PARK USAGE AND PHYSICAL ACTIVITY: AN EXPLORATION
OF PARK FEATURES, NEIGHBOURHOODS, AND PARK
PROGRAMS

by

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A thesis submitted to the School of Kinesiology and Health Studies
In conformity with the requirements for
the degree of Masters of Science

Queen’s University
Kingston, Ontario, Canada
(September, 2011)

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Abstract

Parks have a long-standing history of providing leisure and recreation environments to local neighbourhood residents. They are designed to enhance the livability of communities and to provide recreation opportunities for individual health benefits. Recent studies have found that parks are underutilized for physical activity. In order to address this concern, this thesis research included two studies addressing the association between five park characteristics (i.e., park feature and amenity type, condition, cleanliness, neighbourhood type, and a park program) and levels of park usage and physical activity behaviour. Manuscript 1 explores park feature and amenity type, condition, cleanliness, and neighbourhood type in association with park usage and physical activity using the System for Observing Play and Recreation in Communities (SOPARC) and the Environmental Assessment of Public Recreation Spaces (EARPS) observational measurements. Park usage differed between park feature types (p<.001) and neighbourhood types (p<.001), with higher rates of park use and physical activity noted in urban neighbourhoods, and on splash pad, pool, path, and play structure feature types. Physical activity levels were associated with park feature type (p<.001), condition (p<.001) and cleanliness (p<.001) as well as neighbourhood type (p<.05). Manuscript 2 reports on the effectiveness of a family park physical activity program using questionnaire feedback (n=28), and observational comparisons’ of park usage and physical activity when the program was and was not occurring. No significant difference was found for overall park usage and physical activity levels, however the program target area significantly reported more usage (p<.05) when the program was offered. A majority of program participants were currently moderately-vigorously active (79%), met Canadian Physical Activity Guidelines (57%), came to the park with family members (93.1%), walked to the park (85.7%), and visited the park regularly (62%). From these collective findings,
this thesis makes an important contribution to furthering our understanding of associations
between park characteristics and park usage and physical activity levels. Findings from this study
will be useful in guiding park researchers, planners, and designers as well as, park program
practitioners and community agencies in promoting and creating more user-friendly and active
neighbourhood park environments, as a means to increase population health amongst Canadians.
Co-Authorship

This thesis presents the original work of Kerry Lynn Hamilton in collaboration with her supervisor, Dr. Lucie Lévesque.
Acknowledgements

“Success is a journey, not a destination. The doing is often more important than the outcome”. I would like to take this opportunity to thank all who have journeyed these past two years with me. I am truly, more humble, grateful, and stronger from all of your friendship and guidance throughout this experience.

To Lucie, thank you for encouraging me to follow my passion and interests in this degree. I am forever grateful for the opportunities you challenged me to pursue and explore. Your mentorship, strength and health promotion wisdom has truly shaped my journey for the better.

To Kim Bergeron, thank you for mentoring me throughout my research and practice, constantly inspiring and encouraging me to pursue this passion. You are my built environment guru and I cannot thank you enough for always being willing to teach me all that you know.

To Hannah, my research assistant willing to work for coffee money and foremost, my positive and supportive friend and roommate. I cannot begin to thank you enough for the time you gave to this study, let alone express what a gift you have been in my Kingston life.

To my Stat supports: Val, Joe, Atif, Karla and Dr. Spencer Moore, I cannot thank you all enough for taking the time to A) understand my study and B) interpret what to do with my 600 SPSS variables. I thank you all for your patience and willingness to help.

To my Friends, both near and far, you have been both the fuel to my weekends and the reason to come back to the office every week. Thank you for the countless coffee, Duke and exercise breaks, they have given me the energy and encouragement to continue.

To Amanda, from clueless to conferences, from challenge to completion, we did it all together. Thank you for always being there for every step, set-back, and celebration. I am so proud of what we have accomplished and cannot be more grateful to have had such a strong and intelligent friend to challenge and motivate me along the way.

Finally and most importantly, none of this would have been possible without the unconditional love, support, and encouragement of my family. Thank you Jonathan, for being my motivation to come home, Lindsay, for being my best friend on the other line night after night, my Mother, for giving me her strength and joie de vivre, and finally to my Father for being the rock that constantly supports my wild dreams and ambitions, wherever they may take me.

On to the next journey…

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Chapter 1

Introduction

1.1 Overview

Significant health benefits related to physical activity behaviour in all ages have been well documented in recent decades (Bauman, 2004; Warburton, Nicol, & Bredin, 2006). Given that 52% of Canadians are still classified as insufficiently active (Canadian Community Health Survey [CCHS], 2008) and health care costs continue to rise (Katzmarzyk & Janssen, 2004) physical activity in the general population has become an increasing public health priority. Although the benefits of physical activity are well known, research has shown that the uptake and maintenance of this behaviour present many barriers (Sallis & Owen, 1999, Sherwood & Jeffery, 2000). Due to the complex nature of this behaviour, strategies to increase physical activity behaviour in the population have begun to address broader levels of community and built environment influences such a local programs or neighbourhood park environments (McLeroy, Bibeau, Steckler, & Glanz, 1988; Sallis et al., 2006). Community and built environment interventions are increasingly accepted as promising solutions for addressing the population inactivity epidemic we currently face (Frank, Engelke, & Schmid, 2003; Transportation Review Board, 2005).

Park and recreation environments were originally designed in response to the belief that public parks enhance the livability of communities and that recreation contributes to individual health (Cross, 1990). Parks and open spaces have since been viewed as an optimal environment to encourage community level physical activity behaviour (Bedimo-Rung, Mowen, & Cohen, 2005; Jacobs, 1961; Kaczynski & Henderson, 2007). For example, neighbourhood parks have been
shown to provide areas and structures that can support and encourage the most basic forms of physical activity behaviour (Cohen et al., 2010; Reed et al., 2008). Parks are also associated with leisure-time physical activity due to their wide range of free or low-cost activities (Godbey, Caldwell, Floyd, & Payne, 2005; Moody et al., 2004), their accessible locations (Cohen et al., 2006; Giles-Corti et al., 2005), and because parks are widely available in neighbourhood settings (Zlot & Schmid, 2005).

Despite this appeal, recent reports have revealed a decline in park usage and decreasing activity levels of park users; highlight a need to increase the frequency of park usage and levels of physical activity within parks (Active Living Research [ALR], 2010; Bedimo-Rung et al., 2005). Moreover, recent reviews stress that research exploring the relationship between park environments and physical activity is still in its infancy and that there is a need to further explore this connection for its promising potential to enhance park usage and population levels of physical activity behaviour (ALR 2010, Davison & Lawson, 2006; Kaczynski & Henderson, 2007; McCormack, Rock, Toohey, & Hignell, 2010).

1.2 Purpose & Hypothesis

*Manuscript 1*

The primary purpose of this thesis was to explore associations between four park characteristics on both park usage and physical activity levels through observational methods in six neighbourhood parks in Kingston, Ontario.

*Manuscript 2*

A secondary purpose of this thesis was to evaluate the effectiveness of a park family physical activity program in four neighbourhood parks in Kingston, Ontario through
questionnaire feedback, and observation comparisons of park use and physical activity when the 
*Family Fit Stop* park program was occurring and when there was no program occurring.

The overall purpose of this study was to enhance our understanding of how park characteristics’ may be associated with levels of park usage and physical activity to guide research, and practice on environmental and policy interventions to influence population-level physical activity behaviours.

In sum, in response to recent reviews on the relationships between parks and physical activity (ALR, 2010; Bedimo-Rung et al., 2005; Davison & Lawson, 2006; Kaczynski & Henderson, 2007; McCormack et al., 2010), five key park characteristics and their association with park usage and physical activity behaviour will be investigated in this thesis: 1) park feature and amenity types, 2) park feature and amenity conditions, 3) park feature and amenity cleanliness, 4) surrounding neighbourhood type, and 5) the presence of a park program. Given previous research in this area, it is hypothesized that these park-related characteristics will be associated with park use and levels of physical activity behaviour.

This is one of the first studies to combine direct observation of park characteristics with direct observation of park usage and physical activity levels. As physical activity research related to parks is still emerging, this study makes an important contribution to furthering our understanding of the role of park characteristics in relation to park usage and physical activity levels. Findings from this study will be useful in guiding future park researchers, planners, or designers as well as, park program practitioners or community agencies in promoting and creating more user-friendly and active neighbourhood park environments, as a means to increase population health amongst Canadians.
1.3 Thesis Organization

This thesis conforms to the regulations outlined by the Queen’s School of Graduate Studies and Research. An in depth review of the literature is provided in Chapter 2. Two separate manuscripts addressing both primary and secondary research questions of this thesis are provided in Chapter 3 and 4 respectively. Finally, a general discussion is provided in Chapter 5. All cited references are provided at the end of each chapter. The appendices include copies of all materials relevant to this thesis.
1.4 References


Chapter 2

Literature Review

2.1 Conceptual Models

2.1.1 Ecological Model

Previous physical activity intervention research has mainly focused on psychosocial approaches to behaviour change via theories such as the Health Belief Model, the Theory of Planned Behaviour, and the Social Cognitive Theory, (Glanz, Rimer, & Lewis, 2002). Interventions and practice derived from these theories have centered on motivating, educating, and/or supporting the individual to become or stay physically active, (Sallis et al., 2006; Stokols, 1992). These physical activity interventions may include hiring a personal trainer or creating health promotional slogans or advertisements aimed to encourage an individual’s physical activity uptake. Although these models have guided effective interventions, important limitations to taking an individualistic approach include: lack of adherence, sustainability, and population reach (Dishman & Buckworth, 1996; Glanz, et al., 2002). Furthermore, despite these efforts, inactivity rates amongst Canadians continue to rise (Statistics Canada, 2009). There is mounting consensus that interventions and models with a sole focus on the individual are insufficient to enhance physical activity behaviour at a population level, suggesting that other levels of influence are in need of consideration (McLeroy, Bibeau, Steckler, & Glanz, 1988; Sallis et al., 2006; Stokols, 1992; 1996).

In response to the limitations of these individualistic theories, practices, and interventions new research and models have emerged exploring broader levels of influence upon physical
activity behaviour. This conceptualization of hierarchical influences on human behaviour emerged with Bronfenbrenner’s classification of human behaviour settings into microsystem, mesosystem, exosystem and macrosystem (1979). It was only in much later that these socio-ecological structures were then interpreted as levels of factors that influence health behaviour and health behaviour change (McLeroy, 1988; Stolks, 1992; 1996). These novel socio-ecological approaches draw focus away from the individual and onto other levels of behavioural influence, including: the individual’s family, community, environment, and governance. This holistic socio-ecological view of health behaviour has increasingly been used to guide physical activity interventions and research (Sallis, 2009; Sallis et al., 2006).

A socio-ecological model proposes that physical activity behaviour is determined by five interacting influences: Individual, Intrapersonal, Community, Environment, and Policy. It provides a framework conceptualizing how multiple levels of an individual’s surrounding environment can influence physical activity behaviour (McLeroy et al., 1988; Sallis et al., 2006; Stokols, 1996). A socio-ecological model is increasingly used to guide physical activity interventions and research (Jackson, 2003; Giles-Corti, Timperio, Bull, & Pikora, 2005; Sallis, 2009; Sallis et al., 2005) and has been key in highlighting the relationship between the built environment and healthy communities (Frank, Engelke, & Schmid 2003; Srinivasan, O’Fallon, & Dearry, 2003). Specifically for this study, an ecological model provides a conceptual backdrop to framing how park and neighbourhood characteristics (environment) and park programs (community) might influence physical activity behaviour.


2.1.2 Parks & Physical Activity Conceptual Models

Bedimo-Rung and colleagues’ conceptual model on park usage for physical activity expands on the socio-ecological model by providing a more detailed description of the specific relationship between park environments, physical activity behaviour, and physical health benefits (Bedimo-Rung, Mowen & Cohen, 2005).

Figure 1. The relationship between parks and physical activity.
Note. Darker arrows and shaded boxes indicate the main connections covered in this thesis. Replica taken from Bedimo-Rung et al., 2005. p. 160

The model highlights how park characteristics, taken together with individual characteristics, might influence individual health (among other outcomes) by promoting park visitation, which then provides users the opportunity to engage in physical activity behaviour (figure 1). Figure 2 describes in greater detail the several park attributes that can be classified as park characteristics. Highlighted boxes are park characteristics that will be further explored in subsequent sections. Consistent with several reviews of the relationship between parks and physical activity (Active Living Research [ALR], 2010; Kaczynski & Henderson, 2007;
McCormack, Rock, Toohey, & Hignell, 2010), Bedimo-Rung et al. (2005) encourage researchers to further examine the model’s association between park characteristics, park usage and levels of park physical activity.

**Figure 2. Park characteristic attributes.**
Note. Highlighted arrows and boxes indicate the main connections covered in this thesis. Figure adapted from Bedimo-Rung et al., 2005, p.163

### 2.2 The Built Environment & Physical Activity

The built environment is the setting in which people work, live, and play. Recent efforts to increase physical activity in the population have highlighted the important role that community and built environment influences may play in discouraging or enabling this behaviour (McLeroy, 1988; Sallis et al., 2006). The built environment is composed of both small and large scale, indoor or outdoor surroundings. It represents how land is distributed (e.g., land-use mix, density), how people commute within these areas (transportation services and connectivity of routes; e.g., sidewalks, highways), and which facilities and services are provided within them (e.g., schools, workplaces, grocery stores, parks, and recreation centers). Together, these elements shape access
to several different utilitarian and recreational physical activity opportunities (Handy, Boarnet, Ewing, & Killingsworth, 2002).

The built environment has come to the forefront in public health during the past decade, leading to a surge of research on environmental attributes and their associations with physical activity behaviors (Jackson, 2003). In addition, over the past decade, considerable advances have been made in the measures used to document these built environment influences (Brownson, 2009). Many of these studies are now showing that the built environment plays an important role in promoting active living and its corresponding health benefits (McGinn, Evenson, Herring, Huston, & Rodriguez, 2007; Owen, Salmon, & Fotheringham, 2000; The Transportation Review Board [TRB], 2005). In particular, research trends has begun to emerge detailing that some environments encourage physical activity behaviour more than others (Jackson, 2003; Sallis, King, Sirard, & Albright, 2007). This has led to an increased exploration of various environments in relation to physical activity behaviour.

Neighbourhood parks are recognized as promising solutions, given their potential to offer environmental resources that can promote leisure-time physical activity behaviour (Kaczynski & Henderson, 2007). However, research is needed to understand the specific role neighbourhood parks and recreation environments might play in enabling people to become physically active, and thus healthier (Librett, Henderson, Godbey, & Morrow, 2007). A better understanding about the relationship between specific park attributes and physical activity will allow us to better leverage this community resource to enhance population health.
2.3 Parks & Physical Activity

2.3.1 Park Usage and Health

The Parks and Recreation Movement was premised on the belief that national and municipal parks would preserve natural resources (Kraus, 1978) and that public parks would enhance the livability of communities (Cross, 1990) Although, today’s parks are increasingly associated with physical health it is important to recognize that parks and recreation services have also been found to offer a wealth of other health benefits including positive individual, social, economic, and environmental impacts (Crompton, 1999). For example, the presence of open space and natural scenery has been shown to enhance positive psychological, emotional, and mental health (Ulrich & Addoms, 1981). In addition, parks have been said to facilitate positive social interactions amongst community members and neighbours, which can promote healthy community cohesion, pride, and social capital (Bedimo-Rung et al., 2005). From an economic standpoint, proximity to parks has been shown to increase property values, thereby indirectly increasing a community’s economic health (Hammer, Coughlin, & Horn, 1974). Lastly, park green space and tree abundance play a role in preserving and purifying the environmental health of neighbourhoods and cities (Nowak, 1994). Therefore, it is important to address park usage as its own entity within park research in order to recognize park usage’s influence on multiple health benefits regardless of its influence on physical activity.

