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Physical activity among Latino children in London, Ontario: An assessment of physical activity levels, sedentary behaviours, and physical activity-related barriers and facilitators

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A thesis submitted in partial fulfillment of the requirements for the degree in Master of Science

PHYSICAL ACTIVITY AMONG LATINO CHILDREN IN LONDON, ONTARIO: AN ASSESSMENT OF PHYSICAL ACTIVITY LEVELS, SEDENTARY BEHAVIOURS, AND PHYSICAL ACTIVITY-RELATED BARRIERS AND FACILITATORS

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by

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Abstract

The purpose of the study was to assess the physical activity (PA) levels, sedentary behaviours, and PA-related barriers and facilitators of a sample of Latino children in London, Canada. Forty boys and 34 girls (mean age = 11.4 years) completed questionnaires related to PA levels, sedentary behaviours, and PA-related barriers and facilitators, and 64 of these children wore an accelerometer for 4 consecutive days. Children spent an average of 53 minutes per day in moderate-to-vigorous PA. The average daily sedentary time for participants was 8.6 hours, and subjective measures revealed that participants spent 3.8 hours per day in front of screens. Participants identified a number of barriers to PA, including environmental factors, a lack of resources, reduced opportunities for PA, a lack of motivation, and a lack of time. PA-related facilitators included motivation, opportunities for skill development, social support, and physical fitness goals.

Keywords: Physical activity, sedentary behaviour, children, Latino

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Chapter 1: Introduction and Literature Review

Obesity is a growing problem in Canada, particularly among children (Colley et al., 2011). In fact, the rate of childhood obesity has tripled in the past 25 years; currently 28.2% of Canadian children are overweight or obese (Heart and Stroke Foundation of Ontario, 2009; Merrifield, 2007).

The growing rate of obesity among children is problematic for a number of reasons, including the fact that obesity is associated with several negative consequences related to physical health, quality of life, and longevity (Franks et al., 2010; Reilly & Kelly, 2010). From a clinical perspective, there is a connection between childhood overweight and obesity and type II diabetes mellitus, metabolic syndrome, hyperlipidemia, hypertension, cardiovascular disease, asthma, liver disease, gastrointestinal diseases, orthopaedic complications, and obesity in adulthood (Abrams & Levitt Katz, 2011; Arslanian, 2002; Reilly, 2006; Young, Dean, Flett, & Wood-Steiman, 2000). In addition to these and other physical consequences, obesity is associated with sleep-related disorders and a myriad of negative psychological outcomes, including low self-esteem, increased anxiety, and depression or depressive symptoms (Cornette, 2008; Vila et al., 2004; Wing et al., 2003).

While obesity affects a large number of children, research has shown that Latino[1] children are disproportionately affected by overweight and obesity (Gesell, Scott, & Barkin, 2010; Ogden, Yanovski, Carroll, & Flegal, 2007). The obesity patterns among Latino children can be seen as early as the preschool years, as evidenced by the 2003 Pediatric Nutrition Surveillance report (PedNSS; Polhamus et al., 2004). This report found that the prevalence of overweight among

[1]Throughout this dissertation, the term Latino will be used to refer to individuals whose origins can be traced to countries that share the Spanish language as a universal identifier (e.g., the Caribbean, Mexico, Central America, and South America; Centrella-Nigro, 2009; Flores et al., 2002).

Latino preschoolers (i.e., children ages 2 to 5) in the U.S. was 19.4%, which was significantly higher than the 10.4% reported for American children of the same age (Polhamus et al., 2004). Furthermore, it was noted that although the increase in overweight and obesity among preschool-aged children in the past decade has been consistent among all ethnic groups in the United States, the greatest absolute increase (3.9%) was seen in Latino children (Polhamus et al., 2004).

Obesity patterns in the preschool years continue into later childhood. In fact, it has been reported that up to 27.3% of American Latino children between the ages of 6 and 11 have body mass indices (BMIs) that classify them as obese for their age and sex (Ogden et al., 2007). In Canada, a recent pilot study conducted by He and colleagues (2009) found that 35.0% of a convenience sample (n = 300) of Latino children ages 6 to 12 in London, Ontario, were overweight (defined as having a BMI > 85% for their age and sex) and 24.2% were obese (defined as having a BMI > 95% for their age and sex). These rates were more than double those reported for children ages 6 to 12 in the general London, Ontario population (24.1% overweight and 12.3% obese; He et al., 2009).

The disproportionately high rate of obesity among Latino children in Canada is alarming in part because Latinos comprise one of the largest non-European ethnic groups in Canada (Statistics Canada, 2003). It is also estimated that 5 to 8% of Canada's 1.5 million Latinos live in Ontario, and interestingly, London, Ontario is home to one of the fastest growing Latino communities in the province (Statistics Canada, 2003).

Given the growing rates of and detrimental consequences associated with childhood obesity, it is important to examine factors that: (a) are modifiable; and (b) can help to address this growing problem among Canadian children in general, and Latino children specifically. Two important lifestyle-related factors that can impact the obesity levels of children are physical

activity and sedentary behaviours. In early 2007, the Canadian Clinical Practice Guidelines for the Management and Prevention of Obesity in Children was published based on the available scientific literature in the area (Lau et al., 2007). Some key recommendations that emanated from this report included helping children to achieve a healthy bodyweight; promoting physical activities that are fun, recreational, and tailored to the strengths of the child and his/her family; and restricting screen time to a maximum of 2 hours per day. It was concluded that by following these recommendations—and consequently increasing children's energy expenditure while decreasing their sedentary behaviours—obesity levels among the pediatric population would be reduced (Lau et al., 2007).

Another important consideration in the promotion of health among children is an understanding of the barriers and facilitators that children face with respect to engaging in appropriate amounts of physical activity. Understanding the factors that influence physical activity and sedentary behaviours can provide insight into the beliefs, attitudes, and motivations of children and important others (He, Piche, Beynon, & Harris, 2010), and can also aid in the design of effective lifestyle interventions (Sallis, Prochaska, & Taylor, 2000). With respect to Latino children in particular, an understanding of the unique and culturally relevant physical activity-related barriers and facilitators is essential in order to gain a complete understanding of: (a) Latino children's health behaviours within the context of their family and social environments; and (b) the most appropriate way(s) to target these behaviours.

Given the issues outlined above, and for the purpose of this dissertation, the following sections pertaining to children in general and Latino children specifically, will be discussed below: (a) physical activity levels; (b) sedentary behaviours; (c) the measurement of physical activity and sedentary behaviours; and (d) physical activity-related barriers and facilitators.

Physical Activity Levels Among Children

Physical activity is an effective approach in the prevention and treatment of obesity because it directly increases energy expenditure. Not surprisingly, it has been well documented that there is a negative correlation between physical activity levels and obesity among children (Shields, 2006; Trost, Kerr, Ward, & Pate, 2001; Veugelers & Fitzgerald, 2005). Despite this, however, most Canadian children engage in insufficient amounts of weekly physical activity (Shields, 2006; Tremblay et al., 2010b).

Recently, a panel of researchers involved in the development of the 2011 Active Healthy Kids Canada Report Card on Physical Activity for Children and Youth reported on a variety of topics related to the physical activity behaviours of Canada's youth (Active Healthy Kids Canada, 2011). With respect to physical activity levels specifically, this interdisciplinary group of experts reviewed two primary sources of data: (1) accelerometer data from the 2007-2009 Canadian Health Measures Survey (CHMS; Colley et al., 2011); and (2) pedometer (i.e., step count) data from the Canadian Fitness and Lifestyle Research Institute's CAN PLAY survey (Canadian Fitness and Lifestyle Research Institute, 2010). The accelerometer data from the CHMS were collected from a representative sample of children (n = 1,213) aged 6 to 14 from across Canada who wore accelerometers for 7 consecutive days (Colley et al., 2011). Results revealed that a mere 7% of Canadian children and youth (9% of boys and 4% of girls) met the new Canadian Physical Activity Guidelines which suggest that children aged 5 to 11 years and youth aged 12 to 17 years should accrue at least 60 minutes of moderate to vigorous intensity physical activity (MVPA) per day (Tremblay et al., 2011). Similarly, results from the Canadian Fitness and Lifestyle Research Institute's CAN PLAY survey found that 9 to 13% of children and youth aged 5 to 19 met the targeted 16,500 steps per day (Canadian Fitness and Lifestyle

Research Institute, 2010). As a result of the appalling findings from both the CHMS and CAN PLAY, Canada's children and youth were assigned an 'F' for physical activity levels; a failing grade for the fifth year in a row (Active Healthy Kids Canada, 2011).

Although physical activity rates have been shown to be alarmingly low for Canadian children in general (Colley et al., 2011), particular sub-groups of children face an increased risk for insufficient activity levels. Among Latino children, for example, low physical activity rates can be seen as early as the age of 4, and they often persist into childhood and adolescence (Olvera, Kellam, Menefee, Lee, & Smith, 2010). In fact, research has shown that 4-year old Latino preschoolers (n = 351, mean age = 4.4 years) engaged in less physical activity than Anglo-American children as measured by observations at preschools (i.e., during unstructured recess time) and during home visits (McKenzie, Sallis, Nader, Broyles, & Nelson, 1992).

Recently, Olvera and colleagues (2010) conducted a narrative review of the literature that investigated the physical activity behaviours of Latino children in the United States. These researchers acknowledged that there is a documented ethnic disparity in terms of physical activity patterns in the literature. Specifically, they found that although low levels of physical activity are reported for all children, its prevalence is higher in minority children, and Latino children in particular (Olvera et al., 2010). Olvera and colleagues (2010) also noted a sex difference among Latino children in that Latino boys have been found to be more physically active than Latino girls; in addition, overweight Latino girls had the lowest rates of MVPA when compared to both Latino boys and Non-Latino (Caucasian) girls and boys of the same age. After completing their review, Olvera and colleagues (2010) acknowledged that most of the physical activity research conducted to date with Latino children has utilized cross-sectional designs. Furthermore, it was suggested that the methods and measurements used to measure correlates of

physical activity among Latino children have been inconsistent, and that longitudinal studies, as well as studies using valid physical activity tools such as accelerometers, are needed.

As mentioned above, the patterns of inactivity that have been documented among very young Latino children also persist into childhood and youth. One study that utilized accelerometers to assess the physical activity levels of Latino children in the United States (n = 897, age range = 4 to 19 years) was conducted by Butte, Puyau, Adolph, Vohra, and Zakeri (2007). Activity counts were divided into *sedentary*, *light*, *moderate*, and *vigorous* categories according to activity energy expenditure and physical activity ratio thresholds. Results showed that total physical activity counts significantly declined (and became more sporadic and of shorter duration) as children's age increased. In addition, the percentage of Latino children that engaged in 60 minutes or more of MVPA per day decreased significantly as age increased: 87.3% of 4 to 8 year olds, 73.2% of 8 to 12 year olds, and 37.0% of 12 to 19 year olds (Butte et al., 2007).

More recently, Aznar and colleagues (2011) examined the physical activity patterns of 9-year old children living in Spain (n = 136) using accelerometers for 4 consecutive days (2 weekend days and 2 weekdays). These researchers found that overall, there were differences between weekdays and weekend days for the average MVPA levels achieved among the children: boys achieved 81.8 minutes (SD = 34.8) of MVPA on weekdays and 76.2 minutes (SD = 40.2) on weekends, whereas girls achieved 57.5 minutes (SD = 25.3) of MVPA on weekdays and 51.5 minutes (SD = 29.9) on weekends. In other words, significantly more Spanish children achieved the Spanish Health Education Authority's Physical Activity guidelines (which suggest that youth should accumulate at least 60 minutes of MVPA per day) during the weekdays as

compared to weekend days (Aznar et al., 2011). Additionally, boys engaged in more MVPA than girls on both week and weekend days.

Sedentary Behaviours Among Children

In addition to physical activity, another factor that contributes to overweight and obesity among children is a decrease in energy expenditure through engagement in sedentary behaviours. In previous years, sedentary behaviours have been defined as the absence of physical activity. More recently, however, it has been suggested that this definition fails to acknowledge the importance of understanding what people are doing when they are not being physically active (Leatherdale & Wong, 2008). It is now recommended that sedentary behaviours should be examined independent of physical activity (Biddle, Pearson, Ross, & Braithwaite, 2010) and that its definition "should reflect more than just the mere absence of activity alone (i.e., not physically active), but specific behaviours (computer usage, motorized transportation) of very low to low intensity" (Spanier, Marshall, & Faulkner, 2006, pp. 255-56; Tremblay, Colley, Saunders, Healy, & Owen, 2010). Consequently, the definition of sedentary behaviours has been expanded to include activities in which the large skeletal muscles involved in habitual movement and postural control are very limited (Mitchell et al., 2009). Generally speaking, sitting is the most prevalent sedentary behaviour (Hamilton, Hamilton, & Zderic, 2007), while the sedentary activities that children most often engage in include watching television, playing video games, and using the computer (Leatherdale & Wong, 2008). A recent cross-sectional analysis of 4,757 participants from the 2003/04 and 2005/06 U.S. National Health and Nutrition Examination Survey (NHANES) found that increased time spent in sedentary behaviours (primarily television viewing) was associated with unfavourable body composition outcomes, decreased levels of physical fitness, increased risk for metabolic syndrome and cardiovascular disease, decreased

self-esteem, as well as behavioural problems and decreased academic achievement (Healy, Matthews, Dunstan, Winkler, & Owen, 2011). Healy and colleagues (2011) also found that there was a dose-response relationship; as sedentary time increased, so too did the abovementioned health risks.

The 2011 Active Healthy Kids Canada Report Card on Physical Activity for Children and Youth examined (for the first time) sedentary behaviours, independently from physical activity behaviours, because of the growing evidence showing that increased levels of sedentary behaviours are associated with increased risks of chronic disease, physiological problems, and psychological challenges (Katzmarzyk, Church, Craig, & Bouchard, 2009; Owen, Bauman, & Brown, 2009; Tremblay et al., 2010a). The experts involved in developing this report examined the evidence pertaining to sedentary behaviours based on how many children met the Canadian Sedentary Behaviour Guidelines for Children and Youth published through the Canadian Society for Exercise Physiology (CSEP; Tremblay et al., 2011). These guidelines recommend that for health benefits, children and youth between the ages of 5 and 17 should minimize the amount of time they spend being sedentary each day and should limit screen time (e.g., television, computer, video games, etc.) to less than 2 hours per day. Based on the available evidence, experts associated with the report card assigned Canadian children a failing grade in this area (Tremblay et al., 2011). In fact, the report card notes that Canadian children spend approximately 6 hours per day in front of screens on weekdays and upwards of 7 hours on the weekends (Active Healthy Kids Canada, 2011).

In addition to questionnaire-based data, the 2011 report card also included accelerometer-based results from the 2007-09 Canadian Health Measures Survey (CHMS; Colley et al., 2011) to illustrate time spent in sedentary pursuits. These results confirmed the alarmingly high levels

of sedentary behaviours engaged in by Canadian children and youth aged 6 to 19. Specifically, data revealed that Canadian children spent an average of 8.6 hours per day (62% of their waking hours) engaged in sedentary activities. While it was suggested that a large proportion of Canadian children's sedentary time was likely spent in front of screens (e.g., watching television, playing video games, or using a computer), Colley and colleagues (2011) analyzed accelerometer data only, and thus, were unable to determine what types of sedentary behaviours these children had engaged in.

To further explore sedentary behaviours among children, He and colleagues (2010) conducted a cross-sectional study of grade 5 and 6 students (n = 508) in London, Ontario. Results suggested that children engaged in an average of 3.3 ± 0.2 hours of screen activities per day. Interestingly, an average of 0.5 hours of daily screen viewing time took place during school hours, while the remaining time was spent outside of school hours (He et al., 2010). In addition, children engaged in slightly more screen-related sedentary behaviours on the weekends (3.6 ± 0.2 hours) compared to weekdays (3.1 ± 0.2; He et al., 2010).

Not surprisingly, Latino children appear to be no exception when it comes to excessive levels of sedentary behaviours. In fact, research has shown that Latino children in the United States spend more time engaged in screen-related sedentary behaviours than Caucasian children (Taverno, Rollins, & Francis, 2010). In 2002, Lowry, Wechsler, Galuska, Fulton, and Kann analyzed data from the 1999 National School-based Youth Risk Behaviour Survey, which consisted of questionnaires that were completed by a sample of 15,359 school-aged participants in 144 schools across the United States. Results revealed that more than half (52.3%) of Latino students engaged in more than 2 hours of television viewing per day, whereas approximately one

third (34.1%) of Caucasian students spent the same amount of time watching television (Lowry et al., 2002).

In 2009, Sission et al. examined the sedentary behaviours of 8,708 children from the U.S. National Health and Nutrition Examination Survey (NHANES) cycles 2001-02, 2003-04, and 2005-06. Results showed an ethnic difference with regard to the amount of time children spent engaged in more than 2 hours of screen time per day. Specifically, a greater proportion of Latino children spent more than 2 hours per day in front of screens compared to their European American counterparts (Sission et al., 2009).

In addition, a study conducted by McKenzie et al. (2008) used three trained observers to asses physical activity and sedentary behaviours in the homes of 139 Latino children (mean age = 6.5 years) during the after school hours. Results from this study showed that Latino children spent 74.5% of their time after school engaged in sedentary behaviours: 7.0% lying down, 48.0% sitting, and 19.5% standing (McKenzie et al., 2008).

The Measurement of Physical Activity and Sedentary Behaviours Among Children

Physical activity. It has been well documented that an accurate measurement of physical activity can be challenging, particularly among children as a results of their complex and varied activity patterns (Aznar et al., 2011). In addition, it is often difficult to interpret and compare the results of studies that have included assessments of physical activity because of the differences in measurement tools, data collection strategies, statistical analyses, and reporting methods (Adamo, Prince, Tricco, Connor-Gorber, & Tremblay, 2009; Leatherdale & Wong, 2008). Often, subjective tools such as self-report questionnaires, surveys, and interviews have been used to measure physical activity because they are easy to administer, cost-effective, and have a low participant burden (Adamo et al., 2009). Subjective measures of physical activity tend to capture

information about the type, frequency, and length of time spent in various activities; however, because these measures require children to recall what they did in the past, and because children are less time conscious and engage in a variety of activities in intermittent bouts, the responses tend to be over- or underestimates of the true amount and intensity of activity (Armstrong & Bray, 1991; Bailey et al., 1995).Thus, although subjective physical activity measures can yield useful information about the context and subjective perception of these behaviours, objective measures can also provide additional contextual information such as the type, amount, and intensity of physical activity behaviours (Reilly et al., 2008; Trost, Pate, Freedson, Sallis, & Taylor, 2000).

Objective measures of physical activity include the use of doubly labelled water (DLW), calorimetry, physiologic markers (e.g., heart rate monitoring and respiratory rate), motion sensors (e.g., accelerometers, pedometers), and direct observation (Adamo et al., 2009; Trost et al., 2000). Although these measures tend to be more costly, time-consuming, and burdensome than subjective measures, the objective measurement of physical activity removes the confounding issues of recall and response bias and yields a more contextual assessment of children's activities (Adamo et al., 2009).

Sedentary Behaviours. As mentioned previously, it has been suggested that sedentary behaviours (including the use of labour-saving devices, television viewing, and video game playing) are important to consider independently when assessing activity (and inactivity) levels (Spanier et al., 2006), particularly among children (DeMattia, Lemont, & Meurer, 2007). Similar to physical activity measures, researchers have suggested that it is difficult to obtain accurate measures of sedentary behaviours among children (Loprinzi & Cardinal, 2011). Various subjective methods have been used to measure sedentary behaviours, including self-report

surveys, self-report diaries, and parental reporting for children (Loprinzi & Cardinal, 2011); such tools are widely accepted for use in the measurement of sedentary behaviours in children (Arroll, Jackson, & Beaglehole, 1991; Treuth et al., 2003). Again, while subjective measures can provide useful behavioural and contextual information, objective measures are typically favoured because they eliminate recall and response bias and also yield more accurate and precise assessments of time spent in various activities (Adamo et al., 2009; Reilly et al., 2008; Trost et al., 2000). One of the preferred methods of objectively assessing inactivity levels (and in particular, the amount of time spent being inactive) is the accelerometer, as it provides the most practical, accurate, and reliable means of quantifying this information (Mitchell et al., 2009).

Physical Activity-Related Barriers and Facilitators

Although physical activity and sedentary behaviours are distinct constructs, they are usually examined concurrently in the literature. In fact, a recent review of 30 prospective studies provided evidence for the conclusion that there are very few studies of high methodological quality that examine the independent determinants of physical activity *and* sedentary behaviours among young people (Uijtdewilligen et al., 2011). In the following section of this dissertation, these two constructs will be presented together.

