Walkable for Whom? Examining the Role of the Built Environment on the Neighbourhood-based Physical Activity of Children

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ABSTRACT

Objectives: To date, only a few studies have attempted to study the processes by which community design and the built and social environments affect individual physical activity, especially in children. Qualitative enquiry is useful for exploring perceptions and decision-making, and to understand the processes involved in how people interact with their environments. This study used qualitative methods to gain insight into the pathways linking the neighbourhood environment with children's activity patterns.

Methods: Data were collected in semi-structured interviews with 24 child-parent dyads (children aged 10-14 years). Families lived in neighbourhoods ranging from lowest to highest median income and representing the three main design types found in Saskatoon – urban, semi-suburban and suburban.

Results: Parents and children underscored the importance of safe environments for children's physical activity: streets or paths they can cycle on without feeling threatened, parks and green spaces free of criminal activity, and neighbourhoods where people know each other and children have friends to play with. Although grid-pattern urban neighbourhoods with a high density of destinations may in principle promote active transportation, the higher levels of crime and traffic danger that tend to exist in these areas may hinder physical activity in children.

Conclusion: Understanding what facilitates activity in children is a complex endeavour. It requires understanding the barriers to physical activity present at the neighbourhood level as well as social and perceptual factors that act in interdependent ways to either promote or hinder children's physical activity.

Key words: Neighbourhood built environment; children; qualitative method; safety; physical activity

La traduction du résumé se trouve à la fin de l'article.

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Walkability – the extent to which an area is supportive of walking – is a concept that emerged from the transportation literature and has been widely adopted in health research examining the impact of the built environment on physical activity and health outcomes.¹ Factors that make neighbourhoods more walkable include pedestrian amenities such as sidewalks, crosswalks, curb cuts and traffic lights; street connectivity; mixed-land use; and the presence of a variety of destinations within walking distance, features typically found in urban more than suburban neighbourhoods.²⁻⁴ From a public health perspective, creating more walkable neighbourhoods might be expected to lead to a healthier environment by encouraging reduced car usage and therefore lower car emissions and air pollution, and also by increasing opportunities for active transportation (physically active modes of transportation, such as walking, biking, rollerblading, skateboarding), which could increase overall levels of physical activity and decrease obesity.⁵⁻⁷

Although a significant amount of research has shown that adults living in urban neighbourhoods walk more and have a lower body-mass index (BMI) than their suburban counterparts, other studies have found that this association is not consistent in all urban neighbourhoods or with all demographic groups.^{4,8,9} Very little research has examined the impact of neighbourhood design on activity levels in children and youth, and the few studies that have looked specifically at youth activity have also produced mixed findings.¹⁰⁻¹³ A study of Belgian adolescents found that they were more

likely to walk and bike in less walkable neighbourhoods than more walkable neighbourhoods.¹⁴ Other studies have found that while boys are more active in neighbourhoods that are close to commercial areas and have connected streets, girls are more active in neighbourhoods with unconnected, curvilinear, low-traffic streets.^{15,16}

No consistent association has been established between children's BMI and neighbourhood design, but some research suggests that certain neighbourhood characteristics may be influential. For example, neighbourhood safety and access to parks, playgrounds, recreation centres and sidewalks were significantly associated with lower BMI in girls aged 10-11 years in a US study based on a survey conducted by the National Centre for Health Statistics.¹⁷ Higher rates of overweight and obesity were found in both boys and girls

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living in neighbourhoods perceived to be unsafe or where garbage and other signs of neighbourhood disorder were evident.¹⁷

Despite the wide adoption of walkability measurements in the study of neighbourhoods, numerous questions remain to be answered about this concept, especially its relevance to children. The amount of neighbourhood-based physical activity is likely to be influenced not only by the walkability of an area as it is typically measured but also by the neighbourhood's socio-economic status (SES) and the characteristics of the individual.^{18,19} Studies from both Canada and the United States have found that BMI tends to be higher in low-income neighbourhoods, despite their typically high "walkability", suggesting that social factors may modify the relation between the built environment and behaviour.^{4,20,21}

Given the complications in capturing complex neighbourhood influences on individual behaviour, understandably few attempts to date have been made to investigate the processes by which the physical and social environments affect individual adaptations, especially in children. The study reported here used qualitative methods to gain insight into the processes linking the neighbourhood environment with children's activity patterns.

METHODS

This study comes from the third and final phase of the Smart Cities, