2006; Sallis et al., 2000; van der Horst et al., 2006). This adds evidence to the preliminary support offered by Chen and colleagues (2002), to suggest that the adolescent-emergent model is the most appropriate developmental model to explain when the SES and PA relationship changes throughout youth development. Overall, the literature suggests that adolescents may be the most appropriate target group for PA interventions that relate to breaking down SES barriers; therefore, identifying the factors to be targeted is the next step.

Before commenting on these factors, it should be noted that additional research is also required to better understand the SES-PA relationship among children. Prior to dismissing children as an important age group for intervention, one must consider the degree to which the findings may be biased by how SES and PA are being defined and measured, and how youth are categorized based on age.

First, across the many reviews and studies examined in the current review, SES was measured at both the individual and area levels, and within those levels was furthered analyzed by various indicators of SES. In particular, the review by Ferreira et al. (2006) included the greatest diversity of SES indicators and found that only maternal education and family income were positively associated with adolescent PA. The finding

[3] This article published results from data collected in 1997 and 2003. Participants were different in both years.

that only certain indicators of SES appeared as correlates of PA highlights the importance of separating different measures of SES (Ferreira et al.) and carefully analyzing how SES is measured. Each SES indicator may explain a different feature of one's social position, thus certain indicators may be more representative for explaining distinct health behaviours (Chen et al., 2002; Hanson & Chen, 2007; Lynch & Kaplan, 2000) such as PA. For example, formal education may teach people the skills required to find resources to afford costly physical activities whereas type of occupation (e.g., long hours or shift work) may prevent a parent from being available to accompany their child to a recreation facility. As alluded to by Lynch and Kaplan (2000), considering only one SES indicator such as income, education, or occupation, and not considering their interaction may in part explain why some studies found a positive relationship with certain SES indicators and not others. For example, Hesketh et al. (2006) found that maternal education and maternal occupation were positively associated with moderate to vigorous PA (MVPA) but paternal education, occupation and work hours were unrelated.

Second, Chen et al. (2002) suggest that the relationship found between SES and a specific health outcome likely changes depending on the measurement of that outcome. Therefore, when considering PA as a health behaviour related to SES, in addition to discussing how SES is measured, one must also be aware of the way PA is being defined and measured. Gustafson and Rhodes (2006) highlighted the lack of psychometrically sound properties among SES and PA measurement tools used in the studies they reviewed. In addition, van der Horst and colleagues (2006) suggested inconsistencies between study findings may be a result of the breadth of PA measures being used (i.e., subjective and objective measures). Likewise, in the current review, it was found that PA

was measured differently across the 13 studies thus making it difficult to draw comparisons. For example, time spent in MVPA was often how PA was assessed when using accelerometers; however, each study included in the current review used different criteria for determining cut off points for MVPA (e.g., 3200 counts per min (Kelly et al., 2005) versus 3600 counts per min (Riddoch et al., 2007)). In addition, accelerometers do not provide the context of the activity which is problematic given the type of PA measured can change the relationships that are found (Mahar & Rowe, 2002). For example, Salmon and colleagues (2005) found that SES was negatively associated with active transport to school but positively associated with participation in school sports and physical education. Despite the fact that there is evidence for the adolescent-emergent model, researchers must pay attention to the type of information that is generated from different measures of PA. Certain types of PA may be more or less related to certain indicators of SES and this relationship requires further exploration. Future studies should include multiple aspects of PA (e.g., active transport, free play, organized activities) in order to better understand the multiple ways that SES may influence PA behaviour among youth. Developing an international PA survey instrument for children and adolescents such as the International Physical Activity Questionnaire that has been developed for adults (Craig et al., 2003) would also assist is comparing results from various countries.

Finally, broadly categorizing youth into two age groups such as children aged 3-12 years and adolescents aged 13-18 years, may also mask the effects of SES and PA. For example, in the current additional review, it appears that SES is not related to PA until six years of age (Kelly et al, 2005; Lioret et al, 2007). Furthermore, when studies

included multiple age categories, the reported outcomes differed by age. For example, Hesketh et al. (2006) reported a positive association between maternal education and PA among six year olds; however, when studying 11 year olds they found that maternal education was not related to PA whereas maternal occupation was positively related to PA. In addition, Lioret et al. found no association between the head of the household's occupation and PA among 3-5 year olds but a positive association among 6-10 year olds. This suggests that researchers need to perform age specific analyses when reporting study findings. Furthermore, given the support for the adolescent-emergent model is based on findings from predominately cross-sectional research, longitudinal studies are needed to more fully examine the developmental changes that occur across time (Chen et al., 2002).

Further, when comparing research and practice, the discrepancy between statistically significant findings and practical implications is evident. Although research suggests that statistically SES may not play a role in terms of PA opportunities for children, there are a number of programs that cater to children of low SES including: KidSport™ Ontario, (a provincial government supported organization that provides funds to help "underserviced children and youth break through the social and/or economic barriers preventing or limiting their participation in organized sport and physical activity") (KidSport™ Ontario, 2008, About Us section, ¶ 4); Canadian Tire JumpStart™, ("a community-based charitable program that has helped over 100,000 Canadian kids in financial need participate in organized sport and recreation")(Canadian Tire Foundation for Families, 2007, Homepage, ¶ 1); and subsidies provided by various municipalities. Given these programs are in demand it is likely that SES influences youth earlier than research suggests. Although additional research is required to determine the

appropriate developmental model, understanding why there is a consistent link between SES and PA among adolescents is of current interest.

How Does SES Influence PA Among Youth?: Proposed Factors with SES and PA

Given the evidence for an SES-PA link among adolescents, a deeper understanding of *how* SES may influence PA is important to consider from an intervention development perspective. Chen and colleagues (2002) offer insights into mechanisms that may explain the SES and health relationship among youth as they develop from children to adolescents. Although this model does not address PA specifically, it includes health habits (e.g., PA) as a type of behavioural factor that may lead to health outcomes (e.g., high blood pressure). In their model (Figure 2), Chen et al. highlight emotional/cognitive factors, and social, environmental, behavioural, and biological mechanisms that might mediate the relationship between SES and health. They suggest that emotions and cognitions (e.g., hostility and information processing, respectively) play a much greater role among adolescents. The social influence shifts from family members to peers as children age, and most of the environmental (e.g., neighbourhood, stressful events), behavioural (treatment compliance), and biological mediators are fairly consistent throughout development. However, health habits are one of the behavioural factors that appear to have a stronger influence on health during adolescence (Chen et al).

In support of this proposed mechanisms model, Kroenke (2008) suggests, based on evidence provided by multiple studies that the SES and health relationship is mediated by both material (e.g., overcrowding) and psychosocial (e.g., depression) factors and further suggests these factors influence the SES-health relationship differently across the

developmental stages of youth. Furthermore, in a summary of evidence relating SES and PA behaviour, McNeill, Kreuter, and Subramanian (2006) provided evidence to suggest that low SES may influence PA through "reduced access to health care, which in turn results in poor health" (p. 1015), or reduced access to material resources such as a membership to a local PA facility; however, there was no specific evidence to suggest whether or not these mechanisms apply to the adolescent population. Starfield and colleagues (2002) highlight the need for conceptual models that help to explain the relationship between SES and the health of youth. In addition, Chen et al. (2002) suggest the mechanisms between SES and health may differ depending on which health outcome is being studied. The same arguments could be applied when considering the relationship between SES and a given health behaviour, thus the development of a conceptual model specific to SES and PA warrants attention. Investigating which of the proposed mechanisms (Chen et al.; Kroenke; McNeill et al., 2006) apply to SES and PA specifically is worthwhile in order to facilitate the development of interventions that are successful at reducing disparities among youth of varying ages and SES levels.

As the preceding review demonstrates, many studies have addressed the SES-PA relationship among youth. Yet, few have provided an explanation for why the given relationship may exist. In response to their findings that there is a more consistent relationship between SES and PA among adolescents versus children, Ferreira et al. (2006) suggested that PA opportunities among adolescents are more formal and costly in contrast to those of children that are generally informal and less expensive, but recommended this be studied further. Other authors support the idea of cost as a barrier to increased participation in physical activities; however, this support is based on results

of SES-PA studies involving children. Stenhammer et al. (2007) reported differences in obstacles described by parents of six year olds with greater than 12 years and fewer than 12 years of education. Although both groups expressed lack of time as the greatest obstacle, lack of money was also an obstacle commonly given by parents of lower education. Furthermore, Ziviani et al. (2006) found that among seven year olds, weekend step counts were higher among children with parents of higher education and income but there were no differences for weekday steps. The authors suggested that costs associated with organized activities, that may be more prevalent on weekends, reduce the opportunities available to economically disadvantaged groups (Ziviani et al.). The cost of equipment, transportation, registration fees, and time are all expenses that must to be considered; less wealthy families, which often include single parent families, may not have the necessary resources for their children to participate in organized activities (Ziviani et al.).

Considering the results of the included reviews, it would be of interest to examine whether the burden of cost that has been suggested for younger children is also a barrier to participation in PA among adolescents; perhaps cost should be considered at all ages. Humbert et al. (2006) interviewed low- and high-SES adolescents (aged 12-18 years) to determine which factors they considered important for increasing PA participation among youth. The authors found that although intrapersonal and social factors such as family and peer support were important for both low- and high-SES youth, environmental factors such as proximity of facilities, cost, and safety were influential for low-SES youth, but not high SES youth (Humbert et al.). However, neither adolescents nor their parents were asked directly how they perceived SES influences PA in this study. To

corroborate these findings, another approach to determine how socioeconomic factors influence PA among adolescents would be to ask parents if and how their SES (e.g., income, education, and occupation) influences their adolescent's PA opportunities considering they are often responsible for covering the various expenses (e.g., registration fees, equipment, transportation to facilities) and granting permission for participation (e.g., safety). Moreover, although cost and time have been identified as a barrier for lower SES families, there are likely many other factors that play a role in the SES-PA relationship and these factors remain to be identified. In addition to parents, people who work to support families of lower SES can offer insight into how income, education, and occupation influence the PA opportunities among adolescents. Although not living the experience themselves, they can draw upon the experiences of the communities they serve. For the remainder of this thesis they will be referred to as community support liaisons.

Purpose

Given there are known differences between when SES influences PA throughout youth development and a consistent positive relationship appears among adolescents, studying the factors that help to explain the SES-PA relationship among a specific age group such as adolescents is an appropriate next step. Therefore, the purpose of this thesis was to identify the factors that influence the relationship between SES and PA among youth aged 12-14 years. The parent and community support liaison perspectives were used to explore the factors involved in the SES-PA relationship. The association between multiple individual SES indicators such as parental income, education, and occupation and multiple forms of PA such as active commuting to school, and both

formal and informal PA opportunities within and outside the school setting was investigated.

Chapter 2: Methods

Qualitative Approach

Patton (2002) suggests the use of qualitative methods when inquiring about a person's experiences in the context of his or her socio-cultural environment and when there is "not enough known about a phenomenon for standardized instruments to be developed" (p. 33). Given the inherent limitations of measuring SES and PA that were described in the analysis of past reviews based on quantitative research, and that the purpose of this research was explanatory in nature, qualitative inquiry was deemed the most appropriate research method. Qualitative research allows an in-depth analysis of people's thoughts, opinions, and behaviours, thus "it allows associations that occur in people's thinking or acting – and the meanings they have for people – to be identified" (Ritchie, 2003, p. 28).

Participants

Participants included five parents (1 male, 4 female) who were of high- (n = 3) or low-SES (n = 2) and 15 community support liaisons (all female). Purposeful intensity sampling was originally used to select parent participants who were either of high- or low-SES. Intensive sampling provides information-rich cases because it is expected these cases "manifest the phenomenon of interest intensely" (p. 234) but not so extremely that cases are highly unusual (Patton, 2002). A number of methods were used to recruit parent participants; three non-private schools and three private schools were contacted, community organizations that cater to lower SES families were sought after, and recruitment posters were distributed at a local minor sports registration. Parents were

successfully drawn from non-private schools (n = 2) and community organizations (n = 3) but no parents were drawn from the private schools or minor sports registration.

For parents recruited through non-private middle schools, it was intended that participants would be high- or low-SES parents/guardians (male or female) of grade seven and eight students. Middle school postal codes were entered into the Statistics Canada 2006 Census Tract Profile (Statistics Canada, 2007a) to identify which schools would likely target the highest and lowest SES catchment areas. Upon Wilfrid Laurier University and School Board ethics approval, a letter of information for parents/guardians was sent home with students during their physical education class. All parents/guardians were invited to participate in a questionnaire and an interview and were asked to call the researcher if they were interested in participating in the study. For parents recruited through community organizations, the organization contacted the parents, provided the letter of information and arranged all further study procedures.

Given low parent response for study participation, community organizations (e.g., community centres and not-for-profit recreation centres) that cater to families of lower SES were contacted in order to recruit their employees. Although not living the experience of being of lower SES, they provide resources for those who are, thus it was assumed they could provide insight into how SES influences the PA opportunities for youth. The researcher attended various community events to network with coordinators of organizations that serve families of lower SES. Although some of the community organizations target low income families specifically, many also target the broader community. A parent of higher SES was also recruited through one of these community events.

Upon Wilfrid Laurier University ethics and community organization approval (where needed), community organization coordinators were provided with the letter of information to circulate to community support liaisons whom they felt would be suited to discuss the influence of SES on PA opportunities among adolescents. If interested in participating, the community support liaison contacted the researcher.

Data Collection Tools

Data was collected using a background questionnaire and personal interviews for parent participants and personal interviews for community organization participants.

Questionnaire.

As a way to summarize participant characteristics, parent participants completed a short questionnaire that included questions regarding their demographics, including occupation, education, and income (Appendix A). The questions were selected from a validated parent questionnaire used for the National Longitudinal Survey of Children and Youth 2000-2001 (Statistics Canada, 2003). There were also questions regarding their participation in PA in addition to the types of PA with which their adolescent is involved. The parent PA questions were selected from the Godin Leisure Time Exercise Questionnaire that has been validated previously (Godin & Shephard, 1997) and the questions regarding their children were modified from the child questionnaire of the NLSCY 2000-2001 (Statistics Canada, 2003). The purpose of the questionnaire was to prepare the researcher for the interview and to determine how a participant's household income and educational attainment differed from the data from the postal code area from which their child attends school. Participants were classified as high SES if their income

and education was above median values for their city and low SES if their income and education was below median values for their city.

Interviews.

Standardized semi-structured interviews (Patton, 2002) guided the discussion between the researcher and study participants. Interviews allowed an in-depth account of the variables that influence PA participation among youth of varying SES levels. The original interview guide for parents was adapted for community support liaisons and parents of lower SES as per recommendations by the community organization facilitating interviews with their community members. The parent interview guides are attached in Appendix B and C and include questions that ask participants to describe if/how their income, education, and occupation, influences their adolescents' opportunities to be physically active. The community guide is attached in Appendix D and asks similar questions but with regards to adolescents attending and not attending their programs. Participants were encouraged to consider all types of PA such as active transportation, free play and organized activities both at school and outside of school. For the original interview guide, three pilot interviews were carried out with a convenience sample of family and colleagues who have school-aged children to ensure the guide was coherent. This also provided practice for the interviewer.

Procedure

Upon contacting the researcher, parent participants recruited through schools (n = 2) and networking at community events (n = 1) were mailed a questionnaire and two consent forms (one for them to keep and one for the researcher's files). They were asked to complete the questionnaire, sign the informed consent form, and return the documents

in a postage paid envelope. Once this was received an interview time and location was arranged. Two interviews took place over the phone and one in person at Wilfrid Laurier University. This process yielded three parents of higher SES.

For parents recruited through community organizations, a staff member from the organization (also a community support liaison) contacted the parents and provided the letter of information. If parents were interested in participating in the study, this staff member provided consent forms (one for them to keep) and a questionnaire. All forms were completed prior to the interview which was arranged by the community support liaison and took place at their community centre. The consent form and questionnaire were given to the interviewer at the beginning of the interview. This process yielded two parents of lower SES.

For community support liaisons recruited through community organizations, the participants contacted the researcher if they were interested in participating and a consent form was emailed to them. Consent was provided by phone in the case of phone interviews (n = 13) and in written format for face to face interviews (n = 2).

Data Analysis

All parent (except one) and community support liaison interviews were tape recorded and transcribed verbatim. When tape recording was not agreed to the researcher took extensive notes. The interviews yielded 140 pages of single spaced text.

Following each interview, the interviewee had an opportunity to verify the accuracy of the transcript and to make any additional comments via a member check. According to Lincoln and Guba (1985) a member check "is the most crucial technique for establishing credibility...it gives the respondent an immediate opportunity to correct

errors of fact and challenge what are perceived to be wrong interpretations" (p. 314). Patton (2002) suggests that, "researchers and evaluators can learn a great deal about the accuracy, completeness, fairness, and validity of their data analysis by having the people described in that analysis react to what is described and concluded" (p. 560); therefore, this was one approach to ensuring the reliability of the data. In most cases, the transcript was emailed to the participant, comments or changes were made directly on the document, and the file was sent back to the researcher via email. In one case a printed copy of the transcript was given to the participant. In total, eight participants made small edits prior to returning the transcript.