2.3.2 Park Usage & Physical Activity

Parks and open space have a long-standing history of being optimal environments to offer community level physical activity opportunities (Jacobs, 1961), however this was not initially intended as a park space’s primary purpose. The Playground Movement was first established at the peak of the industrialized revolution within the poor working class districts of rapidly
urbanizing cities (Kraus, 1978). Community supervised sandbox spaces became an increasingly popular way to provide children safe opportunities for play. As this movement gained appeal, cities moved rapidly to develop a network of sandboxes, which later developed into playgrounds, completely managed and funded by the cities themselves (Kraus, 1978). By the 1900’s playgrounds became a recreational movement, concerned not only with the play needs of children, but the leisure and recreation needs for all ages. Today, parks have a well established tradition in Canadian neighbourhoods as leisure environments that support many forms of play and leisure activities for all ages (Laumen, 2007). In recent times, however, popular technologies and convenient sedentary entertainment opportunities have begun to compete for our leisure time, potentially diminishing the appeal of park usage and its related physical health benefits (Cohen et al., 2009). This concerning decline, coupled with a need to increase physical activity behaviour in Canadians (Canadian Community Health Survey [CCHS], 2008) has made parks the focus of a growing and important topic in physical activity research. In acknowledging this concern, interdisciplinary research between planning and public health researchers is increasing (Librett, et al., 2007). Emerging research seeks to further understand the influence of park environments on physical activity behaviour and to guide interventions to optimize park environments to encourage physical activity in the population.

A recent review examining the relationship between parks and physical activity found that one-third (n = 13) of the articles reviewed reported positive associations between park usage and physical activity (Kaczynski & Henderson, 2007). Of these studies, one reported that respondents who had used parks in the past month were more than 4 times more likely to have engaged in physical activity at least 5 times per week for more than 30 minutes per episode (Deshpande, Baker, Lovegreen, & Brownson, 2005), closely achieving recommended daily
Furthermore, Brownson (2001) found that meeting physical activity recommendations was significantly associated with usage of walking/jogging trails (OR =1.55) and parks (OR = 1.95). From these findings we can infer that parks are ideal settings in which to achieve recommended amounts of physical activity for health.

### 2.3.3 Parks and Physical Activity Levels

Park settings offer opportunities for both sedentary and active forms of leisure. Thus, it is important to recognize that park usage may not guarantee physical activity behaviour. Indeed, despite the potential benefits of park environments for promoting physical activity, most park observations have found that parks are underutilized for physical activity (Cohen et al., 2009; 2010). Recent studies have found that most park users are sedentary or only moderately active (Floyd, Spengler, Maddock, Gobster, & Luis, 2008a; McKenzie, Cohen, Sehgal, Williamson, & Golinelli. 2006; Shores & West, 2008).

While park environments traditionally offer a wide range of free or low-cost activities (Godbey, Caldwell, Floyd, & Payne, 2005; Moody et al., 2004), easily accessible locations (Cohen et al., 2006; Giles-Corti et al., 2005), and are widely available in neighbourhood settings (Zlot & Schmid, 2005), it is surprising to discover that these recreation destinations are not promoting more physical activity behaviour. The study of park characteristics offers promising potential for understanding how parks can influence higher levels of physical activity (ALR 2010, Bedimo-Rund et al., 2005; Kacynski & Henderson, 2007; Kacynski, Potwarka, & Saelens, 2008; Reed et al., 2008). This area of research is still emerging and a further understanding of the potential role park characteristics may play in influencing physical activity behaviour has become a compelling new area of research.
2.4 Park Characteristics in Association with Park Usage & Physical Activity

While there is consensus that parks are optimal environments for enhancing population health and that park usage can encourage physical activity behaviour, there is less clarity about which park characteristics may be influencing these behaviours. As recent findings highlight the need to increase the frequency of park usage and levels of physical activity within parks (ALR, 2010; Bedimo-Rung et al., 2005, Cohen et al., 2009, 2010), recent reviews (Davison & Lawson, 2006; Kaczynski & Henderson, 2007; McCormack, Rock, Toohey, & Hignell, 2010), reports (ALR, 2010; Harnik & Welle, 2011) and models (Bedimo-Rung et al., 2005) on park usage and physical activity behaviour have all begun to highlight physical park characteristics as influential in impacting park usage and population levels of physical activity behaviour. Evidence is needed about specific park characteristics that may contribute to park usage and physical activity behaviour.

To date, park characteristics such as: accessibility (Floyd, Spengler, Maddock, Gobster, Luis, 2008b; Giles-Corti, Broomhall et al., 2005), size (Cohen et al., 2010; Kaczynski et al., 2008), proximity (Kaczynski & Henderson, 2007) and safety (Cohen et al., 2010; Davison & Lawson, 2006), are well documented. However, early findings are mixed as to the ways in which they might be associated with park usage and physical activity behaviour (Bedimo-Rung et al., 2005; Brownson, 2009; Kaczynski & Henderson, 2007). For example the Active Living Research 2010 report found that proximity and availability of parks generally correspond with higher physical activity levels across several different population groups. On the other hand, a review by Kazcynski and Henderson (2007), found that the strength of these associations tended to vary. For example, unsafe or poorly maintained parks may discourage use even when they are located
within easy walking distance of home (Powell, Martin, & Chowdhury, 2003). A qualitative study also found that children are willing to travel further distances in order to use certain parks with desired features or facilities (Veitch, Salmon, & Ball, 2008). In addition to proximity, Davison and Lawson (2006) reviewed the association between perceived safety of parks and children's physical activity; seven out of nine studies found no association. These equivocal results indicate that the relationship between park characteristics and physical activity is complex and requires further study.

There is emerging consensus in the literature that the mere presence of or proximity to parks may no longer guarantee a healthier population, and that there are still many other park characteristics in need of further study (Bedimo-Rung et al., 2005; Harnik & Welle, 2011). Recent park characteristic reviews and research in association with park usage or physical activity have recognized similar gaps and direction for future park characteristic research. Among the park characteristics receiving increasing research attention are: 1) internal park characteristics such as park features (e.g., play structures, baseball diamonds, and open spaces), amenity type (e.g., benches) and quality of features and amenities (i.e., condition and cleanliness; ALR, 2010; Bedimo-Rung et al., 2005; Kaczynski & Henderson, 2007; Kaczynski 2007; McCormack et al., 2010; Reed et al., 2008; Floyd et al., 2008a; 2008b), 2) neighbourhood park characteristics such as walkability and surrounding destinations (Frumkin, Frank, & Jackson, 2003; Frank, et al. 2003; Kaczynski, Johnson, & Saelens, 2010), and 3) facilitated park characteristics such as organized park programs or events (Cohen et al., 2009, 2010; Parra et al., 2010). A further understanding of these three park characteristics in association with physical activity levels and park usage will be further detailed in subsequent sections.
2.4.1 Internal Park Characteristics

People choose to visit or not visit a park not only because of park location and design, but also because of what the park has to offer. These park characteristics include play structure availability and quality, number of paths, condition of basketball courts, etc. It has been found that creating and improving places for physical activity can increase the percentage of people who are physically active at least three times a week by an average of 25% (Centers for Disease Control and Prevention, 2005). Therefore, researching the influences of these specific feature and amenity types and qualities of a park may be useful in advancing our understanding of the role park characteristics play in promoting park usage and physical activity behaviour (ALR, 2010, Bedimo-Rund et al., 2005; Floyd et al., 2008a). Furthermore, there is consensus that the use of objective measures to assess the impact of these park characteristics on park usage and physical activity levels are rare and should be used in future studies (Bedimo-Rung et al., 2005; Floyd et al., 2008a; Kaczynski & Henderson, 2007).

2.4.1.1 Measurement Tools

Park characteristic research has focused mainly on theoretical, mixed methodology, and survey findings (Bedimo-Rung, et al., 2005; Kaczyski & Henderson, 2007; McCormack et al., 2010). McCormack and colleagues’ review highlights that both qualitative and quantitative methodologies make important contributions to understanding the influence of park characteristics on park usage and physical activity (2010). As the research in this area is still emerging, recent reviews have highlighted the need to use more direct observational tools to measure park characteristics and physical activity levels. In response to this need, observational instruments have been developed to examine both park characteristics and park-specific physical activity behaviour. These park specific observational tools include: SOPARC (System for
Observing Play and Recreation in Communities; McKenzie et al., 2006), PARA (Physical Activity Resource Assessment; Lee, Booth, Reese-Smith, Regan, & Howard, 2005), and EARPS (Environmental Assessment of Public Recreational Spaces; Saelens et al., 2006).

2.4.1.2 Features & Amenities

Although methodologies have varied, initial studies are still identifying common associations between park characteristics, park usage, and physical activity. To date, research has established that presence and absence of park features and amenities influences both park usage and physical activity (Cohen et al., 2010; Kaczynski et al., 2008; Reed et al., 2008). For example: Kaczynski and colleagues found that parks with more features were seven times more likely to be used for physical activity than parks with less features (2008). In addition to the number of park features and amenities, studies have also begun to look at the type of feature or amenity and how it may too influence physical activity and park usage. Early observational research on feature and amenity type has shown that paved trails, sporting fields, swimming pools, and courts are areas highly associated with either increased park usage or higher levels of physical activity behaviour (Reed et al., 2008). A Tampa Bay and Chicago study also found that sporting facilities such as tennis and basketball courts tend to be associated with greater energy expenditure (Floyd et al., 2008b), while a Canadian study found that parks with paved trails were 26 times more likely to be used for physical activity than were parks without paved trails (Kaczynski et al., 2008). Qualitative findings also suggest that park features that facilitate both structured (e.g., sports played on fields and courts) and unstructured (e.g., walking on paths and trails) physical activity were important for encouraging park usage (Reed et al., 2008; McCormack et al., 2010).

Although these traditional sporting and path park features are commonly associated with park usage and physical activity, many neighbourhood parks do not include structured sporting
fields or lengthy trail systems, which have been the predominant comparison focus for most of these prior observations. In looking closer at more neighbourhood park features, qualitative studies have suggested that splash pads, swings, and pools are features that can promote park usage for physical activity (Tucker 2007; Chad et al., 2005). GIS and survey data also revealed that children living within 1 km of a park playground were almost five times more likely to be classified as being of a healthy weight than those children without playgrounds in nearby parks (Potwarka, Kaczynski, & Flack, 2008). Furthermore, a recent observational study found that play structures were significantly associated with increased park usage and physical activity (Colabianchi, Maslow, & Swayampakala, 2011). This evidence suggests that it may be valuable to compare different park feature and amenity types in neighbourhood parks using observational measurements.

2.4.1.3 Condition & Cleanliness

Although some advancements have been made in associating physical activity with the presence or absence of features and amenities (Cohen et al., 2010), few studies have attempted to determine the influence of the quality (i.e., conditions and cleanliness) of these features and amenities upon physical activity and park usage. Previous studies have found that esthetically pleasing environments (Corti, Donovan, & Holman, 1996; Sallis et al., 2007) and renovated playgrounds (Cohen et al., 2009; Colabianchi, Kinsella, Coulton, & Moore, 2009; Tester & Baker, 2009) encourage more physical activity uptake, whereas inadequacy of park facilities and the presence of incivilities (e.g., litter, vandalized buildings, graffiti), tend to discourage physical activity behaviour (Heinrich et al., 2007; McCormack et al., 2010). Despite this early evidence, few studies have examined how both condition and cleanliness of specific park features and amenities relate to observed levels of park-based physical activity and usage. To date, only one
study using observations of school play structures have found that overall cleanliness was associated with increased utilization of renovated playgrounds (Colabianchi et al., 2011).

In sum, both qualitative findings and theoretical models provide a rationale for considering the possible influence of quality (i.e., condition and cleanliness) of feature and amenity on park usage and physical activity. The extent to which these qualities influence physical activity or park usage is currently unknown. A better understanding of this relationship can help guide interventions and policies to create park environments and opportunities to support physical activity behaviour (Floyd et al., 2008a; Kaczynski & Henderson, 2007).

### 2.4.2 Neighbourhood Park Characteristics

As the built environment is increasingly recognized to influence physical activity and recreational behaviours (Saelens, Sallis, Black, & Chen, 2003), it is important to consider that multiple layers may exist within an environment (Miller & Miller, 1992). Most of the health research on parks has used the whole park as the unit of study, however, both the internal and external park environment may provide possible influences of park usage and physical activity levels. Bedimo-Rung and colleagues state that “activity areas and supporting areas within the park, the overall park, and the surrounding neighborhood are the four geographic areas that should be considered when assessing parks for their relationship to physical activity” (2005). Since park physical activity behaviour or usage usually requires a park user to first travel through the surrounding neighbourhood, characteristics of the park’s surrounding neighborhood or the overall neighbourhood type are likely to have a strong influence on who uses the park and how the park is used.
Surrounding neighbourhood conditions likely to have an effect on how people use a park include, but are not limited to: access (e.g., traffic, proximity; ALR, 2010; Kaczynski & Henderson, 2007; Troped, Saunders, Pate, Reiningher, Ureda, & Thompson, 2001), aesthetics (i.e., greenery, graffiti, abandoned housing; Brownson, Baker, Housemann, Brennan, & Bacak, 2001; Corti et al., 1996; Miles, 2008), and safety (i.e., crime, lighting; Center for Disease Control and Prevention, 1996; Miles, 2008). As the characteristics of a surrounding neighbourhood continue to have an increasing affect on park usage and physical activity, it may be important to investigate how different neighbourhood types (e.g., urban, suburban, rural. etc) may also be influencing physical activity behaviour and park usage.

2.4.2.1 Neighbourhood Type

Shores and West were the first to compare physical activity and park usage differences between rural and urban parks (2010). They found that rural park usage was less likely to be physically active and was more likely to occur during traditional “non-work” hours, suggesting that rural parks may serve as sites for many forms of leisure rather than sites primarily for physical activity (Shores & West, 2010). They also found that urban parks observed more usage from children, while in contrast rural parks observed more adults. Despite these interesting findings, relatively few studies have examined how the different neighbourhood types around a park may affect park-based physical activity and usage (Coen & Ross, 2006; Floyd et al., 2008b; Kaczynski et al., 2010).

Differences between urban and suburban neighbourhood types are mainly related to general land-use, connectivity, and density (Frumkin, Frank, & Jackson, 2003), all of which are also neighbourhood design features well known to influence physical activity behaviour (Roemmich et al., 2006). Specific to park research, Kaczynski and colleagues (2010), found that
although increased surrounding land-use did not contribute to the likelihood of a park being used for physical activity, other studies have found that walking to parks has been positively associated with living in a neighbourhood with high proximity to parks (density; Roemmich et al., 2006; Tilt, 2010), and access to a variety of destinations (mixed-use; Sallis et al., 2007; Tilt, 2010). In addition, people living in walkable neighbourhoods with access to parks get about 35–45 more minutes of moderate-intensity physical activity per week (ALR, 2010), while moderate intensity physical activity increases have also been associated with greater neighbourhood street connectivity (Heinrich et al., 2007).

Urban neighbourhoods generally provide more walkable environments and walkability has been shown to create more opportunities for park usage (Wen, Kandula, & Lauderdale, 2007; Saelens et al., 2003; Dill, Rutt, & Mumford, 2011). Moreover, urban neighbourhoods are typically categorized by environments with high density, high connectivity, and diverse land-use mix. Therefore, it is reasonable to assume that urban and suburban neighbourhoods will have different influences on park usage and physical activity behaviours. To date, urban and suburban neighbourhood park types have only been studied separately (Cohen et al., 2007; Floyd, et al., 2008a [urban]; Shores & West, 2008 [suburban]). Exploring the differences between these neighbourhood types holds promise in furthering our understanding about how these neighbourhood park characteristics may influence park usage and physical activity.

### 2.4.3 Park Program Characteristics

In addition to studying the influence of internal and external park characteristics, research is also needed to determine the potential for organized park programs to increase park usage and physical activity behaviour. In addition to parks being used for organized sporting events or
summer day camps (Cohen et al., 2009), local community groups, non-for-profit agencies, public health units and parks and recreation city staff have also begun to fund and implement local park programs (Librett et al., 2007). As public health initiatives seek to increase physical activity behaviour and the municipal parks and recreation mandate is to increase park usage, collaborative efforts to fund and implement organized park programs may present an effective solution to enhance park usage and park-based physical activity opportunities. Although local neighbourhood and city park program initiatives seem to be common, to date very few studies have evaluated their effectiveness (Spangler & Caldwell, 2007; Godbey, 2009; Kruger, Mowen, & Librett, 2007).