In 2007, Van Der Horst, Paw, Twisk, and Van Mechelen conducted a literature review to identify correlates of physical activity and sedentary behaviours in children and adolescents. The authors reviewed 84 papers published from 1999 to January 2005. Results revealed that the primary facilitators of physical activity for children were self-efficacy, parental physical activity, and parental support. Interestingly, Van Der Horst and colleagues (2007) found that there were insufficient data to draw conclusions pertaining to determinants of sedentary behaviours.

In terms of physical activity, the investigation of barriers is important for a number of reasons. The theoretical framework of the health belief model (HBM; a theory that purports that one's readiness to change a health behaviour is based on the perceived cost and benefits of engaging in the behaviour) suggests that perceived barriers are the most influential predictors of health behaviours (Janz & Becker, 1984). Taking into consideration the HBM and the documented levels of physical (in)activity among Latino children, it is important to consider the physical activity-related challenges that may be unique to this group of children. To this extent, Morales, Kington, Valdez, and Escarce (2002) suggested that decreased physical activity and increased sedentary behaviours may be a cultural phenomenon among Latinos. In particular, it has been suggested that there are specific cultural views among Latinos related to lifestyle, physical activity, diet, and the perception of obesity and its related health consequences that may have an impact on health behaviours (Gesell et al., 2008). For example, one cultural consideration is that some Latinos believe that overweight and obesity is a reflection of health and strength, not disease; consequently, it has been suggested that some Latinos may engage in less physical activity and more sedentary behaviours (Galanti, 2005; Gesell et al., 2008).

Additionally, there is a prominent view among Latinas (Latino mothers) that growing is good (Galanti, 2005). In fact, many Latinas do not distinguish between children who are growing in height versus those who are growing in weight as they believe that both are equally healthy (Flores et al., 2002). This acceptance of children growing fatter is particularly concerning as some Latino parents do not promote the maintenance of a healthy body with their children. As a result, some Latino parents do not encourage regular physical activity or discourage sedentary activities as an important part of their child's growth and development (Flores et al., 2002).

An important physical activity-related barrier reported by Ornsetin (2000) relates to socioeconomic status. Ornsetin (2000) used 1996 Canadian Census data and reported that the average income of Latino families living in Canada is lower than that of the rest of the Canadian population. This finding suggests that Latinos are a particularly vulnerable population that face unique challenges that may encourage obesogenic behaviours (i.e., low levels of physical activity, poor dietary habits, high amounts of screen time; Gordon-Larsen, Harris, Ward, & Popkin, 2003; Sussner, Lindsay, Greaney, & Peterson, 2008).

An additional—and related—barrier faced by some Latino families with respect to physical activity is that they often reside in lower-income neighbourhoods that have high rates of crime and are not conducive to outdoor recreational play and physical activity (Morales et al., 2002). Recently, Moore and colleagues (2010) conducted 13 focus groups with Latino parents (n = 41) in the U.S. and found that participants cited crime and danger as two main barriers that prevented their children from engaging in physical activity. In the same study, Moore and colleagues (2010) held a series of 13 focus groups with Latino children (n = 50). These children also identified crime and danger as barriers that prevented them from engaging in sufficient levels of physical activity.

In 2001, Crawford, Story, Wang, Ritchie, and Sabry examined a sample of African-American (n = 734), Latino (n = 745), and Caucasian children (n = 591) in the United States. The physical activity-related barriers identified by the Latino children included linguistic barriers; financial constraints; susceptible genes; and cultural attitudes, beliefs, perceptions, and practices regarding health, physical activity, and healthy body weight.

In addition to the many barriers cited in the literature, several activity-related facilitators have been documented among Latino children, primarily in the United States. Gesell and

colleagues (2008) examined factors that influenced the physical activity and obesity levels of Latino children in the United States, and one important factor that was highlighted was social influences. Specifically, it was found that friends or family members who believed that it was good to be physically active (or joined the child in physical activity) significantly predicted baseline physical activity; as positive social influences increased, self-reported physical activity also increased (Gesell et al., 2008). Other documented physical activity-related facilitators noted within the Latino community, by both children and adults, have included the presence of social support, increased literacy, acculturation, and a sense of safety (Amesty, 2003).

Purpose of the Study

There appear to be gaps in the literature pertaining to the physical activity levels of Latino children in that there has been little research conducted in this area in Canada, and objective measures of physical activity have rarely been used. Additionally, it has been suggested that there is a need to investigate sedentary behaviours among this population in addition to—and as a construct independent of—physical activity (Shields & Tremblay, 2008; Spanier et al., 2006). Finally, most studies related to physical activity among Latino children have not investigated and/or determined the unique cultural barriers and facilitators that these children may experience with respect to physical activity.

The primary objective of the study was to assess the physical activity levels and sedentary behaviours of Latino children aged 10-14 years in London, Ontario, using subjective (i.e., self-report) and objective (i.e., accelerometer) measures. A secondary objective was to gather qualitative data to gain a preliminary understanding of the physical activity-related barriers and facilitators faced by Latino children. In terms of the primary objective, in relation to physical activity, it was hypothesized that Latino children in London, Ontario would score lower on the

subjective measure of physical activity (the modified PAQ-C; Crocker, et al., 1997) than Canadian children. With regard to physical activity levels measured via accelerometry, it was hypothesized that Latino children would not achieve the current Canadian Physical Activity Guidelines (Tremblay et al., 2011), and would engage in less moderate-to-vigorous physical activity than Canadian children in general. In relation to sedentary behaviours, it was anticipated that Latino children would self-report that they spend more time in front of screens than Canadian children in general. It was also expected that objective measures would show that Latino children would: (a) exceed the Canadian guidelines for sedentary behaviours (Tremblay, et al., 2011); and (b) engage in more sedentary behaviours than Canadian children in general. Finally, in terms of the secondary objective, wth regard to the barriers and facilitators that are unique to this ethnocultural group, no a priori hypotheses were advanced.

Chapter 2: Method

Research Design

The present study utilized a descriptive, cross-sectional research design involving three self-report questionnaires (focused on demographic information, physical activity behaviours, and sedentary behaviours), and one direct assessment tool (i.e., an Actical® accelerometer) used to objectively measure the physical activity (and inactivity) levels of Latino children.

Participant Characteristics

Latino children aged 10 to 14 who resided in London (Ontario) or surrounding areas were invited to participate in this study. As described above, for the purpose of this project, "Latino" was defined as any individual whose origins could be traced to countries that have the Spanish language as a common identifier (e.g., the Caribbean, Mexico, Central America, and South America; Centrella-Nigro, 2009; Flores et al., 2002). To take part in this study, both the child and his/her parent(s)/guardian(s) had to: (a) self-identify as Latino; (b) be willing to participate; and (c) be able to complete and comprehend written questionnaires (available in English or Spanish). Finally, the child had to be physically able to participate in physical activity. Children who did not fit the age criteria (i.e., were less than 10 years of age or greater than 14 years of age), were not Latino, did not live in London or surrounding areas, were not physically able to participate in physical activity, or had learning disabilities that prevented them from completing questionnaires with minimal assistance were not included in this study.

Procedure

Recruitment and data collection took place during July and August 2011. Participants were recruited using an established partnership with Projenesis London, a non-profit organization that focuses on emerging issues associated with Canadians of Latino descent. Beginning in June

2011, recruitment posters (see Appendix A) were posted at local Latino establishments and businesses such as grocery stores, restaurants, public libraries, churches, laundromats, and markets. Additionally, the research team, along with Projenesis staff and volunteers, set up recruitment tents at two Latino cultural festivals that were held in London, Ontario in July, 2011: (1) Calienté, a celebration of folklore, gastronomy, and heritage of Latino Culture; and (2) Columbia's Independence Day celebration. Snowball sampling was also employed as participants were asked if they had friends or family members that could be referred to the study and were given half page flyers (see Appendix B) to pass along to potential participants.

Once the child and his or her family had verbally agreed to participate in the study, informed consent and assent were obtained from parents/caregivers and participants, respectively. First, a Letter of Information and Informed Consent (Appendix C) was given to participants and family members to delineate the nature of the study and outline any potential risks and benefits of participation. In addition, the study procedures were verbally explained to both the child and his or her caregiver(s). Once the Letter of Information and Informed Consent had been reviewed, caregivers were asked to sign the consent form as well as the media consent form (Appendix D). Finally, children were asked to sign an assent form as part of the consent process (Appendix E).

Upon receiving consent and assent, a parent/caregiver was asked to complete a brief sociodemographic questionnaire (Appendix F). This questionnaire was developed for the current study, took approximately five minutes to complete, and was utilized to gain an understanding of the ethnic, social, and economic backgrounds of the participants and their families. Children were then asked to complete a modified version of the Physical Activity Questionnaire for Children (PAQ-C; Crocker, Bailey, Faulkner, Kowalski, & McGrath, 1997 [Appendix G]), and a

modified version of the Child Sedentary Behaviour Questionnaire (CSBQ; Gortmaker et al., 1999; He, Ng, & Malik, 2004 [Appendix H]). Finally, children were asked to provide written responses for three open-ended questions related to physical activity barriers and facilitators (Appendix I). The modified PAQ-C, modified CSBQ, and open-ended questions took approximately 20-30 minutes for the children to complete. All of the questionnaires were available in English and Spanish (see Appendices J, K, L, and M for Spanish versions). The questionnaires that were completed by the children were always done in the presence of their parent(s)/caregiver(s). A trained research assistant and an English/Spanish speaking translator were also available to provide assistance when/if needed.

Following completion of the abovementioned questionnaires, children's anthropometric data were collected for descriptive purposes. First, the child's height was measured using the Seca 214 "Road Rod" Portable Stadiometer following a standardized procedure (Appendix N). All participants were measured twice by the same researcher, and the researcher recorded all measurements to the nearest 0.1 cm; if the two measurements were more than 0.5 cm apart, a third measurement was taken.

Second, children's Bioelectrical Impedance Analysis (BIA; TANITA Body Composition Analyzer, TBF-410, Japan) was completed. BIA is an inexpensive and simple technique used to assess the adiposity of children, and research has shown that it is a valid measure that is sensitive and sufficiently reliable to assess body fat content in children (Lazzer et al., 2005; Okasora et al., 1999).The TANITA Body Composition Analyzer was set up on a hard, level flooring surface and weight was recorded to the nearest 100.0 g (0.1 kg). This procedure was repeated and if measures did not agree within 100.0 g (0.1 kg), a third measure was taken. In addition to weight,

the TANITA Body Composition Analyzer calculated several other body composition indices, including body fat percentage and fat free mass.

Although an overall increase in total body fat is associated with disease development, research suggests that abdominal fat is an independent predictor of disease development in children, irrespective of overall fatness (McCarthy, 2006; Mehta, Richards, Lorber, & Rosenthal, 2009). The anthropometric measurement of waist circumference has been demonstrated as a convenient means to estimate visceral adipose tissue (Pare et al., 2001; Rankinen, Kim, Perusse, Despres, & Bouchard, 1999). In the present study, one researcher measured the waist circumference of the children, above the umbilicus, using the same measuring tape for each measurement. Waist circumference was recorded to the nearest 0.1 cm, following the same procedure described above for weight and height (i.e., taking three measurements if necessary). A full description of the protocol used for waist circumference can be found in Appendix N. The researcher recorded the: (a) height, weight, and waist circumference on the Anthropometric Recording Sheet (Appendix O); and (b) date and participant identification number on the top of the print-outs from the TANITA Body Composition Analyzer.

Following participation in the previously described data collection events, all participants were invited to wear an accelerometer to assess objective levels of physical activity and inactivity. Participants were asked to complete an Actical® consent form (Appendix P) if they were interested in this phase of the study. The Actical® (MiniMitter, Oregon) is an "omnidirectional" tri-axial accelerometer that senses motion in all directions by detecting low frequency (0.5 to 3.2 Hz) G-forces (0.05 to 2.0 Hz) which are common in human movement. This device was selected because not only is it small, lightweight, and water resistant, but it has

also been shown to be a valid and reliable predictor of physical activity and energy expenditure in youth (Heil, 2006; Trost et al., 2000).

In the present study, children were asked to wear the Actical® during waking hours for a minimum of ten hours per day. The raw data counts stored by the Actical® were based on the magnitude and duration of the sensed accelerations (Heil, 2006), and all data were blind to participants while the device was worn. Accelerometers were worn for four consecutive days – Thursday, Friday, Saturday, and Sunday. Two weekdays and two weekend days were selected because previous research has shown that the physical activity patterns of Spanish children differ between weekdays and weekend days (Aznar et al., 2011).

The primary researcher and a volunteer from Projenesis telephoned the parent/guardian of each participant to confirm that the child was willing to wear the Actical®, as well as to determine a convenient time to drop off the accelerometer. A standard telephone script was used (Appendix Q). Upon arrival at the participants' homes, children were given an Actical® Information Sheet for Participants (Appendix R) and an Actical® Recording Sheet for Participants (Appendix S). The same researcher informed both the participant and his or her parent(s) or guardian(s) about proper care and how to wear the device. Children were instructed to wear the Actical® under their clothing on their right hip, and to: (a) put on the Actical® first thing in the morning; (b) push the small button on the back of the Actical® every time he/she put on or removed the device; (c) take off the Actical® before going to bed each night; (d) avoid getting the Actical® wet (i.e., remove prior to swimming or bathing); and (d) fill out the recording sheet every day. All forms, questionnaires, and procedures discussed above were approved by The University of Western Ontario Research Ethics Board (Appendix T).

Measures

As mentioned above, a parent and/or caregiver was asked to complete a brief sociodemographic questionnaire that asked questions about age, height, weight, sex, country of origin, and number of years in Canada (Appendix F). Following completion of the sociodemographic questionnaire, children were asked to complete three self-report questionnaires pertaining to physical activity levels, sedentary behaviours, and barriers and facilitators related to physical activity.

The first questionnaire that was administered was a modified version of the Physical Activity Questionnaire (PAQ-C; Crocker, et al., 1997 [Appendix G]). This tool was designed for children aged 10 to 14, and it is used to collect information about children's physical activity levels over the previous 7 days. It consists of 10 questions, 9 of which are scored on a 5-point Likert scale, with higher values indicating greater levels of physical activity. Evidence exists confirming the reliability and validity of the PAQ-C (Crocker et al., 1997). The PAQ-C was intended to be administered during the school year; however, because data collection for this study was completed during the summer months, some of the PAQ-C questions were modified to reflect this temporal change. For example, three of the items included the words "school", "physical education classes", or "recess" (e.g., "In the last 7 days, on how many days *right after school*, did you do sports, dance, or play games in which you were very active?"). These were modified to reflect corresponding times during the day outside of school (e.g., "In the last 7 days, on how many days *in the afternoon [from after lunch until supper time]*, did you do sports, dance, or play games in which you were very active?"). The tenth and final question on the PAQ-C asked participants if they were sick or did anything that would prevent them from

engaging in their normal activities. This question was intended to identify whether participants had an unusual physical activity pattern during the previous week.

Upon completion of the modified PAQ-C, participants completed a modified version of the Child Sedentary Behaviour Questionnaire (CSBQ; He et al., 2004; [Appendix H]). The CSBQ was adapted from a tool developed by Gortmaker and colleagues (1999), and was validated by He and colleagues in 2004. Specifically, He and colleagues (2004) found that the adapted CSBQ was a reliable and valid tool that could be used to measure screen viewing and sedentary behaviours in children. This tool was selected to provide additional contextual information pertaining to the types of sedentary behaviours in which Latino children engaged. To complete the CSBQ, children were asked to recall: (a) how many hours they spent engaged in screen-related activities every day for the past week (e.g., "In the past week, how much time did you spend watching TV, playing video games, and using computers? Write down the number of hours you did each activity, rounding to the nearest half-hour."); and (b) how many shows they watched each day for the past week (e.g., "In the past week, how many TV programs did you watch? Write down the number of program(s) you watched in each space."). If children were unable to recall these behaviours, they were instructed to indicate the amount of time they would spend engaged in each activity during a "typical" week.

Following completion of the modified PAQ-C and modified CSBQ, children were asked to complete a one page questionnaire (Appendix I) that consisted of three open-ended questions related to perceived barriers and facilitators to physical activity. Specifically, participants were asked the following questions: (1) "Are you as physically active as you would like to be? If you checked no, what are some things that stop you from being as active as you want to be?"; (2) "What do you think would be helpful for you if you wanted to engage in more activities? Is there

anything that you can think of that would make it easier for you to get active?"; and (3) "What do you think would help kids like you in your community to become more physically active?".

As mentioned above, following completion of the questionnaires, anthropometric data, including waist circumference, weight, and height, were collected. Height and weight measurements were measured to determine the participant's Body Mass Index (BMI = weight/height^2). However, since BMI does not take into consideration age and growth (Ogden et al., 2002; Oude Luttikhuis et al., 2009; Wilfley et al., 2007), standardized BMI (BMI-*z*) was also calculated. BMI-*z* is interpreted such that a score of zero is an average score and each score above or below zero is one standard deviation above or below normal (Cole, Faith, Pietrobelli, & Heo, 2005). BMI-*z* has been shown to be an effective way to assess adiposity among children on a single occasion (Cole et al., 2005).

Statistical Analyses

Quantitative data collected from the sociodemographic questionnaire, the modified PAQ-C, and the modified CSBQ were entered into SPSS (version 17.0, SPSS Inc., Chicago). Responses from the sociodemographic questionnaire were entered into SPSS and the frequencies and/or means pertaining to each question were calculated.

Data from the modified PAQ-C were scored to obtain an activity score between 1 and 5 for each item (Kowalski, Crocker, & Donen, 2004). For item 1, the mean of all activities (1 representing "no" activity and 5 representing "7 times or more" in the previous week) on the activity checklist was calculated to form a composite score. For items 2 to 8, the five available physical activity responses (i.e., *none*, *1 time last week*, *2 or 3 times last week*, 4 *or 5 times last week*, and *6 or 7 times last week*) corresponded with values from 1 through 5. A composite score for item 9 was calculated by determining the mean of all of days of the week (1 representing

"none" and 5 representing "very often"). Finally, the purpose of item 10 was to identify students who had unusual activity patterns during the previous week; consequently, this question was not used as part of the summary activity score. To calculate a final modified PAQ-C activity summary score, the mean of the values from items 1 through 9 were calculated. Differences in self-reported physical activity levels between boys and girls were examined using independent samples *t*-tests.

Insofar as the modified CSBQ was concerned, children's total screen time was calculated by adding the total amount of time children reported engaging in screen-related activities. An average value for both weekdays and weekend days as well as for boys and girls was then calculated, and differences between these variables was examined using independent samples and paired *t*-tests. Additionally, as previously mentioned, CSEP's Canadian Sedentary Behaviour Guidelines for Children and Youth (Tremblay et al., 2011) recommended that children and youth between the ages of 5 and 17 should limit screen time to less than 2 hours per day. Thus, children were categorized into two groups based on their self-reported total daily screen time: those who met the Canadian Sedentary Behaviour Guidelines for Children and Youth and those who exceeded the guidelines.

The qualitative data collected from the open-ended physical activity questions were analyzed using inductive content analysis. Several techniques were used to promote the trustworthiness and credibility of the findings. To ensure confirmability, two researchers performed inductive content analysis independently. Additionally, to avoid potential bias, investigator triangulation took place; as the analysis proceeded, a coding template evolved that allowed for the expansion of key themes, which were then coded by sex. Data analysis was

assisted by the qualitative software QSR NVivo (QSR NVivo 9, 2010, QSR International: Victoria, Australia).

Objective physical activity (and inactivity) data, as assessed by Actical® accelerometers, were collected via 15 second epochs. All Actical® devices were programmed with the participant's personal information (e.g., age, weight, and height). The raw data were analyzed using custom software *KineSoft* (Version 3.3.62) to produce a series of standardized outcome variables similar to the procedures outlined by Esliger, Copeland, Barnes, and Tremblay (2005) and Esliger and Tremblay (2007). For analyses, a day was defined as valid if it had 10 or more hours of monitor wear time (Colley et al., 2011; Troiano et al., 2008). Based on a law of probability that results in an estimated prevalence of adherence reported by Troiano and colleagues (2008), participants with one or more valid days of accelerometer data were included in the analyses. Wear time was obtained by subtracting non-wear time from 24 hours, and non-wear time was defined as 60 or more consecutive minutes of zero counts (i.e., 60 minutes or longer of no data as recorded by the accelerometer).