Following a structured set of guidelines for qualitative analysis is required in order to ensure the trustworthiness of the research findings (Côté, Salmela, Baria, & Russell, 1993); therefore, an interpretational analysis was used to create tags and themes in the data (Tesch, 1990). Creating tags involved dividing the text into meaning units. A meaning unit can be thought of as, "a segment of text that is comprehensible by itself and contains one idea" (Tesch, p. 116). Once transcripts were coded into meaning units, emerging themes and sub-themes were identified. This process of de-contextualizing (creating tags) and re-contextualizing (creating themes) the data allowed for connections between participant's responses to be explored (Tesch). Once the emerging themes were identified through interpretative analysis, a model that represents the factors involved in the SES and PA relationship among youth was developed.

The community interviews included a substantial amount of contextual information within the first set of questions. This information was valuable for ensuring the participants worked in a setting that would provide them with the expertise to answer

the remaining questions and to understand the variety of community organizations that exist within a particular region. Since the discussion did not explicitly relate to the main study question of how SES impacts adolescent PA opportunities, the discussion that arose from these contextual questions was not formally coded unless something related to the research question was explicitly mentioned.

Triangulation.

Data triangulation and analyst triangulation were used to increase the trustworthiness of study findings. First, data triangulation was used to integrate findings from the quantitative (questionnaire) and qualitative (interview) data collection methods. Patton (2002) suggests that qualitative data helps to "illuminate the stories behind the quantitative data" (p. 558). Second, analyst triangulation was used in order to "reduce the potential bias that comes from a single person doing all the data collection" (Patton, 2002, p. 560). Analyst triangulation involves using multiple people to "independently analyze the same qualitative data and compare their findings" (Patton, 2002, p. 560). The interviewer and an additional researcher independently coded each transcript into meaning units and then created themes. Together, they refined each theme to create sub-themes and placed all of these into a visual model to re-contextualize the data.

Chapter 3: Results

The prominent themes and sub-themes that emerged from the data are depicted in the model in Figure 3 and are detailed below. This model identifies how SES influences adolescent PA but includes additional factors that participants identified as influencing the PA opportunities among adolescents. Income, occupation, and education were the indicators used to describe SES in the study, and other social-ecological factors account for the additional factors identified by study participants.

Access

Access was the theme identified when participants were asked about the impact of family income on adolescent PA. Specifically, the data revealed meaning units related to four sub-themes indicating how one's income impacts PA: 1) having money available to cover the direct costs of PA programs (i.e., registration/pay-per-use fees and equipment), 2) having transportation and travel options available for PA programming, 3) being able to meet basic needs with limited stress, and 4) being eligible to access subsidies or low cost programs. The stigma involved in asking for assistance to acquire subsidies acts as a barrier to accessing subsidies thereby preventing increased access to PA.

Money available to cover direct costs of PA programs.

The first sub-theme relates to whether a person's income provides the money necessary to cover direct costs associated with PA programs. Whether adolescents choose to engage in active transportation, free play, or organized activities, there are a number of associated costs. Equipment and registration or pay-per-use fees are the two major direct costs that were identified in participant interviews. For organized sports, equipment costs are sometimes the limiting factor in whether a child can participate. For

example, two community support liaisons commented on the expense of hockey gear and why that prevents their community members from participating in that sport:

We don't have enough funds for [hockey] and neither do the parents.

- Participant #14, Community Support Liaison

...hockey, um, the expense of the gear, um, is just too much for some. You know we can sometimes subsidize transportation and registration but to fund equipment, that's an expensive sport.

- Participant #11, Community Support Liaison

Although there are alternatives to organized sport, most physical activities require some form of equipment. One could argue that walking to school or playing in the park does not require money, but for families who are living on a limited income it may be a challenge for them to buy their child appropriate footwear and clothing for a given activity:

Equipment may be a factor for [families living on a limited income], like even to have a good pair of running shoes, even to play basketball can be factor. Skates in the winter time to participate in a school program, although the schools try to have skates that they can lend to everybody, having your own pair of skates is an issue for a number of families.

- Participant #14, Community Support Liaison

Families would ask us for some support [for] even some basic things such as having a bathing suit to wear to the pool, having warm socks to wear if we go skating. Not even having the skates because that's a whole other piece, you know, having um, warm socks so we can go skating.

- Participant #13, Community Support Liaison

In addition to equipment needs, organized physical activities often require a registration fee. Taken together, participating in organized activities can become extremely expensive and this acts as a deterrent for many adolescents, especially when finances are limited:

The reason he hasn't joined any school teams is they all cost money... he was in martial arts but the cost became too much so he had to stop.

- Participant #19, Parent of lower SES

Some of those higher end type of sports like some of the city sports, um, like the community centres are very affordable but then there are some that are just out of reach for many people.

- Participant #12, Community Support Liaison

Think of all those kids out there who would like to play hockey but really, how do you get to play hockey considering the cost of equipment, the cost of joining, the travel.

- Participant #2, Community Support Liaison

Registration fees are extremely variable but even accessing a local facility for unorganized play may involve a nominal fee that is not affordable for all families. A community support liaison made the following comment with respect to a traveling skate board park that cost $2 per use:

There was one summer [the traveling skate park was] here every week and we had purchased passes with some funding we had so kids could go and use it because they weren't using it, right, because they don't have the money.

- Participant #2, Community Support Liaison

In contrast, families earning a higher income commented on how their income was an "enabler" for their adolescents to participate in PA both organized and unorganized:

I mean we try to make sure that the opportunities are there for him to participate in things that he wants to participate in. Um, he does some downhill skiing. I mean we didn't buy a membership at [the local ski hill], um but he got some new skis and boots and things like that for Christmas so if he wants to go on a weekend, [right], then, you know, we try to make sure that the opportunity is there for him to go.

- Participant #17, Parent of higher SES

I would say my current income with my current daughter, I would say, it has enabled her to participate [in physical activity].

- Participant #18, Parent of higher SES

Transportation and travel options available for PA programming.

The second emerging sub-theme was related to having the money available to provide transportation to physical activities, whether local or out of town. Transportation was considered a significant barrier to PA by a number of participants. Organized physical activities often require transportation to facilities that are not within walking distance. Whether accessing transportation requires buying a bicycle, bus ticket, or personal vehicle, there are costs associated with these forms of travel. As a result, not having access to transportation can limit the opportunities available to adolescents:

I think it's really important people understand that accessibility is a big issue as far as um, as transportation and being close and that poverty is a barrier to physical activity, especially structured sports.

- Participant #12, Community Support Liaison

[A sailing camp] offered some spaces but again the challenge was the kids needed to get to a certain location for pick up, and so that was an issue.

- Participant #11, Community Support Liaison

In addition, even if walking or cycling were an option in terms of distance, depending on the equipment needed for the activity, active transportation may not be feasible (e.g., carrying a hockey bag full of gear). As a result, there are certain activities that would not be possible without access to transportation, even if all other costs were covered. Having a variety of activities in the nearby community is critical. Without accessible programs that are within a safe walking distance to an adolescent's neighbourhood, low income youth may not have similar opportunities to those who have higher incomes. This was mentioned by a number of participants and highlighted by a community support liaison:

The community has said to us, "we want things that are offered in our neighbourhood that kids can walk to", um, and the youth have said that as well you know, "if it's right there, then I can come or especially in the winter time, if it's across the street then I'll be allowed to go" because some kids at the age of 11, that's still pretty young for them walking in the dark with a group of friends to the gym. Even if a program starts at 6 o'clock it's dark outside.

- Participant #13, Community Support Liaison

Furthermore, if an adolescent wants to participate in a sport or PA that involves out of town travel or tournaments, there are a number of indirect costs such as renting a hotel, paying for gas, and meals. If the family does not have access to a vehicle, it is likely their child cannot be part of a team.

Like if you're a family that doesn't have a car, how do you get your kid to all these [hockey] games all over Ontario and be a part of this team?

- Participant #2, Community Support Liaison

And even things that you wouldn't think require a lot of equipment, there's the out of town tournaments, the cost of the hotel and then the meals out with the team.

- Participant #16, Parent of higher SES

It is notable that not having access to a vehicle or money to buy a bus ticket or a bicycle acts as a major barrier to the various PA opportunities available to adolescents. Unless there are programs offered within their immediate community, an adolescent is limited to their immediate surroundings. In contrast, one parent commented on how not having access to a vehicle actually increases the time her adolescent spends engaged in PA as part of daily living:

He's very active, very active. He walks to school, we don't own a vehicle so it's a 45 minute walk every single day to and from school.

- Participant #19, Parent of lower SES

Regardless of whether having access to transportation enables an adolescent to participate in more organized activities or encourages them to participate in more unstructured activities such as walking for transport, it is apparent that not having access

to transportation and additional funds for travel associated with PA can be a limitation for the variety of opportunities that are available to adolescents.

Being able to meet basic needs.

The third sub-theme refers to a person's income providing sufficient funds to meet basic needs such as housing, food, and clothing. For families living on a limited income, participants suggested that as meeting basic needs becomes more of a priority, PA becomes less important. With limited funds available, the cost of living day to day may be unmanageable or challenging. This adds an element of stress to the lives of those who are struggling financially; having a place to live and food for the family becomes the focus of their lives. As a result, engaging adolescents in PA in put on the "back burner" until basic needs are met or until the parents have the emotional or physical energy to ensure their children are being active:

[For people who] fall into the low income bracket... the priority is paying rent and having groceries.

- Participant #10, Community Support Liaison

If parents aren't working, which could be the case, then just in terms of finances there's no way that kids can be involved because their main focus for their finances would be to food and shelter and that would definitely become secondary.

- Participant #3, Community Support Liaison

Another issue and it's not just families that live in poverty, although it's much more prevalent, the parents too are dealing with depression and anxiety, um, often and it's difficult to get their kids to [activities], it's just sometimes an

exhaustion of living day to day, you know going around the city trying to get food, you know trying to provide for their families.

- Participant #12, Community Support Liaison

Unless a PA program is completely subsidized or has absolutely no costs, an adolescent living in a family that is unable to meet basic needs will be limited in terms of their opportunities to engage in PA.

Being eligible for subsidies or low-cost programs.

The final sub-theme related to income refers to whether an adolescent or family is eligible for subsidies or low-cost programs. Subsidies refer to financial assistance that reduces the cost to the participants and are intended to increase access to PA programs; however, there are limitations to who is eligible to receive them. Community support liaisons can provide subsidies to families living on a limited income but as soon as the families reach a certain income level, they are no longer eligible. One parent of lower SES commented on the issue of the working poor where a family who is above the low income cut-off for the province may be ineligible for subsidies, yet cannot afford the costs associated with recreation, especially if they are barely above the cut-off. In response to a question on how subsidies are acquired, a community support liaison highlighted rigidity of the subsidy income scale and how this limits the amount of assistance a person can receive:

You need your T1 General from last year's income tax because that gives the household income, and then we have a scale that's actually from the government saying how much of a subsidy to give them. So it's all very clear, um, and if people say they can't afford that, I say well sorry this is what we can offer you.

- Participant #5, Community Support Liaison

The other difficulty with subsidies is the stigmatization involved in asking for assistance and having to prove that one is struggling financially:

A lot of people are embarrassed to ask for a subsidy or say that they need it.

- Participant #12, Community Support Liaison

This acts as a barrier to accessing subsidies which then decreases access to PA opportunities:

I think [accessing programs outside our facility] is a barrier because people just assume that um, they can't afford it and they don't really want to accept help from other places because sometimes the process is really degrading.

- Participant #9, Community Support Liaison

Accessing subsidies in not always an easy process and at times there are many steps to the process. Not only does this reduce the chances that a family will acquire a subsidy, but it can prevent families from asking in the future. In a conversation regarding the subsidy process, a community support liaison revealed that:

...some families have said, "you know I feel like I have to keep proving I'm poor".

- Participant #13, Community Support Liaison

According to the number of meaning units related to income via the four sub-themes discussed above, income appears to be the most influential of the included SES indicators (i.e., income, education, occupation) when looking at how SES influences PA. Having money available to cover the direct costs of PA programs (i.e., registration/pay-per-use fees and equipment), having transportation and travel options available for PA

programming, being able to meet basic needs with limited stress, and being eligible to access subsidies or low cost programs are the four sub-themes that are influenced by one's income and can determine the accessibility of PA among adolescents. The stigma involved in asking for assistance also influences the subsidy process.

Time

Time was the theme identified when participants were asked about the influence of occupation on the PA opportunities of adolescents, and employment schedule was the sub-theme.

Employment schedule.

A parent's occupation, in terms of their employment schedule influences the amount of time they have available to provide support for adolescents. Regardless of the amount a person is being paid, their occupation dictates when and for how long they have to be at work. A person's schedule is also influenced by the degree of flexibility they have with their work. For example, all three parents of higher SES commented on their employment schedules and how they allow them to accompany their adolescents to various activities:

> *I have that flexibility certainly, um, ah, number of hours, yeah, because I could say that because I work so many hours she might miss opportunities, um, but I think because I have the flexibility I could kind of off set that.*
>
> - Participant #18, Parent of higher SES
>
> *Well, um, I've been able to have a little bit of flexibility so that I can leave early if I need to, um, drive her to an activity, um and I have, I have got that schedule so that I can keep my kids in sports.*

- Participant #16, Parent of higher SES

I don't think there's ever been a case where you know he hasn't been able to do something because, you know, mom or dad hasn't been available to take him there.

- Participant #17, Parent of higher SES

In contrast, community support liaisons often spoke of parents who are not employed or who work shift work. In both cases, the parent's schedule influences the opportunities for their children; either enhancing them or limiting them:

I think often too families do a lot of shift work so if the family is working in the evening, that's when most programs are offered, or weekends, so I think it depends on you know when parents work or if they're working. I think it definitely plays a role in what their kids get to do.

- Participant #3, Community Support Liaison

A lot of the parents that I work with again don't have an occupation but if someone does work shift work, [parental occupation] absolutely [impacts PA opportunities] because they just are not able to bring their children. They're often working in the evening, um, or sometimes even overnight.

- Participant #12, Community Support Liaison

A few parents that I have chatted with um, if they're on a shift work or depending when their shift is they can or can't get their children to the programs.

- Participant #6, Community Support Liaison

Without a job that earns income or a subsidy to cover costs, it is unlikely that an adolescent will be able to participate in organized sports; however, for those who are

unemployed or working from home on a part-time basis, there may be more time available to supervise or support adolescents in terms of unstructured play:

> *I do [work in my neighbourhood] so we're always going to the park and stuff and had I not had that job you know, aside from the competitive sports at least the kids are going to the park on a regular basis and that may not be if I'm not home during the day right?*
>
> - Participant #19, Parent of lower SES
>
> *I think as sad as it is and the parents don't work, they're [at our recreation facility] more. They want the kids out of the house.*
>
> - Participant #5, Community Support Liaison

A parent's employment status and schedule influences the time they have available to provide various types of support for their adolescents. Depending on when and for how long they are working will help determine the types of PA that an adolescents will engage in (e.g., organized sports vs. school sports vs. free play on the front lawn) and whether the parent is available to accompany or support them.

Awareness

Awareness was the theme identified when participants were asked how education influences the PA opportunities among adolescents. However, creating a distinction between formal and informal education may be of particular importance. In the original interview guide, a distinction was not made to whether 'education' was referring to formal or informal education; therefore, the responses were up to the interpretation of the participant. On the other hand, probing in later interviews allowed for a distinction to be made if the response was not clear as to whether education was interpreted as formal or

informal. For the purposes of this model, formal education will be the SES indicator under consideration, while informal education will be an influential factor denoting something different from SES. However, the theme of awareness emerged for both types of education and sub-themes for both will be discussed separately below.

Formal Education

According to highly educated parent participants and some community support liaisons, being formally educated with a university or college degree is influential to: 1) a person's knowledge of the importance of PA and, 2) that person's ability to access resources and exposure to PA.

Knowledge of the importance of PA.

Knowledge of the importance of PA is one of the sub-themes for formal education as it relates to the larger theme of awareness. Several participants believe that formal education provides parents with the knowledge of the importance of PA and this might impact the PA opportunities that are then available to their adolescents. If the parents understand that PA is important, they will be more likely to ensure that their adolescents are involved in PA:

> *My guess would be that parents that have had more education or have kept up with education would probably find it benefit more in providing their kids with you know organized activities or that kind of thing.*
>
> - Participant #3, Community Support Liaison
>
> *Very much so, I've been very, um, very assertive in making sure that she's active, um, we've always had this rule that has to do a physical activity everyday... I think our education has made a difference because we know how important it is.*

- Participant #16, Parent of higher SES

In contrast, many participants did not agree that formal education had a large impact:

I don't see [if parents value or encourage PA being] related to their education level

- Participant #7, Community Support Liaison

I think [parental education] might have some implication but I wouldn't say that would be a high impact factor.