Observed measures of organized park activities (sporting events or exercise classes) show that these types of initiatives tend to enhance park usage, but not necessarily physical activity (e.g., park users might be spectators; Cohen et al., 2010). On the other hand, Parra and colleagues observed physical activity levels of the *Academia da Ciudade Program* (ACP), which provided cost-free, supervised physical activity classes in Recife, Brazil parks. The study found that, compared to people in parks that do not offer ACP, people using ACP parks were more likely to be seen engaging in moderate-to-vigorous (64% vs 49%) and vigorous (25% vs 10%) physical activity (Parra et al., 2010). These positive findings were a reflection of the daily availability of the program and reputable awareness it received within the Recife community. These findings suggest that sustainable investments in locally organized park programming may be warranted, but that evaluation data on the effectiveness of these programs are needed (Cohen et al., 2010; Parra et al., 2010). To date, research and reports on park program evaluations have been limited.
2.5 Summary

In sum, park usage and physical activity research is still in its infancy. Studying the influence of park characteristics such as features, amenities, conditions, cleanliness, neighbourhood type, and park programs through observational measurements may be useful in advancing our understanding of the role park characteristics play in promoting park usage and physical activity behaviour. Therefore, the purpose of this present study was to enhance our understanding of these park characteristics as they associate or differentiate between levels of park usage and physical activity in order to guide future research and practice on the environmental and policy interventions influencing population levels of physical activity behaviour.
2.6 References


Reviews 33: 175–181.


Kaczynski, A.T., Potwarka, L.R., & Saelens, B.E., (2008). Association of park size, distance, and


Chapter 3

Manuscript 1: Putting the “PA” back in PARKS: An observation of associations between neighbourhood park feature and amenity type, quality and surroundings and park usage and physical activity levels.
ABSTRACT

Objectives: This study aimed to capture regular summer weekday park usage and physical activity levels to examine their association with: 1) park feature and amenity type, 2) park feature and amenity condition and cleanliness, and 3) neighbourhood type (i.e., urban vs. suburban) park characteristics.

Methods: System for Observing Play and Recreation in Communities (SOPARC) and Environmental Assessment of Public Recreation Spaces (EARPS) were used to observe 143 park features in 6 neighbourhood parks (3 urban, 3 suburban) to obtain data on park usage, physical activity, and park characteristics (feature and amenity type, condition, and cleanliness). For each park, park usage and physical activity observations took place 4 times per day, on 3 different days of the week, over 6 weeks, for a total of 18 days and 72 hours of observation.

Results: A total of 1098 park users were observed, of whom 45% were sedentary, 40% were walking (moderate physical activity), and 15% were engaged in vigorous activity. Physical activity levels were associated with park feature and amenity type (p<.001), condition (p<.001) and cleanliness (p<.001), as well as, park neighbourhood type (p<.05). Target area park usage differed with park feature type (p<.001) and neighbourhood type (p<.001), with higher rates of target area park usage and physical activity levels noted in urban neighbourhoods, and on splash pad, pool, path, and play structure feature types. Condition and cleanliness ratings did not differ between target area park usage.

Conclusions: Designing parks with more splash pads, pools, paths and play structures, may promote more park usage and higher levels of park physical activity. Furthermore, providing monthly inspections, maintenance, and repairs to improve ratings of condition and cleanliness may facilitate increased levels of physical activity behaviour. Future research should continue to
explore a park’s surrounding neighbourhood type as this study provides promising evidence of its potential association with physical activity and park usage.

**INTRODUCTION**

Significant health benefits of physical activity behaviour for all ages have been well documented in recent decades (Bauman, 2004; Hallal, Victora, Azevedo, & Wells, 2006; Sallis, Prochaska, & Taylor, 2000; Trost, Owen, Bauman, Sallis, Brown, 2002; Warburton, Nicol, & Bredin, 2006). Given these benefits, the need to increase this behaviour in the population has become of escalating priority, while 52% of Canadians are still classified as insufficiently active (Canadian Community Health Survey [CCHS], 2008) and preventable health disparity costs continue to rise (Katzmarzyk & Janssen, 2004).

Recent efforts to improve population rates of physical activity are increasingly founded on socio-ecological models highlighting the important role of community and built environment influences (McLeroy, Bibeau, Steckler, & Glanz, 1988; Sallis et al., 2006). Parks, in particular, have been identified as important environmental resources for promoting leisure-time physical activity behaviour (Bedimo-Rung, Mowen, & Cohen, 2005; Kaczynski & Henderson, 2007). For example, neighbourhood parks have been associated with leisure-time physical activity due to their wide range of free or low-cost activities (Godbey, Caldwell, Floyd, & Payne, 2005; Moody et al., 2004), their accessible locations (Cohen et al., 2006; Giles-Corti et al., 2005), and because parks are widely available in neighbourhood settings (Zlot & Schmid, 2005). Moreover, parks tend to provide spaces and structures that can support and encourage the most basic forms of physical activity behaviour (e.g., paths, fields, play structures, etc.; Cohen et al., 2010; Reed et al., 2008).
Despite this potential appeal, recent park studies are highlighting the need to increase the frequency of park usage and levels of physical activity within parks. (Active Living Research [ALR], 2010; Bedimo-Rung et al., 2005). In light of these recommendations, recent reviews (Davison & Lawson, 2006; Kaczynski & Henderson, 2007; McCormack, Rock, Toohey, & Hignell, 2010), reports (ALR, 2010), and models (Bedimo-Rung et al., 2005) on park usage and physical activity behaviour have highlighted park characteristics as a promising influence on park usage and population levels of physical activity behaviour.

To date, park characteristics such as: accessibility (Floyd, Spengler, Maddock, Gobster, Luis, 2008b), size (Cohen et al., 2010), proximity (Kaczynski & Henderson, 2007), and safety (Cohen et al., 2010; Davison & Lawson, 2006), are well documented. However, early findings are mixed as to the ways in which they might influence park usage and physical activity behaviour (Bedimo-Rung et al., 2005; Brownson, 2009; Kaczynski & Henderson, 2007). For example: of nine studies examining the association between perceived safety and childrens’ physical activity, seven reported a null effect showing no association between perceived safety and childrens’ physical activity (Davison & Lawson, 2006), while only two reported a positive relationship. These divergent results indicate that the research exploring park-based physical activity is still in its infancy and documented associations to date may not fully describe the influence of all park characteristics on park usage and physical activity levels. Emerging consensus amongst researchers suggests that other park characteristics such as park feature and amenity types and qualities may also influence the relationship between physical activity and the park environment, and are therefore in need of further research (ALR, 2010; Bedimo-Rung et al., 2005; Kaczynski & Henderson, 2007; McCormack et al., 2010; Reed et al., 2008).
Qualitative (McCormack et al., 2010; Tucker, Gilliland, & Irwin, 2007) and theoretical (Bedimo-Rung et al., 2005) studies have described the potential influence of park feature (i.e., play structures, baseball diamonds, and open space) and amenity (i.e., benches) types on physical activity and park usage as important park characteristics worthy of consideration. Although some advancements have been made in associating physical activity with the presence or absence of park features and amenities (Cohen et al., 2010; Kaczynski, Potwarka, & Saelens, 2008; Reed et al., 2008), few studies have explored associations between the specific type of park features and amenities offered and how this may too associate with physical activity and park usage. Direct observation evidence of feature and amenity park usage and physical activity levels may provide stronger and clearer evidence as to which specific park feature and amenity types encourage more physical activity and park usage.

In addition to type, quality (i.e., condition and cleanliness) of park features and amenities might also play a role in influencing park usage and physical activity. Previous studies have found that aesthetically pleasing environments (Corti, Donovan, & Holman, 1996; Sallis, King, Sirard, & Albright, 2007) and renovated playgrounds (Cohen et al., 2009; Colabianchi, Kinsella, Coulton, & Moore, 2009; Tester & Baker, 2009) encourage more physical activity uptake, whereas inadequate park facilities and the presence of incivilities (e.g., litter, vandalized buildings, graffiti), tend to discourage physical activity behaviour (Heinrich et al., 2007). Despite this early evidence, few studies have examined how both feature and amenity condition and cleanliness park characteristics may too relate to observed levels of park physical activity and usage.

There is also a growing interest in how the surrounding built environment of parks may also be associated with park usage and the physical activity level of its users. Parks are affected
by the neighbourhoods in which they are located in (Jacobs, 1961; Kaczynski, Johnson, & Saelens, 2010; Powell, 2005). Since most users live within walking distance of the parks they frequent, park user demographics are thus also typically reflective of their neighbourhood’s demographics. Most research on park usage and physical activity has been conducted separately in either urban or suburban neighbourhoods (Cohen et al., 2007; Floyd, Spengler, Maddock, Gobster, Luis, 2008a [urban]; Shores & West, 2008 [suburban]). Evidence from one study that found differences in park usage and physical activity between urban and rural neighbourhoods (Shores & West, 2010) suggests that differences between these neighbourhoods significantly influence the types of leisure behaviour performed (i.e. sedentary, active) or its dominant form of usage (i.e. recreational, utilitarian). The possible differences between urban and suburban neighbourhood park usages is of importance due to the general land-use, connectivity, and density differences associated with these neighbourhood designs (Frumkin, Frank, & Jackson, 2003). Yet despite a growing consensus that neighbourhood built environments influence physical activity (Saelens, Sallis, Black, & Chen, 2003), no research has specifically examined how the type of neighbourhood design (urban or suburban) around a park may influence or be associated with park-based physical activity and park usage (Coen & Ross, 2006; Floyd et al., 2008b; Kaczynski et al., 2010).

In sum, park usage and physical activity research is still in its infancy. Studying park characteristics such as: features, amenities, conditions, cleanliness, and neighbourhood types through observational measurements in association with park usage and physical activity levels may be useful in advancing our understanding of the role park characteristics play in promoting park usage and physical activity behaviour. This study aimed to capture regular summer weekday park usage and physical activity levels to examine their association with: 1) park feature type, 2)
park feature condition and cleanliness, and 3) neighbourhood type (i.e., urban vs. suburban) park characteristics. This is one of the first studies to combine direct observation of target area usage and physical activity levels with direct observations of park characteristics in neighbourhood parks.

METHODS

Design

This natural experiment used a cross-sectional design over 72 weekday time points, in six neighbourhood parks during the summer of 2010. Permission to observe park activity was obtained through collaboration with the City’s Parks and Recreation Department and through an existing community park program partnership.

Park Selection

Six parks located in a mid-size Canadian city were sampled. Four of these parks were previously chosen through a larger community project hosting park programs for families. Two additional parks with similar neighbourhood demographics and family appeal as defined by the community partners were included to increase the sample size of the current study.

Neighbourhood Classification

Census Data (Census Canada, 2006) were used to investigate the demographic composition of each neighbourhood park (Table 1). GIS was used to condense neighbourhood census data into a 500 meter buffer around each park. A 500m buffer is comparable to that used in other park and physical activity research (e.g., Hoehner, Ramirez, Elliot, Handy, & Brownson, 2005; Kaczynski et al., 2010; Wendel-Vos et al., 2004). This buffer distance, which represents the approximate distance an average person can walk in roughly 5 minutes (at a speed of 5.95 km/h)
allowed us to estimate a more accurate demographic profile of potential neighbourhood park users. Parks were also categorized into one of two neighbourhood types (urban or suburban) based on street connectivity designs and density dwelling per square kilometre.

**Measures & Procedures**

*Park Usage & Physical Activity*

Park usage and physical activity levels were assessed using the System for Observing Play and Recreation in Communities (SOPARC), a valid observational tool that captures information on community recreation spaces and their users (McKenzie, Cohen, Sehgal, Williamson, & Golinelli, 2006; Ridgers, Stratton, & McKenzie, 2009; Rowe, Van der Mars, Schuldhelsz, & Fox, 2004). As per the SOPARC protocol, each park was first strategically mapped and divided into smaller target areas (McKenzie & Cohen, 2006). Target areas segment the park along natural boundaries and represent all standard park features and amenities likely to provide opportunities for park users to be physically active. These include green spaces, playgrounds, sport-specific fields or courts, and pathways. Other park features or amenities not conducive to physical activity (e.g., park benches or picnic tables) were also coded as distinct target areas. In essence, target areas, as outlined by the SOPARC protocol, can also be practically recognized as park features and amenities and therefore, these terms will be used interchangeably throughout this study. A detailed map for each park was created to identify each target area, as well as to determine a standard observation order. A total of 143 features or amenities from the six parks were identified for observation.
### Table 1
Neighbourhood 2006 census demographics around a 500m radius of each study park

<table>
<thead>
<tr>
<th>Neighbourhood 2006 Census (500m Radius)</th>
<th>Neighbourhood type</th>
<th>Suburban</th>
<th>Park 1</th>
<th>Park 2(^a)</th>
<th>Park 3</th>
<th>Urban</th>
<th>Park 4</th>
<th>Park 5</th>
<th>Park 6</th>
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</thead>
<tbody>
<tr>
<td>Total Population</td>
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<td></td>
<td></td>
<td></td>
<td>11,279</td>
<td>10,905</td>
<td>7,503</td>
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<tr>
<td>Gender</td>
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<td>Female</td>
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<td>48%</td>
<td>48%</td>
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<td>Age</td>
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<tr>
<td>Child</td>
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<td></td>
<td>7%</td>
<td>7%</td>
<td>15%</td>
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<tr>
<td>Teen</td>
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<td></td>
<td></td>
<td>8%</td>
<td>11%</td>
<td>14%</td>
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<tr>
<td>Adult</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>69%</td>
<td>68%</td>
<td>56%</td>
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<tr>
<td>Senior</td>
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<td></td>
<td></td>
<td>19%</td>
<td>21%</td>
<td>18%</td>
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<tr>
<td>Ethnicity</td>
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<tr>
<td>White</td>
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<td>92%</td>
<td>89%</td>
<td>94%</td>
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<td>Other</td>
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<td></td>
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<td>8%</td>
<td>11%</td>
<td>6%</td>
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<tr>
<td>Land Area Dwellings (sq/km)</td>
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<td></td>
<td>2,738.4</td>
<td>2,525.4</td>
<td>1,074.0</td>
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<tr>
<td>Dominant Age Group (yrs)</td>
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<td></td>
<td>20-24</td>
<td>20-24</td>
<td>45-49</td>
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<tr>
<td>Av Household Income ($)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>44,435</td>
<td>51,959</td>
<td>39,110</td>
</tr>
<tr>
<td>Education(^b) (% of population)</td>
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<td></td>
<td></td>
<td></td>
<td>87%</td>
<td>66%</td>
<td>57%</td>
</tr>
</tbody>
</table>

\(^a\)Neighbourhood was not fully developed at the time of census 2006 collection. \(^b\)Education = Total population completion of a high school certificate, diploma, or a degree.
As per the SOPARC protocol (McKenzie et al., 2006), momentary time sampling scans were used to systematically collect park usage and physical activity observations for each target area. Momentary time sampling scans have been shown to yield valid behavioural outcomes due to their brief recording episodes (Ridgers et al., 2009; Rowe et al., 2004). Overall park usage is identified as the sum of all people within the park; whereas target area park usage is equal to the total number of people in a given feature or amenity of a park. Park usage momentary time sampling scans were further categorized by sex (male, female), ethnicity (Latino [L], Black [B], White [W], or Other [O]), and estimated age (Child = infancy to 12 years of age; Teen = 13 to 20 years of age; Adult = 21 to 59 years of age; Senior = 60 years of age and older).