The main variables of interest were total activity counts, total activity time in minutes (i.e., sedentary, light, moderate, vigorous, and moderate-to-vigorous [MVPA] time), accumulation of MVPA (during the morning, afternoon, evening, and overnight as well as in bouts of 10, 10-20, and 20 or more minutes), and amount of inactivity (i.e., sleep hours and sedentary hours). First, total counts per week were used to evaluate the raw data without imposing cut-point decisions. This outcome variable was chosen because it includes all ambulatory activity and thus provides a more complete picture of children's overall physical activity. Second, cut-points were used to classify the data according to level of intensity (light, moderate, or vigorous). To obtain MVPA the moderate and vigorous levels of intensity were

summed. To be counted as a bout of MVPA, 10, 10-20, or 20 or more consecutive minutes of observations had to exceed the moderate intensity cut-point; these cut-points used were in accordance with Actical® manufacturer recommendations (Heil, 2006). Intensity level cut-points corresponded to the following metabolic equivalent of task (MET) and activity energy expenditure (AEE) values: sedentary (<0.015 kcal/kg/min), light (≥0.015 and <0.05 kcal/kg/min), moderate (≥0.05 and <0.10 kcal/kg/min), and vigorous (≥0.10 kcal/kg/min). These MET-values have been validated for children (Puyau, Adolph, Vohra, & Butte, 2002). Data were examined based on sex as well as weekday and weekend days, and differences between these values were examined using independent samples and paired *t*-tests.

Finally, anthropometric data were entered into SPSS (version 17.0, SPSS Inc., Chicago). BMI-*z* was calculated using the LMS method (Ogden et al., 2002; Ward, Evenson, Vaughn, Rodgers, & Troiano, 2005) with an online calculator from the U.S. Department of Agriculture/Agricultural Research Service Children's Nutrition Research Center (USDA/ARS Children's Nutrition Research Center, 2007). This calculator converts BMI to a *z*-score adjusted for age and sex using the U.S. CDC 2000 growth charts (Ogden et al., 2002).

Chapter 3: Results

Recruitment

Study recruitment took place between July and August 2011. During this time, a total of 74 Latino children agreed to participate in the study. The majority of participants (62.2%; *n* = 46) were recruited via word-of-mouth, 35.1% (*n* = 26) were recruited at Latino celebrations, and the remaining 2.7% (*n* = 2) were recruited through posters placed at local community establishments. Figure 1 provides an overview of the general study procedure and timeline from recruitment to analyses.

Participant and Family Characteristics

Participant characteristics are provided in Table 1. More than half of the sample (54.1%; *n* = 40) was comprised of boys and 45.9% (*n* = 34) were girls. The mean age of participants was 11.4 years (*SD* = 1.3). Only 10.8% of the children (*n* = 8) were born in Canada; of the 89.2% (*n* = 66) born elsewhere, the majority (71.6%; *n* = 53) were born in Columbia, followed by El Salvador (8.1%; *n* = 6), the United States (5.4%; *n* = 4), Mexico (1.4%; *n* = 1), and Peru (1.4%; *n* = 1). With regard to body composition, mean BMI-*z* score was 0.6 (*SD* = 1.1), mean body fat percentage was 20.7% (*SD* = 10.96) and mean waist circumference was 74.5cm (*SD* = 15.3).

Insofar as the family characteristics are concerned, 100.0% of the parents/guardians who completed the sociodemographic questionnaire indicated that they had immigrated to Canada. The majority of parents/guardians (83.8%; *n* = 62) reported that they were born in Columbia, followed by El Salvador (10.8%; *n* = 8), Mexico (2.7%; *n* = 2), and Chile (1.40%; *n* = 1). Among the parents/guardians that provided their annual family income, 41.9% (*n* = 31) reported an income in the range of $23,000 - $39,999 and 32.4% (n = 24) reported an annual income of less

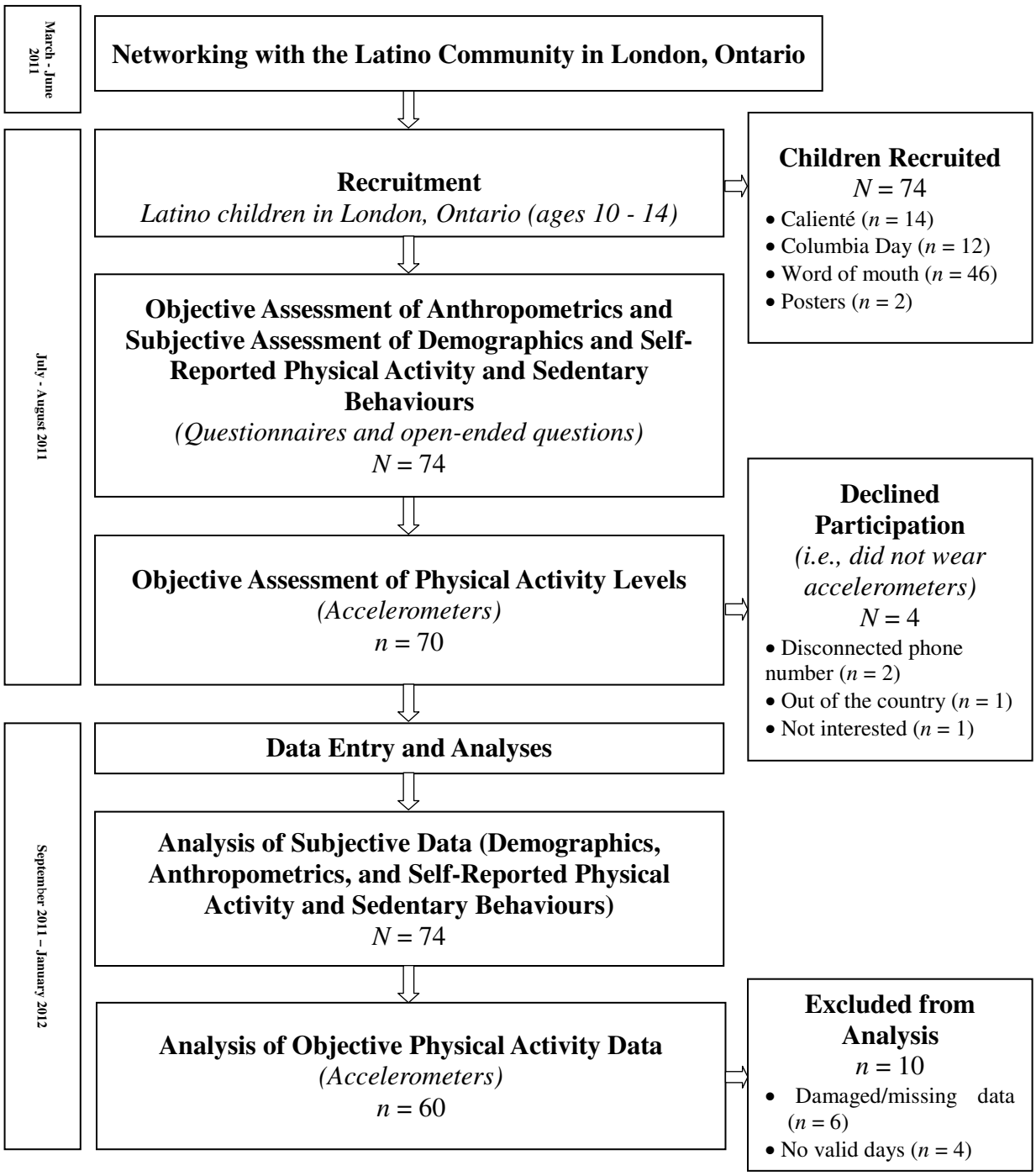

Figure 1. An overview of procedure and timeline from recruitment to analyses.

Table 1

Participant Characteristics

	N	Minimum	Maximum	Mean	*SD*
Age (years)	74	10.00	14.00	11.41	1.33
Sex					
Male	40 (54.1%)				
Female	34 (46.0%)				
Height (cm)	74	127.05	174.50	148.93	10.93
Weight (kg)	74	24.90	84.45	46.61	14.44
BMI[a]	74	14.30	33.00	20.23	4.44
BMI-z score[b]	74	-1.59	2.92	0.57	1.19
Waist Circumference (cm)	74	25.85	112.50	74.50	15.30
Body fat (%)	73	11.68	49.92	20.65	10.96
Fat free mass (%)	73	15.43	98.32	77.12	14.53
Country child born in					
Canada	8 (10.8%)				
Columbia	53 (71.6%)				
Mexico	1 (1.4%)				
El Salvador	6 (8.1%)				
USA	4 (5.4%)				
Peru	1 (1.4%)				

Note. BMI = Body Mass Index; BMI-z = Standardized Body Mass Index score.
[a]BMI =weight/height^2
[b]BMI-*z* is interpreted such that a score of zero is an average score and each score above or below zero is one standard deviation above or below normal (Cole, Faith, Pietrobelli, & Heo, 2005).

than $23,000. Only 9.5% (*n* = 7) of parents/guardians reported an annual family income greater than $55,000. Most parents/guardians indicated that they had received education at the college/university level (73.0% of mothers/female guardians [*n* = 54] and 64.4% of fathers/male guardians [*n* = 47]). Additionally, 31.4% of mothers/female guardians (*n* = 22) and 60.9% of fathers/male guardians (*n* = 39) reported full time employment. Table 2 contains an overview of the participants' family sociodemographic information.

Physical Activity Levels

Subjective measurement. Thirty nine boys and 34 girls completed the modified PAQ-C (Crocker et al., 1997; Appendix G). Overall, participants received a mean activity score of 2.76 (*SD* = 0.63; min = 1.00, max =4.72), out of a maximum score of 5. With regard to sex, boys self-reported as significantly more active than girls (mean activity score = 2.90 [*SD* = 0.63] and 2.61 [*SD* = 0.59] respectively; $t(72) = 2.08$, $p = 0.04$). As mentioned previously, the first item on the modified PAQ-C asked children to indicate whether they had engaged in a number of different physical activities in the past 7 days (in their spare time). The three activities that boys reported engaging in most frequently in the past week were jogging, bicycling, and soccer; girls selected dance, walking, and swimming most frequently. The scale reliability was acceptable for both females (Cronbach's alpha [α] = 0.83) and males (α = 0.80).

Objective measurement. Table 3 contains data pertaining to objectively assessed physical activity (and inactivity) levels. Results showed that children wore Actical® accelerometers for an average of 12.3 hours (*SD* = 1.2) per valid day (10 or more hours of monitor wear time).

Table 2

Participant's Family Sociodemographic Information

Sociodemographic Variable	Mean (*SD*)
Number of children in the family (*n* = 73)	2.45 (1.01)
Number of years the parent/guardian has lived in Canada (*n* = 73)	6.66 (4.46)
	n (%)
Country parent/guardian[a] born in (*n* = 73)	
Columbia	62 (83.8)
Mexico	2 (2.7)
El Salvador	8 (10.8)
Chile	1 (1.4)
Highest level of education the child's father has completed (*n* = 73)	
grade 8 or less	5 (6.8)
high school	11 (14.0)
some college/ university	4 (5.4)
college/university	47 (63.5)
graduate school	6 (8.1)
Highest level of education the child's mother has completed (*n* = 74)	
grade 8 or less	3 (4.1)
some high school	1 (1.4)
high school	6 (8.1)
some college/ university	7 (9.5)
college/university	54 (73.0)
graduate school	3 (4.1)
Child's father's current work status (*n* = 64)	
employed full-time	39 (52.7)
employed part-time	7 (9.5)
student	14 (18.9)
stays at home	3 (4.1)
Other	1 (1.4)
Child's mother's current work status (*n* = 70)	
employed full-time	22 (29.7)
employed part-time	17 (23.0)
student	21 (28.4)
stays at home	9 (12.2)
Other	1 (1.4)
Family's approximate yearly family income from all sources (*n* = 73)	
less than $23,000	24 (32.4)
$23,000-$39,999	31 (41.9)
$40,000-$55,000	11 (14.9)
more than $55,000	7 (9.5)

Note. [a]Refers to the parent/guardian that completed the questionnaire.

Table 3

Objectively Assessed Physical Activity (PA) and Inactivity of Latino Children, Using Actical® Accelerometers

Amount and intensity of PA or Inactivity	Day 1 Thu	Day 2 Fri	Day 3 Sat	Day 4 Sun	Daily avg	Weekday avg	Weekend day avg
N	42	40	43	28	60	51	51
Average daily wear minutes	754	766	721	738	736	759	727
	(77)	(101)	(91)	(99)	(72)	(81)	(83)
Average daily non-wear minutes	685	673	718	702	686	676	716
	(77)	(101)	(91)	(99)	(153)	(82)	(121)
Sedentary minutes	528	539	512	488	522	533	506
(<0.015 kcal/kg/min; e.g., car travel, sitting, reclining, standing)	(102)	(102)	(81)	(77)	(89)	(107)	(67)
Light minutes	168	177	164	186	170	168	173
(≥0.015 and <0.05 kcal/kg/min; e. g., walking less than 3.2 kilometers per hour, light play)	(58)	(57)	(47)	(56)	(46)	(52)	(46)
Moderate minutes	53	48	41	62	49	48	50
(≥0.05 and <0.10 kcal/kg/min; e. g., walking more than 3.2 kilometers per hour, aerobics)	(35)	(34)	(32)	(38)	(31)	(33)	(31)
Vigorous minutes	6	2	4	3	4	4	3
(≥0.10 kcal/kg/min; e. g., jogging, running)	(8)	(4)	(10)	(4)	(6)	(5)	(7)
Moderate-to-Vigorous PA minutes	59	50	45	64	53	53	51
	(41)	(36)	(41)	(39)	(34)	(35)	(37)
Accumulation of Moderate-to-Vigorous PA							
When:							
Morning minutes (6AM - 12PM)	17	11	7	9	11	15	8
	(22)	(21)	(12)	(8)	(17)	(21)	(11)
Afternoon minutes (12PM - 6PM)	20	20	23	34	24	21	28
	(15)	(16)	(26)	(23)	(16)	(13)	(27)
Evening minutes (6PM - 12AM)	22	19	15	22	19	19	18
	(19)	(20)	(15)	(19)	(14)	(14)	(15)
Overnight minutes (12AM - 6AM)	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)

Amount and intensity of PA or Inactivity	Day 1 Thu	Day 2 Fri	Day 3 Sat	Day 4 Sun	Daily avg	Weekday avg	Weekend day avg
How							
Sporadic (<10 continuous) minutes	57	49	44	63	50	50	49
	(40)	(35)	(40)	(39)	(34)	(34)	(37)
Short bout (10-19 continuous) minutes[a]	7	4	6	4	5	5	5
	(11)	(8)	(15)	(11)	(8)	(9)	(14)
Long bout (20+ continuous) minutes[b]	0	0	0	0	1	1	1
	(0)	(0)	(0)	(0)	(3)	(4)	(5)
Short and long bout (10+ continuous) minutes	7	5	6	5	5	6	6
	(12)	(11)	(16)	(13)	(9)	(10)	(14)
Amount of inactivity: Sleep hours (monitor off time)	11.4	11.2	12.0	11.7	11.5	11.3	11.9
	(1.3)	(1.7)	(1.5)	(1.6)	(1.9)	(1.2)	(1.6)
Sedentary hours	8.8	9.0	8.5	8.1	8.6	8.8	8.4
	(1.7)	(1.7)	(1.3)	(1.3)	(1.4)	(1.6)	(1.3)

Note. Standard Deviations indicated in parentheses. Some totals do not add up to 100.00% due to rounding. MET = metabolic equivalent of task.

[a]allowing 1 min <3 METs

[b]allowing 2 min <3 METs

***Light intensity physical activity*.** Children spent an average of almost three hours (170.26 minutes, *SD* = 46.27) per day engaged in light intensity physical activity. Boys spent an average of 2.78 hours (167. 90 minutes, *SD* = 53.62) engaged in light intensity physical activity, whereas girls spent an average of 2.62 hours (157. 97 minutes, *SD* = 54.77) per day engaged in light intensity physical activity; this difference was not statistically significant ($t(58) = 0.71$, $p = 0.48$). In terms of weekend versus weekend day light intensity physical activity, there were no significant differences ($t(58) = 0.62$, $p = 0.16$); children engaged in 167.70 minutes (*SD* = 52.42) on weekdays and 173.05 minutes (*SD* = 45.91) on weekend days.

Moderate-to-vigorous physical activity. Overall, children spent an average of 53.11 minutes (*SD* = 34.20) per day engaged in moderate-to-vigorous physical activity (MVPA). Boys spent an average of just under one hour per day (53.85 minutes, *SD* = 34.24) engaged in MVPA, whereas girls spent 48.22 minutes (*SD* = 35.69) per day engaged in MVPA; this difference was not significant ($t(58) = 0.64$, $p = 0.54$). Almost all MVPA (92.3%; 49.32 minutes, *SD* = 31.07) was accumulated at a moderate intensity. A large proportion of MVPA took place during the afternoon (44.0%; 24.22 minutes, *SD* = 16.29) or evening hours (35.1%; 19.26 minutes, *SD* = 14.11), and almost all of it (94.3%; 50.03 minutes, *SD* = 34.22) was sporadic (i.e., less than 10 continuous minutes). There were no significant differences ($t(58) = 0.90$, $p = 0.93$) between the amounts of MVPA children engaged in on weekdays (53.03 minutes, *SD* = 35.61) versus weekend days (51.27 minutes, *SD* = 37.63).

In terms of the amount of MVPA children engaged in on a daily basis, only one (male) participant (1.6% of the sample) engaged in at least 60 minutes on all four days of accelerometer wear time. Approximately half of boys (51.7%, *n* = 16) and 44.8% of girls (*n* = 13) achieved 60 minutes of MVPA on at least one of the four days (see Figure 2). A greater proportion of

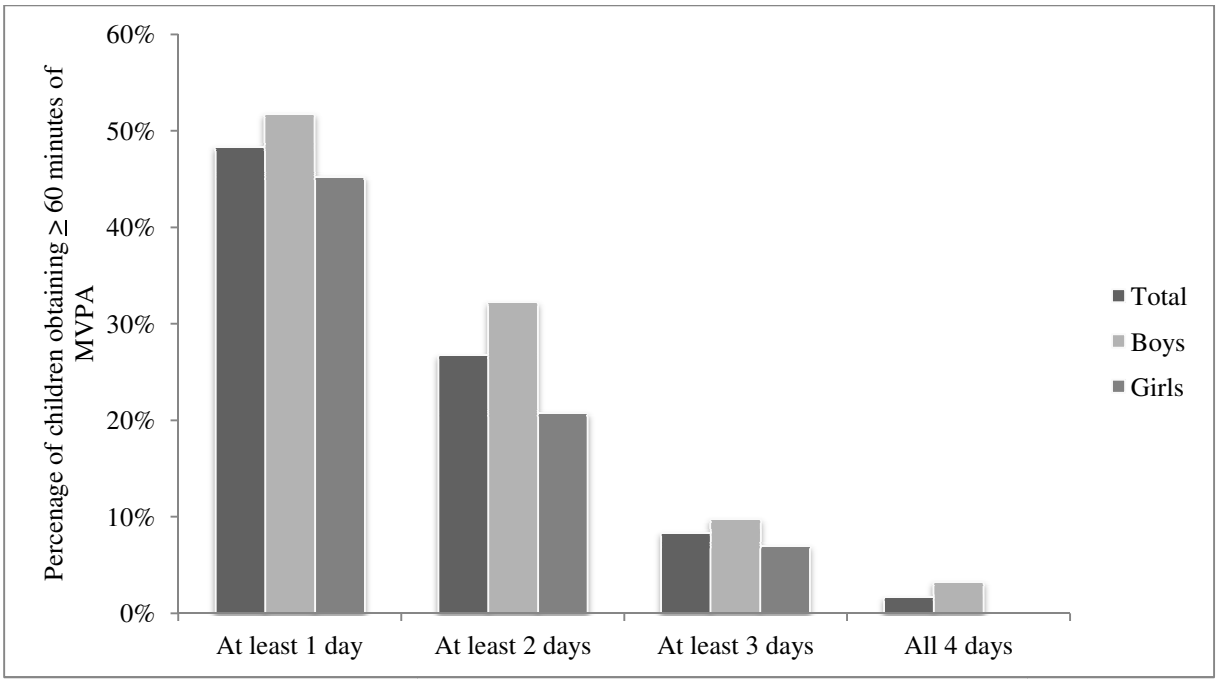

Figure 2. Percentage of Latino children (n = 60) obtaining at least 60 minutes of moderate-to-vigorous intensity physical activity (MVPA), by sex (boys, n = 31; girls, n = 29), on at least 1, 2, 3, and 4 days of Actical® wear time.

children accumulated 30 minutes of MVPA per day; 9.7% of boys (n = 3) and 3.4% (n = 1) of girls did so on all four days, and the majority of boys (87.1%, n = 27) and girls (75.9%, n = 22) accumulated 30 minutes of MVPA on at least one valid day.