- Participant #14, Community Support Liaison

When assessing the impact of formal education, participant opinions differed greatly. Some participants were confident that formal education plays a role while others were equally confident that it does not.

Ability to access resources and exposure to PA.

Having the ability to access resources and exposure to PA is the sub-theme for formal education as it relates to the larger theme of awareness. Participants suggested that if parents had access and exposure to various physical activities growing up, they would be more likely to encourage PA among their own adolescents. Although it may not have been the formal education itself that provided the exposure to PA, having access to formal education has implications; people who were formally educated may have also had access to more activities in the past because they had increased access to resources (i.e., funds to pay for school and therefore PA as well). The following comments were in response to whether formal education impacts PA opportunities among adolescents:

I think it can and one of the reasons is if somebody has a high level of education they, it's more likely that they came from a background that had access to more resources for them to be more involved in activities themselves. So, if they've experienced it then they value it for their children as well.

- Participant #11, Community Support Liaison

I think people that don't have um higher education just haven't been exposed to people that know about nutrition and healthy living.

- Participant #5, Community Support Liaison

In addition to supporting the idea that formal education may lead to "broader exposure", the following quote also supports the link between education and income (third and fourth line of quote) that was described above:

We have some families in our community that um, are university educated...I think they may have had broader exposure to different types of recreation and that may be an impact whereas other families who have lower income who maybe had limited education, they themselves as youth may have had limited recreation exposure and may not then see a broader perspective for their own children when they reach that 12-14 age.

- Participant #13, Community Support Liaison

There is also the issue of being able to access resources and having the 'know-how' to do it:

I would say [my education] has [had an impact]. I think um, I probably have good, a good understanding of the various components of health, you know, that

may be linked to my ability to access information or to know where I might find information about health in children.

- Participant #18, Parent of higher SES

Although a person's knowledge of the importance of PA and that person's ability to access resources and exposure to PA are influenced by formal education, knowledge can also be gathered informally.

Informal Education

A substantial number of community support liaisons and parents who have obtained a high school education or less consider informal education (vs. formal education) a more essential component of understanding the importance of PA or did not think that parental education had an impact. Under the theme of awareness, the sub-themes that emerged from the data for informal education were: 1) knowledge of the importance of PA and, 2) knowledge of affordable programs and subsidies.

Knowledge of the importance of PA.

The majority of participants suggested that informal or public education is more important than formal education for determining whether a person is aware of the importance of PA:

I think with um, you know with physical activity and good nutrition and things like that, a lot of it is around us so you don't need to have a university degree to understand that physical activity or nutrition is important or you know, for a children's well being kind of thing.

- Participant #1, Community Support Liaison

I would say what would impact more [than education level] in my experience would be knowledge about physical activity or awareness of the benefits or how you get involved versus an actual education.

- Participant #2, Community Support Liaison

Public health departments, community centres, and schools include some of the many organizations that provide information on the importance of, as well as how adolescents can engage in PA. With adequate resources within the community, public education can provide a wealth of information to help adolescents become more active:

I think the really good thing is that more and more, just with the public education and the resources available, parents and youth and young adults recognize the importance of being active.

- Participant #11, Community Support Liaison

One parent mentioned that if recreation or subsidy providers are forthcoming with information on how adolescents can get involved in PA, parental education level does not have an impact. It is therefore the knowledge of affordable programs and subsidies that will further assist adolescents in increasing their levels of PA.

Knowledge of affordable programs and subsidies.

Based on the low cost programs and subsidies that were mentioned by community support liaisons, it is apparent that a range of PA opportunities exist for adolescents in families living on a limited income. For example, many community centres and recreation facilities provide free PA programming through drop-in gym time or summer sports programs, or offer subsidized memberships, municipalities have fee assistance programs, and the regional government provides recreation subsidies through regional

staff members who have relationships with families living below the low income cut-off. However, unless a parent or adolescent is aware of affordable programs or subsidies, these offerings will have no impact on the PA opportunities of the adolescent:

> *If they can't afford the fee, right, if the fee is not attainable, right and they're not aware that we have the ability to help out or help subsidize the fee, it may then impact their decision for not coming to [this recreation facility].*
>
> - Participant #1, Community Support Liaison
>
> *In the parents that I have, um, I'm in touch with, they want their kids to be physically active, it's just how they can do that in an organized fashion which is maybe the challenge.*
>
> - Participant #14, Community Support Liaison
>
> *A lot of it is um by word of mouth that they are finding out about our subsidized program, um right, so I think that children are getting the opportunity when their parents are finding out, they are getting an opportunity to participate when they might not have otherwise had the opportunity.*
>
> - Participant #8, Community Support Liaison

Informally educating parents and adolescents about the importance of PA and providing information about affordable programs and recreation subsidies are steps that can be taken to increase awareness about the PA opportunities that exist for adolescents. If people can learn the value of PA and how they can incorporate PA into their lives, one could argue that adolescents would have increased opportunities to be active.

Interaction of SES Indicators

Although the SES indicators of income, occupation, and education were related to themes that described the relationship between SES and PA, participants also highlighted the interaction amongst the various indicators.

Occupation – income

A person's income is often dictated by their occupation; if someone is unemployed or working in an occupation that pays minimum wage, they are less likely to have a substantial income and therefore to have access to PA (in reference to what was described for the theme 'access' above). This idea was captured by several participants:

The better job you have the more money you have and the more things are available to you.

- Participant #19, Parent of lower SES

Yes [occupation impacts the PA opportunities of youth], because if a parent's occupation is making them, um, a higher income, then they'll have maybe more money to go into, increase opportunities.

- Participant #2, Community Support Liaison

The data suggests that parental occupation influences PA opportunities via several pathways. In addition to influencing one's access via income, and one's time available to provide support for adolescents to engage in PA, occupation is also influenced by formal education which will be discussed below.

Formal education – occupation – income.

As previously alluded to, participants suggested that education level can dictate one's occupation and therefore influence income, but also that education level is related to income independent of occupation.

Participants commented on the influence of formal education on a person's occupation and this then influences both income and one's employment schedule. When asked how parental occupation impacts PA opportunities among adolescents a community support liaison replied:

> *Um, um, hm, you know that could go either way. That can be, um, a professional occupation suggests a higher level of education and income and therefore, you know, more opportunities for the kids but I've also seen it go the other way where depending on the parent's occupation and the amount of time commitment that's required, they have less time available, and those children are less involved.*
>
> - Participant #11, Community Support Liaison

In addition, a parent of higher SES commented that having a graduate degree has provided her with employment and thus a financially supportive income, but that also provides her with flexibility in her work schedule:

> *I think also having that level of education enables me to have employment that supports us financially...I think my education has led me to a job that enables me to [have the flexibility to accompany daughter to tournaments]. I think if I were working you know, for a minimum wage at a Tim Horton's let's say, I might be able to take the day off but I would lose the income for that.*
>
> - Participant #18, Parent of higher SES

In contrast, one community support liaison discussed the challenges faced by new Canadians when their education is not recognized in Canada and thus cannot find work or are working for minimum wage despite a high level of education in their country of origin:

> *...many of the immigrant families, are highly educated and they are either seeking employment in their field of study, while they work at minimum wage positions or some are um, completing, um re-training that they need in order to practice their skill in Canada, and some are completing additional degrees in order to be more employable in Canada, that kind of thing.*
>
> - Participant #11, Community Support Liaison

In the case of new Canadians, being more formally educated does not necessarily lead to a better occupation that earns a larger income; however, in general, participants suggested that formal education is a stepping stone for obtaining a lucrative occupation.

Formal education – income.

Although cited less frequently, formal education was also linked directly to income when asked if education influences PA:

> *Well yeah, because [education] goes hand in hand with poverty. For sure, like there's not a lot of people with post secondary education who are below the low income.*
>
> - Participant #12, Community Support Liaison

Other Social-Ecological Factors

Given the complexity of PA as a health behaviour, there are additional factors outside of SES that influence the activity level of youth and these should be accounted

for in the model. Based on the interview data, it appears that intrapersonal, social, and physical environmental factors must also be considered when addressing PA levels among adolescents. In addition, funding processes impact what is available in particular communities and thus also influence adolescent PA. The intrapersonal environment included meaning units related to self-esteem/confidence, personality/interest, and the change in recreational time use in middle school; the social environment included meaning units related to peer influence, parent health, family structure/supports, and parental encouragement/influence; and the physical environment included meaning units related to the built environment and weather/seasonal variation. Each factor is discussed below.

Intrapersonal environment.

It would be unrealistic to assume that all adolescents have the exact same interests. Personality and what adolescents are interested in plays a role in determining what activities they participate in, but self-esteem and confidence appear to play a large role as well. For example, fear of failure might prevent them from trying new things and developing an interest for a new sport or PA or low-self-esteem may act as a barrier to participation in PA:

> *You have 13 and 14 year olds...they don't want to be on a sports team because they couldn't handle the rejection of trying out and not getting it...but then that leaves you with kids who really don't have very much physical activity.*
>
> - Participant #9, Community Support Liaison

I think body image is a big issue. I have a lot of parents asking me for self-esteem building for girls...teen depression too is a big issue... Depression and anxiety is a big one.

- Participant #12, Community Support Liaison

There is also the issue of recreational time use and as children become adolescents they tend to spend more time 'hanging out' with peers. Most of the parents commented on this transition as their adolescents entered middle school:

When she was in the K-6 school, she used to have vigorous recesses and play, but her 7/8 school, um, I don't think girls do anything other than stand around and talk.

- Participant #16, Parent of higher SES

He's going to be 13 shortly so any organized activity outside of school now tends to be more again, social. You know, friends getting together to go to a movie, um, he doesn't tend to be as active as I guess when he was younger.

- Participant #17, Parent of higher SES

Social environment.

Data related to the social environment can be divided between peer influence and family factors (parent health, family structure/supports, and parental influence). It has been suggested that adolescence is a time when friends become more important than family in terms of determining what activities an adolescent will participate in. Without support from peers, adolescents may not have the encouragement necessary to continue doing activities they did in the past, try new activities or to take an activity to the next level (e.g., try out for a competitive team):

I guess there's always going to be kind of the peer group at this age, right, and their interest in participation in activities. As long as everybody is doing something that makes it okay.

- Participant #18, Parent of higher SES

Peer pressure is huge for kids at this age so also, like I said, if your friends aren't doing it, probably you're not going to go out on a limb and do it yourself.

- Participant #4, Community Support Liaison

Although peer influence seems to have a substantial impact, the family is bound to exert some form of influence. There are a number of factors that need to fall into place for an adolescent to be able to participate in certain activities. For example, the size of the family and whether there are two parents to coordinate travel to activities; being well enough as a parent to provide instrumental or emotional support to their children; or seeing enough value in PA that they are willing to figure out a way to make PA a part of their lives, regardless of what is preventing them to do so. These ideas were captured well in the following quote that was a response addressing the factors that are unrelated to SES that make being active easy or tough for today's adolescents:

Number of siblings [can make PA easy or tough for adolescents] and whether you've got a dual parent family because packing you know, I always think about this single mother with [number removed] *kids a few years ago who, I mean she had a vehicle which really helped but she packed up her kids and she sought out subsidies because her son wanted to play hockey and she managed but what she went through ... but for her to pack up* [number removed] *other children, and um transport them and entertain them while one child does something is hard and if*

you have fewer children or if you have a partner at home who can stay with the children or you know that kind of thing I think that really impacts um, options.

- Participant #11, Community Support Liaison

It's just difficult, like a lot of families are single parent families, [okay], um, some of them have a large number of children so trying to get an older one to an activity when you've got three younger ones then maybe you have to use public transportation and you're not comfortable with your child aged 12-14 on public transportation on their own.

- Participant #14, Community Support Liaison

I think it really comes down to that comment about the interest in. If you have a dad who's working shift work who grew up playing hockey and loves the sports and has the financial ability to put his children in hockey, that kid will be in hockey. Whereas, if another dad with the same situation who didn't like playing hockey and the child isn't sort of expressing an interest in hockey, that child's not going to be in hockey.

- Participant #2, Community Support Liaison

Physical environment.

The physical environment influences what is available for adolescents, especially when transportation is a barrier to accessing PA. Seasonal variation and weather have a varying impact from day to day and season to season but the built environment also plays a role both in conjunction with weather and on its own. One community support liaison tries to get every child or adolescent she services involved in one recreational activity a season but notices differences by season:

Winter is really hard because of transportation, there's definitely a dip. Summer's the highest followed probably by spring.

- Participant #12, Community Support Liaison

If adolescents do not have places to play within their immediate surroundings and they do not have access to an indoor facility (e.g., poor weather conditions), they are less likely to engage in PA. This is the case for adolescents who live in a townhouse complex that is near a busy street:

For this townhouse complex there is a lack of green space for their kids to have areas to play in.

- Participant #14, Community Support Liaison

Given the urban sprawl of many communities, it would be unreasonable to expect that all neighbourhoods would have access to every type of facility such as a skating rink, pool, and gymnasium; however, this impacts what is available for adolescents, especially when parents are unable to accompany their kids to various activities:

So, geographically, um, people here would need to bus to go and swim and that's going to impact because if you've got four kids and you have to buy bus tickets for everybody, you're less likely to do it.

- Participant #11, Community Support Liaison

Funding processes.

Funding for recreation and PA is provided in a number of different ways. For example, funding may be used to build a facility, create a program, or subsidize costs to help an adolescent participate in PA. It was evident from the community interviews that the way funding is made available, by either government or private organizations, plays a

large role in determining the opportunities available to different communities. For example, some municipalities might provide funds directly to community centres so that they can respond to community needs in each neighbourhood specifically. In contrast, other municipalities might provide subsidies for families living on a limited income when they register for city programs or run low-cost programs in community centres so that they are more accessible in terms of cost and transportation.

Potential Links Between SES and 'Other' Factors

Given the multiple influences of PA among adolescents, the social-ecological factors described above were prevalent in the data. Although not the primary focus of the current thesis, addressing these factors helped to provide a more complete model of how SES influences PA among adolescents. SES is a complex variable. When participants were asked to discuss factors unrelated to income, education, and occupation, their comments reflected this complexity; factors that participants identified as unrelated to SES were often still related in some way. For example, one parent commented on peer influence (social environment) and how the SES of the peer's family would influence the peer's opportunities and therefore the PA choices made by her own adolescent. Similarly for the physical environment, a few participants commented on how certain facilities are not accessible by bus. Therefore, a family who may be able to afford the bus but who cannot afford a vehicle would be unable to attend that facility. PA opportunities are affected by a combination of SES related factors and other social-ecological factors thus neither set of factors should be ignored when addressing the issue of increasing PA opportunities among adolescents.

Cultural diversity and immigrant status were additional variables that were often mentioned by community support liaisons when providing context, but seldom mentioned as part of the SES-PA relationship. In providing the characteristics of the populations they service, the majority of community support liaisons discussed working with families living on a limited income and that they were from culturally diverse backgrounds. In addition, twelve community support liaisons commented on working with "new Canadians" and the challenges they face in terms of either, cultural interest, cultural roles, language barriers, and/or comfort level when getting involved in PA programs. For example, one community support liaison suggested that cultural interest influences whether adolescents will participate in sports offered in their community:

> *There are sports leagues in the summer time that these kids could access but most of them do not. Baseball is held locally but...it's not a sport that many of the children um, culturally that's not a sport that they grew up with. Soccer is more a sport that they would look to.*
>
> - Participant #14, Community Support Liaison

Although the above mentioned factors (e.g., language barriers) may influence PA, they were not explicitly related to SES in the interviews and therefore not coded formally (as noted in the methods section).

Chapter 4: Discussion

SES is a non-modifiable factor that has been consistently shown in published reviews (Ferreira et al., 2006; Gustafson & Rhodes, 2006; Hanson & Chen; 2007; Sallis et al., 2000; van der Horst et al., 2006) and the supplemental review herein, to influence PA among adolescents; however, research with regards to how SES is influential among adolescent PA has been limited. Understanding the modifiable factors that influence the SES-PA relationship among adolescents provides insight into what should be addressed in future interventions (Sallis & Owen, 1999). Therefore, the purpose of this thesis was to identify the factors that influence the relationship between SES and PA among youth aged 12-14 years. The results of this study suggested a variety of ways through which SES influences PA among adolescents aged 12-14 years. Themes and sub-themes were identified for each SES indicator (income, occupation, education) and will be discussed in turn.

Access was the overall theme that related to how one's income impacts PA and four sub-themes emerged: 1) having money available to cover the direct costs of PA programs (i.e., registration/pay-per-use fees and equipment), 2) having transportation and travel options available for PA programming, 3) being able to meet basic needs with limited stress, and 4) being eligible to access subsidies or low cost programs.