Physical activity levels were recorded by categorizing the behaviour of each park user according to the following definitions: Sedentary (S) = Individual is lying down, sitting, or standing in place; Walking (W) = Individual is walking or moving in some form at a moderate pace; Vigorous (V) = Individual is engaged in an activity more vigorous than an ordinary walk (e.g., jogging, swinging, doing cartwheels; McKenzie et al., 2006). These activity codes have been shown to yield high inter-rater agreement (i.e., 88-89.5%; McKenzie et al., 2006) and validity for these activity level codes has been previously established through heart rate monitoring (McKenzie et al., 1991; Rowe et al., 2004), pedometer (Scruggs, Eisenman, Watson, Shultz, & Ransdell, 2003), and accelerometer (Ridgers et al., 2009) comparisons.

**Feature Type, Condition, and Cleanliness**

Type, condition, and cleanliness of the 143 features and amenities located within the six study parks were assessed and ranked using the Environmental Assessment of Public Recreation Spaces (EAPRS) tool (Saelens et al., 2006). EAPRS protocol uses a series of detailed guidelines, definitions, and visual examples to consult upon when conducting type, condition, and cleanliness
observations. Previous research has demonstrated adequate inter-rater reliability and validity of the EARPS tool (Saelens et al., 2006).

Type of park features and amenities (i.e, target areas) were categorized according to neighbourhood park feature and amenity types commonly found within this study, and informed through previous park literature and study findings (Kazinsky et al., 2008; Reed et al., 2005; Shores & West, 2008; Tucker et al. 2007). Ten distinct park feature or amenity types were identified: 1) Paved Path, 2) Rough/Natural Path, 3) Open Space (open grass field or hill, treed area & stream), 4) Fields & Courts (soccer, baseball, tennis, & basketball), 5) Splash Pad, 6) Pool, 7) Play Structure, 8) Swing Set, 9) Play Features (webbed climber, slide, play ground areas, see-saw, rock wall, & balance rockers), and 10) Sitting Amenities (benches, picnic tables, sheltered areas & bleachers).

Condition and cleanliness of each of the 143 features and amenities were carefully ranked according to the EARPS ranking descriptions, visuals, and published protocol. As defined by the EARPS tool cleanliness refers to, “the general aesthetics of the element. Things that make elements less clean include graffiti, dirt, broken glass, lack of maintenance cleaning (eg., painting) and/or debris/litter” (Saelens et al., 2006). Cleanliness is not affected by twigs, leaves, or muck; thus, poor weather conditions (i.e., wind or rain) would not affect rankings. Cleanliness was coded as a discrete variable ranging from: 1=not at all, 2=somewhat, 3=mostly to extremely. Condition is defined as “the general state of an element. Most condition assessments are element specific, but include, missing or broken pieces, age of the element, rust, and/or evidence of vandalism (not graffiti)” (Saelens et al., 2006). In short, condition refers to anything that may compromise the operation of the element. For each target area, condition was ranked as a discrete variable categorized as: 1=poor, 2=fair, and 3=excellent.
Neighbourhood Type

Census data (Census Canada, 2006) were used to help classify neighbourhood type around each park as either suburban or urban. Of the following parks hosting a family park program two were located in low density (482.4 dwellings per sq/km) and dendrite street connectivity neighbourhoods. These neighbourhoods were classified as suburban. The other two parks were located in higher density (2,112.6 dwellings per sq/km) and grid street pattern connectivity neighbourhoods. These neighbourhoods were located closer to the downtown core of the city and thus, were classified as urban. These neighbourhood classifications are consistent with previous literature (Yan, Voorhees, Clifton, & Burnier, 2010), however it should be noted that the definition of an urban neighbourhood may have different meanings across large, middle, or small city populations. For the purpose of this study, urban was defined within the context of a mid size city population. In order to increase the study sample size, one additional park in each a suburban and an urban neighbourhood was selected.

Data Collection

Observer Training

Two observers were trained to use the SOPARC data collection tool to record park use and physical activity. Both observers completed the official SOPARC training DVD, which includes details about the preparation and use of the tool, along with, two pre-coded behavioural vignette tests to rate scanning ability and physical activity level recognition. In addition, inter-rater reliability between the trained observers was further assessed during a park simulation field observation. This field test yielded 99.4% agreement on all observation aspects of the SOPARC
tool. The principal researcher collected 80% of the data, whereas the assistant researcher collected the remaining 20%.

The principal researcher used the EARPS observation protocol, which included detailed guidelines, definitions, and visual examples to consult when conducting observations of park features and amenities type, condition, and cleanliness (Saelens et al., 2006). These observations included one initial trial observation and six final observations, one for each study park. The principal researcher conducted 100% of the EARPS observations.

**Observation Scheduling**

In line with the SOPARC protocol (McKenzie & Cohen, 2006), observations were scheduled at four different time points (i.e., 7:30AM, 12:30PM, 3:30PM, 6:30PM). Observation duration for each time point varied between 30-60 minutes depending on the number of target areas outlined for each park. Observations were conducted on three different days of the week from Monday to Friday. Data collection was carried out over a 6 week period only during optimal weather in the summer of 2010. Weather temperatures and conditions were recorded from the Kingston Weather Network on an hourly basis both before and after each time point observation to ensure optimal weather conditions (The Weather Network, 2010). These temperatures and conditions were later matched with Canada’s National Climate Data and Information Archive to ensure consistency (2010). Any scheduled observation time missed due to inclement weather (i.e., rain, thunderstorms, cold, extreme wind, etc) or a holiday was rescheduled for the same day and time in a subsequent week. In sum, SOPARC observations collecting park usage and physical activity levels took place 4 times per day, on 3 different days of the week, over 6 weeks, for a total of 72 hrs of observation over 18 days. EARPS observations of features and amenities took place once within all 6 parks over 2 week period.
RESULTS

A total of 1098 park users were recorded during 72 observations (4 time points x 3 days x 6 parks). For each park, the average number of users over 12 observations was divided by the neighbourhood population (500 meters population census around each park) yielding an overall average of 0.76% of the neighbourhood population making daily use of the parks. Overall park usage patterns revealed that the most prominent park users were female (52%) and white (89%). Children (30%) and adults (47%) were the most prevalent age group of overall park users. Physical activity recordings showed that 45% of users were sedentary, 40% were walking (moderate physical activity), and 15% were engaged in vigorous activity. Similar usage patterns were observed during lunch, afternoon, and evening observation time points (29%, 32%, 32%, respectively), while mornings observations yielded considerably lower usage (6%).

Park Characteristics & Park Usage

Results from bivariate analysis between four separate park characteristics and park usage were conducted. A Mann-Whitney U was used to compare park usage between suburban and urban neighbourhood park types. Results indicate that urban neighbourhood types (Mn= 81.47) yielded higher target area park usage than suburban neighbourhood types (Mn= 54.91), U = 1474.5, z = -3.68, p =< .001, α = 0.31. A Kruskal-Wallis analysis of target area park usage did yield significant differences between type of feature and amenity (i.e. Path, Play structure, Open Space, etc.; H= 18.48, p= .03). In contrast, a Kruskal-Wallis analysis comparing ratings of feature and amenity condition (i.e., poor, fair, excellent; H= 3.197, p<0.20) and cleanliness (i.e., not at
all, somewhat, mostly/extremely; H= 1.140, p<0.56) did not yield significant differences in target area park usage. Post hoc test results are reported in the following sections.

**Neighbourhood Type**

Table 2 presents Pearson’s chi-square associations between neighbourhood type (urban vs. suburban) and physical activity, age, and time of day. No associations were found between park type and gender or ethnicity. Cramér’s V post hoc comparisons revealed that both age ($X^2 = 83.389, p <0.01$, Cramér’s V = .276) and time of day ($X^2 = 20.184, p<0.01$, Cramér’s V = 0.136) had a moderate association with park type. Standardized residuals highlight teenager (urban = -3.5, suburban = 6.7) and adult (urban = 2.3, suburban = -4.5) usage as major contributors to the significant difference between age of users in suburban and urban park settings. Fewer teen and more adult users (13% vs. 52%) were seen in urban areas whereas more teen and fewer adult users (37% vs. 26%) were seen in suburban areas. Urban park usage remained relatively consistent during the lunch, afternoon, and evening time points (30%, 35%, 29%), whereas suburban park usage increased during evening observations (45%). Major contributors to this significant difference were that suburban parks had less afternoon usage (n=58) than expected (n=75.1) and in contrast, more evening usage (n=103) than expected (n=74.9).

**Park Feature Type**

Kruskal-Wallis comparisons between features and amenities categories found that target area park usage significantly differed with feature and amenity types (H= 18.48, p= .03). Statistical post hoc tests could not be performed due to a variable and small sample size between and within feature and amenity types. Descriptive results were thus used to illustrate overall (Figure 3) and average (Figure 4) park usage frequencies within each feature and amenity type. Figure 1 clearly displays that paths, sitting amenities, and open space are the most highly used
park features. However, when the average number of users per park feature and amenity type is taken into account in Figure 2 (e.g., Path 286 people/26 target areas = 11), the distribution changes. In this graph, both splash pad (n=47) and pool (n=38) show the highest average of target area park usage. Paved paths and play structures follow with 11 and 9.5 average users respectively. Field and court usage was found to be lower than expected, accounting for only 3.5% of all park usage.

**Figure 3.** Total number of people observed using each feature and amenity type.
Figure 4. Average number of people observed using each feature and amenity type.

Park Characteristics & Physical Activity

Associations between park characteristics (i.e., feature and amenity type, condition, cleanliness, and neighbourhood type), and physical activity were tested using Pearson’s chi-square analyses. Neighbourhood type (suburban vs. urban) and park feature type (i.e., Path, Play structure, Open Space, etc.), were both significantly associated with physical activity (p< .05 and p<.001 respectively). Table 3 shows chi-square associations between 143 feature and amenity ratings on condition and cleanliness with levels of physical activity from 1098 park users (i.e., sedentary, moderate, vigorous; p<.001).

Neighbourhood Type

Chi-square test results indicated a significant association between neighbourhood type ($X^2 = 6.402, p= 0.041, \text{Cramer’s V} = 0.07$) and physical activity. Examination of standardized
Table 2
Pearson chi-square associations between neighbourhood type and park usage demographics.

<table>
<thead>
<tr>
<th>Variable Category</th>
<th>Suburban N (%)</th>
<th>Urban N (%)</th>
<th>X²</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Activity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Sedentary</td>
<td>88 (47%)</td>
<td>402 (38%)</td>
<td>6.402</td>
<td>0.041*</td>
</tr>
<tr>
<td>-Moderate</td>
<td>100 (39%)</td>
<td>338 (43%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Vigorous</td>
<td>43 (14%)</td>
<td>120 (19%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Female</td>
<td>120 (52%)</td>
<td>445 (51%)</td>
<td>0.840</td>
<td>0.772</td>
</tr>
<tr>
<td>-Male</td>
<td>104 (48%)</td>
<td>422 (49%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Child</td>
<td>73 (32%)</td>
<td>260 (30%)</td>
<td>83.389</td>
<td>0.000**</td>
</tr>
<tr>
<td>-Teen</td>
<td>84 (37%)</td>
<td>111 (13%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Adult</td>
<td>61 (26%)</td>
<td>453 (52%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Senior</td>
<td>12 (5%)</td>
<td>42 (5%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-White</td>
<td>200 (87%)</td>
<td>762 (89%)</td>
<td>1.030</td>
<td>0.310</td>
</tr>
<tr>
<td>-Other</td>
<td>30 (13%)</td>
<td>90 (11%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time of Day</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Morning</td>
<td>12 (5%)</td>
<td>55 (6%)</td>
<td>20.184</td>
<td>0.000*</td>
</tr>
<tr>
<td>-Lunch</td>
<td>58 (25%)</td>
<td>260 (30%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Afternoon</td>
<td>58 (25%)</td>
<td>299 (35%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-Evening</td>
<td>103 (45%)</td>
<td>253 (29%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. Numbers and percentages are based on total number of observations.
*p<.05  ** p< .001
residuals revealed that urban users were less sedentary (n=88) than would have been expected (n=103.7). In addition, urban users were also more vigorously active (n=43) than would have been expected by chance (n=34.5).

**Park Feature Type**

Chi-square results indicated a strong significant association between park feature type and physical activity ($X^2=540.850$, $p<.001$, Cramer’s V = 0.498). Paths (92%), open space (58%), splash pads (55%) and play structures (54%), had more than half of their users being active (moderate and vigorous). Specifically, the splash pad, play structures, and swing sets all had over 20% of users categorized as vigorously active whereas, paths, and open spaces had more than 45% of users categorized as moderately active.

**Condition & Cleanliness**

Significant chi-square associations between feature and amenity condition and cleanliness rankings and physical activity levels were detected ($p<.001$). Cramér’s V revealed a moderate association between condition and physical activity ($X^2 = 54.941$, $p<.001$, Cramér’s V = 0.154) and a moderately strong association between cleanliness and physical activity ($X^2 = 183.242$, $p<.001$, Cramér’s V = 0.290). An examination of the standardized residuals showed that significant associations could be attributed to poor (Sedentary = -3.2, Moderate = 4.5) and fair (Sedentary =3.0, Moderate = -2.2) ratings of condition in relation to sedentary and moderate physical activity levels. Moreover, these standardized residuals indicated that low cleanliness ratings may be negatively associated with vigorous activity (-1.8) whereas high cleanliness ratings may be negatively associated with sedentary activity (1.8).
Table 3
Associations between physical activity and park feature and amenity condition and cleanliness

<table>
<thead>
<tr>
<th>Feature and Amenity Ranking</th>
<th>Physical Activity Observations</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Sedentary n=490</td>
<td>Moderate n=438</td>
</tr>
<tr>
<td>Condition</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n=143</td>
<td>Poor</td>
<td>18 (21%)</td>
<td>60 (72%)</td>
</tr>
<tr>
<td></td>
<td>Fair</td>
<td>191 (56%)</td>
<td>111 (32%)</td>
</tr>
<tr>
<td></td>
<td>Excellent</td>
<td>281 (42%)</td>
<td>267 (40%)</td>
</tr>
<tr>
<td>Cleanliness</td>
<td>n=143</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Not at all</td>
<td>56 (92%)</td>
<td>4 (7%)</td>
</tr>
<tr>
<td></td>
<td>Somewhat</td>
<td>160 (75%)</td>
<td>26 (12%)</td>
</tr>
<tr>
<td></td>
<td>Mostly/Extremely</td>
<td>274 (34%)</td>
<td>408 (50%)</td>
</tr>
</tbody>
</table>

Note. Value indicates number of people observed within each category. Frequency percentages reflect condition and cleanliness ratings between each physical activity level.

** p< .001
DISCUSSION

This study aimed to capture regular summer weekday park usage and physical activity levels to examine their association with park characteristics. This is one of the first studies to combine direct observation of park characteristics with direct observation of park usage and physical activity levels. As physical activity research related to parks is still emerging, this study aimed to further our understanding of the role of park feature type, condition, cleanliness, and neighbourhood type in relation to park usage and physical activity levels.

Findings from the current study revealed that less than one percent of the surrounding neighbourhood park population is making use of neighbourhood parks during a summer weekday. Despite self-report prevalence of outdoor recreation participation (Cordell, Betz, & Green, 2004; Crosby & Rose, 2008), these findings are in line with other recent theories and reports concerned with the declining use of parks (ALR, 2010; Bedimo-Rung et al., 2005). The current results also highlight that, of these park users, almost half were observed engaging in sedentary behaviour. As parks have a long-standing history of being optimal environments to offer community physical activity opportunities (Jacobs, 1961), and continue to be traditionally included in new neighbourhood developments for this reason (Librett, Henderson, Godbey, & Morrow, 2007), it is disconcerting to discover that these environment are not only being inadequately used, but are also not necessarily encouraging physical activity behaviour.

Findings from the current study show that both internal (i.e., feature and amenity type) and external (i.e., neighbourhood) park characteristics play a role in influencing park usage. Thus, it makes sense to focus intervention efforts on creating optimal park characteristics that are most likely to enhance park usage and physical activity. For example, 1) provide neighbourhood maps illustrating walkable connections between local parks and other neighbourhood destinations, and
2) distribute flyers within neighbourhoods to highlight the features and amenities their local parks may offer.