Sedentary Behaviours

Subjective measurement. A total of 73 respondents completed the modified Child Sedentary Behaviour Questionnaire (CSBQ; Gortmaker et al., 1999; He et al., 2004 [Appendix H]). The mean amount of time children spent engaged in screen-related sedentary behaviours per day was 3.8 hours (SD = 2.0); of those hours, 1.8 hours (SD = 1.4) were spent watching TV, 1.2 hours (SD = 1.2) were spent on the computer, and 0.9 hours (SD = 1.00) were spent playing video games (see Figure 4 for a breakdown of screen-related sedentary behaviours by sex). Overall, boys spent more time (3.88 hours, SD = 1.91) engaged in screen-related sedentary behaviours than girls (3.7 hours, SD = 2.1), although this difference was not statistically significant ($t(71) = 0.42$, $p = 0.83$). Interestingly, no significant difference was found between the amount of time participants spent engaged in sedentary behaviours on weekdays (4.1 hours, SD = 3.2) versus weekend days (4.0 hours, SD = 2.6; $t(73) = 0.24$, $p = 0.81$).

Children were also classified as high or low screen users based on the new Canadian Sedentary Behaviour Guidelines for School-Aged Children and Youth advanced by the Canadian Society for Exercise Physiology (Tremblay et al., 2011). Given that accelerometers measure time spent in physical activity/inactivity, but do not provide a measure of screen time specifically, children were classified as high screen users if they provided responses on the CSBQ indicating that they spent more than 2 hours per day in front of screens. Conversely, children were classified as low screen users if they reported that they spent less than 2 hours per day in front of screens (see Figure 5). Overall, 15.1% of participants (n = 11) were classified as low screen users

Figure 3. Average number of ho

on all 4 days of Actical® wear ti

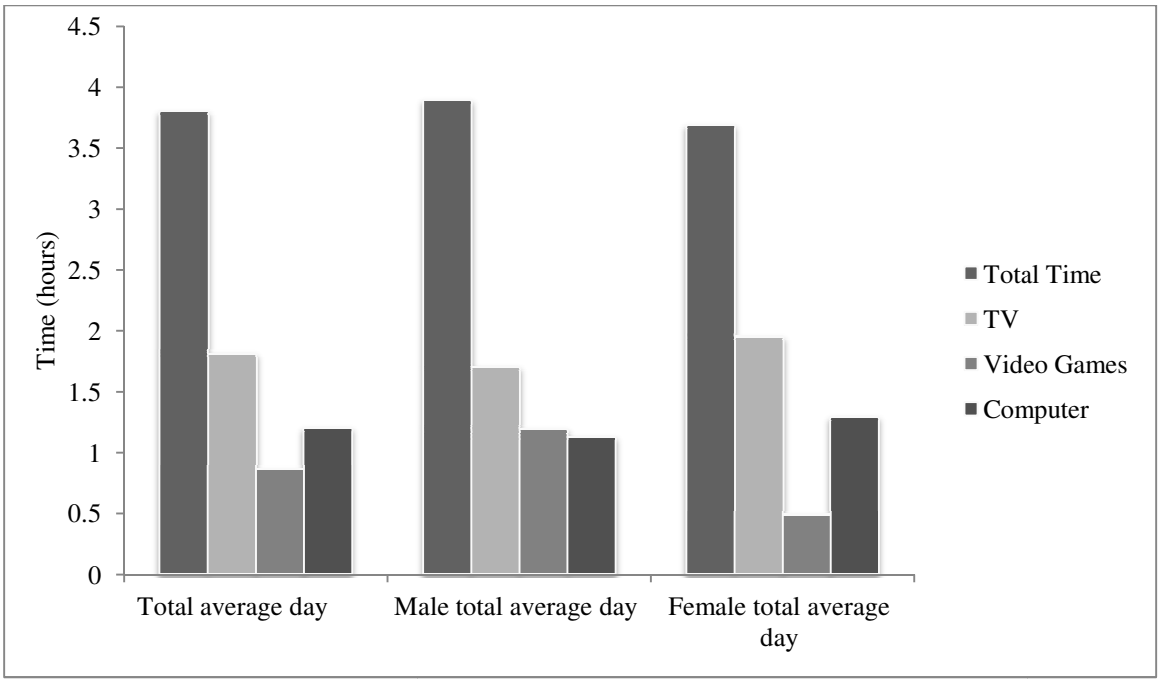

Figure 4. Self-reported screen viewing behaviours of Latino children (n = 73), by sex (boys, n = 39; girls, n = 34), as measured by the modified Child Sedentary Behaviour Questionnaire (Gortmaker et al., 1999; He et al., 2004).

and 84.9% (n = 62) were classified as high screen users. In terms of sex differences, 12.8% (n = 5) of boys and 17.6% (n = 6) of girls were considered low screen users, and the remaining 87.2% of boys (n = 34) and 82.4% (n = 28) of girls were classified as high screen users. Additionally, 66.7% of boys (n = 11) and 61.8% of girls (n = 11) accumulated more than 3 hours of screen time per day, and 48.7% (n = 11) of boys and 35.3% (n = 11) of girls accumulated more than 4 hours of screen time per day.

Objective measurement. In addition to providing a measurement of time spent in physical activity, Actical® accelerometers were used to record the amount of time children spent being inactive. The total daily sedentary time for children (n = 60) was 8.6 hours (SD = 1.4); in other words, 70.0% of the participants' waking hours were spent being inactive. Girls were more inactive than boys (8.8 hours, SD = 1.4 and 8.4 hours, SD = 1.5, respectively), although the difference was not statistically significant ($t(58) = 0.94$, $p = 0.35$). Additionally, there was no significant difference ($t(59) = 1.65$, $p = 0.10$) between the amount of time participants spent engaged in sedentary behaviours on weekdays (8.9 hours, SD = 1.6) versus weekend days (8.4 hours, SD = 1.3). Figure 3 shows the average number of hours of sedentary behaviour that children engaged in on all four days of Actical® wear time.

Physical Activity Barriers and Facilitators

In addition to providing information related to their physical activity and screen-viewing behaviours, children were asked three open-ended questions pertaining to physical activity barriers and facilitators. Participants identified seven main barriers (Figure 6) and eleven main facilitators (Figure 7) related to physical activity participation.

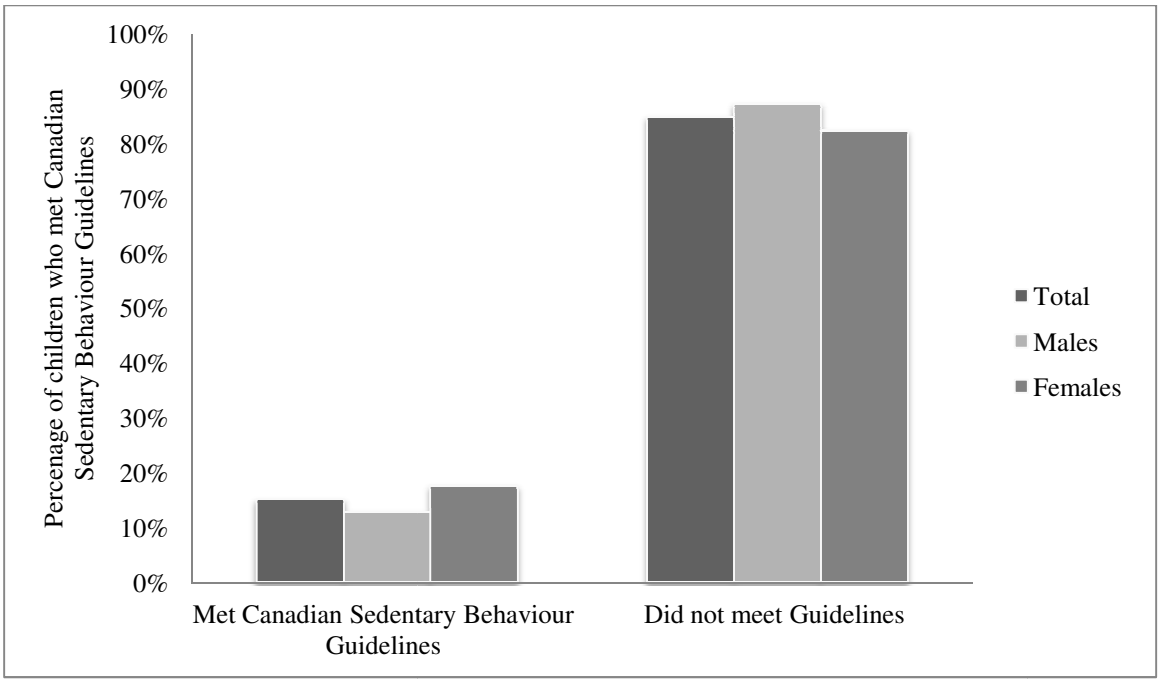

Figure 5. Percentage of Latino (n = 73) children, by sex, who did not exceed (boys, n = 5; girls, n = 6) or who did exceed (boys, n = 34; girls, n = 28) the Canadian Sedentary Behaviour Guidelines for School-Aged Children and Youth (Tremblay et al., 2011) of less than 2 hours of accumulated screen time per day.

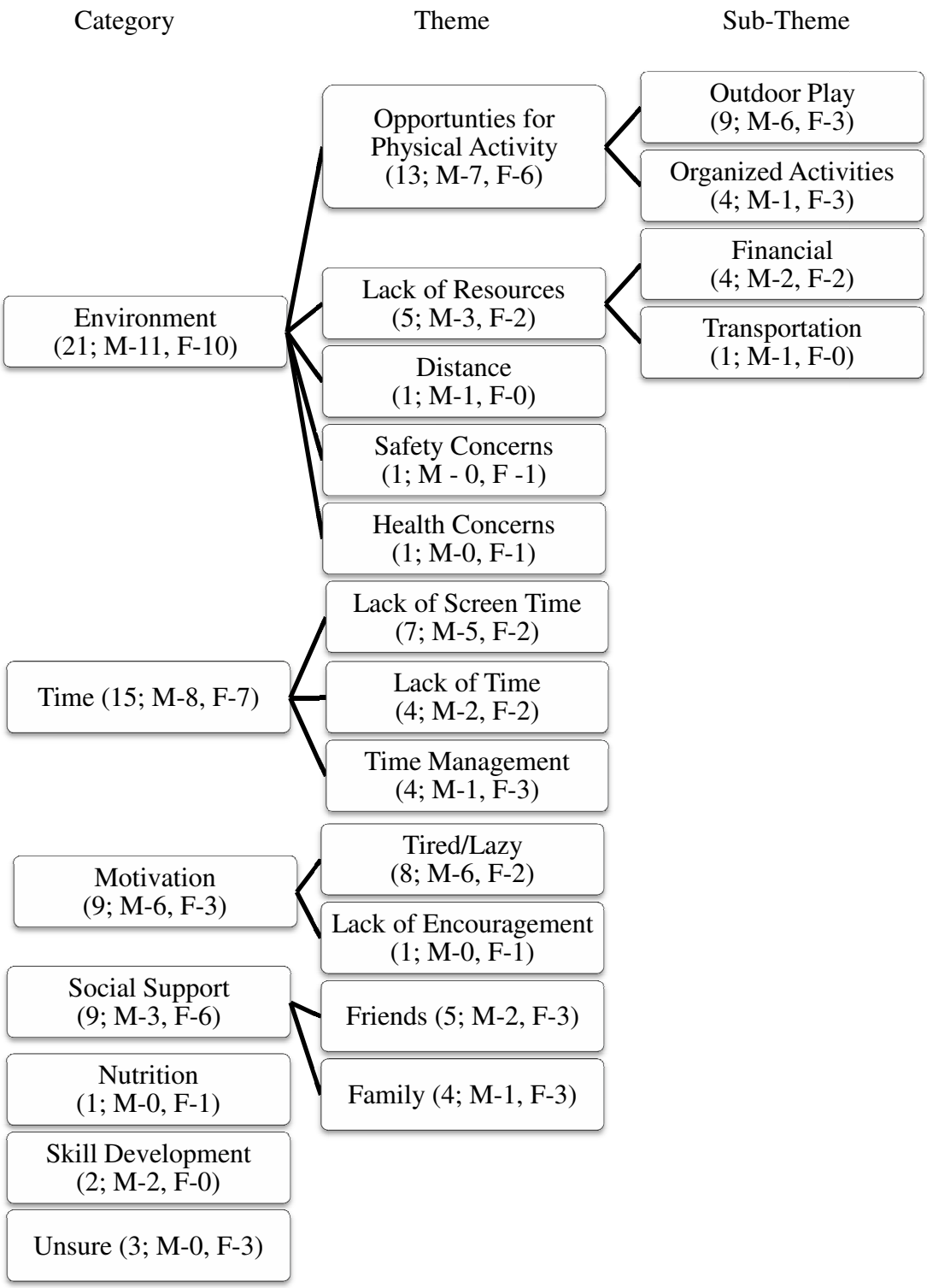

Figure 6. Hierarchical tree illustrating barriers to physical activity as identified by Latino children (n = 74). Frequencies indicated in parentheses. M = male (n = 40); F = female (n = 34).

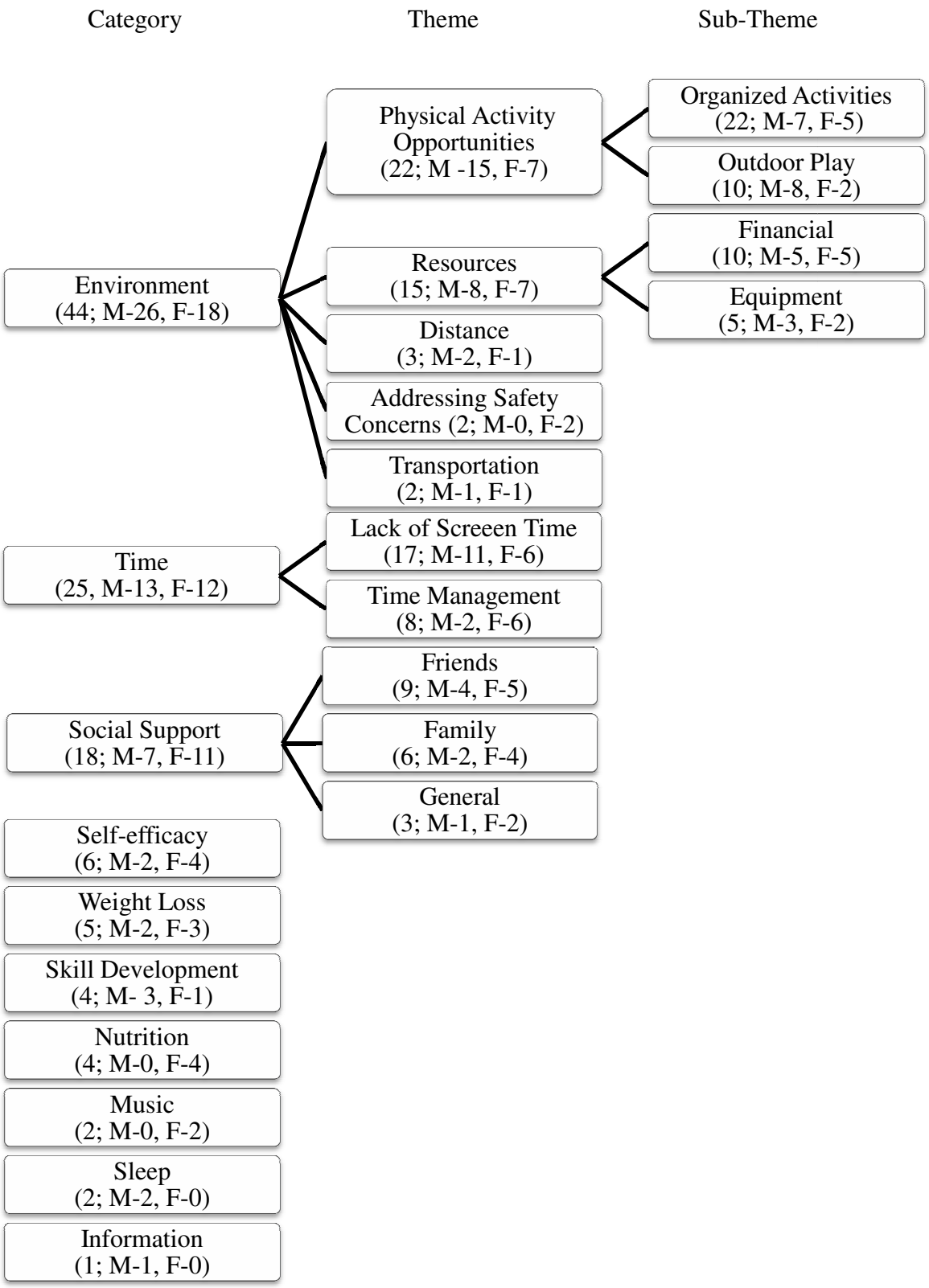

Figure 7. Hierarchical tree illustrating facilitators to physical activity as identified by Latino children (n = 74). Frequencies indicated in parentheses. M = male (n = 40); F = female (n = 34).

Barriers. The most commonly cited physical activity-related obstacles identified by Latino children related to their environment. Within this broad category, five specific themes emerged: (1) inadequate opportunities for physical activity (i.e., a lack of available or accessible outdoor play and organized activities), as expressed in one child's sentiment, "the thing that stops me from being as active as I want to be is not being able to be on a football team"; (2) a lack of resources including finances ("some programs are too expensive and we can't afford it") and transportation ("we got no transportation"); (3) distance from physical activity centres ("the play grownd and parke are too far from my house"); (4) health concerns ("I feel that my desire to get the latest video game or DVD has brought [down] my physical condition a lot in the past few years"); and (5) safety concerns ("My mom says the park is not safe for me to go outside by myself and play"). A second category of barriers acknowledged by participants was time—a lack of time ("I've got none time"), too much time spent in front of the TV, on the computer, or playing video games ("well something that stop me … from being physically active is TV, computer, and my red wii"), and time management challenges ("well most of the time I can't seem to make any time in my day"). Third, children cited a general lack of motivation as a barrier to physical activity. Within this category, two themes emerged, including being too tired or feeling lazy ("sometimes I just feel lazy and I don't want to do it"), and low levels of physical activity self-efficacy ("I think I am not good enough to play manhunt with the other kids on my street"). The fourth physical activity-related barrier that children identified was a lack of social support, both from friends ("don't have any friends to play with …") and family ("parents tired my mom works two full time [jobs]"). Other barriers that were mentioned included a lack of skill development ("I would like to go out and play more sports, pratice, and exercise to get better and faster") and poor nutrition ("I sometimes eat to much chips and then I don't want to exersize").

In terms of sex differences, both boys and girls identified the environment as a primary barrier. Interestingly, more girls cited a lack of organized activities and an unsafe environment as factors that prevented them from being active, whereas more boys cited a lack of opportunities for outdoor play. Additionally, in terms of the time category, more females cited time management challenges as a barrier, whereas more boys cited excessive screen time as an activity-related obstacle. Interestingly, boys also mentioned a lack of skill development and girls cited poor nutrition as additional physical activity barriers.

Facilitators. Similar to the primary barrier discussed above, the most commonly cited physical activity-related facilitator identified by Latino children related to their environment. Within this category, five specific themes emerged: (1) increased opportunities for physical activity including more outdoor play opportunities ("maybe if there was a play grownd or a parke") and additional organized activities ("if maybe there was like an activity place for kids so they can get more active …"); (2) additional resources, including financial assistance ("less cost or free and the community can pay for the family") and equipment ("if there were more fun stuff to play with like better play ground skiping ropes, balls, [bicycles], and scooters"); (3) closer proximity to physical activity centres ("what would be helpful is if we had an organization that let us play sports closer to home"); (4) minimizing safety concerns ("making kids feel safe with every new thing they do"); and (5) providing transportation ("have transport for free that is fast"). Again, similar to the barriers outlined above, the second main facilitator that was mentioned by the children was time (i.e., less time spent in front of screens watching TV, on the computer, or playing video games ["waching lese TV, doing lese vidio gams and not going so mach on the computer"] and scheduling physical activity ["make a schedule"]). The third main facilitator that participants identified was social support, in general ("doing game with a lot of

people"), as well as from friends ("you can play games and sports with friends so you don't get bored", "playing with friends makes it more fun to play sports, it will make you want to play more sports and do more physical activity") and family ("having my family be more active and get out more often").

Several additional physical activity-related facilitators were acknowledged including the need for encouragement ("I would like to be more pushed to do activates physical"), a focus on weight loss outcomes ("it would be helpful for me because I want to lose some weight and become for engage in sports"), opportunities for skill development ("I think that if I practiced sports more often I would be more active), proper nutrition (" to eat more stuff that is healthier"), music ("loud music with good beat that always gets me active"), adequate amounts of sleep ("sleep well to get more energy for you to use during the day), and information about physical activity opportunities in the community ("I would like to have more information about the programs).