In support of the first two sub-themes, Ziviani et al. (2006) alluded to the multiple expenses associated with organized activities (including registration, equipment, and transportation) when postulating why they found higher weekend step counts among children with parents of higher vs. lower education and income. It appears that for families of lower SES, pay-per-use fees and buying basic equipment for informal

activities (e.g., running shoes or bathing suit) incur costs that act as a barrier to participation in what many would consider "free" PA; organized activities are simply out of reach for many adolescents. When trying to explain why SES is related to PA among adolescents and not children, Ferreira et al. (2006) suggested that PA opportunities among adolescents are more formal and costly when compared to children's activities that are more informal and less expensive. In support of this argument, structured or formal PA was often discussed when referring to the influence of income; however, it is important that costs associated with unstructured play be considered as well. It was evident from the data that having running shoes to play tag or a bathing suit to go to a free public swim is even a challenge for some families.

Above and beyond being able to cover the cost of equipment and registration, there remains the issue of transportation for any activity that requires a facility or that is not located in one's immediate neighbourhood. Humbert et al. (2006) reported environmental factors such as proximity of facilities, cost, and safety were influential for low-SES youth, and not high-SES youth. Moreover, Kein and Chiodo (2003) designed a free, non-competitive, school-based program offered in the summer and after school. Although their program was successful at increasing PA among middle school students, they commented that, "transportation to the program during the summer and home from the program during both the summer and fall was one of the most obvious barriers to participation" (Kein & Chiodo, p. 814). Moreover, Cameron et al. (2007) reported that "parents with lower incomes and education are less likely to transport their child to their physical activities and sports and to financially support them" (p. 91). In the current study, transportation was consistently mentioned as a barrier for families of lower SES.

Providing low-cost programs at facilities or community centres within neighbourhoods is an effective way of targeting barriers of accessibility and safety. If facilities are within a safe walking distance, even without access to passive transportation or the accompaniment of a parent, an adolescent may be better able to participate. Program coordinators could also arrange for adolescents to form walking groups to attend programs so that nobody is walking alone. Romero (2005) investigated factors that influenced PA among middle-school-aged youth from low-income neighbourhoods and reported that, "more vigorous PA was associated with more hours in after-school programs and perception of better quality of local facilities for PA" (p. 257). It is apparent that ensuring high quality local facilities are available in all neighbourhoods is a promising strategy for facilitating PA among adolescents.

Before a family can even consider spending money on the specific costs associated with PA, they must be able to cover basic needs such as food and shelter. In the current study, struggling to meet basic needs was often cited as a barrier to PA. The stress of living day to day and providing adequate food and shelter may hinder a parent's ability or desire to encourage PA among their children; the lack of resources presents a challenge that must be overcome before PA is put on the radar. In 2003, it was estimated that a family of three would need to earn $37,180 before tax in order to afford the cost of basic living within Waterloo region (Skillen, Lerner, Wamsley, & Opportunities Waterloo Region [OWR], 2003); an income that is well above the low income cut-off before tax that was published for 2005 ($27,386) (Statistics Canada, 2007b).

Without an adequate income, a family is likely to have fewer resources and unstable living conditions (Lynch and Kaplan, 2000). From a general health perspective,

both Lynch and Kaplan (2000), and Kroenke (2008) highlight the connection between neo-material conditions, psychological states, and health behaviours. Applied to the current study, difficulty meeting basic needs (poor neo-material conditions) may lead to stress and depression (psychological states) which could then influence the health behaviour of PA. Further, McNeill et al. (2006) suggest that for adults, PA could be influenced by "differential possession of materials resources that allow individuals to respond to adverse conditions" (p. 1015) and people with a greater disposable income are at an advantage for accessing resources that facilitate PA. Applied to adolescents, if the parents are required to provide financial support but do not have the disposable income to do so, PA may not be an option. When asked about recreation opportunities among children, low income parents raised the issue of not having a discretionary income to facilitate their child's participation in various activities (Frisby et al., 2005). Thus, as found in the present study, meeting basic needs relates to having money available for the costs associated with PA (registration, equipment, and transportation), but also to the psychological impacts (e.g., stress) of struggling to provide the necessities for one's family. In the same focus groups, parents also cited the subsidy process as a barrier to accessing recreation (Frisby et al).

Parent income also impacts the subsidy process by determining whether an adolescent or family is eligible for a subsidy. One parent of lower SES commented on the idea of the "working poor", defined by a local anti-poverty advocacy group as people "living in poverty even though they are working full time, part time and/or holding more than one job" (OWR, Working Poor, 2009, ¶ 2). For these families, their household income may be too high to qualify for a subsidy, yet after tax they do not earn any more,

or actually earn less than someone who is considered to be below the low income cut-off (OWR, Working Poor, 2009, ¶ 5). In these cases, families in need of financial assistance are not able to get it if the subsidy criteria include income tax records as described by one community support liaisons.

In light of this, it would be beneficial to extend the criteria for acquiring a subsidy; however, municipal funding for recreation in Ontario has not kept up with inflation (Slack, 2003) and municipalities are being pressured to increase revenue, leading them to a model of funding that widens the gap between what is offered to between low income and more affluent families (Frisby et al., 2005).

In addition, there is the issue of asking for, and constantly needing to prove one requires financial assistance. Numerous participants highlighted that the stigmatization involved in asking for help or from having to prove one requires assistance can be a major limitation to acquiring subsidies. In four regions across Canada, low income parents cited "discomfort when asking for subsidies and cumbersome subsidy policy procedures" (Frisby et al., 2005, p. 4) as barriers to accessing recreation. Although PA is only one aspect of recreation, this data supports the current findings in that parents often find the subsidy process degrading and challenging. Moreover, participants of the study by Frisby and colleagues suggested that "they would not take advantage of fee reduction policies that required them to 'prove poverty'" (p. 5). Those in political power need to put themselves in the shoes of families living on a limited income and make decisions based on what would be most beneficial in terms of increasing their access to resources. It appears that providing no-cost recreation centres that would eliminate the subsidy

process would be advantageous. It is obvious that the subsidy process is an area for improvement.

Furthermore, there are certain sports and physical activities that may be simply out of reach for low income families. For example, competitive ice hockey was consistently mentioned as a sport with exorbitant costs that make it unaffordable for many families. In a newspaper article in Sudbury, it was revealed that for a 14 year old, $2,700 will cover the cost of registration for regular season play and three tournaments but that figure does not include equipment (Thompson, 2006). A community development coordinator who works with the city and is involved in the subsidy process commented that, "as prices [of hockey] are skyrocketing, as user fees are being increased . . . we're further marginalizing those that can't afford it" (Thomspon, 2006, ¶ 4). Competitive hockey requires a substantial amount of travel to both games and tournaments. In addition to having access to a vehicle, it requires a family has money for gas, hotels and food, and the time available to accompany the adolescent to the various games and tournaments. Furthermore, the equipment list is extensive and therefore expensive, even if buying second-hand or lower quality gear. Although an adolescent might be able to get a subsidized registration fee, there would be too many additional costs to make hockey a viable option. For example, in Sudbury, the subsidy for registration and equipment is $200 (Thompson, 2006); however, given the cost mentioned above, $200 will not suffice.

Earning a substantial income has far reaching effects on the PA opportunities among adolescents. Not only does it provide resources to meet basic needs and to afford the multiple costs associated with PA, but it also acts as a "buffer from the many stresses

of daily life" (Lynch & Kaplan, 2000, p. 25) so families can manage unexpected living costs such as house repairs and incidentals. Although subsidies are also available to "buffer" the cost of basic living, subsidies have inherent limitations. Therefore, it is essential to consider the multiple pathways that income operates when designing PA interventions. Nonetheless, it is also important to address other indicators of SES such as occupation.

Time was the theme that emerged when parent occupation was discussed in participants' interviews. Occupation was said to influence both income and employment schedule (independently and in connection with one another); however, a connection was also made between all three SES indicators that are represented in the current model and this will be discussed in a later paragraph.

Unlike income which relates to resources, occupation is often tied to social prestige (Chen et al., 2002; Krieger et al., 1997); however, in the current study, occupation was more commonly discussed in terms of providing income and influencing time available for parents to be involved in encouraging or supporting PA. Although type of employment has a number of implications for health (e.g., working conditions) (Jackson, 2004), it also "determines the amount of economic return" (Lynch & Kaplan, 2000, p. 23). When first asked about the impact of occupation on PA opportunities, many participants spoke immediately about "money" and how a parent's job is what determines how much money their family has, which then impacts what types of opportunities are available to their children. In extending the question to relate to work hours, the issue of time also became a prominent topic of discussion.

In the current model, time is the major theme that houses the sub-theme of employment schedule. Two types of support that can be affected by a parent's employment schedule are instrumental support (e.g., driving to a sports practice) and companionship support (e.g., a parent playing catch with their child) (Will & Shinar, 2000); the amount of time a parent has available to offer these types of support can have a large impact on PA opportunities, especially those that require transportation or out of town travel. All three parents of higher SES commented on how the flexibility of their work schedule allows their adolescents to be involved in organized PA and also provides time for parents to encourage unstructured play. In contrast, community support liaisons discussed the issue of parents who work longs hours or shift work which then reduces the opportunities for their adolescents. Although some parents with flexibility choose to work longs hours, there are also parents who have less control over their employment schedule. In discussing deviant health behaviours (e.g., drinking alcohol and doing drugs), Hanson and Chen (2007) commented that parents working long hours or shift work are less able to provide supervision to discourage those behaviours. Applied to PA, these parents would also have less time available to provide encouragement for positive behaviours such as PA. Jackson (2004) discusses the family conflict that can arise from long work hours and parent work schedules that do not match the needs of their children. Unfortunately, the number of work hours for parents has increased significantly since the 1970s (Jackson), suggesting today's parents have less time for leisure pursuits with their families than they did in the past.

The link between occupation and time is not commonly cited in the SES-PA literature. For example, of three studies that used a measure of occupation and were

included in the supplemental review included herein, Hesketh et al. (2006) were the only authors to address parental employment as it relates to providing time. In the introduction of their manuscript they mentioned that a parent's occupation may relate to how much time they have available; however, beyond reporting that maternal employment was related to MVPA among 11 year olds in their results, there was no discussion as to why that relationship might exist (Hesketh et al., 2006). In their review of PA correlates, Sallis et al. (2000) found that among adolescents, direct parental help in PA was consistently associated with PA. It is conceivable that time could have been one aspect of this finding, but this was not discussed by the authors.

It is also important to consider the interaction between time and income in relation to occupation and this was discussed by study participants. For example, parents of higher SES discussed having flexibility in their work schedule but their employment also provides an adequate income to support PA financially. In contrast, a parent who is not working would likely have more time to engage with their adolescents, yet may not have the financial means to do so. Based on the 2005 PA Monitor by the CFLRI, it was reported that, "parents who are full-time workers and homemakers are more likely than those who are employed on a part-time basis, or are unemployed or on leave from their job to play active games or sports with their children often or very often" (Cameron et al., 2007, p. 82). This provides support for the comments made by parents of higher SES and a previous community support liaison comment that when parents are unemployed, they want the adolescents out of the house and therefore send them to the local recreation facility. Further, Jackson (2004) suggests that "while a minority of employers do offer flex-time arrangements which are responsive to the needs of employees, the great

majority of part-time jobs do not offer comparable pay, benefits, and career opportunities" (p. 91). It appears there is a complex interaction between occupational status and time, but the details of this interaction have not been well described in the SES-PA literature. For example, Gustafson and Rhodes (2006) summarized the literature on parental correlates of PA (e.g., SES, support, number of parents) and the issue of time and occupation was never discussed. Given that time was a prominent theme related to occupation in the current study, and that occupation was also often linked to income, more research is needed to understand how to overcome barriers related to time and income as they relate to occupation.

Awareness was the theme that emerged when discussing how education influences PA. Prior to discussing how education is related to the theme of awareness that was identified in the model, the relationship between education, occupation, and income will be illuminated. According to Lynch and Kaplan (2000), a person's occupation is "the major structural link between education and income" (p. 23). Although some study participants made a link between all three SES indicators, there were also various connections being made between at least two of the indicators. For example, a community support liaison mentioned the connection between poverty and education level. Chen et al. (2002) also suggested that higher education leads to greater economic resources. In addition to linking the various SES indicators, participants also extended their comments to relate to the themes that emerged for each indicator (e.g., access, time, and, awareness). For example, many participants mentioned how a person's occupation determines how much money they have which them dictates access to PA opportunities, another commented on how a higher income may be indicative of a higher

education and therefore increased access to resources, and finally, a parent noted that her education led her to an occupation that gave her both flexibility with her time while also providing a substantial income able to support the PA of her daughter.

As suggested by the current data and SES literature, in many cases, higher education leads to better jobs and greater incomes; however, this is not always the case for new Canadians (Curry-Stevens, 2004; Lynch & Kaplan, 2000). Two community support liaisons commented on working with new Canadians whose education is not recognized in Canada. For one of these community support liaisons, her population of new immigrants is highly educated but living on a limited income because they cannot find work to match their skills. Although most participants discussed a similar pattern of influence between the SES indicators (e.g., education influences occupation which then influences income), there are other factors (e.g., immigrant status) that make the relationship between the SES indicators much more complex and these should be studied further in order to better explain the factors involved in the SES-PA relationship.

Another factor that should be noted relates to how people define the term education. According to study participants, a parent's education level provides knowledge of the importance of PA, and access to resources and exposure to PA; however, there was an unexpected distinction made between formal and informal education. In addition to providing knowledge of the importance of PA (as does formal education), informal education is also thought to provide knowledge of subsidies and low cost programs. Both types of education influence awareness of PA opportunities available among adolescents thus it is important to consider both types both independently and together.

In discussing factors to explain the SES-health relationship, Kroenke (2008) did not consider formal education as an SES indicator of interest. In contrast, in discussing factors to explain the SES-PA relationship, McNeill et al. (2006) suggested that "underinvestment in human capital" (p. 1015) (i.e., education) that stems from income inequality may impact PA behaviour. In the SES literature, education is thought to provide knowledge and skills that can be used to acquire resources (Conger & Donnellan, 2007; Lynch & Kaplan, 2000) but may also "provide a set of cognitive resources that have broad potential to influence health" (Lynch & Kaplan, p. 22). Extended to the current model of SES and PA, this suggests that parents of higher education may have increased knowledge of health and the benefits of PA. In support of this, participants commented that parents who grew up with a lower SES may have had limited education and exposure to PA and therefore do not have the experience necessary to facilitate PA among their adolescents. For example, they are unaware of the benefits of PA, the variety of physical activities that exist, and/or do not know how to take advantage of the opportunities that are available. In contrast, a number of other participants suggested that public education can play a major role in providing knowledge with regards to the importance and availability of PA among adolescents. Although they do not mention informal education, Lynch and Kaplan (2000) argue that certain measures of education do not expose what elements of one's education are influential to health. For example, a university graduate from Physical and Health Education may or may not value PA differently than a graduate from Computer Science. If the content of what is learned as part of the formal education process is part of the relationship between education and PA, then supporting the argument that informal education can compensate for lack of formal

education when discussing PA is justified. Although informal education was rarely cited in the academic literature relevant to this thesis, strategies commonly cited to increase PA among children and adolescents include public education in terms of "increasing knowledge about benefits [of PA]..., awareness of local opportunities..., [and] providing solutions on how to overcome barriers" (Cameron et al., 2007, p. 77). In addition, not knowing about programs and subsidy policies has been cited as a barrier to participation in recreation (Frisby et al., 2005). Regardless of education level, it is imperative that parents and adolescents are made aware of both the importance of PA, and the opportunities that exist.

In terms of informal/public education, the community support liaisons also commented on the availability of their PA programs and subsidies for adolescents of lower SES. It is apparent from their comments and consolidated resource lists (e.g., CPRA Mobilization Tool Kit – Poverty Information and Resources (CPRA, n.d., Everybody Gets to Play™ Ontario Supplement, p.8)) of what is available in various communities that a variety of opportunities exist for adolescents to be engaged in PA. However, it is also apparent that parents are not always aware of the breadth of low cost and subsidized programs or equipment subsidies that are available and this is an area for improvement (Frisby et al., 2005). Community centres, public health departments, schools, municipalities, and other public and private organizations need to be forthcoming with information on how to access PA programs and subsidies. This could act to decrease the disparities between what is available to adolescents of parents with lower and higher formal education levels.

Numerous explanations have been given with regards to how different aspects SES influence adolescent PA; however, it is clear that SES does not act in a silo as there are additional factors that should also be considered. A variety of social-ecological factors were provided when participants were asked if adolescent PA was influenced by any factors unrelated to SES. These included the intrapersonal environment, social environment, physical environment, and funding processes. Although not the primary focus of the current thesis, addressing these factors helped to provide insight into how they might influence PA either independently or via SES pathways.

In relation to the intrapersonal and social environments, Chen et al. (2002) suggested that as children grow into adolescence, emotions and cognitions become more predictive of health habits and social relationships shift from a predominant influence of family to a predominant influence of peers. Both ideas were captured by participants; the confidence of adolescents and activity choices of peers were commonly mentioned as influential factors unrelated to SES. The shift from family to peer influence has also been cited elsewhere (Cameron et al., 2007); however, peer modeling and support and encouragement from friends have not been consistently positively related to PA in review papers (Ferreira, et al., 2006; Sallis et al., 2000).

In contrast with the current data and that reported elsewhere (Cameron et al,), support and encouragement from parents was positively correlated with adolescent PA in 26 of 52 study samples reviewed by Ferreira et al. (2006) and two of three studies reviewed by Sallis et al. (2000). It appears that although peers may become more influential as children grow into adolescents, parents remain an influential component of an adolescent's social environment. Also, because there is a positive relationship

between SES and PA among adults (Sallis & Owen, 1999), a parent of lower SES may be less supportive and encouraging towards PA if they are less active themselves.

Given that children of lower SES may grow up with fewer opportunities, they may be less likely to develop confidence in a variety of activities and have fewer choices when trying to develop a passion for certain activities that can be enjoyed throughout adolescence. In the review by van der Horst et al. (2006), self-efficacy was positively associated with adolescent PA and Sallis et al. (2000) found a positive relationship between self-efficacy and PA in seven of 13 studies. Participants in the current study suggested that adolescents are resistant to try new physical activities if they do not believe they will be successful. If adolescents have not been exposed to an activity in the past and do not have encouragement from peers or parents who may not have been exposed either, their opportunities are limited. Participants also suggested that body image may play a role, especially for girls; however, Sallis et al. (2000) found the influence of body image to be indeterminate.

The physical environment (e.g., weather and the built environment) can also influence PA opportunities. Kristensen et al. (2007) noted that few studies measure the relationship between seasonal variation and PA among youth; however, they found that in Denmark, a country with four seasons like in Canada (with large variations in weather across seasons), children are less active in the fall and winter compared to the spring and summer. This was also suggested by current study participants who discussed both seasonal variation and the impact of weather. In relation to SES, the winter months pose the largest problem because of issues of transportation and the fact that the sun goes down shortly after the school day ends. If the PA facility is not close to the home, an

adolescent may not be able to walk there safely in the dark and the snow makes it too dangerous to ride a bicycle.

In the absence of infrastructure that provides PA facilities that can be accessed via public transit or active transportation, SES interacts with the built environment. Those who cannot afford a vehicle may not be able to attend if the bus does not travel where they need to be to play. In contrast, if a family does not have access to transportation but lives in a built environment conducive to participating in a variety of physical activities (e.g., multiple facilities that meet their needs), the environment would then be an enabler to PA and might overcome the limitations from other SES factors such as income, education, and occupation. In the 2005 PA Monitor presented by the CFLRI, parents of lower income and education reported that their children used parks/outdoor spaces more than parents of higher income and education (Cameron et al., 2007). Based on this inclusive survey addressing multiple variables related to PA among Canadian children and adolescents, they also suggested that age appropriate facilities and programs may help to ensure needs are being met for adolescents in particular (Cameron et al.).

Funding is an essential component of providing opportunities for families in need of assistance; however, according to the Laidlaw Foundation, the current providers of most youth recreation programs such as government and community groups, "are under-financed, under-staffed and operating in isolation" (Laidlaw Foundation, 2001, p. 2). Based on community support liaison interviews, it is evident that funding channels vary from program to program and city to city and often times are in fact, quite isolated. It appears that at times, specifically channelled funding is better able to meet unique community needs; however, to achieve equal access and participation in PA among

adolescents in Canada, it is imperative that individuals, communities, government, and the private sector work together, not only to encourage the sharing of ideas and resources but also to ensure that youth recreation is seen as a priority for funders (Laidlaw Foundation). It is also essential to have community input when creating programs or policies directed at increasing access to PA among adolescents, particularly those who are of lower SES or who may feel stigmatized based on SES or culture (Frisby et al., 2005). For example, some adolescents of lower SES may not feel comfortable in certain PA contexts if the activity does not fit in with their cultural norms or if their SES is made obvious (e.g., being the only person on a sports team wearing used equipment). Schmalz, Kerstetter and Anderson (2008) argue that if children are conscious of being stigmatized (e.g., being judged for a particular attribute such as being of lower SES or being female), this may influence their participation in PA and sport. Considering how different social classes will respond to new programs and policies and ensuring that those in lower social classes do not feel unwelcome or uncomfortable participating is imperative. It is important to understand what aspects of the subsidized process are enablers and barriers to participation. Although a number of initiatives have been adopted by the federal and provincial governments to facilitate sport and PA participation across Canada (e.g., tax credits, infrastructure spending), evaluation of their effectiveness is needed (AHKC, 2009).

Given the complexity of the relationship between SES and PA, there are bound to be discrepancies between what is available to families of varying SES. However, it is critical that each point of influence be addressed so that as much as possible, adolescents of lower SES are afforded the same unique and appealing PA opportunities as their

higher SES counterparts; it is time that social resources are distributed in a way that equalizes access to PA among adolescents.

A number of studies have looked at SES as a determinant of adolescent PA but few have explored the factors that help to explain the reported relationships. In this study, the thoughts and opinions of parents and community support liaisons provided a detailed account of how the various SES indicators influence PA, along with a brief discussion of other social-ecological factors. This provides researchers and health practitioners "what" to address in PA interventions (Sallis & Owen, 1999). Summarized in a model, this information can be used to guide future research and the development of effective PA interventions among youth. However, the limitations should be noted.

Limitations

Accessing parents of high and low SES was a challenge. Prior to choosing schools as the original recruitment medium, a number of local resources and organizations were called to identify ways to access parents of lower SES. It was suggested that accessing parents through the community would be too difficult considering most families who access subsidies do not speak English. Not only would this limit the number and diversity of potential parent participants but it also suggests that by only including parents who speak English, there is a population of lower SES parents being excluded who likely have different insight into how SES influences PA. Amongst other limitations, language may have also been a barrier when letters of information were distributed through schools; however, the reasons parents did not choose to participate are unknown.

Between three non-private schools, 1015 letters were distributed to students at either the beginning or end of their physical education class. It is assumed that many of these letters did not reach the hands of the parents for a variety of reasons. In one school, six letters were found in the boys change room after two classes had received letters so far that day and eleven letters were found in the girls change room after three classes had received letters so far that day. In addition, some students verbally stated that their parents would not participate and a couple of students folded the letter and threw it on the ground before going into the change room.

The small sample of parents made it unlikely that saturation was reached in terms of parent views and experiences. Patton (2002) states that, "there are no rules for sample size in qualitative inquiry" (p. 244) because the required sample size is dependent on the purpose and rationale of the study; however, the limited number of parent participants was inadequate for addressing the research question. There may have also been bias among the parents who chose to participate as they likely had an interest in PA. Moreover, parents of lower SES had access to resources that other parents living with a similar income, education, and occupation may not have because they were recruited from a community centre.

In addition, there is likely an element of race and culture that was not explored because of the limited sample. Although the community support liaisons commented on the cultural diversity of the populations they serve, all parents who were interviewed were white and born in Canada or England.

In terms of community support liaisons, all of the participants were female and came from only five organizations. There was also a question of whether all of the community

support liaisons had sufficient expertise on the topic or adequate experience in working with adolescents of lower SES. In addition, some of the community support liaisons were unaware of the occupation and education level of the parents in their communities. Although parents could discuss the influence of their own education and occupation, community support liaisons could only speculate on if and how these SES indicators impacted adolescent PA. Given the many types of organizations that service families of lower SES, it would be interesting to gain insight from a more diverse sample in a variety of geographical locations. For example, all organizations were located in urban areas of only a few cities.

Further, the community support liaisons service a wide age range thus at times it was difficult to ensure they were limiting their comments to those pertaining to the 12-14 age group specifically. Although this can be seen as a limitation, it may also provide support for applying the current model beyond the 12-14 age range. However, given that PA levels decrease with increasing age (CFLRI, 2007), it may be more relevant to evaluate the influence of SES at small and specific ages before extending the model to the entire youth population; the answer to this query remains to be identified. In light of this, and the current limitations identified above, future research is warranted.

Future Directions

The current study has provided insight into avenues for both research and practice, thus research-based and practice-based future directions will be discussed below.

Research-based future directions.

In the future, it would be advantageous to recruit parents from different neighbourhoods with varied resources. Parents who do not have access to or who are not using a community centre in their neighbourhood would likely have a different outlook on how SES influences PA. Given the difficulties in recruiting parent participants, acting as a participant observer in communities with limited resources may be a future avenue for data collection. This would allow the researcher to live the experience of the participants and to make her own observations of how SES influences PA, while also gaining insight from the participants themselves (Patton, 2002). It would also be advantageous to explore the relationship between culture/immigrant status and SES and how this interacts with PA. This would involve recruiting a more culturally and ethnically diverse sample and including interview questions related to ethnicity, culture, and immigrant status. Based on previous research, this is an appropriate next step. Singh, Kogan, Siahpush, and van Dyck (2008) used the 2003 National Survey of Children's Health to study socioeconomic and behavioural factors related to PA among 6-17 year olds in the United States. They concluded that, "while racial/ethnic disparities in PA and inactivity are primarily due to differences in underlying socioeconomic factors, significant differentials by language use reflect substantially higher physical inactivity and lower activity levels among immigrant children, whose cultural norms may not necessarily promote participation in leisure-time PA" (Singh et al., 2008, p. 214). Although this would add even more complexity to the model, the diversity of the Canadian population requires that this be considered in order to fully understand the relationship between SES and PA.

The majority of community support liaisons commented that they work with new Canadians and culturally diverse populations. Given most of them are servicing families living on a limited income, a connection between SES and immigrant status is suggested. This connection is also supported by Canadian data that was analyzed by Frenette and Morisette (2003); the majority of new Canadians are visible minorities and are often more educated than their Canadian-born counterparts. In addition, "the earnings gap between recent male immigrants and Canadian-born men more than doubled between 1980 and 2000" (Frenette & Morisette, p. 7). Clearly, there is a relationship between SES and immigrant status; how this relationship influences PA should be explored further.

Moreover, there are a number of perspectives that were not garnered in the current research but that would increase the understanding of the SES-PA relationship. These include those of the adolescents themselves, their school teachers, and all levels of government. Given that social-ecological models suggest targeting all levels of one's environment (Spence & Lee, 2003), it would be ideal if the breadth of participants could provide expertise at all levels. For example, when asked about in-school PA, parents and community support liaisons were less familiar with the school-based activity patterns of adolescents. Presumably, teachers would have a better sense of both an adolescents' activity level and what is being offered at the school, and asking the adolescent would provide a way of comparing what they perceived is being offered to what is actually being offered.

Although the current study attempted to cover all types of PA including organized activities and free play within and outside of school as well as active transportation,

future studies should include more probing on the different types of PA and how these may be related to SES. Participants often spoke of organized activities if they were not encouraged otherwise but SES is likely related to different types of PA in different ways. For example, a low SES parent commented on how her son walks 45 minutes to school every day because he has no other way of getting there, yet cannot afford organized sports. He is physically active, but in a different way than the adolescent whose parent can afford to have her participate on a competitive ringette team.

Among adults, sports can be used to display one's SES (Booth & Loy, 1999). According to Coakley (1998), wealthy people often participate in sports that involve membership to a certain facility or club (e.g., golfing and sailing), the middle class steer towards no-cost or publicly funded sports, and those living on a limited income "spend so much time and energy coping with the challenges of everyday life, they have few resources to development sport participation traditions" (p. 299). In addition, Booth and Loy argue that when considering sporting practices, the middle class look to the future and the lower class focus on the present. In this case, the middle class may use sport or PA as a means to better health in the future, whereas the lower class may use sport and PA as a means to excitement that they may not gain from their work (Booth & Loy). In other words, PA has a different meaning for various social classes.

The degree to which social class and sporting practices translates to adolescents is unknown. Perhaps there are certain sports and physical activities that certain adolescents will not participate in either because of the status that is attached them or because they are influenced by their parents' sport participation and what their parents' have exposed them to. Booth and Loy posit that middle class youth are more likely to play structured

games in specific facilities whereas "lower class youth typically play in freely available open spaces and rely on improvisation" (p.18); however, it is unknown whether they are playing for enjoyment, to gain status, or for long term health . How social class relations among adolescents influences the types of PA that adolescents engage in or the meaning they attach to sport and PA remains to be identified in future research.

Practice-based future directions.

In addition to providing avenues for future research, the current findings should be applied to the development of PA interventions and policy. Given that PA opportunities are unequally distributed between adolescents of lower and higher SES, there is work to be done in order to level the playing field. Considering SES is a non-modifiable correlate of PA, practitioners must look at the modifiable factors involved in the SES-PA relationship (i.e., sub-themes) and aim to reduce the barriers associated with access, time, and awareness (i.e., themes).

One way to target issues of access, time, and awareness that were mentioned by study participants would be to offer more PA opportunities at school, either within the curriculum and/or extra-curricular. Gordon-Larson, McMurray, & Popkin (2000) analyzed data from the 1996 National Longitudinal Study of Adolescent Health and found that adolescents who took part in daily physical education (PE) were more than two times as likely to engage in moderate to vigorous PA five days or more per week. They also noted that participation in PE declined between the ages of 11-21 (Gordon-Larson et al., 2000) indicating that a reduction in PA throughout adolescent development may be partly attributed to reductions in PE at school. In Canada, parents of 5-19 year olds were asked about the frequency of their children's PE classes and a majority of

parents reported that PE occurred zero to two times a week (Cameron et al., 2007). Trudeau and Shephard (2005) argue that, "for an increasing majority of children, the PE period is now the only opportunity to engage in moderate-to-intense PA" (p. 91). Evidently, this is an area for improvement, especially for targeting those adolescents who do not have access to transportation (either due to income or parent's schedule) or funds that are required for numerous PA opportunities. Given that school is a place for learning, increasing knowledge of the importance of PA and what opportunities are available would also be viable in the school setting.

Providing no-cost school-based extra-curricular or intramural programs is an additional strategy that study participants discussed for targeting adolescents of lower SES and this has also been mentioned in the literature (Trudeau & Shephard, 2005). This strategy is appealing for a variety of reasons: most adolescents attend school, schools have the necessary equipment and facilities (McKenzie, 1999), and already being at the school would potentially reduce the issue of transportation as a barrier. In situations where transportation remained a barrier, intramurals at recess would eliminate transportation needs but would still provide students with the opportunity to engage in organized activities. The CFLRI reported that youth who participated in organized sports took approximately 1700 more steps than youth who did not (Cameron et al., 2007). In addition, organized sport participation increased with increasing household income and was more common for youth of parents with a post-secondary education (Cameron et al.). If youth of lower SES have fewer opportunities to engage in organized sports or PA than their higher SES counterparts, offering no-cost extra-curricular activities that address the issue of transportation is one way of improving this inequality.

Neighbourhood community centres with a variety of PA facilities (e.g., gymnasium, outdoor field, etc.) can also provide opportunities for PA given consistent and adequate funding is received. Accounts from community support liaisons suggest that community centres have great potential for enhancing opportunities among adolescents. This may also remove some of the burden from schools who may feel pressured to tackle various issues related to child development. Also, providing no-cost programs within one's neighbourhood removes the issues of transportation and asking for assistance, thus preventing parents of lower SES from feeling alienated or disadvantaged. Along with schools, community centres can also be used to ensure adequate public education with regards to the importance of PA and how adolescents can achieve the recommended amount to encourage a healthy development. Moreover, after-school programs within the community could reduce time conflicts that may arise from cumbersome parent work schedules.

In order to translate the present research into practice, communities could use the current model to develop a survey that asks parents and adolescents which of the identified factors (sub-themes) act as barriers for the adolescents to participate in PA. From this, the community organizations could then address the most prominent barriers in future interventions and evaluate their effectiveness in reducing them. It is likely unfeasible to target every factor in a single intervention thus from a practical standpoint, it would be essential for each community to determine which factors are most valuable to target to meet their specific needs. It would also be advantageous to determine how the current model applies to various populations in terms of gender, age, and race/ethnicity/culture.

Summary and Conclusions

Given that changing the social structure of society is an arduous task, and SES is considered a non-modifiable determinant of PA among adolescents, understanding the factors involved in the SES-PA relationship is a valid contribution to future research and practice. Despite our best efforts to equalize PA opportunities between adolescents of higher and lower SES, socioeconomic adversity will continue to impact health (Curry-Stevens, 2004; Frisby et al., 2005). Ideally, future generations of adolescents will see equal opportunities for PA, regardless of their SES; however, in line with conflict theory, this is unlikely in a market economy where those in control will ensure that participation in certain sports and physical activities remains impossible for families of lower SES (Coakley, 1998; Eitzen, 1988). As shown in focus group interviews with low income parents, this conflict between the affluent and the less affluent can lead to mistrust of community organizations and resistance to accepting assistance (Frisby et al., 2005). To help overcome this, it is up to those advocating for equal opportunities to do everything in their power to support initiatives and policies that encourage equitable access to all. Given the complexity of the SES-PA relationship and current recommendations for the future, there remains work to be done to ensure that adolescents are afforded the opportunities to achieve the recommended levels of PA and this thesis is a step in the right direction.

References

Active Healthy Kids Canada. (2008). *Canada's report card on physical activity for children & youth.* Toronto, ON. Retrieved June 24, 2008, from, http://www.activehealthykids.ca/Ophea/ActiveHealthyKids_v2/upload/AHKC-Long-Form-EN.pdf

Active Healthy Kids Canada. (2009). *Canada's report card on physical activity for children & youth.* Toronto, ON. Retrieved June 3, 2009, from, http://www.activehealthykids.ca/ecms.ashx/ReportCard2009/AHKC-Longform_WEB_FINAL.pdf

Bellisle, F., Rolland-Cachera, M. F., & the Kellogg Scientific Advisory Committee. (2007). Three consecutive (1993, 1995, 1997) of food intake, nutritional attitudes and knowledge, and lifestyle in 1000 French children, aged 9-11 years. *Journal of Human Nutrition and Dietetics, 20*, 241-251.

Booth, D., & Loy, J. (1999). Sport, status, and style. *Sport History Review, 30*, 1-26.

Bouchard, C., & Shephard, R. J. (1994). Physical activity, fitness and health: The model and key concepts. In C. Bouchard, R. J. Shephard, & T. Stephens (Eds.), *Physical activity, fitness and health. International proceedings and consensus statement* (pp.77-88). Champaign, IL: Human Kinetics.

Cameron, C., Wolfe, R., & Craig, C. (2007) Physical activity and sport: Encouraging children to be active. Ottawa, ON: Canadian Fitness and Lifestyle Research Institute.

Canadian Fitness and Lifestyle Research Institute. (2007). *Kids CAN PLAY!*

Encouraging children to be active at home, at school, and in their communities. Retrieved January 15, 2008, from, http://www.cflri.ca/eng/statistics/surveys/documents/Canada.pdf

Canadian Parks and Recreation Association. (n.d.). *Everybody Gets to Play: Ontario Supplement.* Ottawa, ON. Retrieved May 28, 2009, from, https://www.cpra.ca/UserFiles/File/EN/sitePdfs/initiatives/EGTP/EverybodyGetsToPlay_english.pdf.

Canadian Parks and Recreation Association. (n.d.). *Everybody Gets to Play.* Ottawa, ON. Retrieved May 28, 2009, from, http://www.everybodygetstoplay.ca/EN/main.php?action=cmsEGTP.

Canadian Tire Foundation for Families. (2007). *Canadian Tire Jump Start.* Toronto, ON. Retrieved June 24, 2008, from, http://www.canadiantire.ca/jumpstart/index.html.

Chen, E., Matthews, K. A., & Boyce, W. T. (2002). Socioeconomic differences in children's health: How and why do these relationships change with age? *Psychological Bulletin, 128*, 295-329.

Coakley, J. J. (1998). Sport in society: Issues and controversies. United States: McGraw-Hill.

Conger, R. D., & Donnellan, M. B. (2007). An interactionist perspective on the socioeconomic context of human development. *Annual Review of Psychology, 58,* 175-199.

Côté, J., Salmena, J. H., Baria, A., & Russell, S. J. (1993). Organizing and Interpreting Qualitative Data. *The Sport Psychologist, 7,* 127-137.

Craig, C.L., Marshall, A.L., Sjostrom, M., Bauman, A.E., Booth, M.L., Ainsworth, B.E., et al. (2003). International Physical Activity Questionnaire: 12-country reliability and validity. *Medicine and Science in Sports and Exercise, 35*, 1381-1395.

Curry-Stevens, A. (2004). Income and income distribution. In D. Raphael (Ed.), *Social determinants of health: Canadian perspectives* (pp. 21-52). Toronto: Canadian Scholars' Press Inc.

Eitzen, D. S. (1988). Conflict theory and deviance in sport. *International Review of the Sociology of Sport,* 23, 193-203.

Ferreira, I., van der Horst, K., Wendel-Vos, W., Kremers, S., van Lenthe, F. J., & Brug, J. (2006). Environmental correlates of physical activity in youth – A review and update. *Obesity Reviews, 8,* 129-154.

Frenette, M., & Morisette, R. (2003). *Will they ever converge? Earnings of immigrant and Canadian-born workers over the last two decades.* Ottawa: ON. Retrieved on June 4, 2009, from, http://www.statcan.gc.ca/pub/11f0019m/11f0019m2003215-eng.pdf.

Frisby, W., Alexander, T., Taylor, J., Tirone, S., Watson, C., Harvey, J., et al. (2005, September 26). *Bridging the recreation divide: Listening to youth and parents from low income families across Canada.* Retrieved February 12, 2009, from, http://www.cpra.ca/UserFiles/File/EN/sitePdfs/initiatives/BridgingtheRecreationDivideFINALREPORT.pdf

Godin, G., Shephard, R. J. (1997). Godin Leisure-Time Exercise Questionnaire. *Medicine and Science in Sports and Exercise, 29,* S36-S38.

Gordon-Larson, P., McMurray, R.G., & Popkin, B.M. (2000, June). Determinants of adolescent physical activity and inactivity patterns. *Pediatrics, 105*, 6. Retrieved October 9, 2007, from, http://pediatrics.org/cgi/content/full/105/6/e83.

Gustafson, S. L., Rhodes, R. E. (2006). Parental correlates of physical activity in children and early adolescents. *Sports Medicine, 36*, 79-97.

Hanson, M.D., & Chen, E. (2007). Socioeconomic status and health behaviours in adolescence: A review of the literature. *Journal of Behavioral Medicine, 30,* 263-285.

Henning Broderson, N., Steptoe, A., Williamson, S., & Wardle, J. (2005). Sociodemographic, developmental, environmental, and psychological correlates of physical activity and sedentary behavior at age 11 and 12. *Annals of Behavioral Medicine, 29*, 2-11.

Hesketh, K., Crawford, D., & Salmon, J. (2006). Children's television viewing and objectively measured physical activity: Associations with family circumstance. *International Journal of Behavioral Nutrition and Physical Activity, 3*. Retrieved March 10, 2008, from PubMed database.

Human Resources and Skills Development Canada. (2009). Indicators of well-being in Canada. Statistics Canada, 2007. Ottawa, ON. Retrieved on July 13, 2009, from http://www4.hrsdc.gc.ca/.3ndic.1t.4r@-eng.jsp?iid=23.

Humbert, M. L., Chad, K. E., Spink, K. S., Muhajarine, N., Anderson, K. D., Bruner, M. W. et al. (2006). Factors that influence physical activity participation among high- and low-SES youth. *Qualitative Health Research, 16*, 467-483.

Jackson, A. (2004). The unhealthy Canadian workplace. In D. Raphael (Ed.), *Social*

determinants of health: Canadian perspectives (pp. 79-105). Toronto: Canadian Scholars' Press Inc.

Katzmarzyk, P., Baur, L. A., Blair, S. N., Lambert, E. V., Oppert, J. M., Riddoch, C. (2008). International Conference on Physical Activity and Obesity in Children: Summary Statement and Recommendations. *International Journal of Pediatric Obesity, 3*, 3-21.

Kelly, L. A., Reilly, J. J., Fisher, A., Montgomery, C., Williamson, A., McColl, J. H. et al. (2006). Effect of socioeconomic status on objectively measured physical activity. *Archives of Disease in Childhood, 91*, 35-38.

KidSport Ontario. (2008). Toronto, ON. Retrieved June 24, 2008, from, http://www.kidsport.on.ca/home.html.

Kien, C. L., & Chiodo, A.R. (2003). Phsyical activity in middle-school-aged children participating in a school-based recreation program. *Arch Pediatrics of Adolescent Medicine, 157*, 811-815.

Krieger, N., Williams, D. R., & Moss, N.E. (1997) Measuring social class in US public health research: Concepts, Methodologies, and Guidelines. *Annual Review of Public Health, 18,* 341-378.

Kroenke, C. (2008). Socioeconomic status and health: Youth development and neomaterialist and psychosocial mechanisms. *Social Science & Medicine, 66*, 31-42.

Kristensen, P. L., Korsholm, L., Moller, N. C., Wedderkopp, N., Anderson, L. B., & Froberg. (2007). Sources of variation in habitual physical activity of children and adolescents: the European youth heart study. *Scandinavian Journal of*

Medicine & Science in Sports. (2007, February 7). Retrieved March 10, 2008, from PubMed database.

Laidlaw Foundation. (2001). *Towards universality in youth arts and recreation programs in Canada.* Toronto, ON. Retrieved on January 22, 2009, from, http://www.laidlawfdn.org/cms/file/Final_Youth_Rec_Statement.pdf.

Lincoln, Y. & Guba, S. (1985). Naturalistic Inquiry. Beverly Hills: Sage Publication.

Lioret, S., Maire, B., Volatier, J. L., & Charles, M. A. (2007). Child overweight in France and its relationship with PA, sedentary behaviour and socioeconomic status. *European Journal of Clinical Nutrition, 61*, 509-516.

Luke, A., Philpott, J., Brett, K., Cruz, L., Lun, V., Prasad, N., et al. (2004). Physical inactivity in children and adolescents. *Clinical Journal of Sports Medicine, 14*, 261-264.

Lynch, J., & Kaplan, G. (2000). Socioeconomic position. In L. F. Berkman, & I. Kawachi (Eds.), *Social epidemiology* (pp. 13-35). New York: Oxford University Press.

Mahar, M. T., & Rowe, D. A. (2002). Construct validity in physical activity research. In G. J. Welk (Ed.), *Physical activity assessments for health-related research* (pp. 51-72). Champaign, IL: Human Kinetics.

McKenzie, T. L. (1999). School health-related physical activity programs: what do the data say? *Journal of Physical Education, Recreation, & Dance, 70*, p. 16-19.

McNeill, L. H., Kreuter, M. W., & Subramanian, S.V. (2006). Social environment and physical activity: A review of concepts and evidence. *Social Science & Medicine, 63*, 1011-1022.

Merchant, A. T., Dehghan, M., Behnke-Cook, D., & Anand, S. S. (2007). Diet, physical activity, and adiposity in children in poor and rich neighbourhoods: A cross-sectional comparison. *Nutrition Journal, 6*. Retrieved March 10, 2008, from Pubmed database.

Olshansky, S. J., Passaro, D. J., Hershow, R. C., Layden, J., Carnes, B. A, Brody, J. B., et al. (2005). A potential decline in life expectancy in the United States in the 21st Century. *New England Journal of Medicine, 352*, 1138-1145.

Opportunities Waterloo Region. (2009). *Working poor.* Waterloo, ON. Retrieved June 3, 2009, from, http://www.owr.ca/workingpoor.htm#Who_is_the_Working_Poor_.

Patton, M. Q. (2002). *Qualitative research & evaluation methods.* Thousand Oaks, CA: Sage Publications.

Public Health Agency of Canada. (2002). *Canada's physical activity guides for children and youth.* Ottawa, ON. Retrieved January 15, 2008, from, http://www.phac-aspc.gc.ca/pau-uap/paguide/child_youth/children/guidelines.html

Riddoch, C. J., Mattocks, C., Deere, K., Saunders, J., Kirkby, J., Tilling, K. et al. (2007). Objective measurement of levels and patterns of physical activity. *Archives of Disease in Childhood, 92*, 963-969.

Ritchie, J. (2003). The applications of qualitative methods to social research. In J. Ritchie, & J. Lewis (Eds.), *Qualitative Research Practice* (pp24-46). London: Sage Publications.

Romero, A. J. (2005). Low-income neighbourhood resources for adolescents' physical activity. *Journal of Adolescent Health, 36*, 253-259.

Rogers, A. (2002). *The World Health Report, 2002: Reducing Risks, Promoting Healthy Life.* Geneva, Switzerland. Retrieved December 15, 2007, from, http://www.who.int/whr/2002/en/whr02_ch4.pdf

Sallis, J. F., Cervero, R. B., Ascher, W., Henderson, K. A., Kraft, M. K., & Kerr J. (2006). An ecological approach to creating active living communities. *Annual Review of Public Health, 27*, 297-322.

Sallis, J. F., & Owen, N. (1999). Determinants of physical activity. In *Physical activity and behavioral medicine* (pp.110-133). Thousand Oaks, CA: Sage

Sallis, J. F., & Owen, N. (2002). Ecological Models of Health Behaviour. In K. Glanz, F. M. Lewis, & B. K. Rimer (Eds.), *Health behavior and health education: Theory, research and practice* (3rd ed., pp.462-484). San Francisco: Jossey-Bass.

Sallis, J. F., Prochaska, J. J., & Taylor, W. C. (2000). A review of correlates of physical activity of children and adolescents. *Medicine and Science in Sports and Exercise, 32,* 963-975.

Salmon, J. & Timperio A. (2005). Trends in children's physical activity and weight status in high and low socio-economic status areas in Melbourne, Victoria, 1985-2001. *Australian and New Zealand Journal of Public Health, 29*, 337-342.

Schmalz, D. L., Kerstetter, D. L., & Anderson, D. M. (2008). Stigma consciousness as a predictor of children's participation in recreational vs. competitive sports. *Journal of Sport Behavior, 31*, 276-298.

Singh, G. K., Kogan, M. D., Siahpush, M., & van Dyck, P.C. (2008). Independent and

joint effects of socioeconomic, behavioral, and neighbourhood characteristics on physical inactivity and activity levels among US children and adoelcents. *Journal of Community Health, 33,* 206-216.

Skillen, K., Lerner, S., Wamsley, D., & Opportunities Waterloo Region. (2003, February). *A living wage for Waterloo region.* Retrieved June 9, 2009, from, http://tamarackcommunity.ca/downloads/vc/Wat_Living_Wage.pdf.

Spence, J., & Lee, R. (2003). Toward a comprehensive model of physical activity. *Psychology of Sport and Exercise, 4,* 7-24.

Spinks, A., Macpherson, A., Bain, C., & McClure, R. (2006). Determinants of sufficient daily activity in Australian primary school children. *Journal of Pediatrics and Child Health, 42,* 674-679.

Starfield, B., Riley, A. W., Witt, W. P., & Robertson, J. (2002). Social class gradients in health during adolescence. *Journal of Epidemiology and Community Health, 56,* 354-361.

Slack, E. (2003). Municipal funding for recreation. In *Actions speak louder: Making the case for youth recreation.* Retrieved February 12, 2009, from, http://www.ideasthatmatter.com/quarterly/itm-2-3/vol2no3.pdf.

Statistics Canada. (2003). National Longitudinal Survey of Children and Youth, Cycle 4 2000-2001. Statistics Canada Catalogue no. 89FOO77XPE. Ottawa, ON. Retrieved June 30, 2008, from, http://nesstar.tdr.uoguelph.ca.remote.libproxy.wlu.ca/SS/NLSCY/CYCLE4/DOCS/nlscyc4que-book1.pdf.

Statistics Canada. (2007a). 2006 *Census Tract (CT) Profiles.* 2006 Census. Statistics

Canada Catalogue no. 92-597-XWE. Ottawa, ON. Retrieved July 9, 2008, from http://www12.statcan.ca/english/census06/data/profiles/ct/Index.cfm?Lang=E

Statistics Canada. (2007b). *Table 18: Low income before tax cut-offs (1992 base) for economic families and persons not in economic families, 2005*. Statistics Canada Catalogue no. 75F0002MIE, no. 004. Ottawa: ON. Retrieved June 10, 2009, from, http://www12.statcan.ca/english/census06/reference/dictionary/tables/table18-family20.htm.

Stenhammer, C., Sarkadi, A., & Edlund, B. (2007). The role of parents' educational background in healthy lifestyle practices and attitudes of their 6-year-old children. *Public Health Nutrition, 10*, 1305-1313.

Tesch, R. (1990). *Qualitative research: Analysis types and software tools*. New York: Falmer Press.

Thompson, J. (2006, September 14). Hockey costs soar along with kids' expectations. *Northern Life*. Retrieved June 10, 2009, from, http://www.northernlife.ca/News/Sports/2006/09-15-06-hockey-gear.asp?NLStory=09-15-06-hockey-gear.

Tremblay, M. S., Barnes, J. D., Copeland, J. L., & Esliger, D. W. (2005). Conquering childhood inactivity: Is the answer in the past? *Medicine and Science in Sports and Exercise, 37*, 1187-1194.

Tremblay, M. S. & Willms, J. D. (2000). Secular trends in the body mass index of Canadian children. *Canadian Medical Association Journal, 163*, 1429-1433.

Trudeau, F., & Shephard, R.J. (2005). Contribution of school programmes to physical

activity levels and attitudes in children and adults. *Sports Medicine, 35*(2), 89-105.

van der Horst, K., Paw, M. J. C. A., Twisk, J. W., & Van Mechelen, W. (2006). A brief review of correlates of physical activity and sedentariness in youth. *Medicine and Science in Sports and Exercise, 39*, 1241-1250.

Villard, L. C., Ryden, L., & Stahle, A. (2007). Predictors of healthy behaviours in Swedish school children. *European Journal of Cardiovascular Prevention and Rehabilitation, 14*, 366-372.

Wills, T. A., & Shinar, O. (2000). Measuring perceived and received social support. In S. Cohen, B. H. Gottlieb, & L. G. Underwood (Eds.). *Social Support Measurements and Intervention* (pp. 86-135). New York: Oxford University Press.

Ziviani, J., MacDonald, D., Jenkins, D., Rodger, S., Batch, J., & Cerin, E. (2006). Physical activity of young children. *Occupation, Participation and Health, 26*, 4-14.

Tables

Table 1: Summary of Past Reviews

Review	Search years	SES as only predictor	PA as only outcome	Age	SES studies (samples)	(+) association	Overall
Sallis et al., 2000	1970-1998	No	Yes	4-12	9(13)	4 of 13 samples	(0)
		Multiple correlates		13-18	6(9)	3 of 9 samples	(0)
Gustafson & Rhodes, 2006	1985-1997	No	Yes	4-18	6	Not explicitly identified	(+)
		Parental correlates					
van der Horst et al., 2006	1999-Jan 2005	No	No	4-12	4(7)	2 of 7 samples	(0)
		Multiple correlates		13-18	8(14)	7 of 14 samples	(+)*
Ferreira et al., 2006	1980-Dec 2004	No	Yes	3-12	29(96)i	19 of 96 samples	(0)
		Environmental Correlates			4(6)a	1 of 6 samples	(0)
				13-18	36(100)i	38 of 100 samples	(+)*
					2a	1 of 2 studies	n/a
Hanson & Chen, 2007	1970-2007	Yes	No	10-21	28i	21 of 28 studies	(+)
					6a	5 of 6 studies	(+)

Note. i = individual level SES measure; a = area level SES measure; (0) no association, (+) positive association; *for some SES indicators.

Table 2: Summary of Studies That Used an Individual Measure of SES

Authors	Sample n (associations)	Age mean (range)	PA measure	SES measure	Association
Bellisle et al., 2007	1001 (2)	(9-11)	parent reported time in sports	parent occupation	(+)
– 1995 sample				parent education	(+)
Hesketh et al., 2006	380B (5)	6	accelerometer – MVPA	maternal education	(+)*
	385G (5)			maternal employment	more PA if mom worked part time**
				work hours, paternal employment/education	(0)* , (0)*/(0)*
	736B (5)	11	accelerometer – MVPA	maternal employment	(+)*
	875G (5)			works hours, paternal employment	(0)*, (0)*
				maternal education, paternal education	(0)*, (0)*
Kelly et al., 2006a	339 (1)	4.2	accelerometer – MVPA	Carstairs Score (composite)	(0) with other variables in model
Kelly et al., 2006b	78 (2)	5.6	accelerometer – MVPA	Carstairs Score (low vs. high)	(0) total PA, (0) MVPA
Lioret et al., 2007	242 (1)	(3-5)	self-reported time in formal and	head of household occupation	(0)
	441 (1)	(6-10)	informal sports outside school	head of household occupation	(+)

Table 2 (continued)

Authors	Sample n (associations)	Age mean (range)	PA measure	SES measure	Association
Riddoch et al., 2007	5595 (4)	11.8 (11.6-11.9)	accelerometer	mother's education	(0) total PA, (0) MVPA
			- total PA, MVPA	partner's education	(-) total PA, (0) MVPA
Spinks et al., 2006	135 (2)	(5-6)	parents completed 7 day diary	household income	(0) for both SES indicators
	230 (2)	(7-9)	(minutes per day)	maternal education	(0) for both SES indicators
	153 (2)	(10-12)			(0) for both SES indicators
Stenhammer et al., 2007	158C (1)	6	parents reported	parents reported education	(+)
	213P		(once/week vs. never)	(<12 yrs vs. >12 yrs)	
Ziviani et al., 2006	50 (2)	7.74	pedometer (steps/day)	combined parent education	(+)weekend steps
				and household income	(0) weekday steps

Note. B = boys; G = girls; MVPA = moderate to vigorous physical activity; C = children; P = parents; a = study 1, b = study 2; *boys and girls; **boys only; (+) positive association, (0) no association, (-) negative association.

Table 3: Summary of Studies That Used an Area Level Measure of SES

Authors	Sample n (associations)	Age mean (range)	PA measure	SES measure	Association
Henning Brodersen et al., 2007	2578B (1)	(11-12)	self reported frequency of vigorous PA	Townsend Index	(0)B
	1742G (1)		(days/week)		(+)G
Kristensen et al., 2007a	377 (1)	(8-10)	accelerometer - intensity	school level SES	(0)
Kristensen et al., 2007b	416 (1)	(8-10)	accelerometer - intensity	school level SES	(+) mid vs. low and high SES
Merchant et al., 2007	160 (1)	9	self reported activities (minutes/day)	school level SES (confirmed	(-) did not report PA outcomes
				by parent education, income)	in results (only discussion)
Spinks et al., 2006	135 (1)	(5-6)	parents completed 7 day diary	school level SES	(0)
	230 (1)	(7-9)	(minutes per day)		(0)
	153 (1)	(10-12)			(0)
Salmon et al., 2005	926 (3)	(9-13)	self reported frequency (times/week)	school level SES	(+) school PE, (+) school sport
-2001 sample			school PE, school sport, transport to school		(-) transport to school

Table 3 (continued)

Authors	Sample n (associations)	Age mean (range)	PA measure	SES measure	Association
Villard et al., 2007	1409 (1)	12.5	self reported frequency ('healthy' amount vs. 'unhealthy amount')	neighbourhood affluence	(+)

Note. B = boys; G = girls; a = 1997 data; b = 2003 data; (0) no association, (+) positive association, (-) negative association.

Figures and Illustrations

Figure 1: Developmental Models for the SES and Health Relationship Among Youth

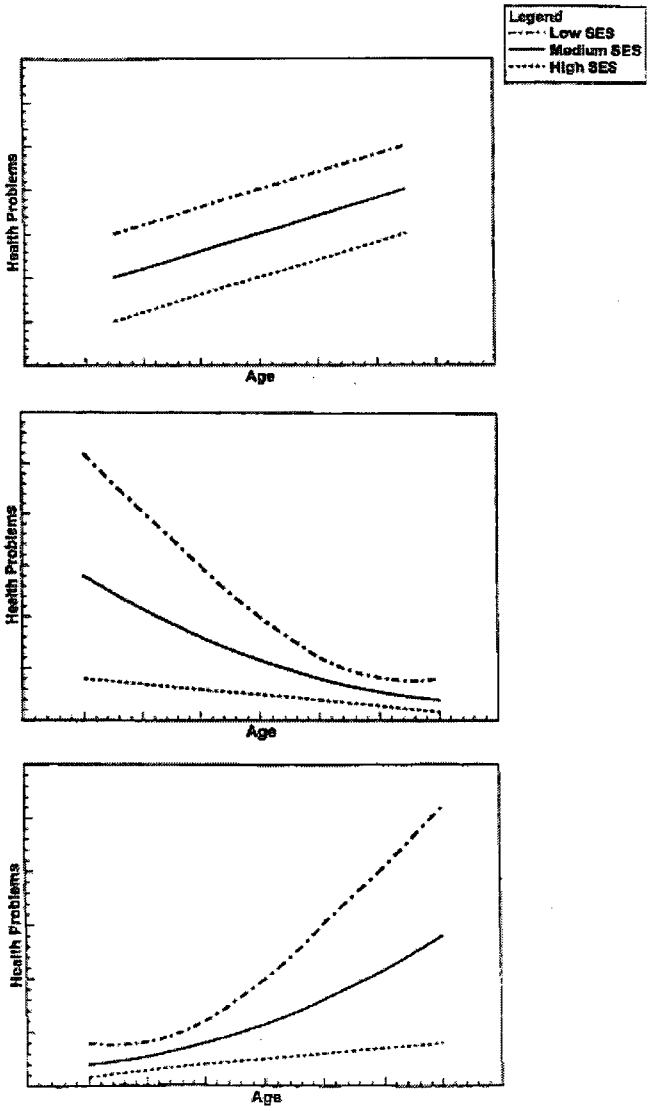


Figure 1. Three possible developmental models of the relationship between socioeconomic status (SES) and child health. The top panel depicts the childhood-adolescent persistent model, showing that the SES and health relationship remains constant over time. The middle panel depicts the childhood-limited model, showing that the relationship between SES and health is strongest in early childhood and weakens with age. The bottom panel depicts the adolescent-emergent model, showing that the relationship between SES and health is weak in early childhood and becomes more pronounced with age.

Figure 2: Potential Mechanisms for SES and Health Relationship Among Youth

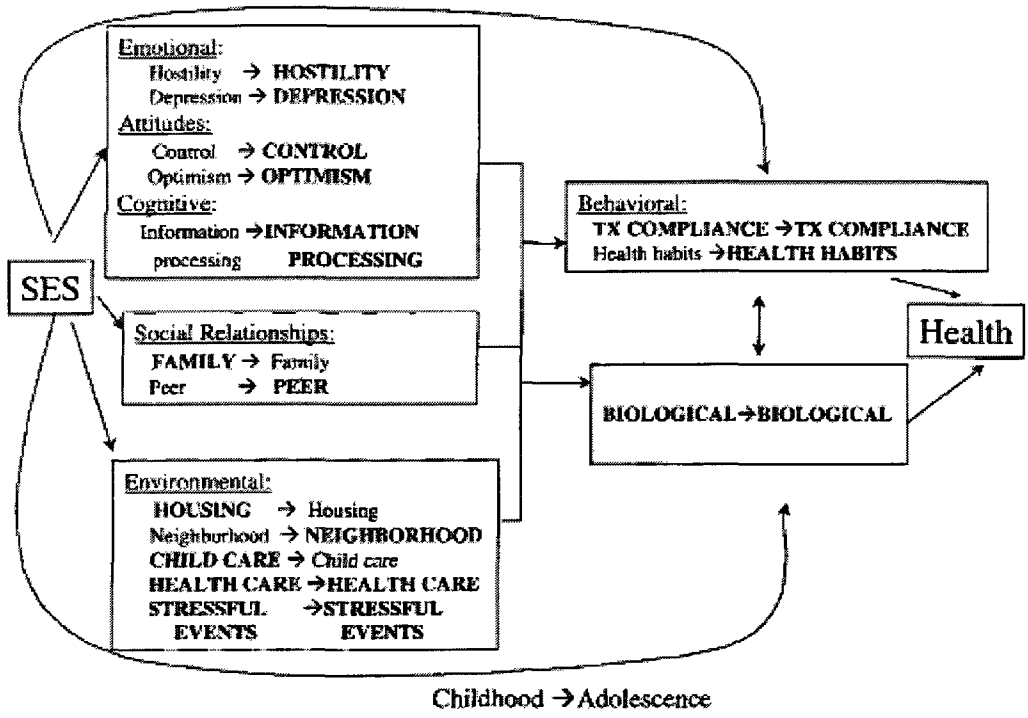
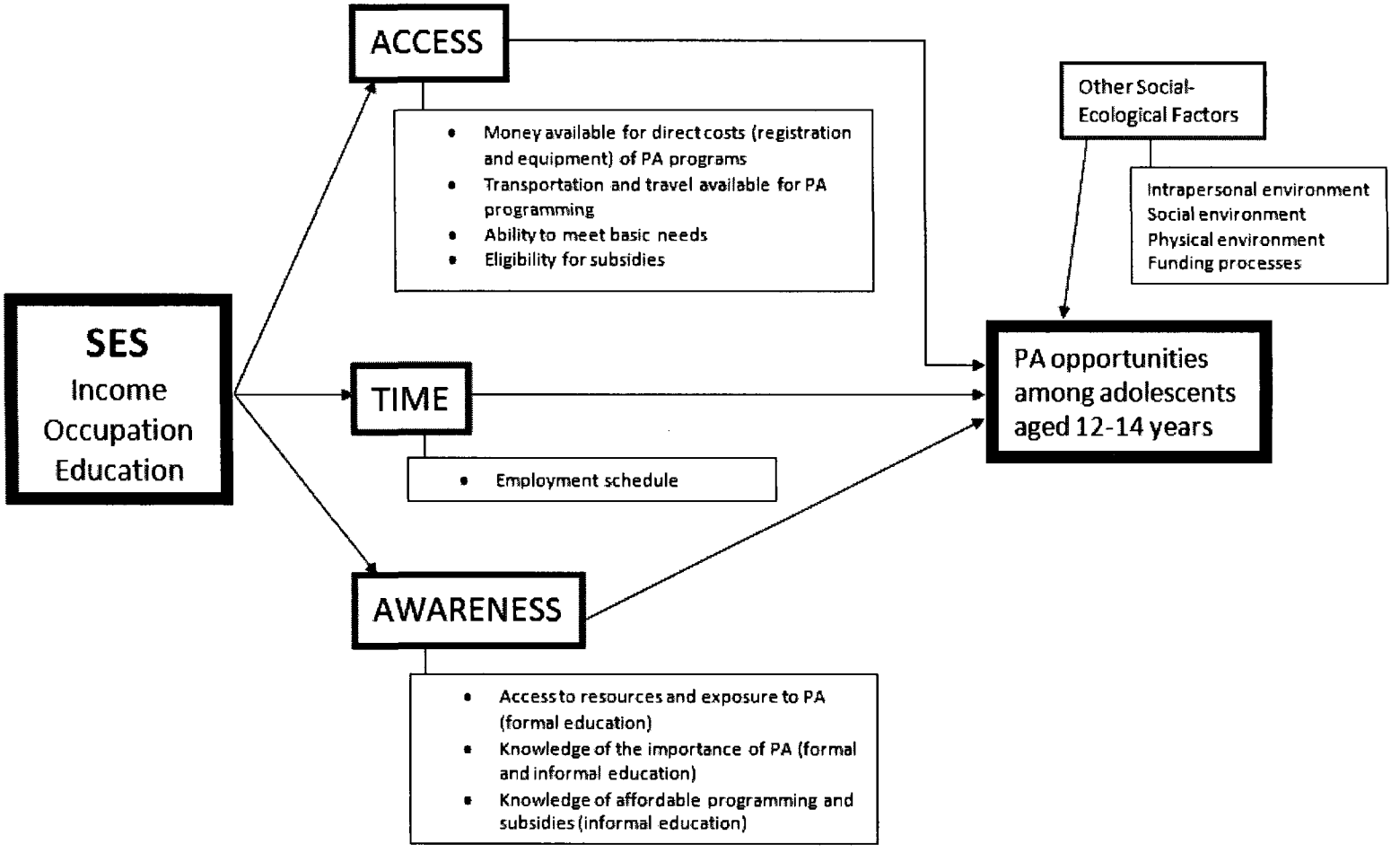


Figure 2. Model of potential mechanisms for the relationship between socioeconomic status (SES) and child health. The strength of each mediator changes over time as children undergo normal developmental changes. Each mediator is depicted twice, once to represent the period of childhood and once to represent the period of adolescence, with an arrow in between indicating developmental change in the mediator. Bolded mediators indicate a period of strong influence of that mediator; nonboldface mediators indicate a period of weaker influence for that mediator. Tx = treatment. It should be noted that, although not depicted, genetic factors likely influence each step in this model (SES, mediator, health outcome).

Figure 3: Current Model to Explain the Factors of the SES-PA Relationship Among Adolescents Aged 12-14 Years



Appendices

Appendix A - Pre-Interview Questionnaire

Thank you for agreeing to participate in this study. This questionnaire should take about 15-20 minutes to complete. Please mail the completed questionnaire and one of the included consent forms (signed) to Meredith Stockie in the pre-addressed postage paid envelope that was included in this package. The second consent form is for you to keep. Once Meredith has received your questionnaire and consent form she will contact you to arrange an interview.

1. What year were you born? 19____

2. a) Are you fluent in English?

☐ Yes ☐ No

d) What is your country of birth? _____

3. a) What is your relationship to the adolescent who brought home the letter of information for this questionnaire?

☐ Mother
☐ Father
☐ Stepmother
☐ Stepfather
☐ Guardian
☐ Other (Please specify) _____

b) What is your marital status?

☐ Married
☐ Living common law
☐ Widowed
☐ Separated
☐ Divorced
☐ Single, never married

c) Does the adolescent who brought home the letter of information for this questionnaire also live at another household part of the time?

☐ Yes ☐ No

4. a) How many children (17 years of age or younger) live in your household? _____

b) How many adults (18 years of age or older) live in your household? _____

The next section refers to your own participation in physical activity/exercise.

5. a) Considering a 7-day period (a week), how many times on the average do you do the following kinds of exercise for more than 15 minutes during your free time (write on each line the appropriate number).

	Times per week
Strenuous Activity (heart beats rapidly) (e.g., running, jogging, hockey, football, soccer, squash, basketball, cross country skiing, judo, roller skating, vigorous swimming, vigorous long distance bicycling)	_____
Moderate Exercise (not exhausting) (e.g., fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, alpine skiing, popular and folk dancing)	_____
Mild Exercise (minimal effort) (e.g., yoga, archery, fishing from river bank, bowling, horseshoes, golf, snow-mobiling, easy walking)	_____

b) During a typical 7-day period (a week), in your leisure time, how often do you engage in any regular activity long enough to work up a sweat (heart beats rapidly)?