This study also provides a closer look at the type, condition, and cleanliness of park features and amenities and strengthens the evidence that features and amenities may be an important influence of park usage and physical activity levels. Relative to feature and amenity type, the current findings show that splash pads, pools, paths and play structures are high-use target areas within parks. Moreover, splash pads, play structures, and swing sets were features most conducive to higher frequencies of vigorous physical activity behaviour. These results complement findings from previous qualitative, GIS, and survey research (Tucker et al. 2007; Kazinsky et al., 2008; Reed et al., 2005; Shores & West, 2008; Potwarka, Kaczynski & Flack, 2008).

As all of these features support standard forms of child’s play, these findings might suggest that neighbourhood parks are being best used as environments for children. Structure commonalities amongst these features also suggest that creative and entertaining built structures that support child’s play will encourage the most active target area park usage per feature. As 47% of park users were adults it may be valuable to consider offering creative and entertaining structures that also appeal to adult usage and activity. These features could include circuit training stations such as platforms and bars. The addition of innovative and entertaining structures such as these for all ages may represent a design opportunity to promote more overall park usage and activity levels within parks. Future research needs to assess the impact of adult play infrastructure on adult park usage and physical activity.

Quality ratings of condition and cleanliness did not seem to differ between target area park usage, however, significant findings on their association with physical activity levels provide
promising support to continue investigating this area of park research. Qualitative (McCormack et al., 2010; Tucker et al., 2007) and theoretical (Bedimo-Rung et al., 2005) studies have outlined the importance of cleanliness and condition on park usage, yet previous observational studies have had difficulty quantifying the implications of this association (Colabianchi, Maslow, & Swayampakala, 2011; Kazinsky et al., 2008). The current study is the first to attempt to quantify condition and cleanliness ratings of all neighbourhood park features relative to observed target area park usage and physical activity levels. Findings revealed that the condition and cleanliness of a feature did not necessarily deter use, but could be limiting in terms of physical activity level. For example, if a play structure were to receive a low rating of condition due to extensive amounts of rust on the metal framework, a child might still use the structure by standing on its various levels and bridges, however the child might refrain from engaging in more vigorous activity or free play such as crawling, swinging, or climbing the structure due to the rusty conditions. From these findings and similar studies we can conclude that park feature type, and condition and cleanliness could be important factors in influencing park usage, physical activity or both.

The correlational nature of the current findings warrants a conservative approach to recommendations for practice. Although it may be too early to recommend costly park re-designs, it seems reasonable to suggest that designing parks with more activity promoting features will likely support more park usage and higher levels of park physical activity. In addition, monthly inspections, maintenance, and repairs to enhance the quality of features and amenities may constitute a cost-effective priority to encourage physical activity in neighbourhood parks.

This study suggests that there may be benefits of urban neighbourhood designs over suburban designs in promoting higher levels of park usage and physical activity. One possible
explanation is that urban environments typically provide more walkable environments (Frumkin, Frank, & Jackson, 2003), with more destinations around parks (Tilt, 2010; Sallis et al., 2007). Thus, it may be simply that urban parks can be used as both a recreational destination and as a utilitarian connection (i.e., to get from point A to point B), whereas suburban parks are more likely to be only a recreation destination. Shores and West (2010) also found that rural parks, which are similar to suburban parks in that they do not typically provide active connections to other destinations, were mainly used during evening hours and for recreation leisure activities. This suggests that suburban parks may need to rely more on internal park characteristics to entice people to visit the park and be active within it, whereas urban neighbourhoods can rely on other resources in the surrounding environment to encourage park usage and physical activity behaviour. In light of accumulating evidence about the association between the neighbourhood built environment and its physical activity usage for population health benefits, this study highlights that neighbourhood types is an important park characteristic to be considered (Brownson et al., 2009; Jacobs, 1961; Kaczynski et al., 2010; Powell 2005).

Limitations

Although the six parks in this study shared similar park characteristics, parks in general tend to contain a wide variety of features that lend themselves to different types of usage (Bedimo-Rung et al., 2005). The SOPARC tool uses these features instead of individuals as their unit of analysis. Thus, the variability of park features coupled with a small park sample size, limited the type of statistical analyses that could be used. As a result, only omnibus assumptions or group comparisons were conclusive for these findings, whereas differences amongst variables to further describe these associations were hypothesized through descriptive statistics and chi-
square standardized residuals. Many of these statistical limitations were in part due to the complexity of quantifying park feature usage and categorical physical activity levels.

Secondly, due to limited resources and time, weekend observations were not collected for this study. This is inconsistent with SOPARC tool recommendations, however with the exception of results for gender (i.e., more female users observed) and field and court usage (i.e., less field and court usage observed), results mirrored similar studies that had used the full 7 day protocol (Floyd et al., 2008; McKenzie et al., 2006; Reed et al., 2008).

Thirdly, although physical activity codes have been validated through heart rate monitoring, pedometers, and accelerometers (McKenzie et al., 1991; Ridgers et al., 2009; Rowe et al., 2004; Scruggs et al. 2003), the codes did not permit measurement of time spent in sedentary, moderate, or vigorous activity. The activity codes were also broad, such that “vigorous,” for example, encompassed a wide range of movement intensities (McKenzie et al., 2006).

Finally, this study was based on the SOPARC momentary time sampling protocol (McKenzie et al., 2006), where observations were limited to 3 days at four specific time periods per day. Park use and physical activity levels during other time periods might yield different results. In addition, momentary time sampling per feature or amenity did not allow for overall park usage to be quantified within the respected hour of observation, often missing active users who were moving from one park feature or amenity to the next. Therefore, park usage and physical activity observed frequencies of individuals have the potential to be underestimated. Many of these SOPARC limitations and concerns have been previously addressed in other studies (Floyd et al., 2008; Parra et al., 2010; Reed et al., 2008), including by the SOPARC the developers themselves (McKenzie et al., 2006).
Conclusion

These findings indicate that target area park usage will differ according to park feature and amenity types and neighbourhood types, most notably in urban neighbourhoods and on splash pads, pools, paths, and play structures. Physical activity levels were generally associated with park feature type, condition and cleanliness as well as, neighbourhood type. Findings from this study can guide future researchers, practitioners, planners, and designers in promoting and creating more user-friendly and active neighbourhood park environments.
REFERENCES


Powell, K. (2005). Land Use, the Built Environment, and Physical Activity A Public Health Mixture; A Public Health Solution American Journal of Preventative Medicine, 28: (Suppl 2)


Chapter 4

Manuscript 2: Do Families Fit Stop? An evaluation of a free family physical activity park program.
ABSTRACT

Objective: To evaluate the effectiveness of a park-based family activity program to increase park usage and physical activity behaviour, in order to address current research gaps and to inform future park program partnerships and interventions.

Method: The Family Fit Stop (FFS) program was initiated through a partnership between the City of Kingston and the Kingston Family YMCA to provide free family physical activity opportunities in four Kingston, Ontario city parks during the summer of 2010. Direct observations using the System for Observing Play and Recreation in Communities (SOPARC) were used to compare physical activity levels and park usage frequency both when the FFS program was being offered and when it was not being offered. Twenty-eight respondents completed surveys to assess park program involvement and participant’s level of weekly physical activity using the International Physical Activity Questionnaire for adults and youth and the Health Behaviour in School Aged Children Survey for children. Observations and surveys were conducted twice in each of the four participating parks during the 7-week program.

Results: Overall, the FFS program did not seem to significantly increase park usage or physical activity levels, although significantly greater numbers of park users were observed in the specific FFS target areas when the program was occurring compared to when no program was offered. A majority of FFS participants reported being currently moderately-vigorously active (79%), while 57% met Canadian Physical Activity Guidelines. A majority of program users came to the park with family members (93.1%), walked to the park (85.7%), and visited the park regularly (3 or more times per week, 62%).

Conclusions: Although free neighbourhood park programs are a promising approach to engage families in physical activity and to increase overall park usage, targeted promotional
strategies are needed to attract more non-park users and non-physically active users to park programs in order to have an impact on health at a population level.

**INTRODUCTION**

Increasing physical activity behaviour amongst Canadians has been a top priority of recent public health initiatives (Public Health Agency of Canada, 2011). Partnerships amongst health practitioners, researchers, and policy makers from both government and not-for-profit agencies have the potential to significantly influence public health in increasing physical activity and positive health outcomes (Spangler & Caldwell, 2007). In particular, recent interventions aimed at increasing physical activity have highlighted the potential benefit of collaborations between Public Health and Parks and Recreation (Ainsworth, Mannell, Behrens, & Caldwell, 2007; Godbey, Caldwell, Floyd, & Payne, 2005; Librett, Henderson, Godbey, & Morrow, 2007).

Part of the parks and recreation movement was predicated on the belief that public parks enhance the livability of communities and that recreation contributes to individual health (Cross, 1990). Parks have since then been viewed as an optimal environment to address community level physical activity behaviour. For example, neighbourhood parks have been found to play an important role in leisure-time physical activity given their wide range of free or low-cost activities (Godbey et al., 2005; Moody et al., 2004), their accessible locations (Cohen et al., 2006; Giles-Corti et al., 2005), and because parks are widely available in neighbourhood settings (Zlot & Schmid, 2005). Despite this potential appeal, recent findings have highlighted a need to increase the frequency of park usage and levels of physical activity within parks. (Active Living Research [ALR], 2010; Bedimo-Rung, Mowen & Cohen, 2005).

As Public Health initiatives seek to increase physical activity behaviour and Parks and
Recreation seek to increase park usage, innovative collaborative efforts to address these combined issues are increasingly encouraged and are in need of implementation and evaluation (Godbey, 2009; Kruger, Mowen, & Librett, 2007; Spangler & Caldwell, 2007). To date, a limited number of studies have published evaluations on physical activity park programs; yet these preliminary studies do suggest that organized park activities have been shown to increase park usage (Cohen et al., 2010), while park activity programs have been shown to increase physical activity levels (Parra et al., 2010).

Therefore, investments in locally organized park programming and the implementation of park program evaluations may be an effective approach for increasing and monitoring levels of physical activity and park usage, benefiting both Public Health and Parks and Recreation’s combined efforts to enhance population health and well-being. Thus, this pilot study proposed to evaluate the effectiveness of a park-based family activity program to increase park usage and physical activity behaviour for local neighbourhood residents. The General Research Ethics Board at Queen’s University cleared the research protocol.

Specifically, this pilot study consisted of four objectives, to: 1) compare overall park usage and physical activity during evenings when the program was offered and evenings when it was not offered, 2) compare the specific target area usage and physical activity levels during evenings when the program was offered and evenings when it was not offered, 3) assess park program and FFS program participant characteristics through an onsite questionnaire, and 4) relate FFS program participant self-reported levels of weekly physical activity to current Canadian Physical Activity and Sedentary Guidelines.
METHODS

Program Description

The Family Fit Stop (FFS) is a park-based physical activity program created through a partnership between the City of Kingston Recreation and Leisure Services Department and the Kingston Family YMCA. Branching out from traditional recreation facility programming, a neighbourhood park setting was chosen to implement a new physical activity program, making the program highly visible within the community, while leveraging the appeal and use of Kingston’s public outdoor spaces. The program’s aim was to encourage physically active lifestyles for family members of all ages, while also promoting the usage of Kingston’s urban and suburban local neighbourhood parks. To accomplish this, the FFS program offered convenient, free, and local opportunities to engage all types of families in physical activity, while encouraging accessible and safe neighbourhood park usage.

The FFS program ran in five parks from July 2010-Aug 2010, once a week from 6:30-8:30pm for seven weeks. The FFS was facilitated by a qualified YMCA staff member and one trained YMCA volunteer. The program was modestly advertised via local recreation facilities, newspapers, radio, and through large banners displayed at the park during the evening activities. Family-friendly program activities included: Tennis-baseball, Volley Balloon, Obstacle Courses, Soccer, Badminton, Capture-the-Flag, Overflow (water game), Soccer-Baseball, etc. To ensure safety, rest areas and drinkable water were also provided.

Program Setting

The FFS program was implemented in four diverse neighbourhood parks and one larger regional park in Kingston, Ontario. For the purpose of consistency, only the four neighbourhood
park programs were evaluated for this study. Each park was strategically selected as a FFS site because of its recognized family appeal. The four different sites were also considered to be representative of diverse neighbourhood profiles within the City of Kingston.

Physical activity and usage of parks have been shown to vary across socioeconomic status (SES) characteristics (Floyd, Spengler, Maddock, Gobster, & Suau, 2008) and neighbourhood surroundings (Kaczynski, Johnson, & Saelens, 2010). In order to account for this variability and to ensure a diversity of park settings, City of Kingston and YMCA staff purposely chose two parks from each suburban and urban area, as well as two parks from each low and high average household income neighbourhoods. Neighbourhood characteristics were collected for each park through the Kingston’s Neighbourhood Profiles census data (Census Canada, 2006) using a 500m buffer around each park. Table 4 outlines the specific neighbourhood classification for each park in this program evaluation.

Data Collection

The FFS program drew data from three different sources: A) A researcher observed park usage and physical activity recordings using the System for Observing Play and Recreation in Communities (SOPARC) tool, B) Park program participants self-reported program involvement, demographics, and weekly physical activity levels using a ten-question questionnaire, the International Physical Activity Questionnaire (IPAQ) and Health Behaviour in School Aged Children Survey (HBSC), and C) YMCA staff collected overall participant attendance and wrote a report on program findings and future improvements. This third piece was not part of the formal evaluation and therefore was only used to supplement the discussion of these pilot study findings. In sum, both direct observation and self-report questionnaire methods were used to evaluate the
Table 4
Neighbourhood (2006) demographics around a 500m radius\textsuperscript{b} of each Park

<table>
<thead>
<tr>
<th>Parks</th>
<th>SES\textsuperscript{a} Av. Household Income</th>
<th>Neighbourhood Land Area Dwelling Sq/km</th>
</tr>
</thead>
<tbody>
<tr>
<td>Park A</td>
<td>High ($100,381)</td>
<td>Suburban (679.9)</td>
</tr>
<tr>
<td>Park B</td>
<td>Low ($39,110)</td>
<td>Urban (1,074.0)</td>
</tr>
<tr>
<td>Park C</td>
<td>High ($104,547)</td>
<td>Suburban (529.4)</td>
</tr>
<tr>
<td>Park D</td>
<td>Low ($44,435)</td>
<td>Urban (2,738.4)</td>
</tr>
</tbody>
</table>

Note: SES – Socioeconomic status
\textsuperscript{a} SES was categorized as low or high if house hold income averages for each park were respectively below or above the city of Kingston overall average of $83,163.
\textsuperscript{b} Geographic Information System (GIS) was used to condense each neighbourhood census data into a 500m buffer around each park. This allowed for a more accurate description of each neighbourhood profile representing the approximate distance an average adult could walk to the park in roughly 5 minutes (3.7 mph).
FFS program’s effectiveness to engage families in FFS activities and promote more usage of local neighbourhood parks.

**Observation**

The SOPARC tool was used to directly observe overall park and FFS target area usage and physical activity levels both on evenings with and without the FFS program (Objectives 1 and 2). SOPARC is a tool designed to collect observational data on physical activity and leisure opportunities in community recreation spaces (McKenzie, Cohen, Sehgal, Williamson, & Golinelli, 2006). Target areas segment the park along natural boundaries and represent all standard park features and amenities likely to provide opportunities for park users to be physically active. These can include: green spaces, playgrounds, sport-specific fields or courts, and pathways. The FFS program was located in open space target areas.

A trained SOPARC observer conducted momentary time sampling scans at each target area of each sample park to determine both target area and total park usage by gender, physical activity level, ethnicity, and estimated age. Park usage represents the total number of people observed in each target area. Physical activity levels were categorized as: “Sedentary (S) = Individuals are lying down, sitting, or standing in place. Walking (W) = Individuals are walking or moving in some form at a moderate pace. Vigorous (V) = Individuals are currently engaged in an activity more vigorous than an ordinary walk (e.g., jogging, swinging, doing cartwheels)” (McKenzie et al., 2006). Reliability tests have shown high agreement, (ie. 88-89.5%) for activity levels (McKenzie et al., 2006). In addition, validity for these activity level codes have been previously established with heart rate monitoring (McKenzie, Sallis & Nader, 1991; Scruggs, Eisenman, Watson, Shultz, & Ransdell, 2003), pedometer (Scruggs et al., 2003), and accelerometer (Ridgers, Stratton, & McKenzie, 2010) comparisons. Furthermore, SOPARC has
been used successfully in previous park program observational studies (Parra et al., 2010) and has been found to be both a highly reliable and valid tool (McKenzie et al., 2006; Ridgers et al., 2010).

A total of 91 target areas from all four parks were observed on four weekday evenings from 6:30-7:30pm. These times were in line with McKenzie & Cohen SOPARC scheduling protocol (2006) and coincided with observations of the first hour of the FFS program. Two of these four observations in each park were recorded during regular weekday evenings when the FFS was not offered, while the subsequent two were recorded during FFS program evenings. Program observations were scheduled at week 3 and week 6 of the 7-week program. On days with inclement weather (i.e., rain, thunderstorms, cold, extreme wind, etc) and on holidays, observations were rescheduled to take place during a subsequent week. Therefore, observational data were only collected during optimal weather conditions.

In each park, all target area observations were summed to quantify overall park usage with and without the FFS program (objective 1). Secondly, to allow for a more direct comparison of the FFS program’s influence on park usage and physical activity levels differences, only the specific FFS target area observations where FFS program activities were occurring were compared (objective 2). Frequency demographics for both overall park and specific FFS target area park usage and physical activity levels are reported in Table 2.

**Participants**

FFS participants were approached to partake in a two-part questionnaire collecting FFS participant feedback on program involvement and each participant’s weekly level of physical activity (Objectives 3&4). A total of 30 FFS program participants (14 adults, 2 teens, 12 children) provided active consent to participate in the questionnaire. Two children lost interest and
rejoined activities before completion, leaving 28 questionnaires remaining for evaluation. Average age of adults, teens, and children were 40, 15 and 9 years respectively. The majority of the questionnaire participants were female (71%) and all were Caucasian.

**Questionnaire**

Working closely with the City of Kingston and Kingston YMCA staff, a 2-3 minute, 10-item questionnaire was developed to evaluate park program involvement and participant demographics. Questions pertained to participant characteristics such as: the frequency of an individual’s weekly park visitation and overall program visitation. It also enquired about accompaniment (i.e., who they came to the park with) and how they heard about the program (i.e., family, friends, advertisements, etc). Lastly, two questions specifically pertained to the park characteristics of perceived park safety and proximity, both shown to influence park usage and physical activity levels (Cohen et al., 2010; Davison & Lawson, 2006; Kaczynski & Henderson, 2007).

In order to gauge the activity profile of park users participating in the FFS programs, the second component of the questionnaire assessed weekly activity levels of program participants. Participants responded to questions from the International Physical Activity Questionnaire (IPAQ) and Health Behaviour in School Aged Children (HBSC) questionnaire, both valid, reliable, and globally established tools in physical activity research and practice (Booth, Okley, Chey, & Bauman, 2001; Craig et al., 2003).

The short version IPAQ quantifies varying levels of an individual’s physical activity and sedentary behaviours throughout a regular 7-day week. Seven items query daily and hourly vigorous, moderate, walking, and sedentary activities. The IPAQ questionnaire was administered to adult and youth park program participants. The HBSC was used to assess children’s physical
activity and sedentary behaviours; two questions directly pertain to the weekly amount of daily bouts of 60 minutes or more of physical activity. The remaining three questions address hourly screen time and video game usage. IPAQ and HBSC findings were compared to the Canadian Physical Activity and Sedentary guidelines (Canadian Society for Exercise Physiology [CSEP], 2011). The complete questionnaire including both IPAQ and HBSC questions is available in Appendix C (for thesis review committee only).

Data Analysis

Observation objectives 1 and 2 were met by conducting dependent t-tests (park usage) and Chi-Square tests (physical activity). To address objective 3, frequency comparisons of park and participant characteristics were conducted. To achieve objective 4, weekly physical activity levels assessed by IPAQ and HBSC items were compared with Canadian Physical Activity and Sedentary Behaviour Guidelines (CSEP, 2011). Analyses were conducted using SPSS version 19.0.

RESULTS

Observation Data

Park Usage

Dependent t-tests were used to compare means of 1) overall park usage, and 2) specific FFS target area usage both when the FFS program was offered and not offered. Differences were compared between the sample means of 16 observations (8 FFS, 8 Control). Skewness and kurtosis frequencies were not significantly large, indicating that normality assumptions were met. Overall park usage means when the FFS program was offered and when the FFS program was not
offered were not significantly different ($M = 19.37$, SE = 2.79 / $M = 24.75$, SE = 2.79), $t(7) = -.965$, $p = .367$, $r = .34$. On the other hand, within the specific FFS program target areas a significantly greater number of park users were present when the FFS was offered ($M = 6.38$, SE = .995) than when the program was not offered in those same target areas ($M = 1.88$, SE = .99), $t(7) = -.2.412$, $p < .05$, $r = .67$.

**Physical Activity Levels**

Chi-square tests compared sedentary, moderate, and vigorous physical activity frequencies between when the FFS program was offered and when the FFS program was not offered. Comparisons between overall park physical activity levels while the program was offered and not offered were non-significant ($X^2 = 5.111$, $p = 0.78$, df=2). The same was true for comparisons between the specific FFS target area when the program was offered and not offered ($X^2 = .866$, $p = 0.65$, df=2). It should, however, be noted that there was a trend towards an increased number of participants engaged in vigorous physical activity at each FFS target area when the program was offered.

**Questionnaire Data**

**Family Fit Stop Program**

Frequency analyses showed that a majority of FFS participants attended the program accompanied by family members (93.1%), walked to the park (85.7%), and visited the park regularly (3 or more times a week, 62%). A majority of FFS participants ($n=20$) heard about the program by seeing the promotional banners while visiting the park. Others were referred by family ($n=2$), friends ($n=2$), or saw web ($n=1$) and flyer ($n=2$) advertisements. Ninety-one percent of participants said they would be able to continue these activities at home or at the park when the
Table 5
Park user demographics, total park usage, and physical activity levels both with and without the Family Fit Stop program.

<table>
<thead>
<tr>
<th>Park Usage</th>
<th>Overall Park Without program</th>
<th>With program</th>
<th>Family Fit Stop Target Area Without program</th>
<th>With Program</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>People</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Park Usage</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical</td>
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</tr>
<tr>
<td>Activity</td>
<td></td>
<td></td>
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<tr>
<td>Sedentary</td>
<td>71 (46%)</td>
<td>116 (52%)</td>
<td>9 (64%)</td>
<td>30 (59%)</td>
</tr>
<tr>
<td>Moderate</td>
<td>58 (37%)</td>
<td>58 (27%)</td>
<td>3 (21%)</td>
<td>8 (16%)</td>
</tr>
<tr>
<td>Vigorous</td>
<td>26 (17%)</td>
<td>45 (21%)</td>
<td>2 (14%)</td>
<td>13 (25%)</td>
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<td></td>
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<td></td>
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</tr>
<tr>
<td>Female</td>
<td>75 (48%)</td>
<td>96 (43%)</td>
<td>6 (43%)</td>
<td>24 (47%)</td>
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<tr>
<td>Male</td>
<td>80 (52%)</td>
<td>126 (57%)</td>
<td>8 (57%)</td>
<td>27 (53%)</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child</td>
<td>52 (34%)</td>
<td>89 (40%)</td>
<td>3 (21%)</td>
<td>34 (67%)</td>
</tr>
<tr>
<td>Teen</td>
<td>30 (20%)</td>
<td>32 (14%)</td>
<td>9 (64%)</td>
<td>1 (2%)</td>
</tr>
<tr>
<td>Adult</td>
<td>67 (43%)</td>
<td>95 (43%)</td>
<td>2 (14%)</td>
<td>15 (29%)</td>
</tr>
<tr>
<td>Senior</td>
<td>5 (3%)</td>
<td>7 (3%)</td>
<td>0</td>
<td>1 (2%)</td>
</tr>
<tr>
<td>Ethnicity</td>
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<tr>
<td>White</td>
<td>129 (84%)</td>
<td>201 (93%)</td>
<td>13 (93%)</td>
<td>49 (96%)</td>
</tr>
<tr>
<td>Other</td>
<td>25 (16%)</td>
<td>15 (7%)</td>
<td>1 (7%)</td>
<td>2 (4%)</td>
</tr>
</tbody>
</table>

*Significant mean differences were found at p < .05
FFS program was no longer available. Park proximity and safety were both reported highly, 91% lived within less than a five minute walk from the park, and 85.7% felt mostly to very safe in the particular park.

**Physical Activity and Sedentary Behaviour**

Following standardized IPAQ protocol (International Physical Activity Questionnaire [IPAQ], 2011) adult and youth participants were categorized into one of three groups: low, moderate, or high physical activity levels. With the exception of one participant, all adults were categorized as engaging in moderate (64%) or high (29%) physical activity intensities during the previous week. Further analysis revealed that 71% of adult program participants were meeting Canadian Physical Activity Guidelines for Adults 18-64 years, reporting more than 150 minutes of moderate-vigorous physical activity per week (CSEP, 2011). Although most program participants self-reported being moderately to vigorously active, half of the participants also reported being sedentary for over six hours daily (average= 268 min.). Both youth participants followed similar patterns, both were categorized as highly active and meeting Canadian Physical Activity Guidelines for Youth 12-17 years of 60 min of daily physical activity with at least three days of vigorous-moderate activity (CSEP, 2011). Weekly youth sedentary behaviour varied between 2-10 hours a day.

HBSC self-reported physical activity and sedentary behaviour showed that 83% of children were engaged in 60 minutes of physical activity on at least four days of the week, while 33% of these were meeting Canadian Physical Activity Guidelines for Children 5-11 years of 60 minutes on all seven days of the week (CSEP, 2011). None of the children (0%) were meeting Canadian Sedentary Guidelines for children 5-11 years (CSEP, 2011), as all children reported over two hours of daily sedentary screen time.
DISCUSSION

The Family Fit Stop (FFS) program was implemented and evaluated in four diverse park settings in Kingston Ontario. The program was offered for seven weeks during the summer months of 2010. The program aimed to encourage physically active lifestyles amongst local neighbourhood families, while also promoting the usage of Kingston’s urban and suburban local neighbourhood parks. As this was the first summer of implementation for the program, an evaluation of its effectiveness to increase park usage and physical activity behaviour was essential for improving future FFS programs and for guiding further park program evaluations. This pilot study provides preliminary evidence for the effectiveness of a joint municipal-YMCA neighbourhood park program.

Program

The FFS program seemed to be successful in attracting the intended audience (i.e., local families) as evidenced by a majority of program users living in close proximity (i.e., 5 minutes from the park) and attending the program with family members. Most participants rated the park where they attended the FFS program as mostly to very safe, while safety was only expressed as a concern if park usage was during dark evening hours. Finally, the program seemed to also encourage regular park usage, as participants reported visiting the park regularly with most reporting that they would be able to continue these activities on days when the FFS program was not offered.

The FFS program at neighbourhood parks offers a promising strategy to engage local families in physical activity opportunities. As research in this area is limited, more evaluations of these types of park recreation opportunities are necessary to strengthen these findings. Therefore,
partnerships between local municipalities and community agencies with similar interests in increasing park usage and physical activity should be encouraged to evaluate park programs in their local communities.

**Park Usage and Physical Activity**

Although the FFS program may not have led to increased park usage or physical activity, the FFS program itself did generate a significant increase in park target area usage where the program was being implemented, suggesting that program users were already park users. This finding is further supported by the questionnaire data showing that 74% of program participants were made aware of the program while visiting the park and seeing the promotional banners.

Moreover, trends indicated that FFS participants were engaging in more vigorous activity in these target areas during program hours (as compared to a number of vigorously active people in the same target area when no program activities were ongoing). Although these results contrast with Parra et al.’s findings that “City Gyms” deployed in Brazil parks did yield significant increases in overall park usage and vigorous physical activity (2009), important program differences should be noted. For example, the Brazil City Gym park program activities were available throughout the day, were well established, and had funded evaluations that provided the means for collecting more data than in the current pilot study.

The current findings also showed that a majority of FFS program participants reported meeting *Canadian Physical Activity Guidelines*. This suggests that the FFS program may have more appeal for families who are already active. Although providing physical activity programs and resources is essential to continue to support active families, additional strategies are needed to reach the 52% of Canadians who are still classified as insufficiently active (Canadian
Community Health Survey, 2008). Therefore, in order to improve health at a greater population level, there is a need to enhance a park program’s ability to attract populations that may be in greater need of these services (i.e., inactive families in low income neighbourhoods, or in neighbourhoods with few local facilities).

The FFS 2010 report, prepared by YMCA staff, included a lack of advertisement and promotion of the FFS program as one of the most prominent barriers to the program’s success. Despite the use of multiple media channels (i.e., advertisements in local recreation facilities, newspapers, radio, and through large banners displayed at the park during the evening activities), the “dose” (i.e., the number of times the media messages were made available) may have been insufficient to reach a critical mass of community residents. In a study by Hoener et al., it was found that media exposure significantly increased (by 7%) the number of active visits at seven national parks (2010). Therefore, strategies to increase park program awareness through intense media exposure may play a key role in encouraging non-park users to visit the park and to engage in a physical activity park program. Future research should explore innovative strategies to increase the participation of more non-park users and inactive neighbourhood families.

**Limitations**

The small sample size of parks (N=4) and questionnaire respondents (n=28) represents a limitation to the generalizability of the current findings. Future research recommendations are to increase the sample size and diversity of parks included in the park program evaluation. For example, as this park program specifically targeted local neighbourhood parks, it may not be generalizable to larger parks events (e.g., organized fitness classes; park festivals) or to other
special populations, such as seniors. Future research recommendations are to replicate this type of study with an increased and diverse sample

**Implications**

Public health practitioners, researchers, municipal staff, and not-for profit agencies such as the YMCA should continue to fund, implement, and evaluate park programs to test their effectiveness. Park programs are a novel strategy for reintroducing local residents to the many benefits of park usage, physical activity, and community involvement. Providing physical activity programs within community neighbourhoods as an alternative to offering programs solely in recreation facilities, is a promising strategy to increase population health. This pilot study is one of the first in North America to use observational tools to quantify such park program usage and physical activity levels. As research is limited in this area, partnerships between researchers and practitioners should be encouraged as a model for assessing the effectiveness of park programs.
REFERENCES


Chapter 5
Discussion

5.1 Overview

Parks have been long-standing leisure and recreation environments for many centuries (Jacobs, 1961). They are designed to enhance the livability of communities and provide recreation opportunities for individual health benefits (Cross, 1990). They are efficiently designed within neighbourhoods to offer, free or low cost activities (Godbey, Caldwell, Floyd, & Payne, 2005; Moody et al., 2004), accessible locations (Cohen et al., 2006; Giles-Corti et al., 2005), and are widely available in neighbourhood settings (Zlot & Schmid, 2005). Surprisingly, despite the potential benefits of neighbourhood park environments for promoting physical activity, most park observations have found that parks are underutilized (Cohen et al., 2009; 2010). Moreover, of those people who do use parks, most engage in sedentary or only moderately active behaviours while there (Floyd, Spengler, Maddock, Gobster, & Luis, 2008a; McKenzie, Cohen, Sehgal, Williamson, & Golinelli. 2006; Shores & West, 2008).

Findings from the current thesis provide valuable insight into our understanding of park characteristics (i.e., feature and amenity type, condition, cleanliness, neighbourhood type, and park program) and their association with park usage and physical activity behaviour. The following discussion will review implications, limitations, and strengths of the findings from the two manuscripts.
5.2 Practical Implication

Manuscript one findings provide evidence about the importance of park feature and amenity type and quality for the design of neighbourhood parks. In particular, results suggest that providing feature and amenity types that support unstructured play, such as: splash pads, pools, paths, and play structures may be an effective design strategy to promote more overall neighbourhood park usage and to enhance activity levels within parks. These findings confirm similar qualitative or self-report research findings (Chad et al., 2005; Reed et al., 2008; Tucker, Gilliland, Irwin, 2007). In contrast, field and court features may not be as influential to park usage and physical activity levels in neighbourhood parks as has been found in previous studies (Reed et al., 2008; Floyd et al., 2008b). This could be due to a lack of statistical power or because previous studies have included park samples that had organized leagues using these particular features.

Analysis of feature and amenity quality ratings revealed that the condition or cleanliness of a feature did not necessarily deter use, but could be limiting in terms of physical activity level. Therefore, monthly inspections, maintenance, and repairs to enhance the quality of features and amenities may constitute a cost-effective priority to encourage more physical activity behaviour in neighbourhood parks.

Lastly, the current findings add to the built environment research evidence base showing that urban and suburban neighbourhood environments will affect people’s physical activity behaviours differently (Frank, Engelke, & Schmid, 2003; Frumkin, Frank, & Jackson, 2004). Urban parks support more park usage and are associated with higher levels of physical activity. This finding is likely due to the different uses local residents make of parks. For instance, urban parks are likely used both for recreational and utilitarian purposes (e.g., using a park path to
connect to other destinations). Overall, differences between park neighbourhood types should continue to be researched and may provide valuable information about the best location for a park within a specific neighbourhood and about the ideal features and amenities the park should contain, in order to meet specific neighbourhoods needs.

Findings presented in the second manuscript provide novel insight into how free neighbourhood park programs provide another strategy to enhance park use and physical activity in community residents. Park programs represent a promising approach to engage families in physical activity and increase park usage, but may only be as successful as their promotional strategies. For example: this study’s findings highlight the need for park programs to attract more non-park users and non-physically active users in order to impact health at a population level. This may most effectively be done through advertisement strategies targeted to the park programs intended population. Overall, this pilot study highlights park programs as a promising strategy to provide family physical activities at a park while promoting the usage of local neighbourhood parks.

5.3 Limitations of the Thesis

The correlational nature of the findings presented in manuscript one warrant a conservative approach to conclusions and recommendations for practice. The combined complexity of physical activity, park environments, cross-sectional nature of the design, and use of observational measurements precluded our ability to control for extenuating variables such as, the amount of features within each study park. This complexity and the limited sample also did not adequately account for the hierarchical nature of the data (i.e., park users nested in target areas nested in parks nested in neighbourhoods). Although non-parametric analyses are
statistically meaningful, they do not account for the unique variance in park usage and park user physical activity that could be explained by the influence of each of these nested layers through multilevel modeling. Finally, the small park sample size (n=6) may restrict the generalizability of the findings. However, given that target areas (i.e., features and amenities, n= 143) and park usage (n=1098) were used to evaluate associations and to make comparisons, our small park sample is only limiting in the generalizability of our findings to other types of parks such as rural, regional, or national parks.

The small sample size of parks (n=4) and questionnaire respondents (n=28) reported in Manuscript two also impairs the generalizability of these pilot study findings. Future research recommendations are to replicate this type of study with an increased and diverse sample. For example, as this park program specifically targeted local neighbourhood families, it may not be generalizable to larger park events or to other age groups such as seniors. Lastly, as this study was designed to evaluate a naturally occurring community-based program, our community partners (i.e., the City of Kingston and the Kingston Family YMCA) made decisions about park program location, time, activities, intensity, or promotional advertisements.

Finally, because the influences of park usage and physical activity are multi-layered, parks can offer a wealth of overall health benefits through several individual, social, economic, and environmental influences (Crompton, 1999). These other levels of influence were not addressed within the context of this thesis in order to effectively focus on community and environmental characteristic associations with park usage and physical activity. However, as this thesis does frame itself on the foundation of socio-ecological models, it is valued and understood that this thesis may only provide a piece in our understanding of the complex impact parks may have in influencing park usage and physical activity behaviour.
5.4 Strengths of the Thesis

Overall, as research on parks is still emerging, both manuscripts provide novel contributions to our understanding between the relationship of park characteristics and park usage. To the best of our knowledge, the study presented in Manuscript one is the first to attempt to quantify condition and cleanliness ratings of all neighbourhood park features and amenities relative to observed park usage and physical activity levels. In addition, it is the first study to attempt to explore how differences between urban and suburban neighbourhood types may affect park usage and physical activity levels. Furthermore, Manuscript two is one of the first studies in North America to report the use of observational tools to quantify park program usage and physical activity levels.

Although further research in this area is recommended to strengthen these findings, it is important to value the contribution this thesis makes despite its challenges and limitations. This thesis’s usage of a natural experiment has provided a unique and realistic look at what role park characteristics may play in influencing park usage and physical activity within neighbourhood parks. For many practical reasons parks cannot always be studied using the idealist conditions of a randomized control trial (Petticrew et al., 2003; Ramanathan, Allison, Faulkner, & Dwyer, 2008). Park environments naturally consist of complex characteristics and populations, which are not necessarily conducive to controlled evaluation designs. Although it is impossible to control for the many variables that may influence park behaviour, natural experiments have been found to play a key role in investigating the determinants of health and have historically been underused and undervalued within health promotion research (Petticrew et al., 2003). This thesis provides a valuable contribution that will help advance the field of park and health research and practice.
because it provides evidence on real behaviours in real neighbourhood contexts outlining where practical interventions or policies can be implemented to shape park environments and population health for the better.

5.5 Conclusion

As a whole, this thesis highlights the important role some park characteristics may play in influencing park usage and physical activity behaviour. It also showcases why this is an emerging field of research and how it may contribute to positive population health outcomes. As physical activity research related to parks is still emerging, this study makes an important contribution to furthering our understanding of the role of park feature and amenity type, condition, cleanliness, and neighbourhood type in relation to park usage and physical activity levels. It also provides public health practitioners, researchers, municipal staff, or non-for profit agencies a rationale to promote, implement, and evaluate future park programs that aim to increase physical activity and park usage. These findings will be useful in guiding future research and practice in this area with a view to ultimately enhance population health amongst Canadians by creating more user-friendly and active neighbourhood park environments.
5.6 References


Zlot, A.I. & Schmid, T.L. (2005). Relationships among community characteristics and walking and
Appendix A

Observational Measurement Tools
### SOPARC Tool

#### CONDITIONS OF TARGET AREA

- **Accessible** (e.g., not locked or rented to others)  | [ ] Yes  [ ] No
- **Usable** (e.g., is not excessively wet or windy)  | [ ] Yes  [ ] No
- **Equipped** (e.g., removable balls available)  | [ ] Yes  [ ] No
- **Supervised** (e.g., not locked or rented to others)  | [ ] Yes  [ ] No
- **Organized** (e.g., team sporting event)  | [ ] Yes  [ ] No
- **Dark** (e.g., insufficiently lit)  | [ ] Yes  [ ] No
- **Empty** (i.e., scan area is empty)  | [ ] Yes  [ ] No

**Comments:**

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<thead>
<tr>
<th>PEOPLE</th>
<th>ACTIVITY</th>
<th>AGE GROUP</th>
<th>ETHNICITY</th>
<th>ACTIVITY LEVEL</th>
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<tr>
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<tr>
<td>Male</td>
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</tbody>
</table>

**Fitness Related Codes:**
- aerobics (dance/step aerobics)
- fitness stations
- jogging/running
- strengthening exercises (pull ups)
- walking

**Sport Related Codes:**
- baseball
- basketball
- cheerleading
- dance
- football
- gymnastics
- handball
- horseshoes
- soccer
- tennis/racquet
- tetherball
- volleyball

**Active Game Related Codes:**
- climbing/sliding
- jumping (rope, hop scotch)
- manipulatives/racquet
- tag/chasing games

**Sedentary Related Codes:**
- chess/checkers/card
- lying down
- picnic (food involved)
- reading
- standing
- sitting
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<td></td>
<td></td>
<td></td>
<td>V</td>
</tr>
</tbody>
</table>
### B. Paths

#### 1. Existence and surface

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Rating</th>
<th>Scaling</th>
<th>Considerations</th>
<th>Picture</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Path presence</td>
<td>Yes</td>
<td>No</td>
<td>Distinct and designated walking area with the primary function of linking elements within the park; may be paved or unpaved. Paths can lead to trails. <strong>If no, skip to section C</strong></td>
<td>B1.1</td>
</tr>
<tr>
<td>2. Paved</td>
<td>Yes</td>
<td>No</td>
<td>Must be mostly (&gt;80%) paved for “yes”</td>
<td></td>
</tr>
<tr>
<td>3. Condition</td>
<td>1 2 3</td>
<td>PEX</td>
<td>Refer to guidebook; consider condition of path surface, including holes, cracks, etc.</td>
<td>B1.4</td>
</tr>
<tr>
<td>4. Width</td>
<td>1 2 3</td>
<td>&lt;2 ft (1 adult); 2.5 ft (2 adults); sidewalk width; &gt;3 ft (&gt;3 adults)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Cleanliness</td>
<td>1 2 3</td>
<td>NATE</td>
<td>Refer to guidebook; consider man made litter, but not mud, rocks, twigs, etc.</td>
<td>A7.6a</td>
</tr>
<tr>
<td>6. Flatness</td>
<td>1 2 3</td>
<td>NATE</td>
<td>Completely flat=3, some incline/decline=2, significant incline/decline=1</td>
<td>B1.1, B1.4</td>
</tr>
<tr>
<td>7. Continuity</td>
<td>Yes</td>
<td>No</td>
<td>More than two surface materials, missing sections, or patched sections would receive a “no” rating</td>
<td>A1.8</td>
</tr>
<tr>
<td>8. Clear from obstruction</td>
<td>1 2 3</td>
<td>NATE</td>
<td>Refer to guidebook; it is what happens on top of the surface; do not consider small twigs, small rocks or small areas of mud. Is progress hindered?</td>
<td>A1.9 a,b</td>
</tr>
<tr>
<td>9. Coverage/shade</td>
<td>1 2 3</td>
<td>PLR</td>
<td>Refer to guidebook; consider the entire length of the path, but not width</td>
<td>A1.10 a,b</td>
</tr>
</tbody>
</table>

#### 2. Access

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Rating</th>
<th>Scaling</th>
<th>Considerations</th>
<th>Picture</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Parking proximity</td>
<td>1 2 3 4 5</td>
<td>PROX</td>
<td>Refer to guidebook; use shortest distance</td>
<td></td>
</tr>
<tr>
<td>2. Entrance proximity</td>
<td>1 2 3 4 5</td>
<td>PROX</td>
<td>Refer to guidebook; use shortest distance</td>
<td></td>
</tr>
<tr>
<td>3. Seating proximity</td>
<td>1 2 3 4 5</td>
<td>PROX</td>
<td>Refer to guidebook; use shortest distance</td>
<td></td>
</tr>
<tr>
<td>4. Pollards/other barriers</td>
<td>Yes</td>
<td>No</td>
<td>Refer to guidebook; anything to delineate an access point or exclude vehicles, must be present on the path to rate as “yes”</td>
<td>A4.4 a,b</td>
</tr>
<tr>
<td>5. Steps</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix B
Observational Protocol
### SOPARC CODES and RECORDING

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Date</strong></td>
<td>Enter the date (mm/dd/yyyy) of the observation.</td>
</tr>
<tr>
<td><strong>Park ID#</strong></td>
<td>Enter the designated Park ID. This is generally a two-letter abbreviation of the park name (e.g., Pecan Park is represented by “PP”).</td>
</tr>
<tr>
<td><strong>Observer ID</strong></td>
<td>Enter your ID code.</td>
</tr>
<tr>
<td><strong>Period</strong></td>
<td>Check the appropriate box to indicate whether observations were made in the morning, lunch, afternoon, or evening.</td>
</tr>
<tr>
<td><strong>Target Area</strong></td>
<td>Refers to the number of a previously designated Target Area (see the park map). If necessary, assign Sub-target Area numbers when you divide the area into multiple scan spaces.</td>
</tr>
<tr>
<td><strong>Start Time</strong></td>
<td>Enter the start time of the scan for that designated area.</td>
</tr>
<tr>
<td><strong>Area Condition</strong></td>
<td>Check “Yes” or “No” to describe specific conditions for each scan area.</td>
</tr>
<tr>
<td><strong>Accessible</strong></td>
<td>Code “YES” if area is accessible to the public (e.g., area is not locked or rented to private party).</td>
</tr>
<tr>
<td><strong>Usable</strong></td>
<td>Code “YES” if area is usable for physical activity (e.g., is not excessively wet or roped off for repair). For example, code “YES” when the space is usable, even though it may be locked. Code “NO” when there is insufficient lighting to use the space (e.g., no outdoor lights permitting play after sunset).</td>
</tr>
<tr>
<td><strong>Equipped</strong></td>
<td>Code “YES” if equipment (e.g., balls, jump ropes) provided by the park is present during the scan. Code “NO” if the only equipment available is permanent (e.g., basketball hoops and climbing apparatus) or owned by park users themselves (e.g., frisbee, ball, or bicycle brought by a family).</td>
</tr>
<tr>
<td><strong>Supervised</strong></td>
<td>Code “YES” if area is supervised by designated park or adjunct personnel (e.g., park rangers, playground supervisors, volunteers, sport officials, teachers). The supervisor must be in or adjacent to that specific area (e.g., available to direct park users and respond to emergencies), but does not have to be instructing, officiating, or organizing activities.</td>
</tr>
<tr>
<td><strong>Activity Organized</strong></td>
<td>Code “YES” if an organized physical activity is occurring in the scan area (e.g., a scheduled sporting event or exercise class is being lead by park staff or adjunct personnel).</td>
</tr>
<tr>
<td><strong>Dark</strong></td>
<td>Code “YES” to indicate the area has insufficient lighting to permit active play. Observers should not enter a target area unless there is sufficient lighting.</td>
</tr>
<tr>
<td><strong>Empty</strong></td>
<td>Code “YES” when there are no individuals present during the scan. Also, code “YES” when the area is dark.</td>
</tr>
<tr>
<td><strong>Comments</strong></td>
<td>Enter relevant additional information about the condition, people, or activities within the Target Area.</td>
</tr>
</tbody>
</table>
Activity

Write in the most prominent (primary) physical activity that females and males are doing in the area. If applicable, write in the second most prominent physical activity (secondary) that females and males are doing. A space is also provided to write in the most prominent activity attracting female and male onlookers/spectators to the area (this only applies to organized activities).

During scans of the target area, all people should be accounted for as either participating in the primary activity, secondary activity, or as a spectator.

Some physical activity modes are:

**Fitness Related Codes:**
aerobics (dance/step aerobics)
fitness stations
jogging/running
strengthening exercises (pull ups)
walking

**Sport Related Codes:**
baseball
basketball
cheer leading
dance
football
gymnastics
handball
horseshoes
soccer
tennis/racquet
tetherball
volleyball

**Active Game Related Codes:**
climbing/sliding
jumping (rope, hoops, hop scotch)
manipulatives/racquet activities
tag/chasing games

**Sedentary Related Codes:**
artwork
chess/checkers/cards
lying down
picnicking (food involved)
reading
standing
sitting
Age Group: Determine age according to the following criteria:

- **Child**: Children from infancy to 12 years of age as children.
- **Teen**: Code adolescents from 13 to 20 years of age as teenagers.
- **Adult**: Code people from 21 to 59 years of age as adults.
- **Senior**: Code people 60 years of age and older as seniors.

Ethnicity: Code whether the primary ethnicity for each individual is Latino (L), Black (B), White (W), or Other (O).

Activity: Scanning left to right, determine the activity level based on the following criteria:

- **Sedentary (S)**: Individuals are lying down, sitting, or standing in place.
- **Walking (W)**: Individuals are walking at a casual pace.
- **Vigorous (V)**: Individuals are currently engaged in an activity more vigorous than an ordinary walk (e.g., increasing heart rate causing them to sweat, such as jogging, swinging, doing cart wheels).