In terms of sex differences, both boys and girls identified the environment as a primary facilitator for physical activity; however, more boys cited the need for outdoor play opportunities and additional resources, whereas more girls suggested the need for organized activities and safe environments for physical activity. Additionally, in terms of time, more females cited time management as a facilitator towards physical activity, whereas more boys mentioned less screen time. Interestingly, girls cited nutrition and music as potential facilitators to physical activity; these concepts were not mentioned by boys.

Chapter 4: Discussion

The purpose of the study was to examine the physical activity levels and sedentary behaviours of Latino children in London, Ontario, using both subjective (i.e., self-report) and objective (i.e., accelerometer) measures. A secondary purpose was to collect qualitative data to gain an understanding of the physical activity-related barriers and facilitators identified by Latino children. A total of 74 children (40 boys and 34 girls) self-selected to participate in the study; consequently, these results may not be representative of the entire Latino population in London, Ontario. The majority (71.6%) of children were Columbian, and the overall BMI-*z* score was above average (0.57, *SD* = 0.57). Almost half (41.9%) of participants' parents/guardians reported a total family income in the range of $23,000 to$39,999 per year.

Results centered around three primary outcomes: physical activity levels, sedentary behaviours, and physical activity barriers and facilitators. Where relevant, each of these outcomes will be discussed within the contexts of: (1) current Canadian guidelines; (2) Canadian children in general; and (3) other Latino children.

With regard to physical activity levels, five sets of results warrant discussion. First, results obtained via accelerometers revealed that only one child acquired at least 60 minutes of moderate-to-vigorous physical activity (MVPA) per day for all four days of wear time. Current Canadian Physical Activity Guidelines (Tremblay et al., 2011) suggest that children and youth between the ages of 5 and 17 years should acquire at least 60 minutes of MVPA every day. Thus, 98.4% of children in the current sample did not meet the Canadian guidelines for physical activity. In fact, the percentage of children who met the guidelines in this study (1.6%) is considerably lower than the 7% of Canadian children and youth (9% for boys and 4% for girls)

who wore Actical® accelerometers and met the same guidelines, as measured in the 2007-2009 Canadian Health Measures Survey (Colley et al., 2011).

A second set of results that should be highlighted relates to the fact that despite the low percentage of Latino children who did not exceed the Canadian guidelines for physical activity, a considerably higher number of participants (87.1% of boys and 75.9% of girls) accumulated 30 minutes of MVPA on all 4 days of Actical® wear time. These percentages are higher than those reported by Colley and colleagues (2011) for Canadian children in general; specifically, 70.1% of boys and 58.4% of girls in the 2007-2009 Community Health Measures Survey engaged in 30 minutes of daily MVPA on four days of Actical® wear time. It is noteworthy that the Actical® protocol and analytical procedures used in the present study were also used by Colley and colleagues (2011); however, the number of children aged 11 to 14 who wore accelerometers in the 2007-2009 Community Health Measures Survey (n = 504) was substantially greater than the sample size in our study (n = 60). Thus, while our results provide a preliminary and descriptive picture of the physical activity levels of Latino children in our community, it is difficult to determine whether the abovementioned differences in physical activity levels are a result of ethnic differences, differences in sample size, or a combination of these and other factors.

A third set of results pertaining to the physical activity levels of Latino children that warrants discussion relates to the finding that no significant difference was found between the amounts of MVPA achieved on weekday versus weekend days. This is in contrast to research that has shown that generally speaking, children engage in less MVPA on weekends than weekdays (Treuth et al., 2007; Trost et al., 2001). Our findings are also inconsistent with those reported by Aznar and colleagues (2011) who examined the physical activity patterns of Latino children (n = 136) for four consecutive days (two weekend days and two weekdays). These

researchers reported that Latino children were significantly more active on weekdays than on weekend days. One possible explanation for the difference in findings may be attributed to the fact that the study conducted by Aznar and colleagues (2011) with Latino children, as well as those conducted by Treuth and colleagues (2007) and Trost and colleagues (2001) with multi-ethnic samples of children, occurred during the school year whereas the current study took place over the summer months. It may be the case that MVPA levels do not differ on weekdays versus weekend days during the summer months because there is less variation in schedule from day to day during this time.

Fourth, with regard to the subjective measure of physical activity utilized in the present study (i.e., the modified PAQ-C; Crocker, et al., 1997), the overall physical activity score for participants was 2.76, out of a maximum possible score of 5. This score, while moderate, was lower than the baseline mean PAQ-C scores reported by Thompson , Baxter Jones, Mirwald, and Bailey (2003) with a larger sample (n = 375) of Canadian children of approximately the same age (3.11 out of a total possible score of 5).

Finally, the last set of physical activity results that warrants discussion relates to sex differences. The subjective (modified PAQ-C) results of the present study showed that boys were significantly more active than girls. This finding is consistent with previous research that has utilized self-report measures of physical activity (i.e., PAQ-C scores) with multi-ethnic Canadian samples (Ahamed, MacDonald, Reed, & Naylor, 2007; Thompson et al., 2003). In terms of objectively measured physical activity levels, our results showed a similar trend in that Latino boys were more active than Latino girls for light intensity physical activity and MVPA, however these difference were not statistically significant. Similarly, accelerometer findings reported by Colley and colleagues (2011) showed that girls engaged in less MVPA than boys. Not only is

this sex difference noted among Canadian children (Ahamed et al., 2007; Colley et al., 2011; Thompson et al., 2003), it has also been shown among Latino children and youth in the United States and Spain—that is, Latino boys have been found to be more physically active than Latino girls (Eaton and colleagues, 2008; Olvera and colleagues 2010; Perry, Saelens, & Thompson, 2011; Storey and colleagues, 2012).

In addition to the fact that the vast majority of children in our sample exceeded the current Canadian Physical Activity Guidelines, Latino children in the present study engaged in excessive sedentary behaviours. Three sets of results pertaining to sedentary pursuits warrant discussion.

First, results from the Actical® analyses revealed that Latino children spent an average of 8.6 hours per day, or 68.8% of their total waking hours, being inactive. Interestingly, this finding was identical to the levels of sedentary time (8.6 hours) measured by Acticals® and reported in the 2007-2009 Community Health Measures Survey (Colley et al., 2011) for Canadian children.

A second set of results pertaining to sedentary behaviours that should be highlighted relates to screen time. Colley and colleagues (2011) suggested that although they were unable to describe what behaviours constituted children's total daily sedentary time (because the Canadian Health Measures Survey utilized accelerometers to collect physical activity information), it was likely that much of that time was devoted to screen-related behaviours (e.g., watching television, playing video games, or using a computer). Self-report results from the current study (i.e., those from the modified Child Sedentary Behaviour Questionnaire) have provided important insights in this area, providing evidence that indeed, the Latino children in our sample spent an inordinate amount of time (i.e., more than 4 hours per day) in front of screens. This is fairly consistent with results reported by He and colleagues (2010) who administered the modified CSBQ to Grade 5 and 6 students in London, Ontario and found that children spent 3.3 hours per day in front of

screens. This finding is also consistent with other studies of Latino children in the United States. Feng, Reed, Esperat, and Uchida (2011) reported a mean total daily screen time of 3.4 hours, and Eaton et al. (2008) reported 4 hours of daily screen time among an American sample of Latino youth.

Sedentary pursuits are an important consideration when examining the health behaviours of children. As discussed previously, the Canadian Society for Exercise Physiology has published the Canadian Sedentary Behaviour Guidelines for Children and Youth (Tremblay et al., 2011), which recommend that for health benefits, children and youth between the ages of 5 and 17 should: (a) minimize the amount of time they spend being sedentary each day; and (b) limit screen time to less than 2 hours per day. Thus, the third finding that should be highlighted is that a large proportion (84.9%) of the sample exceeded these guidelines; that is, they reported that they exceeded 2 hours of screen time per day. These rates are substantially higher than those reported by Lowry and colleagues (2002), who reported that more than half (52.0%) of the school-aged Latino students in the U.S. Youth Risk Behavior Survey (n = 15,359) engaged in more than 2 hours of daily screen time. There may be a number of potential reasons that account for this difference, including one or a combination of the following: a temporal explanation (i.e., the current study was conducted during the summer months, whereas the Youth Risk Behavior Survey was conducted during the school year); a geographic explanation (i.e., Canadian versus American samples of children); and/or a power-related explanation (i.e., differences in sample sizes).

Although quantifying and describing the physical activity levels and sedentary behaviours of Latino children provides a baseline assessment and understanding into the behaviour patterns of Latino children, it was also deemed important to identify the factors that are perceived to

influence these behaviours. The primary category of physical activity-related barriers identified by participants related to their environment, including a lack of opportunities for physical activity (i.e., a lack of outdoor play and organized activity opportunities), a lack of resources (i.e., inadequate financial resources and transportation challenges), distance from physical activity centres, safety concerns, and health concerns. Interestingly, O'Dea (2003) conducted semi-structured focus groups with students in Grades 2 to 11 (age range = 7 to 17 years; *n* = 213), and found that similar to the present findings, a lack of outdoor play opportunities was identified as a barrier to physical activity. Also, given the low family incomes of many participants in our study, it may not be surprising that financial resources emerged as a barrier to physical activity, although it is interesting that children as young as 10 years of age identified such a barrier. This finding was also noted by Crawford and colleagues (2001) who found that financial constraints were a significant barrier to physical activity identified by Latino children (*n* = 745), as well as African-American (*n* = 734) and Caucasian children (*n* = 591) in the United States.

A lack of motivation was the second category of barriers identified by participants in the current study, and perhaps not surprisingly, this concept was also noted by American children (*n* = 213, ages 7 to 18) in a study conducted by O'Dea (2003). The third category of barriers that emerged in the current study was a lack of social support from both friends and family members. Again, this was cited as a barrier to physical activity by the American children in the O'Dea (2003) study.

Interestingly, while researchers have acknowledged various cultural considerations relevant to Latinos (e.g., that obesity is a reflection of health; Galanti, 2005; Gesell et al., 2008), these ideas did not emerge in our findings. However, many of the strategies that were suggested

by Latino children to increase their physical activity levels were similar to those that have been cited by other children (both Latino and non-Latino) in the literature.

Similar to the responses provided for barriers, the primary category of physical activity-related facilitators identified by Latino children related to the child's environment. Themes and sub-themes within this category included physical activity opportunities (i.e., more organized activity and outdoor play opportunities), resources (i.e., financial assistance and greater availability of equipment), a shorter distance to physical activity centres, safety concerns, and transportation. O'Dea (2003) suggested that restructuring the physical environment to include a greater variety of physical activities would help promote activity among children, and this was echoed by the children in our study. A perceived sense of safety within the child's environment emerged as a physical activity facilitator in our study; this concept has also been cited in the literature by Amesty (2003) and Moore and colleagues (2010) with American children.

Social support (from parents, friends, and in general) was also identified by children as a potential physical activity-related facilitator. This finding is consistent with the overall social support literature in exercise settings which has documented a positive relationship between social support and exercise behaviour among adults (e.g.,Carron, Hausenblas, & Mack, 1996). With regard to children, Van Der Horst and colleagues (2007) suggested that one of the primary facilitators of physical activity behaviours was parental support, and O'Dea (2003) suggested that an important method to overcoming barriers to physical activity among children is to increase support from parents and school staff. Insofar as Latino children are concerned, Gesell and colleagues (2008) found that positive social influences (i.e., friends or family members who believed that it was good to be physically active or joined the child in physical activity) significantly predicted self-reported baseline physical activity levels among Latino children (n =

114, mean age = 9.8 years). A literature review conducted by Amesty (2003) cited the presence of social support as a facilitator to physical activity for both Latino children and their parents. Finally, Perry and colleagues (2011) examined sources of physical activity motivation among middle-school Latino children (n = 773) by administering subjective questionnaires and found that the most frequently cited sources of physical activity motivation were family and friends.

In addition to motivation and support, a third category of facilitators identified by Latino children in our study focused on self-efficacy. O'Dea (2003), in a study that utilized semi-structured focus groups with American children between the ages of 7 and 17 (n = 213), noted that self-efficacy was cited as an important factor in overcoming inactive behaviours. Additionally, a systematic review of 60 studies with children between the ages of 4 and 12 suggested that increased self-efficacy was an important facilitator in the promotion of physical activity among children (Van Der Horst et al., 2007).

Chapter 5: Conclusion

An examination of the physical activity and inactivity levels of Latino children was considered important due to the fact that these children are disproportionately affected by overweight and obesity (Gesell, Scott, & Barkin, 2010; Ogden, Yanovski, Carroll, & Flegal, 2007). As a result, they are at a heightened risk for a multitude of health complications (Abrams & Levitt Katz, 2011; Arslanian, 2002; Reilly, 2006; Young, Dean, Flett, & Wood-Steiman, 2000).

The primary objective of the study was to assess the physical activity levels and sedentary behaviours of Latino children aged 10-14 years in London, Ontario, using subjective (i.e., self-report) and objective (i.e., accelerometer) measures. A secondary objective was to gather qualitative data to gain a preliminary understanding of the physical activity-related barriers and facilitators faced by Latino children. In terms of the primary objective, Latino children scored lower on the subjective measure of physical activity (the modified PAQ-C; Crocker, et al., 1997) than Canadian children in general, and they did not successfully meet current Canadian Physical Activity Guidelines (Tremblay et al., 2011). Importantly, these children also engaged in less MVPA than Canadian children in general (Colley et al., 2011).

In relation to sedentary behaviours, the vast majority of Latino children reported that they spent close to 4 hours per day in front of screens, a number that is higher than the rate reported for children of the same age in London, Ontario (He et al., 2010). Furthermore, not only did participants report high levels of sedentary and screen-related behaviours (as measured by the Child Sedentary Behaviour Questionnaire; He et al., 2004), but inactivity results from accelerometer data revealed that the vast majority of the current sample did not meet the Canadian Sedentary Behaviour Guidelines for Children and Youth advanced by the Canadian

Society for Exercise Physiology (Tremblay et al., 2011). Interestingly, the reported levels of inactivity in our sample were the same as those documented for Canadian children (Colley et al., 2011).

Finally, in terms of the secondary objective, the barriers and facilitators to physical activity that Latino children identified were similar to those identified in the previous literature for children in general. It did not appear that there were barriers and/or facilitators identified by children that were unique to this ethnocultural group.

The present study utilized both quantitative (i.e., questionnaires and accelerometers) and qualitative (i.e., open-ended questions) measures. This mixed-methods approach was useful in providing important insights into the physical activity and sedentary behaviour patterns of the Latino children in our sample. Not only do the results from this study provide objective physical activity (and inactivity) information, but they also provide novel insights into the types of sedentary pursuits that Latino children engage in. As discussed above, previously reported inactivity data for Latino children, using accelerometers, has failed to examine the various types of sedentary behaviours engaged in by Latino children.

This project has strengthened relationships with Latino community partners, as was evidenced by the high participation rate of Latino children and their families, as well as the support of community partners during the recruitment period. The willingness of the community to participate in research, in combination with the identified need for further investigation into the physical activity and sedentary behaviours of Latino children, warrants future investigation and collaborations.

The current study used accelerometers to objectively assess physical activity and sedentary behaviours. While accelerometers are a useful tool in the objective measurement of physical

activity and are typically used in favour of self-report measures, they are not without shortcomings. For example, accelerometers cannot accurately capture activities that are load carrying or that include walking up an incline, and they may provide an underestimate of overall physical activity and sedentary behaviours (Heil, 2006). Additionally, accelerometers do not provide contextual information or provide a description of the types of behaviours individuals engage in. Thus, future researchers may wish to explore new technologies designed to more accurately capture physical activity and sedentary behaviour information, such as inclinometers (i.e., an instrument that measures tilt, slope, or angle in relation to gravity; Healy, et al., 2011) or SenseCams (i.e., a wearable digital camera that takes photographs based on light-intensity and light-color sensors, an infrared detector, a temperature sensor, and an accelerometer; Janssen, Cliff, Okely, Reilly, & Jones, 2011). Such tools may prove useful in providing additional postural or contextual information that may address some of the abovementioned limitations associated with accelerometers.

This study took place during the summer months. Consequently, patterns of physical activity and sedentary behaviours during the school months were not assessed. Furthermore, a relatively small number of Latino children were included in the study, which may have influenced the results. Future work with this population involving a larger sample size, additional resources, and a broader time frame for data collection could help to address these questions.

While the vast majority of Latino children in the study (98.4%) did not meet the Canadian Physical Activity Guidelines (at least 60 minutes of MVPA per day, every day; Tremblay et al., 2011), it is noteworthy that the average daily MVPA (53 minutes) approached this guideline. On the other hand, a very small proportion of Latino children (15.1%) met the Canadian Sedentary Behaviour Guidelines for Children and Youth (a maximum of 2 hours of screen time per day;

Tremblay et al., 2011). These findings suggest that although targeting physical activity is important, a critical issue that must be addressed in future research is reducing sedentary behaviours. In fact, such findings reiterate the suggestion that sedentary pursuits should not be categorized simply as “inactivity”—or a construct that sits at the opposite end of the spectrum from MVPA—but as a set of behaviours that require research attention independent of and in addition to physical activity.

Both the subjective and objective results from the current assessment provide preliminary support for the conclusion that Latino children in London, Ontario, may be less physically active and at least as sedentary as Canadian children, in general. Future research is needed to further investigate physical activity and sedentary behaviours as well as to develop a culturally appropriate and relevant lifestyle intervention for Latino children in London, Ontario.

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Appendix A: Recruitment Poster

Appendix B: Half Page Recruitment Flyer

Appendix C: Letter of Information and Informed Consent

The University Western Ontario

Letter of Information

Physical activity among Latino children in London, Ontario: An assessment of physical activity levels, sedentary behaviours, and physical activity-related barriers and facilitators

Investigators:
Dr. Shauna Burke, PhD, Assistant Professor, University of Western Ontario
Gillian Mandich, MSc Candidate, University of Western Ontario

(Please note: The pronouns 'you' and 'your' should be read as referring to the participant rather than the parent/guardian who is signing the consent form for the participant.)

Background:
You are invited to participate in an assessment of physical activity and sedentary behaviours of Latino children in London, Ontario conducted by Dr. Shauna Burke and colleagues from The University of Western Ontario (UWO). This project will allow the research team to measure what the level of physical activity and sedentary behaviours are for Latino children in the London community. If you agree to participate, you will be asked to complete 2 questionnaires: 1 that asks demographic questions and 1 that asks about physical activity and sedentary behaviours. Both of the questionnaires will be filled out by you, but you will be encouraged to ask for assistance from parents and/or the translator when you are unsure of answers. We will also measure height, weight, waist circumference, and body composition after you fill out the questionnaires. A smaller group of people that complete the questionnaires will be randomly selected to wear an accelerometer (a small instrument that is worn on the hip and measures your physical activity level) for 4 days between June and August 2011.

The primary purpose of the program is to gain a better understanding of the current level of physical activity and sedentary behaviours as well as a better understanding of the barriers and facilitators of physical activity of Latino children in London, Ontario. We will have as many children as possible complete the 2 questionnaires and measurements. There will be 60 children selected at random that will be asked to wear accelerometers for 4 days.

Who Can Participate in This Study?
In order to participate in the program, you must be Latino, between the ages of 10 and 14, and agree to participate. You must also live in London or Middlesex county, be able to complete a written questionnaire, and be physically able to participate in physical activity**.**

What Will Happen In This Study:
Questionnaires
If you agree to participate, your parents or caregivers will be asked to complete a questionnaire regarding the demographics of your family. You will also be asked to complete a questionnaire

about your physical activity in the past 7 days, your sedentary behaviours, and the barriers and facilitators that you face with physical activity.

Completion of the questionnaires should take approximately 20 minutes. A member of the research team will be available at all times to answer any questions that you may have pertaining to the questionnaire. A translator will also be available. Please note that you may refuse to answer any of the questions at any time.

Physical Assessments

You will be asked to remove your shoes and socks so we can measure your height, weight, and body composition. Your height will be measured first and then your weight and body composition will be measured at the same time using a scale. Before we measure height you will be asked to go to the washroom and remove any heavy clothing you are wearing. Your waist circumference will be measured using a measuring tape. These measurements will take about 5 minutes to complete.

Additionally, 60 randomly selected children will be asked to wear an accelerometer for 4 consecutive days in order for the researchers to obtain physical activity and energy expenditure measures. You will need to wear an Actical® (a small, lightweight, water resistant accelerometer worn on the right hip) during waking hours (for a minimum of 10 hours per day)for 4 days (2 weekdays and 2 weekend days) between June and August 2011.

Feedback from the Study:

You may request the general findings of this research after the study is complete. If you have any concerns, please feel free to contact the researchers below. You will receive a copy of this letter of information and the consent form.

Possible benefits and risks associated with participating in the study:

Participation in this study may make you more aware of your physical activity habits. It is also possible that you do not receive any benefits from participation in the study.

Speaking with other families and learning more about the risks associated with excess body weight may elicit feelings of distress or upset both during and after the study. If you feel that you would like to share your feelings with individuals outside of the program environment, there are resources available in London and area.

1. The London and District Distress Centre: http://www.londondistresscentre.com/Introduction.htm (open 24 hours per day and 7 days per week)
2. Family Services Thames Valley: Community Counselling Program:
3. Kids Help Phone: A free, confidential service available for kids who want to talk, or post a question on-line http://www.kidshelpphone.ca/en/home.asp (available 24 hours per day and 7 days per week)

Alternatives and Right to Withdraw from the Study:

Your participation in this study is voluntary. You may refuse to participate, refuse to answer any questions, or withdraw from the study at any time with no penalty.

Cost and Compensation:

There is no cost for participating in the program. Those children that are randomly selected to wear an accelerometer for 4 days will be given a $10 Chapters/Indigo voucher as a token of appreciation. Participants will not receive any other financial compensation.

Confidentiality:
Your participation in this study is completely confidential. The information obtained will only be for the use of the researchers listed. The completed questionnaires will be stored in a locked cabinet, inside a locked office. After a minimum of 5 years, all of the questionnaires will be shredded. By participating in this research, you agree that your results may be used for scientific purposes, including publication in scientific journals. A master list will be maintained linking your name as a participant to an identifying number. Upon completion of the study, this list will be destroyed. The results of the study will be reported without identifying you personally thus maintaining your confidentiality. Representatives of the University of Western Ontario Health Sciences Research Ethics Board may contact you or require access to your study-related records to monitor the conduct of the research. You do not waive any legal rights by signing the consent form.

RIGHTS OF SUBJECTS
If you have any questions about the conduct of this study or your rights as a research participant you may contact:

The Manager - Office of Research Ethics
The University of Western Ontario
Tel:
Email:

CONTACT INFORMATION
If you have any questions or concerns about the research, please feel free to contact Dr. Shauna Burke or Gillian Mandich

This letter is for you to keep.

Thank you for considering participation in this study.

Informed Consent (Parents or Legal Guardians)

I, _____ have read the Letter of Information, have had the nature of the study explained to me and I agree to participate. All questions have been answered to my satisfaction.

Parent or Legal Guardian Signature:

_____ Date: _____

Participant's (Child's) Name (please print clearly):

_____

Name of Researcher/Individual Obtaining Consent:

Print: _____ Date: _____

Signature: _____

[ ] Yes, I would like to receive a copy of the results of the study.

[ ] No, I would not like to receive a copy of the results of the study.

Appendix D: Media Consent Form

Media Consent Form

Physical activity among Latino children in London, Ontario: An assessment of physical activity levels, sedentary behaviours, and physical activity-related barriers and facilitators

I, the parent of _____, give consent for the "*Physical activity among Latino children in London, Ontario: An assessment of physical activity levels, sedentary behaviours, and physical activity-related barriers and facilitators"* research team to photograph or video my child during data collection or events related to this study.

I am aware that these photographs and/or videos may be used in publications in the future. I am also aware that no personal information such as names will be used in any publications.

This consent may be withdrawn at anytime by notifying a study team member.

I give this consent voluntarily.

_____

Date

_____ _____

Child's Name **Parent's Signature**

_____ _____

Name of Person Responsible for Obtaining Consent **Name of Person Responsible for Obtaining Consent's Signature**

Appendix E: Assent Form (for Children)

Physical activity and sedentary behaviours among Latino children in London, Ontario

Assent Form

Who is doing the study?

Dr. Shauna Burke and other researchers from The University of Western Ontario.

What is this study all about?

The main point of this study is to see how much physical activity Latino kids in London are getting right now. We also want to see how much time Latino kids spend doing sedentary things such as watching TV and playing on the computer.

Who can join this study?

Any boy or girl who is Latino and between the ages of 10-14 can join this study.

What will happen once I to sign up for this Study?

You and your parents or caregivers will be asked to fill out a few questionnaires for the first part of the study. Your parents will be asked to fill out a questionnaire that will ask them about things like how old you are and information about your family. You will be asked to fill out a questionnaire that will ask you about your physical activity and the time you spend doing sedentary things like watching TV or playing on the computer. We will also ask you about the things that stop you from being physically active, and the things that might help you to become more active. If you need help with some answers, you can ask your parents or guardians, or one of our English and Spanish-speaking volunteers. The questionnaires will take about 20 minutes to finish. There will be lots of researchers around to help you if you have any questions.

After you are done the questionnaires we will take some measurements so that the researchers can find out some information about your body and how it works. To do this, they will measure:

1. How tall you are
2. How much you weigh
3. Your waist size

For the second part of the study, some kids will be picked by drawing names from a hat to wear an Actical® for 4 days during summer holidays. The Actical® is a way for the researchers to see how much energy your body uses each day. You will need to wear the Actical® (which is small and light, but not waterproof) on your right hip for 2 days during the week and 2 days during the weekend. You will be asked to wear it while you are awake for all of the 4 days.

What if you have any questions?

You can ask the researchers questions at any time, even when the study is over. You can also ask any of the volunteers, or your family.

Do you have to be in the study?

You do not have to be in the study. No one will be mad at you if you don't want to do this. Even if you say yes now you can change your mind later. It's up to you.

Contact Information:

If you have any questions or want to talk about the study, you can contact one of the researchers below at any time by calling or e-mailing them.

Dr. Shauna Burke or
Gillian Mandich

Physical activity and sedentary behaviours among Latino children in London, Ontario

Assent Form

I, _____ want to participate in the study.

Your name (please print): _____

Your signature: _____

How old are you? _____

Researcher Name (please print): _____

Researcher Signature: _____

Date: _____

Appendix F: Sociodemographic Questionnaire

Sociodemographic Questionnaire

SUBJECT ID | | | | |

DATE | | | | | | |
D D M M Y Y

PLEASE ANSWER THE QUESTIONS BELOW. PLEASE NOTE THAT IF YOU HAVE MORE THAN ONE CHILD, THE QUESTIONS ABOUT 'YOUR CHILD' REFER TO YOUR CHILD THAT IS PARTICIPATING IN THIS STUDY.

1. Were <u>you</u> born in Canada?

○ Yes ○ No

If you weren't born in Canada, please answer these questions:

- What country were you born in? _____
- How many years has it been since you moved to Canada? _____

2. How many children do you have? _____

3. Was <u>your child</u> born in Canada?

○ Yes ○ No

If your child wasn't born in Canada, please answer this question:

- What country was your child born in? _____

4. How much did your child weigh when he/she was born?_____

5. Please circle or check the highest level of education the child's **father** has completed:

○ grade 8 or less
○ some high school
○ high school
○ not sure
○ some college/university
○ college/university
○ graduate school
○ not applicable

6. Please circle or check the highest level of education the child's **mother** has completed:

○ grade 8 or less
○ some high school
○ high school
○ not sure
○ some college/university
○ college/university
○ graduate school
○ not applicable

7. Which of the following best describes the child's **father**'s current work status?

○ Employed full-time
○ Employed part-time
○ Not applicable
○ I am not sure
○ Stays at home
○ Student
○ Other:_____

8. Which of the following best describes the child's **mother**'s current work status?

- ○ Employed full-time
- ○ Employed part-time
- ○ Not applicable
- ○ I am not sure
- ○ Stays at home
- ○ Student
- ○ Other:_____

9. What is your family's approximate yearly family income from all sources?

- ○ Less than $23,000
- ○ $40,000 – $55,000
- ○ I am not sure
- ○ $23,000- $39,999
- ○ More than $55,000

Appendix G: Modified Physical Activity Questionnaire for Children (PAQ-C)[2]

Physical Activity Questionnaire for Children (PAQ-C)

SUBJECT ID

DATE

D	D	M	M	Y	Y

PHYSICAL ACTIVITY: WHAT DO YOU DO?

We are trying to find out about your level of physical activity from ***the last 7 days*** (in the last week). This includes activities such as sports or dance that make you sweat, make your legs feel tired, or that make you breathe hard.

***Remember: There are no right and wrong answers — this is not a test.**

1. Physical activity in your spare time: Have you done any of the following activities in the past 7 days (last week)? If no, check the 'No' circle. If yes, check how many times you have done the activity in the past week. (Check only one circle per row.)

	No	1-2	3-4	5-6	7 times or more
Skipping	□	□	□	□	
Rowing/canoeing	□	□	□	□	□
Roller blading	□	□	□	□	□
Tag	□	□	□	□	□
Walking for exercise	□	□	□	□	□
Bicycling	□	□	□	□	□
Jogging or running	□	□	□	□	□
Aerobics	□	□	□	□	□
Swimming	□	□	□	□	□
Baseball, softball	□	□	□	□	□
Dance	□	□	□	□	□
Rugby	□	□	□	□	□
Badminton	□	□	□	□	□
Skateboarding	□	□	□	□	□
Soccer	□	□	□	□	□
Hockey	□	□	□	□	□
Lacrosse..... .	□	□	□	□	□
Tennis	□	□	□	□	□
Basketball	□	□	□	□	□
Touch football.....	□	□	□	□	□
Field hockey.....	□	□	□	□	□
Football……	□	□	□	□	□
Other:_____..	□	□	□	□	□
_____. ...	□	□	□	□	□

[2]Reprinted with permission of the author (personal communication, March 25, 2012).

2. In the last 7 days, how often were you very active (playing hard, running, jumping, throwing)? (Tick one only.)

I was not active at all..... ☐
Hardly ever ..... ☐
Sometimes ..... ☐
Quite often ..... ☐
Always ..... ☐

3. In the last 7 days, what did you do most of the time **in the morning?** (Tick one only.)

Sat down (talking, reading, on the computer)…… ☐
Stood around or walked around ..... ☐
Ran or played a little bit ..... ☐
Ran around and played quite a bit ..... ☐
Ran and played hard most of the time ..... ☐

4. In the last 7 days, what did you normally do **at lunch time** (besides eating lunch)? (Tick one only.)

Sat down (talking, reading, on the computer)…... ☐
Stood around or walked around ..... ☐
Ran or played a little bit ..... ☐
Ran around and played quite a bit ..... ☐
Ran and played hard most of the time ..... ☐

5. In the last 7 days, on how many days **in the afternoon**, did you do sports, dance, or play games in which you were very active? (Tick one only.)

None ..... ☐
1 time last week ..... ☐
2 or 3 times times last week ..... ☐
4 times last week ..... ☐
5 times last week ..... ☐

6. In the last 7 days, on how many **evenings** did you do sports, dance, or play games in which you were very active? (Tick one only.)

None ..... ☐
1 time last week ..... ☐
2 or 3 times last week ..... ☐
4 or 5 times last week ..... ☐
6 or 7 times last week ..... ☐

7. On **the last weekend**, how many times did you do sports, dance, or play games in which you were very active? (Tick one only.)

None ..... □
1 time ..... □
2 — 3 times ..... □
4 — 5 times ..... □
6 or more times ..... □

8. Which **one** of the following describes you best for the **last 7 days?** Read *all five* statements before deciding on the *one* answer that describes you.

A. All or most of my free time was spent doing things that involve little physical effort. □

B. I sometimes (1 — 2 times last week) did physical things in my free time (e.g. played sports, went running, swimming, bike riding, did aerobics). □

C. I often (3 — 4 times last week) did physical things in my free time. □

D. I quite often (5 — 6 times last week) did physical things in my free time. □

E. I very often (7 or more times last week) did physical things in my free time. □

9. Tick how often you did physical activity (like playing sports, games, doing dance, or any other physical activity) for each day last week.

	None	Little bit	Medium	Often	Very often
Monday	□	□	□	□	□
Tuesday	□	□	□	□	□
Wednesday	□	□	□	□	□
Thursday	□	□	□	□	□
Friday	□	□	□	□	□
Saturday	□	□	□	□	□
Sunday	□	□	□	□	□

10. Were you sick last week, or did anything prevent you from doing your normal physical activities? (Tick one.)

Yes .....□
No .....□
If Yes, what prevented you?_____

Appendix H: Modified Child Sedentary Behaviour Questionnaire (CSBQ)[3]

Child Sedentary Behaviour Questionnaire (CSBQ)

SUBJECT ID

DATE

D	D	M	M	Y	Y

SEDENTARY BEHAVIOURS: WHAT DO YOU DO?

1. In the **past week**, how much time did you spend watching TV, playing video games and using computers**?**

Write the number of hours you did **each activity**, rounding to the nearest half-hour.

Example

Day of the week	TV	Video / DVD / Electronic Games	Computer
Tuesday	**2 ½**	**1**	**1 ½**

Your answers

Day of the week	TV	Video / DVD / Electronic Games	Computer
Monday			
Tuesday			
Wednesday			
Thursday			
Friday			
Saturday			
Sunday			

[3] Reprinted with permission of the author (personal communication, March 27, 2012).

2. In the **past week**, how many TV **programs** did you watch**?**
Write down **the number of program(s)** you watched in each space.

	Mon	**Tue**	**Wed**	**Thu**	**Fri**	**Sat**	**Sun**
Morning (6 am – 12 noon)							
Afternoon (12 noon – 6 pm)							
Evening (after 6 pm)							

3. I take part in an exercise activity, such as a sports team, gymnastics, dance, karate, or another activity, at my school.

- ☐ Yes
- ☐ No

4. I take part in an exercise activity, such as a sports team, gymnastics, dance, karate, or another activity, after school or on weekends that is <u>not</u> connected with my school.

- ☐ Yes
- ☐ No

5. I feel that exercise...

- ☐ is important for good health
- ☐ is **not** important for good health
- ☐ I don't know how important it is to good health

6. I have _____ televisions in my home.

- ☐ none
- ☐ 1
- ☐ 2
- ☐ 3 or more

7. I have a television in my room.

☐ Yes

☐ No

Please choose and tick <u>one</u> box in <u>each row</u>. For example:

Smoking is ….

☐ good	X bad	☐ I am not sure
☐ healthy	X unhealthy	☐ I am not sure
☐ useful	X not useful	☐ I am not sure
X bothering parents	☐ not bothering parents	☐ I am not sure

8. I feel that children my age spending many hours on **weeknights watching television** is…

☐ good	☐ bad	☐ I am not sure
☐ healthy	☐ unhealthy	☐ I am not sure
☐ useful	☐ not useful	☐ I am not sure
☐ bothering parents	☐ not bothering parents	☐ I am not sure

9. I feel that children my age spending many hours a day on **weekends** (including Friday night) **watching television** is …

☐ good	☐ bad	☐ I am not sure
☐ healthy	☐ unhealthy	☐ I am not sure
☐ useful	☐ not useful	☐ I am not sure
☐ bothering parents	☐ not bothering parents	☐ I am not sure

10. I feel that children my age spending many hours a day **playing video games is…**

☐ good	☐ bad	☐ I am not sure
☐ healthy	☐ unhealthy	☐ I am not sure
☐ useful	☐ not useful	☐ I am not sure
☐ bothering parents	☐ not bothering parents	☐ I am not sure

11. I feel that children my age spending many hours a day **using the computer or surfing the web (internet) simply for entertainment is…**

□ good	□ bad	□ I am not sure
□ healthy	□ unhealthy	□ I am not sure
□ useful	□ not useful	□ I am not sure
□ bothering parents	□ not bothering parents	□ I am not sure

12. I feel it is ….

- □ safe for me to play outside near my home
- □ **not** safe for me to play outside near my home
- □ I do not know if it is safe

13. If I had a choice, I would spend more time ….

- □ watching TV
- □ surfing the Net
- □ playing video games
- □ taking part in exercise activities (including practices)
- □ other, please specify _____

Please tell us how important it is when deciding whether or not to engage in a screen viewing activity (circling a number for each item):

14. I think TV and video games are boring.

1----------2----------3----------4----------5

not boring at all extremely boring

15. Watching TV takes time away from doing other more important things.

1----------2----------3----------4----------5It doesn't

take any time away it takes a lot of time away

16. I would feel lazy and sluggish if I sat and watched TV for many hours.

1----------2----------3----------4----------5I would

not feel sluggish at all I would feel extremely sluggish

17. Playing computer/video games hurts my eyes

1----------2----------3----------4----------5It does

not hurt my eyes at all it hurts my eyes a lot

18. I enjoying playing computer/video games for many hours

1----------2----------3----------4----------5

I don't enjoy at all I enjoy very much

19. Watching TV or playing computer games is my way to escape from the world

1----------2----------3----------4----------5

not at all it is how I always how I feel

20. I feel good about myself when I do well at my favourite computer games.

1----------2----------3----------4----------5

I don't feel good at all I feel extremely good

21. Watching TV is one of my favourite forms of entertainment.

1----------2----------3----------4----------5

not at all it is my very favourite

22. I find sitting and watching TV very relaxing.

1----------2----------3----------4----------5

not relaxing at all extremely relaxing

Please tell us how sure are you are doing the following things (circle a number for each item)

23. Turn off the TV even when there is a program on I enjoy

1----------2----------3----------4----------5

I am sure I can't I am sure I can

24. Limit my computer game playing time to 1 hour a day

1----------2----------3----------4----------5

I am sure I can't I am sure I can

25. Leave the room where the TV is on even if others are watching TV?

1----------2----------3----------4----------5

I am sure I can't I am sure I can

26. Plan ahead of time what TV shows I will watch during the week?

1----------2----------3----------4----------5

I am sure I can't I am sure I can

27. Limit TV, video, and computer games to only 2 hours per day?

1----------2----------3----------4----------5

I am sure I can't I am sure I can

Please tell us how do you feel about yourself

28. How happy are you with your body weight?
(please circle a face)

29. How happy are you with the shape of your body?
(please circle a face)

Appendix I: Open-Ended Physical Activity Questions

Open-Ended Physical Activity Questions

SUBJECT ID

DATE

D	D	M	M	Y	Y

We have a few questions that ask about ***your*** physical activity level. When we ask about physical activity, we want to know about activities such as sports or dance that make you sweat, make your legs feel tired, or that make you breathe hard.

***Remember: <u>There are no right and wrong answers — this is not a test.</u>**

1. Are you as physically active as you would like to be?

○ Yes ○ No

If you checked no, what are some things that stop you from being as active as you want to be?

_____

_____

_____

_____

2. What do you think would be helpful for you if you wanted to engage in more activities? Is there anything that you can think of that would make it easier for you to get active?

_____

_____

_____

_____

3. What do you think would help kids like you in your community to become more physically active?

_____

_____

_____

_____

Appendix J: Sociodemographic Questionnaire (Spanish Translation)

Cuestionario Sociodemográfico

No. de Identificación

FECHA

D	D	M	M	A	A

POR FAVOR RESPONDA LAS SIGUIENTES PREGUNTAS. POR FAVOR TENGA EN CUENTA DE QUE SI TIENE MAS DE UN(A) NINO(A), LAS PREGUNTAS SOBRE "SU NINO" SE REFIEREN SOLO AL/LA QUE ESTE PARTICIPANDO EN ESTE PROGRAMA.

10. Nació Usted en Canadá?

○ Si ○ No

Si Usted no nació en Canadá, por favor responda las siguientes preguntas:

- En qué país nació? _____
- Cuantos años ha vivido en Canadá? _____

11. Cuantos hijos tiene Usted? _____

12. Su hijo(a) nació en Canadá?

○ Si ○ No

Si su hijo(a) no nació en Canadá, por favor responda la siguiente pregunta:

- En qué país nació su hijo(a)? _____

13. Cuanto pesaba su hijo(a) cuando nació?_____

14. Por favor haga un circulo o escoja la opción que representa el nivel más alto de educación que el **padre** de su hijo(a) ha completado:

○ Grado 8 o menos
○ Parte del Bachillerato
○ Bachillerato
○ No estoy seguro(a)
○ Parte de Universidad/Colegio Técnico
○ Colegio Técnico/Universidad
○ Estudios Post-Universitarios
○ No es mi caso/No me aplica esta pregunta

15. Por favor haga un circulo o escoja la opción que representa el nivel más alto de educación que la **madre** de su hijo ha completado:

○ Grado 8 o menos
○ Parte del Bachillerato
○ Bachillerato
○ No estoy seguro(a)
○ Parte de Universidad/Colegio Técnico
○ Colegio Técnico/Universidad
○ Estudios Post-Universitarios
○ No es mi caso/No me aplica esta pregunta

16. ¿Cuál de las siguientes opciones describe de la mejor manera el estatus laboral del **padre** de su hijo(a)?

○ Empleo de tiempo completo
○ Empleo de medio tiempo
○ No es mi caso/No me aplica esta pregunta
○ No estoy seguro(a)
○ Permanece en casa
○ Estudiante
○ Otro:_____

17. Cuál de las siguientes opciones describe de la mejor manera el estatus laboral de la **madre** de su hijo(a)?

- ○ Empleo de tiempo completo
- ○ Empleo de medio tiempo
- ○ No es mi caso/No me aplica esta pregunta
- ○ No estoy seguro(a)
- ○ Permanece en casa
- ○ Estudiante
- ○ Otro:_____

18. Cual es (aproximadamente) su ingreso anual familiar?

- ○ Menos de $23,000
- ○ $40,000 – $55,000
- ○ No estoy seguro(a)
- ○ $23,000- $39,999
- ○ Más de $55,000

Appendix K: Modified Physical Activity Questionnaire for Children (PAQ-C; Spanish Translation)[4]

Questionario de Actividad Física para Niños (PAQ-C)

No.de Identificación ☐☐☐☐ FECHA ☐☐☐☐☐☐

ACTIVIDAD FISICA: ¿QUE HACES?

Estamos intentando saber más sobre tu nivel de actividad física de **los últimos 7 días** (en la última semana). Esto incluye actividades como deportes o baile que hacen que perspires (sudes), que hacen que sientas cansancio en las piernas, o que hacen que tu respiración aumente.

***Recuerda: No hay respuestas correctas o incorrectas – este no es un examen.**

1. Actividad física en tu tiempo libre: ¿Has hecho alguna de las siguientes actividades en los últimos 7 días (la última semana)? Si no, escoge el circulo de "No". Si lo has hecho, escoge el número de veces que has hecho la actividad en la última semana. (Solo escoge una opción para cada actividad)

	No	1-2	3-4	5-6	7 veces o mas
Saltar lazo (cuerda).....	☐	☐	☐	☐	☐
Remar/canoa	☐	☐	☐	☐	☐
Patinar (en ruedas).....	☐	☐	☐	☐	☐
Tag (juego de persecución-"La lleva"	☐	☐	☐	☐	☐
Caminar por ejercicio.....	☐	☐	☐	☐	☐
Montar en bicicleta	☐	☐	☐	☐	☐
Trotar o correr	☐	☐	☐	☐	☐
Hacer Aeróbicos	☐	☐	☐	☐	☐
Nadar	☐	☐	☐	☐	☐
Baseball, softball	☐	☐	☐	☐	☐
Baile	☐	☐	☐	☐	☐
Rugby	☐	☐	☐	☐	☐
Bádminton	☐	☐	☐	☐	☐
Patineta	☐	☐	☐	☐	☐
Futbol	☐	☐	☐	☐	☐
Hockey	☐	☐	☐	☐	☐
Lacrosse..... .	☐	☐	☐	☐	☐
Tennis	☐	☐	☐	☐	☐
Basketball	☐	☐	☐	☐	☐
Touch football.....	☐	☐	☐	☐	☐
Hockey	☐	☐	☐	☐	☐
Futbol Americano…….	☐	☐	☐	☐	☐
Otro:_____..	☐	☐	☐	☐	☐
_____....	☐	☐	☐	☐	☐

[4]Reprinted in Spanish with permission of the author (K. Kowalski, personal communication, March 26, 2012).

2. En los últimos 7 días, durante **clases de Educación Física (EF),** que tan activo físicamente estuviste (corriendo, saltando, etc.)? (Escoge solo una opción)

No tomo Educación Física.....… □

Casi nunca ..... □

Algunas Veces ..... □

Muy frecuentemente..... □

Siempre ..... □

3. En los últimos 7 días, que hiciste en el **descanso escolar?** (Escoge solo una opción)

Estuve sentado(a) (hablando, leyendo, haciendo deberes) □

Estuve caminado □

Corrí o jugué un poco □

Corrí y jugué bastante □

Corrí y jugué la mayoría del tiempo □

4. En los últimos 7 días, que hiciste en tu **almuerzo** (aparte de comer)? (Escoge solo una opción)

Estuve sentado(a) (hablando, leyendo, haciendo deberes) □

Estuve caminando □

Corrí o jugué un poco. □

Corrí y jugué bastante □

Corrí y jugué la mayoría del tiempo □

5. En los últimos 7 días, ¿cuantos días **después del colegio,** participaste en deportes, baile o en juegos en los cuales fuiste muy activo(a) físicamente? (Escoge solo una opción)

Ninguno .....…… □

1 vez la semana pasada..... □

2 o 3 veces la semana pasada..... □

4 veces la semana pasada..... □

5 veces la semana pasada..... □

6. En los últimos 7 días, cuantas **tardes** participaste en deportes, baile o en juegos en los cuales fuiste muy activo(a) físicamente? (Escoge solo una opción)

Ninguna ..... □

1 vez la semana pasada ..... □

2 o 3 veces la semana pasada..... □

4 o 5 veces la semana pasada..... □

6 o 7 veces la semana pasada..... □

7. Durante **el último fin de semana,** cuantas veces participaste en actividades deportivas, de baile, o juegos en los que fuiste muy activo(a) físicamente? (Escoge solo una opción)

Ninguna ..... □

1 vez ..... □

2 — 3 veces ..... □

4 — 5 veces ..... □

6 o más veces ..... □

8. Cuál de las siguientes opciones te describe de la mejor manera para **los últimos 7 días?** Lee *las cinco frases* antes de decidir *una* que te describa de la mejor manera.

A. Todo o la mayoría parte de mi tiempo lo pase hacienda cosas que no requerían mayor esfuerzo .....□
B. Algunas veces (1 — 2 veces la última semana) participe en actividades físicas en mi tiempo libre (e.g. jugué deportes, corrí, nade, monte en bicicleta, hice aeróbicos)...……...□
C. Participe en actividades físicas frecuentemente (3 — 4 veces a la semana) durante mi tiempo libre…….....□
D. Participe en actividades físicas MUY frecuentemente (5 — 6 veces la semana pasada) durante mi tiempo libre……..……..…..…□
E. Participe bastantes veces (7 o más veces la semana pasada) en actividades físicas durante mi tiempo libre……..…□

9. Escoge la respuesta que muestra la frecuencia en la que participaste en actividades físicas (como deportes, juegos, bailar, o cualquier otra actividad física) por cada día de la semana.

	Ninguna	Alguna	Medio	Frecuentemente	Muy frecuentemente
Lunes	□	□	□	□	□
Martes	□	□	□	□	□
Miércoles	□	□	□	□	□
Jueves	□	□	□	□	□
Viernes	□	□	□	□	□
Sábado.....	□	□	□	□	□
Domingo	□	□	□	□	□

10. ¿Estuviste enfermo(a) la semana pasada, o hubo algo que te evitara hacer tus actividades físicas normales? (Escoge una opción).

Si .....……□

No .....□

Si respondiste “SI”, cual fue la razón? _____

Appendix L: Modified Child Sedentary Behaviour Questionnaire (CSBQ; Spanish Translation) [5]

Cuestionario de Comportamiento Sedentario del Nino (CSBQ)

No. de Identificación

FECHA

D	D	M	M	A	A

COMPORTAMIENTOS SEDENTARIOS: ¿QUE HACES?

1. En la **última** semana, ¿cuánto tiempo estuviste viendo televisión, jugando videojuegos y usando el computador cuando **no estabas en el** colegio?
   Escribe el número de horas que estuviste haciendo **cada actividad.** Usa la manera de responder del ejemplo siguiente:

Ejemplo

Día de la semana	Televisión	Videos / DVD / Videojuegos	Computador
Martes	**1. 2 ½**	**2. 1**	**3. 1 ½**

Tus respuestas

Día de la semana	Televisión	Videos / DVD / Videojuegos	Computador
Lunes			
4. Martes			
5. Miércoles			
6. Jueves			
7. Viernes			
8. Sábado			
9. Domingo			

[5] Reprinted in Spanish with permission of the author (personal communication, March 28, 2012).

2. En la **última semana, ¿**cuantos **programas de televisión** viste cuando **no estabas en el colegio?**

   Escribe el **número de programas** que viste en cada día de la semana dentro de los siguientes horarios.

	Lunes	**Martes**	**Miércoles**	**Jueves**	**Viernes**	**Sábado**	**Domingo**
Mañana (6 am – 12m)							
Tarde (12m – 6 pm)							
Noche (después de las 6 pm)							

3. Participo en actividad física, como un equipo de deportes, gimnasia, baile, karate, u otra actividad en mi colegio.

- ☐ Si
- ☐ No

4. Participo en una actividad física, como un equipo de deportes, gimnasia, baile, karate, u otra actividad no relacionada con mi colegio**, después del colegio o durante los fines de semana.**

- ☐ Si
- ☐ No

5. Siento que el ejercicio...

- ☐ Es importante para la buena salud
- ☐ **No** es importante para la buena salud
- ☐ No sé qué tan importante es para la buena salud
- ☐

6. Tengo _____ televisores en mi casa.

- ☐ ninguno
- ☐ 1
- ☐ 2
- ☐ 3 o mas

7. Tengo televisor en mi habitación.

□ Si

□ No

Por favor escoge un cuadro en cada fila. Por ejemplo:

Fumar es…

□ bueno	X malo	□ No estoy seguro(a)
□ saludable	X no saludable	□ No estoy seguro(a)
□ útil	X no útil	□ No estoy seguro(a)
X molesto para mis padres	□ no molesto para mis padres	□ No estoy

8. Siento que el que niños que ven **muchas horas de televisión después del colegio** es……

□ bueno	□ malo	□ No estoy seguro(a)
□ saludable	□ no saludable	□ No estoy seguro(a)
□ útil	□ no útil	□ No estoy seguro(a)
□ molesto para mis padres	□ no molesto para mis padres	□ No estoy seguro(a)

9. Siento que el que niños de mi edad **vean muchas horas de televisión** durante los **fines de semana** (incluyendo los Viernes) es…

□ bueno	□ malo	□ No estoy seguro(a)
□ saludable	□ no saludable	□ No estoy seguro(a)
□ útil	□ no útil	□ No estoy seguro(a)
□ molesto para mis padres	□ no molesto para mis padres	□ No estoy seguro(a)

□ bueno	□ malo	□ No estoy seguro(a)
□ saludable	□ no saludable	□ No estoy seguro(a)
□ útil	□ no útil	□ No estoy seguro(a)
□ molesto para mis padres	□ no molesto para mis padres	□ No estoy seguro(a)

11. Siento que el que niños de mi edad **usen el computador o el internet** muchas horas **solo por entretenerse** es…

□ bueno	□ malo	□ No estoy seguro(a)
□ saludable	□ no saludable	□ No estoy seguro(a)
□ útil	□ no útil	□ No estoy seguro(a)
□ molesto para mis padres	□ no molesto para mis padres	□ No estoy seguro(a)

12. Siento que es…

- □ Seguro para que yo juegue cerca de mi casa
- □ **No** seguro para que yo juegue cerca de mi casa
- □ No sé si es seguro

13. Si tuviera la opción, yo pasaría más tiempo…

- □ Viendo televisión
- □ Utilizando el Internet
- □ Jugando videojuegos
- □ Haciendo ejercicio (incluye entrenamientos)
- □ Otro, por favor especifica _____

Por favor dinos que tan importante es cada una de las siguientes cosas para decidir si quieres tomar parte en una actividad para la que utilizas una pantalla (ej. Televisión, computador, etc.). Haz un círculo en el número para responder a cada pregunta:

14. Creo que los videojuegos y la televisión son aburridos.

1----------2----------3----------4----------5

No importante en absoluto Extremadamente importante

15. Ver televisión le quita tiempo a otras cosas más importantes.

1----------2----------3----------4----------5

No importante en absoluto Extremadamente importante

16. Me sentiría perezoso(a) y lento si me sentara a ver televisión por muchas horas.

1----------2----------3----------4----------5

No importante en absoluto Extremadamente importante

17. Jugar videojuegos o juegos en el computador lastima mis ojos

1----------2----------3----------4----------5

No importante en absoluto Extremadamente importante

18. Disfruto jugando videojuegos y juegos electrónicos por muchas horas

1----------2----------3----------4----------5

No importante en absoluto Extremadamente importante

19. Ver televisión o jugar videojuegos es mi manera de escapar del mundo

1----------2----------3----------4----------5

No importante en absoluto Extremadamente importante

20. Me siento bien sobre mí mismo(a) cuando me va bien en mis juegos electrónicos favoritos.

1----------2----------3----------4----------5

No importante en absoluto Extremadamente importante

21. Ver televisión es una de mis maneras favoritas de entretenerme.

1----------2----------3----------4----------5

No importante en absoluto Extremadamente importante

22. Estar sentado(a) viendo televisión es muy relajante.

1----------2----------3----------4----------5

No importante en absoluto Extremadamente importante

<u>Por favor dinos que tan seguro te sientes de estar haciendo las siguientes cosas</u> (Selecciona tu respuesta con un circulo en el número correspondiente para cada pregunta)

23. Apagar el televisor, aun cuando están dando un programa que me gusta

1----------2----------3----------4----------5

Estoy seguro(a) de que puedo Estoy seguro(a) de que no puedo

24. Limitar mi tiempo de juegos electrónicos a 1 hora al día

1----------2----------3----------4----------5

Estoy seguro(a) de que puedo Estoy seguro(a) de que no puedo

25. Dejar la habitación del televisor, aun cuando otros están viendo televisión

1----------2----------3----------4----------5

Estoy seguro(a) de que puedo Estoy seguro(a) de que no puedo

26. Planear con anticipación que programas veré durante la semana

1----------2----------3----------4----------5

Estoy seguro(a) de que puedo Estoy seguro(a) de que no puedo

27. Limitar la televisión, juegos electrónicos y videojuegos a 2 horas por día

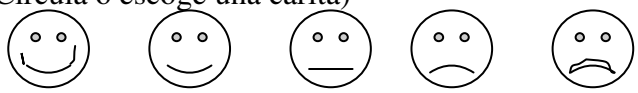
1----------2----------3----------4----------5

Estoy seguro(a) de que puedo Estoy seguro(a) de que no puedo

<u>Por favor dinos cómo te sientes sobre ti mismo(a)</u>

28. ¿Qué tan feliz estas sobre tu peso corporal?
(Circula o escoge una carita)

29. ¿Qué tan feliz estas con la forma de tu cuerpo?
(Circula o escoge una carita)



Appendix M: Open-Ended Physical Activity Questions (Spanish Translation)

Preguntas Abiertas Sobre Actividad Física

No. de Identificación | | | | |

FECHA | | | | | | |
D D M M A A

Tenemos algunas preguntas que hacerte sobre ***tu*** nivel de actividad física. Cuando te preguntamos sobre actividad física, queremos saber sobre actividades deportivas o de baile que hacen que tu cuerpo perspire (sude), que hacen que sientas cansancio en las piernas, o que hacen que tu respiración aumente. ***Recuerda: <u>No hay respuestas correctas o incorrectas – este no es un examen.</u>**

1. ¿Eres tan activo físicamente como te gustaría ser?

○ Si ○ No

Si escogiste la opción de **No**, ¿cuáles son algunas de las cosas que evitan que seas tan activo(a) como te gustaría ser?

_____

_____

_____

_____

2. ¿Qué cosas crees que te ayudarían a participar en más actividades? ¿Puedes pensar en algo que te facilitaría ser más activo(a) físicamente?

_____

_____

_____

_____

3. ¿Qué crees que ayudaría a niños como tú, en tu comunidad, a ser más activos físicamente?

_____

_____

_____

_____

Appendix N: Procedure for Anthropometric Measurements

Procedure for Anthropometric Measurements

Respect of Privacy and Confidentiality

- When measuring anthropometrics, it is important to ensure that **privacy and confidentiality** are always respected. To do this, you must make sure that measurements are taken on a one-on-one basis (this means that when you take the measurements, you should be in a private space so that other participants cannot watch you take the measurements). Also, it is very important that before you take any measurements you explain to the participant exactly what you are going to do and then allow him/her the opportunity to ask any questions he/she may have.

Stature (Standing Height)

- Stature, or standing height, can be measured for participants who are cooperative and able to stand without assistance. A stadiometer (height rod) will be used in this study to determine an accurate height for each child. An appropriate stadiometer requires a vertical board with an attached metric rule and a horizontal headpiece that can be brought into contact with the most superior part of the head. **This measurement will take about 2 minutes.**

How to Set-Up a Stadiometer

- Stadiometers must be stable, calibrated and dedicated to the purpose. This requires:
    - ✓ A vertical board with an attached metric ruler (when assembling the stadiometer, ensure that the tiny icons at the top and bottom of each piece fit together with the piece that has the same corresponding icon. For example, put the top of the piece with the * symbol into the bottom of the piece that has the same * symbol)
    - ✓ An easily moveable horizontal headpiece that can be brought into contact with the most superior part of the head. Ensure that the flat side of the headpiece faces the floor.
    - ✓ A wide and stable platform or firm uncarpeted floor as the base
    - ✓ Firmly mounted on a stable wall

How to Measure Stature Using a Stadiometer

Step 1. Ask the subject to remove the following items:

- Shoes
- Hair ornamentation (clips, headbands, barrettes, etc.)
- Bulky outer layers (minimal clothing is best)

Step 2. Position the subject as follows:

- Stand with heels together
- Arms to the side
- Legs straight
- Shoulders relaxed
- Head in the Frankfort horizontal plane (“look straight ahead”, make sure the chin is parallel to the floor)

- The following four body points should be gently touching the wall: head, shoulder blades, buttocks, and heels

  Note: Some people may not be able to touch all four points against the stadiometer because of obesity, protruding buttocks, or curvature of the spine. Rather than creating an embarrassing situation by trying to force a subject into a physically impossible position, have the child touch two or three of the four points to the vertical surface of the stadiometer. Also make sure that the points are just touching, and that the person is not leaning on the stadiometer.

Step 3. Just before the measurement is taken, the subject should:

- Inhale deeply
- Hold the breath
- Maintain an erect posture ("stand up tall")

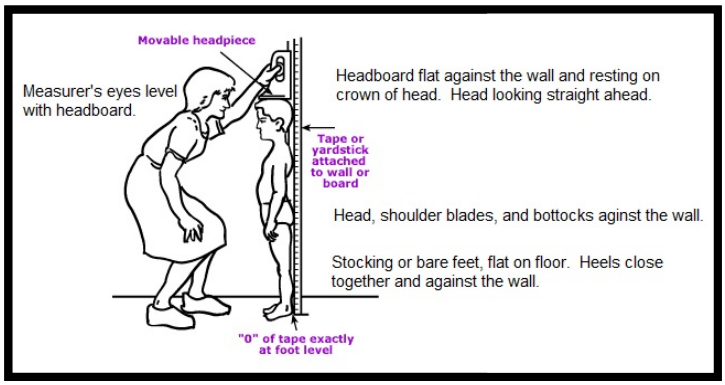
Step 4. Collect the stature measurement as follows:

- Lower the headboard to the highest point of the head with enough pressure to compress the hair
- Eye level of the observer should be level with the headboard to avoid errors caused by parallax.

  Parallax: Is a difference in the apparent reading of a measurement scale when viewed from various points not in a straight line with the eye.
- Read the measurement to the nearest 0.1 cm (1/8")
- Repeat the measurement one more time to ensure accuracy.
- If the two measurements are more than 0.5 cm apart, repeat and record the measurement a third time.

Considerations:

- The stadiometer should be placed vertically against a flat wall, and the wall should not have a thick baseboard. The stadiometer should also be placed on a hard flooring surface such as tile, avoid surfaces such as carpet.



Current Body Weight and Body Composition

Weight will be collected using an electronic scale. **This measurement will take about 2 minutes.**

How to set up an Electronic Scale

- Ensure that the scale is set up on a hard flooring surface, avoid carpet
- Ensure that the surface that the scale is on is as level as possible

How to Measure Weight Using an Electronic Scale

Step 1. Ask the subject to remove the following items:

- Shoes
- Bulky outer layers (minimal clothing is best)
- Heavy items in pockets / on the person

Step 2. Collect the weight measurement as follows:

- Turn the electronic scale on
- Ask the subject to stand still in the middle of the scale's platform without touching anything
- Body weight should be equally distributed on both feet
- Read the weight to the nearest 100 g (0.1 kg)
- Repeat and collect another measurement taken in immediate succession, which should agree within 100 g (0.1 kg)
- If the two measurements are more than 100 g (0.1 kg) apart, repeat and record the measurement a third time.