☐ Often
☐ Sometimes
☐ Never/Rarely

This is the last section of the questionnaire and will ask you about the physical activities that your grade seven or grade eight adolescent is involved in.

6. a) In the past 12 months, did your adolescent participate in any sport or physical activity outside of school that you had to pay for?

☐ Yes ☐ No

b) If yes, please list those activities.

_____
_____
_____
_____

7. a) In the past 12 months, did your adolescent participate in any sport or physical activity outside of school that you did **NOT** have to pay for?

☐ Yes ☐ No

b) if yes , please list those activities.

_____
_____
_____
_____

8. a) In the past 12 months, did your adolescent participate in any sport or physical activity at school that you had to pay for?

☐ Yes ☐ No

b) If yes, please list those activities.

_____
_____
_____
_____

9. a) In the past 12 months, did your adolescent participate in any sport or physical activity at school that you did **NOT** have to pay for (not including gym class)?

☐ Yes ☐ No

b) If yes, please list those activities.

_____
_____
_____
_____

10. In the past 12 months, outside of school hours, how often has your adolescent

a) taken part in sports with a coach or instructor (except dance or gymnastics)?

☐ Most days
☐ A few times a week
☐ About once a week
☐ About once a month
☐ Almost never

b) taken lessons or instruction in other organized physical activities with a coach or instructor such as dance, gymnastics or martial arts?

☐ Most days
☐ A few times a week
☐ About once a week
☐ About once a month
☐ Almost never

c) taken part in unorganized sports or physical activities without a coach or instructor?

☐ Most days
☐ A few times a week
☐ About once a week
☐ About once a month
☐ Almost never

d) taken lessons or instruction in music, art or other non-sport activities?

☐ Most days
☐ A few times a week
☐ About once a week
☐ About once a month
☐ Almost never

e) How does your adolescent usually travel to school?

☐ By school bus
☐ By city bus
☐ Walks/Bikes
☐ Is driven
☐ Other (specify) _____

f) How long does it take him/her to get to and from school (using the travel method checked above?

☐ 15 minutes or less
☐ 16 to 30 minutes
☐ 31 to 45 minutes
☐ 46 to 60 minutes
☐ more than 60 minutes

The following questions will ask about your education, occupation, and income as well as the education and occupation of other adults (18 years or older) living in your household. There is room to describe up to two other adults who may be living in your home. Please respond on behalf of the other adults living in your household. If there are more than three adults please choose those who have the most impact on the adolescent who brought home the letter of information.

11. Please describe the relationship between you and each adult living in your household (e.g., spouse, mother, father, friend, common-law partner, grandparent, son/daughter, etc.)

Adult living in household	Relationship to respondent (you)	Is this adult currently attending a school, college or university? (Please check)	
EXAMPLE: Adult X	Spouse	☐ Yes	√ No
Adult 1	Yourself	☐ Yes	☐ No
Adult 2		☐ Yes	☐ No
Adult 3		☐ Yes	☐ No

12. a) What do you consider to be the main activity currently for each adult listed above?? (MARK ONE ONLY PER PERSON)

Adult 1 (yourself)	
Caring for family	
Working for pay or profit	
Caring for family and working for pay or profit	
Going to school	
Looking for work	
Retired	
Recovering from illness/on disability	
Other (specify) _____	

Adult 2	
Caring for family	
Working for pay or profit	
Caring for family and working for pay or profit	
Going to school	
Looking for work	
Retired	
Recovering from illness/on disability	
Other (specify) _____	

Adult 3	
Caring for family	
Working for pay or profit	
Caring for family and working for pay or profit	
Going to school	
Looking for work	
Retired	
Recovering from illness/on disability	
Other (specify) _____	

12. b) What is the highest level of education that you (and any other adults living in your household) have ever attained? Select only one option for each adult.

Adult 1- yourself	
Less than high school or equivalent	
High school diploma or equivalent	
Some trade, technical or vocational school, or business college	
Some community college, CEGEP or nursing school	
Some university	
Diploma or certificate from trade, technical or vocational school, or business college	
Diploma or certificate from community college, CEGEP, nursing school, or university	
Bachelor or undergraduate degree or teacher's college (e.g., B.A., B.Sc., B.A.Sc., B.Ed.)	
Master's (e.g., M.A., M.Sc., M.Ed.)	
Degree in Medicine (M.D.), Dentistry (D.D.S., D.M.D.), Veterinary Medicine (D.V.M.), Optometry (O.D.) or Law (LL.B.)	
Earned doctorate (e.g., Ph.D., D.Sc., D.Ed.)	
Other (specify) _____	

Adult 2	
Less than high school or equivalent	
High school diploma or equivalent	
Some trade, technical or vocational school, or business college	
Some community college, CEGEP or nursing school	
Some university	
Diploma or certificate from trade, technical or vocational school, or business college	
Diploma or certificate from community college, CEGEP, nursing school, or university	
Bachelor or undergraduate degree or teacher's college (e.g., B.A., B.Sc., B.A.Sc., B.Ed.)	
Master's (e.g., M.A., M.Sc., M.Ed.)	
Degree in Medicine (M.D.), Dentistry (D.D.S., D.M.D.), Veterinary Medicine (D.V.M.), Optometry (O.D.) or Law (LL.B.)	
Earned doctorate (e.g., Ph.D., D.Sc., D.Ed.)	
Other (specify) _____	

Adult 3	
Less than high school or equivalent	
High school diploma or equivalent	
Some trade, technical or vocational school, or business college	
Some community college, CEGEP or nursing school	
Some university	
Diploma or certificate from trade, technical or vocational school, or business college	
Diploma or certificate from community college, CEGEP, nursing school, or university	
Bachelor or undergraduate degree or teacher's college (e.g., B.A., B.Sc., B.A.Sc., B.Ed.)	
Master's (e.g., M.A., M.Sc., M.Ed.)	
Degree in Medicine (M.D.), Dentistry (D.D.S., D.M.D.), Veterinary Medicine (D.V.M.), Optometry (O.D.) or Law (LL.B.)	
Earned doctorate (e.g., Ph.D., D.Sc., D.Ed.)	
Other (specify) _____	

The next section contains questions about jobs or employment which you (or another adult in your household) have/has had during the past 12 months. Please include such employment as part-time jobs, contract work, baby sitting and any other paid work.

13. a) About how many hours a week do you (and other adults living in your household) usually work for pay? (Mark one only per person)

Adult 1-yourself	
Less than ten hours	
Between 10 to 19 hours	
Between 20 to 29 hours	
Between 30 to 39 hours	
Between 40 to 49 hours	
50 hours or more	

Adult 2	
Less than ten hours	
Between 10 to 19 hours	
Between 20 to 29 hours	
Between 30 to 39 hours	
Between 40 to 49 hours	
50 hours or more	

Adult 3	
Less than ten hours	
Between 10 to 19 hours	
Between 20 to 29 hours	
Between 30 to 39 hours	
Between 40 to 49 hours	
50 hours or more	

b) Which of the following best describes the hours you (and other adults living in your household) usually worked during those weeks?
(Mark all that apply if there are several jobs with varying schedules.)

Adult 1-yourself	
Regular daytime schedule or shift	
Regular evening shift	
Rotating shift (e.g., change from days to evenings to nights)	
Regular night shift	
Split shift	
On call	
Irregular schedule	
Other (specify) -	

Adult 2	
Regular daytime schedule or shift	
Regular evening shift	
Rotating shift (e.g., change from days to evenings to nights)	
Regular night shift	
Split shift	
On call	
Irregular schedule	
Other (specify) -	

Adult 3	
Regular daytime schedule or shift	
Regular evening shift	
Rotating shift (e.g., change from days to evenings to nights)	
Regular night shift	
Split shift	
On call	
Irregular schedule	
Other (specify) -	

c) Which days of the week do you most often work outside the home? Check all days that apply.

Adult 1-yourself	
Monday	
Tuesday	
Wednesday	
Thursday	
Friday	
Saturday	
Sunday	
Varies on a weekly basis	

Adult 2	
Monday	
Tuesday	
Wednesday	
Thursday	
Friday	
Saturday	
Sunday	
Varies on a weekly basis	

Adult 3	
Monday	
Tuesday	
Wednesday	
Thursday	
Friday	
Saturday	
Sunday	
Varies on a weekly basis	

d) Please describe what you do at <u>your</u> place(s) of work.

_____
_____
_____
_____
_____

14. During the past 12 months, what was your **total** household income after tax deductions? **Please include income from all contributing members of the household.**

☐ Less than $20,000
☐ $20,000 to less than $40,000
☐ $40,000 to less than $60,000
☐ $60,000 to less than $80,000
☐ $80,000 to less than $100,000
☐ $100,000 or more

Thank you for taking the time to fill out this questionnaire! Please send this questionnaire and ONE signed consent form to Meredith Stockie in the pre-addressed postage paid envelope that was included in this package. Once Meredith has received your questionnaire and consent form she will contact you to arrange an interview.

Appendix B - Interview Guide (Original Guide for Parents)

Thank you for coming to the interview. Before we start I'd like to clarify some of the information that you gave me on the questionnaire. ***Clarify any questions from background questionnaire

Thank you for the clarifications. Now I would like to begin the interview by asking some questions about the physical activity patterns of your son/daughter and then move onto discussing socioeconomic status. If at anytime I ask a question that you would rather not answer simply ask me to move onto the next question. I am interested in youth PA levels and seeking ways to increase PA. By understanding some of the factors that influence PA we can identify ways to enhance PA. Once the interview has been typed you will have a chance to add or remove any comments or responses. No one will be able to identify you from the information you provide since your name will not be used or attached to the interview. My university committee members, my advisor and I will be the only people who will see the full interview data.

We'll start by talking about your son/daughter who brought home the letter of information from school. When I discuss physical activity this involves any activity that brings your son/daughter's heart rate up or makes him/her sweat or breathe hard. This could include walking to get places, or any organized or unorganized activities done at school or outside of school hours.

1. a) Please describe for me your son/daughter's physical activity levels.

b) Canada's Physical Activity Guide recommends 90 minutes of moderate-vigorous physical activity per day for children and youth. For example, moderate activity would be brisk walking and vigorous would be running or playing soccer. How does your son/daughter's activity levels compare to these guidelines?

Probes
-school – intramurals, recess, extra-curricular, transportation
-outside of school – organized sports, free play

Another topic that I am interested in is socioeconomic status which for my project refers to a person's income, education, and occupation.

2. On the background questionnaire, you provided an indicator of family income. Has this impacted your son/daughter's physical activity involvement? Please describe.

Probes
-school – intramurals, recess, extra-curricular, transportation
-outside of school – organized sports, free play

3. On the background questionnaire you told me that you [insert completed education here]. Has this impacted your son/daughter's physical activity involvement? Please describe.

Probes
-school – intramurals, recess, extra-curricular, transportation
-outside of school – organized sports, free play

***Clarify any questions from occupation description on questionnaire.

4. On the background questionnaire you told me that you [insert what they do/how often they work etc]. Has this impacted your son/daughter's physical activity involvement? Please describe.

Probes-school – intramurals, recess, extra-curricular, transportation
-outside of school – organized sports, free play

5. Now I'd like to ask you about your neighbourhood. When you think about where you live, how, if at all, does your neighbourhood impact your son/daughter's PA.

You've given me some excellent information so far. I just have one more question and then you will have the chance to discuss anything you think I should have asked but didn't. Is it okay if we continue?

6. Are there any factors unrelated to SES (i.e., income, education, occupation) that you think make being active easy or tough for your son/daughter?

7. Do you have any other comments or anything you'd like to discuss that I did not ask?

Thank you so much for your time and for answering so many important questions. Once I type out the interview I will send it back to you to make sure that what I have on record is what you meant to say. If there is anything you'd like me to add, change, or take out please let me know at that time.

Appendix C - Interview Guide (Parents of Lower SES)

Thank you for coming to the interview. Before we start I'd like to clarify some of the information that you gave me on the questionnaire. ***Clarify any questions from background questionnaire
Thank you for the clarifications. Now I would like to begin the interview by asking some questions about socioeconomic status and how it impacts the physical activity of your son/daughter. If at anytime I ask a question that you would rather not answer simply ask me to move onto the next question. I am interested in youth PA levels and seeking ways to increase PA. By understanding some of the factors that influence PA we can identify ways to enhance PA. Once the interview has been typed you will have a chance to add or remove any comments or responses.

We'll start by talking about your son/daughter who is 12-14. When I discuss physical activity this involves any activity that brings your son/daughter's heart rate up or makes him/her sweat or breathe hard. This could include walking to get places, or any organized or unorganized activities done at school or outside of school hours. So for example, walking to school or to the mall, playing in the school field, going swimming or skateboarding...

1. a) Please describe for me your son/daughter's physical activity levels.

b) Canada's Physical Activity Guide recommends 90 minutes of moderate-vigorous physical activity per day for children and youth. For example, moderate activity would be brisk walking and vigorous would be running or playing soccer. How does your son/daughter's activity levels compare to these guidelines?

Probes
-school – intramurals, recess, extra-curricular, transportation
-outside of school – organized sports, free play

Another topic that I am interested in is socioeconomic status which for my project refers to a person's income, education, and occupation.

2. Does family income impact the physical activity level of youth aged 12-14 years? How could this have impacted your son/daughter's physical activity involvement? Please describe.

Probes
"Do you mean overall PA or just outside of school? What about in school PA?"

"Are there any resources or non fee-based programs available to your son/daughter? Any programs that don't involve money?"

3. Do you think education impacts the physical activity level of youth aged 12-14 years? How could this have impacted your son/daughter's physical activity involvement? Please describe.

Probes
"Could you elaborate on that? Your response is what I am looking for but could you explain why your education does not play a role in the PA of your son/daughter?"

***Clarify any questions from occupation description on questionnaire.

4. Do you think a person's job impacts the physical activity level of youth aged 12-14 years? How could this have impacted your son/daughter's physical activity involvement? Please describe.

Probes-school – intramurals, recess, extra-curricular, transportation
-outside of school – organized sports, free play

5. Now I'd like to ask you about your neighbourhood. When you think about where you live, how, if at all, does your neighbourhood impact your son/daughter's PA.

You've given me some excellent information so far. I just have one more question and then you will have the chance to discuss anything you think I should have asked but didn't. Is it okay if we continue?

6. Does anything else impact the physical activity level of your son/daughter?

Probe - Are there any factors unrelated to SES (i.e., income, education, occupation) that you think make being active easy or tough for your son/daughter?

7. Do you have any other comments or anything you'd like to discuss that I did not ask?

Thank you so much for your time and for answering so many important questions. Once I type out the interview I will send it back to you to make sure that what I have on record is what you meant to say. If there is anything you'd like me to add, change, or take out please let me know at that time.

Appendix D – Interview Guide (Community Support Liaisons)

Thank you for agreeing to participate in this interview. I would like to begin by asking some questions about your role in the community and in working with youth between the ages of 12-14 and then move onto discussing socioeconomic status as it pertains to physical activity involvement. I am interested in youth PA levels and seeking ways to increase PA. By understanding some of the factors that influence PA we can identify ways to enhance PA for youth. If at anytime I ask a question that you would rather not answer simply ask me to move onto the next question. Once the interview has been typed you will have a chance to add or remove any comments or responses.

When I discuss physical activity this involves any activity that brings one's heart rate up or makes him/her sweat or breathe hard. This could include walking to get places, or any organized or unorganized activities done at school or outside of school hours.

1. a) Please describe the organization your are working for currently.

b) What is your role within that organization?

c) How long have you been in this position?

d) i) What types of programs does your organization offer for youth between the ages of 12-14?

ii) Is programming offered to other youth as well? If so, please describe.

e) What are the characteristics of the youth who attend your programs?

Probes – family background, gender, physical activity levels, attitudes

f) Approximately how many youth between the ages of 12-14 years do you service in your program in a given year?

Another topic that I am interested in is socioeconomic status which for my project refers to a person's income, education, and occupation.

2. Do you think family income impacts the physical activity opportunities of youth attending or not attending your programs, and if so, please explain.

Probe – why does family income impact...

3. Do you think parental education impacts the physical activity opportunities of youth attending or not attending your programs, and if so, please explain.

Probe – why does parental education impact...

4. Do you think parental occupation impacts the physical activity opportunities of youth attending or not attending your programs and if so, please explain.

Probes-school – hours of work, days of work, type of work
Probe – why does parental occupation impact...

5. Are there any factors unrelated to SES (i.e., income, education, occupation) that you think make being active easy or tough for today's adolescents?

6. a) What are the programs currently in place in your municipality that cater the lower SES families?

b) In terms of physical activity opportunities, are lower SES families being serviced as best they can by the available programs that you just described?
If yes – please explain
If no – please explain what is missing

7. Do you have any other comments or anything you'd like to discuss regarding socioeconomic status and physical activity among youth that I did not ask?

Thank you so much for your time and for answering so many important questions. Once I type out the interview I will send it back to you to make sure that what I have on record is what you meant to say. If there is anything you'd like me to add, change, or take out please let me know at that time. Also, if you know of anyone who you think would like to participate in my study please send my information along and if they choose to participate they can contact me directly.