Participants: Include all individuals who are participating in the primary activity in the target area (e.g., baseball). If more than one significant activity is going on, record the information for the group in the "secondary" activity.

Spectators: When spectators are at an organized event, write in the name of the activity they are watching and describe their characteristics. Spectators can be watching from the sidelines or bleachers.

**RECORDING PROCEDURES**

1. On the observation form, enter the Date, Park ID, Observer ID, Period, and Target Area.
   - Observers are encouraged to complete this section prior to the start of the observation period.

2. If there are too many people to count in any area, divide it into separate Subtarget Areas and follow the below procedures for each Subtarget Area separately. Use letters to distinguish the Subtarget Areas (i.e., A, B, C).
   - When people move to a different Subtarget Area while you are scanning, count only those who are present at the time you are scanning. In rare cases you may count people twice or miss them as they change Subtarget Areas. Make sure that all space in each main target area is included within the Subtarget Areas.

3. Enter the Start Time for each area scan.
4. Record the conditions for each area (Accessible, Usable, Equipped, Supervised, Organized, Dark, and Empty).
   - When there are people are in the area, continue with action #5.
   - When the area is “dark” or “empty,” complete the conditions and then move to the next Target Area.

5. Determine if there are Females within the target area.
   - If no females are located within the target area, write "none" and move to action #13.

6. For Females, decide which is the main activity in the target area and record it under Primary Activity. Refer to the codes listed on the SOPARC data form (or this protocol) to determine the appropriate terminology for the activity (e.g., aerobics, baseball, climbing).
   - If no females are participating in a primary activity, write "none" and move to action #11.

7. Scan the target area for Females who are participants in the primary activity. Use the counter to record the number of females by age and ethnicity groupings.
   - Use the top row of the counter to help with age grouping, with children on the left (chartreuse), teens (light green), adults (dark green), and seniors (gray). Use the second row of buttons is ethnicity, (tan=Latino, Black= African American, White=Caucasian, Yellow=other). Count age first, and then ethnicity, for each person.
   - Always scan from LEFT to RIGHT. Observe each person for each category in the area only once. If an observed person reappears in the scan area, do not record a second time. Do not backtrack to count new people entering the area.

8. Transfer these data to the SOPARC Observation Form and reset the counter.

9. Now scan all participating females in the primary activity and record their activity level (sedentary, walking, or vigorous).

10. Transfer these data to the SOPARC Observation Form and reset the counter.

11. Now scan the entire target area again for Females who are participating in a Secondary Activity. Describe the activity and scan for age, ethnicity, and activity level.
    - If there are no females participating in the secondary activity, write "none" under Secondary Activity and move to action #12.

12. Scan the entire target area again for Females who are Spectators. Describe the activity they are watching and scan for age, ethnicity, and activity level (they will typically be sedentary, but could be walking or vigorously involved).
    - If there are no female spectators, write "none" under organized activity and move to action #13.

13. Repeat actions #5 through #12 for Males, scanning first for participants in the primary activity, then secondary activity, and finally spectators.

14. Move to the next Target Area.
RECORDING PROCEDURES FOR WALKING/JOGGING TRACKS

1. Prior to observing in the park, a research team member will walk the path/track and record the length of time, in minutes, it took to complete one full lap around it (e.g., seven minutes). The Target Area will be observed for this length of time. A scan of the area is conducted.

2. A standard location from which all scans will be made will be identified. This location is referred to as the Coding Station and will easily identifiable.

3. On the SOPARC Observation Form, enter the Date, Park ID, Observer ID, Period, and Target Area.
   - If possible, complete this section prior to the start of the observation period.

4. Enter the Start Time for the area scan on the SOPARC Observation Form.

5. Record the conditions for each area (Accessible, Usable, Supervised, Organized, Equipped, Dark, and Empty).
   - If the area is "dark" or "empty," complete the conditions and then move to the next Target Area. If one or more people are in the area, continue with action #6.

6. Enter the Start Time and End Time on the Path Coding Form.

7. Count ALL people as they walk by the coding station and record their characteristics on the Path Coding Form. You may count some people more than once (e.g., runners), and some (e.g., slow walkers) may not pass by the area and will not be counted.
   - When two observers with counters are present during the scan, one counts for females and the other for males.
   - When recording data on the Path Coding Form, place a one (1) in each column that represents the individual characteristics (e.g., male, adult, Latino, walking).

8. Once time has expired, transfer the data from the Path Coding Form to the SOPARC Observation Form.
   - Use CAUTION when transferring data onto the SOPARC Observation Form. If time permits after the park scans are completed, check the form for errors.
   - Attach the Path Coding Form to the SOPARC Observation Form before submitting the data.

9. Move to next Target Area.
## Observation Tables

**PARK (NAME)**  
Recording #2

<table>
<thead>
<tr>
<th>Times</th>
<th>Weather</th>
<th>ID</th>
<th>Date</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>7:30 am</strong></td>
<td>7:00am</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8:00am</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>12:30pm</strong></td>
<td>12:00pm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1:00pm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>3:30pm</strong></td>
<td>3:00pm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4:00pm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>6:30pm</strong></td>
<td>6:00pm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7:00pm</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix C

Questionnaire Tools
Family Fit Stop Questionnaire

SURVEY

Park: ____________  Gender: M / F
Postal Code: ____________  Age: _____  Date: ____________

How many times a week do you usually visit the park during the summer months? _____

How many times have you participated in the FIT STOP program? ________________

How did you get to the park today? { bike, walk, drive } Other: ________________

How many minutes did it take? ________________

How did you hear about the FIT STOP program? ________________

Who did you come with? { family members, friends, alone } Other: ________________

What do you enjoy most about the Family Fit Stop activities? ________________

What feature or area of this park allows you to be most active? ________________

What would you like to see changed in this park to make it more active? ________________

Out of 5 how safe do you feel at this park? Not Safe 1 2 3 4 5 Very Safe

Will you be able to continue these activities at home or at the park when FIT STOP is no longer available? NO / YES  Why: ____________________________
IPAQ Questionnaire

**ADULT PHYSICAL ACTIVITY**

Think about all the **vigorous** activities that you did in the **last 7 days**. **Vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

1. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, digging, aerobics, or fast bicycling?
   
   ____ days per week  
   
   [ ] No vigorous physical activities  **Skip to question 3**

2. How much time did you usually spend doing **vigorous** physical activities on one of those days?
   
   ____ hours per day  
   ____ minutes per day  
   
   [ ] Don’t know/Not sure

Think about all the **moderate** activities that you did in the **last 7 days**. **Moderate** activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

3. During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.
   
   ____ days per week  
   
   [ ] No moderate physical activities  **Skip to question 5**

4. How much time did you usually spend doing **moderate** physical activities on one of those days?
   
   ____ hours per day  
   ____ minutes per day  
   
   [ ] Don’t know/Not sure

Think about the time you spent **walking** in the **last 7 days**. This includes at work and at home, walking to travel from place to place, and any other walking that you might do solely for recreation, sport, exercise, or leisure.

5. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time?
   
   ____ days per week  
   
   [ ] No walking  **Skip to question 7**

6. How much time did you usually spend **walking** on one of those days?
   
   ____ hours per day  
   ____ minutes per day  
   
   [ ] Don’t know/Not sure
The last question is about the time you spent sitting on weekdays during the last 7 days. Include time spent at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television.

7. During the last 7 days, how much time did you spend sitting on a weekday?

___ hours per day
___ minutes per day

☐ Don't know/Not sure
HBSC Questionnaire

CHILD PHYSICAL ACTIVITY

Read to the Participant:

Physical activity is any activity that increases your heart rate and makes you get out of breath some of the time. Physical activity can be done in sports, school activities, playing with friends, or walking to school.

Some examples of physical activity are running, brisk walking, rollerblading, biking, dancing, skateboarding, swimming, soccer, basketball, & football.

For these next two questions, add up all the time you spend in physical activity each day.

Researcher records answers:

1. Over the past 7 days, on how many days were you physically active for a total of at least 60 minutes per day?

   days  day  days  days  days  days  days  days

2. Over a typical or usual week, on how many days are you physically active for a total of at least 60 minutes per day?

   days  day  days  days  days  days  days  days

3. About how many hours a day do you usually watch television (including videos and DVDs) in your free time? (Please mark one box for weekdays and one box for weekend)

   Weekdays

   None at all
   About half an hour a day
   About 1 hour a day
   About 2 hours a day
   About 3 hours a day
   About 4 hours a day
   About 5 hours a day
   About 6 hours a day
   About 7 or more hours a day

   Weekend

   None at all
   About half an hour a day
   About 1 hour a day
   About 2 hours a day
   About 3 hours a day
   About 4 hours a day
   About 5 hours a day
   About 6 hours a day
   About 7 or more hours a day
4. About how many hours a day do you usually play games on a computer or games console (Playstation, Xbox, GameCube etc.) in your free time? (Please mark one box for weekdays and one box for weekend)

<table>
<thead>
<tr>
<th>Weekdays</th>
<th></th>
<th>Weekend</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>None at all</td>
<td>![ ]</td>
<td>None at all</td>
<td>![ ]</td>
</tr>
<tr>
<td>About half an hour a day</td>
<td>![ ]</td>
<td>About half an hour a day</td>
<td>![ ]</td>
</tr>
<tr>
<td>About 1 hour a day</td>
<td>![ ]</td>
<td>About 1 hour a day</td>
<td>![ ]</td>
</tr>
<tr>
<td>About 2 hours a day</td>
<td>![ ]</td>
<td>About 2 hours a day</td>
<td>![ ]</td>
</tr>
<tr>
<td>About 3 hours a day</td>
<td>![ ]</td>
<td>About 3 hours a day</td>
<td>![ ]</td>
</tr>
<tr>
<td>About 4 hours a day</td>
<td>![ ]</td>
<td>About 4 hours a day</td>
<td>![ ]</td>
</tr>
<tr>
<td>About 5 hours a day</td>
<td>![ ]</td>
<td>About 5 hours a day</td>
<td>![ ]</td>
</tr>
<tr>
<td>About 6 hours a day</td>
<td>![ ]</td>
<td>About 6 hours a day</td>
<td>![ ]</td>
</tr>
<tr>
<td>About 7 or more hours a day</td>
<td>![ ]</td>
<td>About 7 or more hours a day</td>
<td>![ ]</td>
</tr>
</tbody>
</table>

5. About how many hours a day do you usually use a computer for chatting on-line, internet, emailing, homework etc. in your free time? (Please mark one box for weekdays and one box for weekend)

<table>
<thead>
<tr>
<th>Weekdays</th>
<th></th>
<th>Weekend</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>None at all</td>
<td>![ ]</td>
<td>None at all</td>
<td>![ ]</td>
</tr>
<tr>
<td>About half an hour a day</td>
<td>![ ]</td>
<td>About half an hour a day</td>
<td>![ ]</td>
</tr>
<tr>
<td>About 1 hour a day</td>
<td>![ ]</td>
<td>About 1 hour a day</td>
<td>![ ]</td>
</tr>
<tr>
<td>About 2 hours a day</td>
<td>![ ]</td>
<td>About 2 hours a day</td>
<td>![ ]</td>
</tr>
<tr>
<td>About 3 hours a day</td>
<td>![ ]</td>
<td>About 3 hours a day</td>
<td>![ ]</td>
</tr>
<tr>
<td>About 4 hours a day</td>
<td>![ ]</td>
<td>About 4 hours a day</td>
<td>![ ]</td>
</tr>
<tr>
<td>About 5 hours a day</td>
<td>![ ]</td>
<td>About 5 hours a day</td>
<td>![ ]</td>
</tr>
<tr>
<td>About 6 hours a day</td>
<td>![ ]</td>
<td>About 6 hours a day</td>
<td>![ ]</td>
</tr>
<tr>
<td>About 7 or more hours a day</td>
<td>![ ]</td>
<td>About 7 or more hours a day</td>
<td>![ ]</td>
</tr>
</tbody>
</table>
Appendix D
Research Ethics
Letter of Information

The "FAMILY FIT STOP": Neighbourhood parks as a space for family physical activity.

What is this study about? The purpose of this research is to A) Evaluate the Family Fit Stop program and B) Understand park participant opinions about park environment and physical activity. The study will ask you 20 simple questions and should only require 5 minutes of your time. There are no known risks associated with your participation in this research study. This study has been granted clearance according to the recommended principles of Canadian ethics guidelines, and Queen's policies.

Is my participation voluntary? Yes. Although it would be greatly appreciated if you are willing to participate and able to answer all material as truthfully as possible. You should not feel obliged to answer any material that you find objectionable or that makes you feel uncomfortable. You may also withdraw at any time for any reason.

What will happen to my responses? We will keep your responses confidential. Only the main researcher will have access to this information. To ensure confidentiality, we will not ask for or record any personal or identifying information. This information you provide will be shared with the YMCA and the City of Kingston. It may also be published in professional journals or presented at scientific conferences, but any such presentation or sharing will be of general findings and will never be able to breach individual confidentiality. Should you be interested, you are entitled to a copy of the findings. Separate to the survey, we will also ask you to provide your email address on a separate piece of paper, if you so choose. This is an optional section of the survey that will allow the YMCA or the City of Kingston to contact you for any follow up questions they may have regarding your FIT STOP participation and feedback.

Will I be compensated for my participation? No. You will not directly benefit from participating in this research study.

What if I have concerns? In the event that you have any complaints, concerns, or questions about this research, please feel free to contact myself (Kerry Hamilton); 8kh34@queensu.ca, my project supervisor, Dr. Lucie Lévesque at lucie.levesque@queensu.ca, School of Kinesiology and Health Studies administration, Angie Malloy at <613-533-6000 x75214> or am2@queensu.ca; or the Chair of the General Research Ethics Board <613-533-6081> or chair.GREB@queensu.ca at Queen’s University.

Again, thank you. Your interest in participating in this research study is greatly appreciated.
Recruitment Script

The "FAMILY FIT STOP": Neighbourhood parks as a space for family physical activity.

ADULT/SENIOR VERSION

Hi,

My name is Kerry Hamilton and I’m a Masters student at Queen's University and I was wondering if I could have 5 minutes of your time to ask you a few simple questions about this “Family Fit Stop program in the park”. I won’t need any personal or identifying information and if you don’t mind I will just be writing your answers down on this survey.

YES – Thank you very much! I will just a take a quick minute to give you some more information about the project and the purpose of this survey before we get started.

NO – That’s okay, Thank you very much and I hope you enjoy the rest of the activities today.

YOUTH VERSION

Hi,

My name is Kerry and I’m a student at the University here in Kingston and I was wondering if I could take 5 minutes to ask you a few questions about the games you are playing in the park today? I won’t need any personal information from you and will be just writing your answers down on this sheet of paper.

YES – Thank you very much! I’ll just take a quick minute to give you some more information about my project before we get started.

NO – That’s okay, Thank you very much and I hope you enjoy the rest of the activities today.
CHILD WITH ADULT VERSION

ADULT

Hi,

My name is Kerry Hamilton and I’m a Masters student at Queen’s University and I was wondering if I could have 5 minutes of your time to ask you and your child a few simple questions about this “Family Fit Stop program in the park”. I won’t need any personal or identifying information and if you don’t mind I will just be writing your answers down on this survey.

YES – Thank you very much! I will just take a quick minute to ask your child if he/she is okay with answering a few questions as well and to give you some more information about the project and the purpose of this survey before we get started.
NO – That’s okay, Thank you very much and I hope you enjoy the rest of the activities today.

CHILD

Hi,

My name is Kerry and I’m a student at the University here in Kingston and I was wondering if I could take a few minutes to ask you a few questions about the games you are playing in the park today?

YES - Thank you so much!
NO - That’s okay, have a good rest of your day playing in the park
Identification Badge

Queen’s University Master’s Student

Kerry Hamilton
Appendix E

Family Fit Stop
FAMILY
FIT
STOP

FREE family activities
8 weeks this summer
5 city parks
Activities organized by the
YMCA Fit Crew