Considerations:

- The scale should be placed on a flat, hard surface that will allow it to sit securely without rocking or tipping.
- The scale will be calibrated monthly.
- Ensure that individuals have voided (went to the bathroom) before the measurements are taken.
- The scale will be placed in a spot where adequate privacy will be provided.
- Never tell the participant how optimal their weight is.

Waist Circumference

- The United States National Institute of Health (NIH) recommends using waist circumference to assess abdominal fat content. It is a valuable guide in assessing health risk in persons categorized as normal or overweight (in terms of body mass index [BMI]) and provides an independent prediction of risk over and above that of BMI. Waist circumference has been shown to be positively correlated with the amount of fat within the abdomen and to serve as a good indicator of abdominal visceral obesity. **This measurement will take about 4 minutes.**

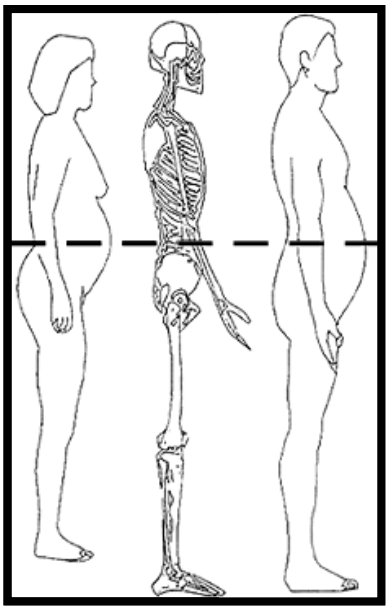
How to Measure Waist Circumference Using a Measuring Tape

Step 1. Ask the subject to remove the following items:

- Outer clothing that restricts access to the abdomen and waist or that interferes with the placement of the measuring tape against the bare skin,
- Clothing that may interfere with measurement accuracy (i.e., by compressing the abdomen or distorting the natural shape of the subject's abdomen and waist)

Step 2. Collect the waist circumference measurement as follows:

- Locate the right iliac crest by using the fingertips to gently feel for the highest point of the hip bone on the subject's right side.
- Locate the lowest right rib.
- Find the midway point between the iliac crest and lowest right rib, and use this as the reference point for which to measure the subject's waist circumference
- Place an inelastic, flexible measuring tape in a horizontal plane (parallel to the floor) around the abdomen at the midway point between the iliac crest and lowest right rib
- The tape should be snug but should not compress the skin
- Have the participant take a breath and then exhale.
- Take the reading at the end of a normal expiration (breath out)
- Record the measurement to the nearest 0.1 cm
- Repeat the measurement one more time to ensure that an accurate measurement has been obtained
    - If the two measurements are more than 0.5 cm apart, repeat and record the measurement a third time.



Appendix O: Anthropometric Data Collection Sheet

Physical activity and sedentary behaviours among Latino children in London, Ontario

Anthropometric Data Collection Sheet

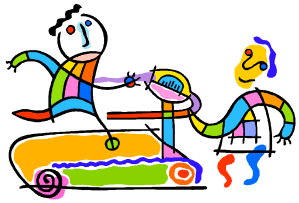
SUBJECT ID

DATE

D	D	M	M	Y	Y

Gender: ☐ boy ☐ girl

Age: _____



Height (cm):		
Weight (kg)		
Waist Circumference (cm)		

Please Staple the 2 Tanita Tapes Below:
(add date and participant ID at the top of each tape)

Notes:

Appendix P: Actical® Consent Form

Physical activity and sedentary behaviours among Latino children in London, Ontario

Actical® Consent Form/Call Log

SUBJECT ID

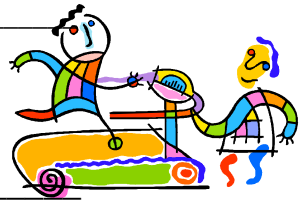
☐ NO, I would not like to be contacted to wear an Actical® for 4 days this summer.

☐ YES, I would like to be contacted to wear an Actical for 4 days this summer.

My phone number is (_____) _____

My address is _____

_____



If Yes…

Participant Name: _____|_____

Parent(s) Name: _____

Drop-Off Date and Time: _____

Pick-Up Date and Time: _____

Phone Call Log:

Appendix Q: Actical Script

Participant Phone Call Scripts

Initial Phone Call

Hi, this is _____(*insert name*) calling from Projenesis, may I please speak to _____ (*insert name of participant's parent/guardian*).

If parent/guardian is home…

Hi, _____ (*insert name of participant's parent/guardian*). This is _____ (*insert name*) calling from Projenesis, we met _____ (*insert where parent/guardian was met or how the parent/guardian's number was obtained)*. I am calling you today because you and your child were interested in wearing an Actical for 4 days (Thursday to Sunday) and I would like to set up a time to drop off an Actical for _____ *(insert name of child)*. Are you available this week for me to drop off an Actical that your child could wear this Thursday to Sunday?

- **Yes, this week is available for the participant…**

Would you like me to come to your house or would you prefer to meet me somewhere such as a coffee shop or library?
(record response)

My visit should take approximately 5-10 minutes, but it is important that _____ *(insert name of child)* be there when I come. Would it be best for you and _____ *(insert name of child)* if I came this week on Monday, Tuesday, or Wednesday?
(record response)

What time of day would be best for me to come?
(record response)

Would you prefer that the volunteer that will be coming with Gillian be able to speak Spanish?
(record response)

Thank you! I will call you the day before I come just to double check that that time still works with your schedule. If before then something comes up with your schedule and you would like to reschedule our appointment please call me at and we can set up a new time. Have a great day.

- **No, this week is not available for the participant…**

I understand that you are very busy this week. Would next week be a better time for you? If not next week, is there a better time this summer for me to come? (record response)

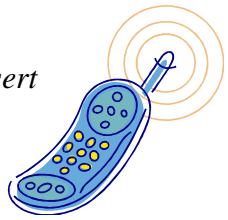
Thank you, I will give you a call back one week before _____ (insert when they are available) to set up a time with you. Thank you for your time!

If parent/guardian is not home…
Do you know when _____ (*insert name of participant's parent/guardian*) would be home or a better time to call them would be?
(record response)

Thank you. I will call them back then. But if you could also give them a message please - my name is _____(insert name) from Projenesis and my phone number is _____ (insert phone number). Can you please ask them to call me back when they get home as well? Thank you and have a great day.

If there is no answer and there is a voicemail…
Hi, _____ (*insert name of participant's parent/guardian*). This is _____ (*insert name*) calling from Projenesis, we met _____ (*insert where parent/guardian was met or how the parent/guardian's number was obtained)*. I am calling you today because you and your child were interested in wearing an Actical and I would like to set up a time to drop one off. My phone number is _____ (insert phone number), and again my name is _____ (*insert name*). Can you please call me back when you get this message? Thank you and have a great day.

Follow-Up Phone Call 1 Day Before Dropping of Actical



Hi, this is _____(*insert name*) calling from Projenesis, may I please speak to _____ (*insert name of participant's parent/guardian*).

If parent/guardian is home…
Hi, _____ (*insert name of participant's parent/guardian*). This is _____ (*insert name*) calling from Projenesis. I called you earlier this week to set up a time to drop off an Actical for your child _____ *(insert name of child)*. Are you and _____ *(insert name of child)* still available tomorrow at _____ (*insert time*) for me to drop off an Actical for your child to wear this Thursday to Sunday?

☐ **Yes, the appointment time is still available for the participant…**
Great! Thank you. Just a reminder that my visit should take approximately 5-10 minutes, but it is important that _____ *(insert name of child)* be there when I come. I would also just like to confirm our meeting place with you. We will be meeting _____ (*insert address or location where we will meet*), is that correct?
(record response)

Great, thank you! I look forward to seeing you and _____ *(insert name of child)* tomorrow. If before then something comes up with your schedule and you would like to reschedule our appointment please call me at so we can set up a new time. Have a great day!

☐ **No, the appointment time is no longer available for the participant…**
I understand that you are very busy, what would be a better time for you?
(record response)

Thank you, I will give you a call back _____ (*insert when they are available*) to set up a time with you. Thank you!

If parent/guardian is not home…
Do you know when _____ (*insert name of participant's parent/guardian*) would be home or a better time to call them would be?
(record response)

Thank you, have a great day.

Appendix R: Actical® Information Sheet for Participants

Actical® Information Sheet

What is an Actical®?

The Actical® is a small, light sensor that can tell researchers how much energy your body uses each day.

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When do I have to wear the Actical®?

You will need to wear the Actical® for 4 days. Please put it on as soon as you wake up on Thursday morning and wear it all day. You can take it off right before you go to bed on Thursday night. You will also need to do the same thing, and wear it all day on Friday, Saturday, and Sunday too.

When Should I take off the Actical®?

If you go in the water (e.g., bath, shower, swimming, etc.) you should take off the Actical® since it is not waterproof. Also, do not wear it when you are sleeping.

Where should I wear the Actical®?

You will need to wear the Actical® on your right hip under your clothes. Please make sure that the black belt that came with it is comfortable but also tight enough to keep it in place on your right hip. If it moves around during the day you can adjust your belt to keep in place.

Do I need to do anything else when I am wearing the Actical®?

No, you can just go about your normal day when you are wearing the Actical®. Please use the recording sheet that Gillian brought to fill out what time you put on the Actical® on in the morning and what time you took it off at night. You need to make sure do you this for all 4 days - Thursday, Friday, Saturday, and Sunday. There is also a space on the recording sheet from Gillian where you can write notes for her (e.g. you can tell her if you took it off for swimming or a shower, if you weren't feeling well that day, etc.).

What happens when I am done wearing the Actical®?

On Sunday night when you go to bed and take off the Actical® please put it back in the envelope that it came in. Please store the Actical® in a safe place until Gillian comes to pick it up on Monday or Tuesday.

What if you have any questions?

You can contact Gillian at any time if you have questions. Her phone number is and her e-mail is

Thank you for your participation in this study!

Appendix S: Actical® Recording Sheet for Participants

Actical® Recording Sheet

SUBJECT ID

Actical # Worn:

THURSDAY _____**, 2011**
I put my Actical® on at _____
I took my Actical® off at _____
Notes for Gillian: _____
_____
_____

FRIDAY _____**, 2011**
I put my Actical® on at _____
I took my Actical® off at _____
Notes for Gillian: _____
_____
_____

SATURDAY _____**, 2011**
I put my Actical® on at _____
I took my Actical® off at _____
Notes for Gillian: _____
_____
_____

SUNDAY _____**, 2011**
I put my Actical® on at _____
I took my Actical® off at _____
Notes for Gillian: _____
_____
_____

- Put on the Actical® right away when you wake up in the morning.
- Also, please push the small button on the back of the Actical every time you put on or take off the Actical®.
- Always wear the Actical® under your clothes on your RIGHT hip.
- Take off the Actical® just before you go to bed each night.
- Take off the Actical® if you go in water (swimming, shower, bath, etc.) or if you are sleeping.
- Fill out this recording sheet every day.
- If you have any questions you can call Gillian at or e-mail her at **Thank you for your participation in this study!**

Appendix T: The University of Western Ontario Ethics Approval Notice

Research Western

Use of Human Participants - Ethics Approval Notice

Principal Investigator: Dr. Shauna Burke
Review Number: 17676
Review Level: Full Board
Approved Local Adult Participants: 0
Approved Local Minor Participants: 200
Protocol Title: Physical activity among Latino children in London, Ontario: An assessment of physical activity levels, sedentary behaviors, and physical activity-related barriers and facilitators.
Department & Institution: Faculty of Health Sciences,University of Western Ontario
Sponsor:
Ethics Approval Date: June 09, 2011 **Expiry Date:** September 30, 2011

Documents Reviewed & Approved & Documents Received for Information:

Document Name	Comments	Version Date
UWO Protocol		
Letter of Information & Consent		2011/01/01
Assent		
Other	Media Consent Form	

This is to notify you that the University of Western Ontario Health Sciences Research Ethics Board (HSREB) which is organized and operates according to the Tri-Council Policy Statement: Ethical Conduct of Research Involving Humans and the Health Canada/ICH Good Clinical Practice Practices: Consolidated Guidelines; and the applicable laws and regulations of Ontario has reviewed and granted approval to the above referenced study on the approval date noted above. The membership of this HSREB also complies with the membership requirements for REB's as defined in Division 5 of the Food and Drug Regulations.

The ethics approval for this study shall remain valid until the expiry date noted above assuming timely and acceptable responses to the HSREB's periodic requests for surveillance and monitoring information. If you require an updated approval notice prior to that time you must request it using the UWO Updated Approval Request form.

Member of the HSREB that are named as investigators in research studies, or declare a conflict of interest, do not participate in discussions related to, nor vote on, such studies when they are presented to the HSREB.

The Chair of the HSREB is Dr. Joseph Gilbert. The UWO HSREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000940.

Signature

Ethics Officer to Contact for Further Information

This is an official document. Please retain the original in your files.

Curriculum Vitae

PERSONAL INFORMATION

Name: Gillian Elizabeth Mandich

Place of Birth: London, Ontario, Canada

EDUCATION, DEGREES, AND AWARDS

Education

Masters of Science, Health and Rehabilitation Sciences Sept 2010 - present
University of Western Ontario, London, Ontario
Child and Youth Health Field

Honours Specialization in Health Science with Health Promotion Sept 2003 - April 2007
University of Western Ontario, London, Ontario
Faculty of Health Science

Graduate School Honours and Awards

Ontario Graduate Scholarship - Science and Technology August 2011 – April 2012

Entrance Tuition Scholarship Sept 2010 – Sept 2011

Tuition Scholarship Sept 2011 – Sept 2012

Best Oral Presentation February 8, 2012
The University of Western Ontario's Health and Rehabilitation Sciences Graduate Research Forum: Brewing Research, Steeped in Ideas

Western University 3 Minute Thesis Competition Finalist March 26, 2012

ACADEMIC AND WORK EXPERIENCE

Project Coordinator June 2010 - present
A community-based healthy lifestyle patient-centred education program of middle-aged (30-59) and older (60+) adults with prediabetes, aimed to strengthen the delivery of health services and assist individuals at high-risk for diabetes in London Ontario

Teaching Assistant Sept 2010 - present
Faculty of Health Science Systemic Approach to Functional Anatomy (Course Code Kin 2222A/HS2300A)

Research Assistant June 2007 - Nov 2011
Public Health Research, Education and Development (PHRED) Program, Middlesex-London Health Unit, London, Ontario

Research Assistant Jan 2006 - June 2007
Kids Skills Clinic, School of Occupational Therapy, University of Western Ontario, London, Ontario

RESEARCH AND PUBLICATIONS

Published Refereed Papers

Callaghan, C., **Mandich, G.**, & He, M. (2010). Healthy Vending machine pilot project in four Ontario secondary schools. *Canadian Journal of Dietetic Practice and Research, 71*(4), 186-191.

Kurtz, J., Battram, D. S., Killough, G., Francis, L., **Mandich, G.,** & He, M. (2010) "Pause-2-Play": A pilot school-based obesity prevention program. *The Brazilian Journal of Mother and Child Health, 10*(3), 303-311.

He, M., Callaghan, C., Evans, A., & **Mandich, G**. (2009). Healthy eating champions award for elementary schools: findings from a process evaluation. *Canadian Journal of Dietetic Practice and Research*, *70*(2), 101-4.

Submitted Refereed Papers

Mandich, G*., & Vanderloo, L*. (2012). Obesity and diabetes among children: Nutrition-related barriers and future opportunities. Health Science Inquiry. Commentary submitted for publication.
*Authors contributed equally to this work

Kurtz, J., Battram, D. S., Killough, G., Francis, L., **Mandich, G.**, & He, M. (2012). Promoting healthy eating through healthful snacks in after-school program: Feasibility and participants' perception. *Canadian Journal of Dietetic Practice and Research*. Manuscript submitted for publication.

Technical Reports

Mandich, G. (2009) *Families in Action: A Community-Based Obesity Prevention Program*. PHRED Focus (Volume 17, Issue 2). London, Ontario: Middlesex-London Health Unit.

Mandich, G. (2008). *Fast Facts: Focus Groups with Children*. London, Ontario: Middlesex-London Health Unit.

Sangster Bouck, M., & Mandich, G. (2008). *Evaluation of Tools and Guide to Managing the Data for the Evaluation of Promoting Cancer Screening in Chinese Communities*. London, Ontario: Middlesex-London Health Unit.

Invited Lectures, Keynotes, and Symposia Presentations

Mandich, G., & Burke, S. (2012, March). *An assessment of physical activity levels and sedentary behaviours of Latino children in London, Ontario*. 16th Annual Eastern Canadian Sport & Exercise Psychology Symposium, London, Ontario.

Mandich, G., & Burke, S. (2012, February). *Physical Activity Among Latino Children in London, Ontario: An Assessment of Physical Activity Levels, Sedentary Behaviours, and Physical Activity-Related Barriers and Facilitators*. Oral Presentation presented at The University of Western Ontario's Health and Rehabilitation Sciences Graduate Research Forum: Brewing Research, Steeped in Ideas, London, Ontario.

Mandich, G., & Harvey, B. (2011, October). *Families in Action Dissemination Project*. Invited lecture presented at the Lawson Foundation 10th Annual Program Workshop, Toronto, Ontario.

Giroux, I., Dworatzek, P., Battram, D., Colby, P., Mathyssen, J., Broxterman, J., **Mandich, G.**, & Hramiak, I. (2011, June). *Genesis of the "Prediabetes Initiative and Partnership"*. Poster presented at The Canadian Foundation for Dietetic Research Dietetic Research Conference, Edmonton, Alberta.

Battram, D., Harvey, B., **Mandich, G.**, Beynon, C., & He, M. (2011, May). *A culturally and linguistically sensitive community-based obesity prevention program for Latin-Canadian children and their families: Preliminary findings*. Poster presented at The 2nd National Obesity Summit, Montreal, Quebec

Mandich, G., & Battram, D. (2010, October). *Families in Action Dissemination Project*. Invited lecture presented at the Lawson Foundation 7th Annual Program Workshop, Edmonton, Alberta.

Pearson, E., **Mandich, G.,** & Burke, S. (2010, October). *Children's Health and Activity Modification Program (C.H.A.M.P.): A lifestyle intervention for obese children at risk for Type 2 diabetes*. Invited lecture presented at the Lawson Foundation 7th Annual Program Workshop, Edmonton, Alberta.

Giroux, I., Dworatzek, P., Battram, D., Colby, P., Mathyssen, J., Broxterman, J., **Mandich, G.,** & Hramiak, I. (2010, October). *A community-based healthy lifestyle patient-centred education program for middle (30-59) and older (60+) adults with prediabetes*. Invited lecture presented at the Lawson Foundation 7th Annual Program Workshop, Edmonton, Alberta.

He, M., Harvey, E., Battram, D. S., **Mandich, G.,** Clarson, C., & Harris, S. B. (2009, October). *A culturally sensitive community-based obesity prevention program targeting Latino-Canadian children: a pilot study*. Poster presented at The 20th World Diabetes Congress, Montreal, Quebec. Abstract in Canadian Journal of Diabetes 33 (3) (Suppl): P-1287, 280-281, 2009.

He, M., Harvey, E., Battram, D. S., **Mandich, G.,** Clarson, C., & Harris, S. B. (2009, June). *Latino Families in Action (LFIA): Implementing and evaluating a community-based obesity prevention program for a high-risk paediatric population.* Lecture presented at Strengthening Connections: The Canadian Public Health Association 2009 Annual Conference, Winnipeg, Manitoba.

Killough, G., He, M., Battram, D., Kurtz, J., & **Mandich, G.** (2009, May). *Pause-2-Play*. Poster presented at The 1st National Obesity Summit, Kananaskis, Alberta.

Mandich, G. (2008, November). *Families in Action: A Community-Based Obesity Prevention Program*. Invited lecture presented at the Public Health in Action Symposium: An Ounce of Prevention…Healthy Eating Active Living, Middlesex-London Health Unit, London, Ontario.

Harvey, B., **Mandich, G.**, & Salomon, D. (2008, October). *Latino Families in Action - A Community-Based Obesity Prevention Program for a High-Risk Ethnocultural Paediatric Population*. Invited lecture presented at the Lawson Foundation 6th Annual Program Workshop, Montreal, Quebec.

SERVICES AND ADMINISTRATION

Chapter President — May 2011 – present
The Canadian Obesity Network, University of Western Ontario Chapter

Student Field Leader, Child and Youth Health — September 2011 – present
The University of Western Ontario Chapter

Vice President — May 2010 – May 2011
The Canadian Obesity Network, University of Western Ontario Chapter

Member — Aug 2010 - present
The Canadian Diabetes Association

Member — Jan 2008 – Jan 2010
The Ontario Public Health Association

Member — Jan 2008 – Jan 2010
The Canadian Public Health Association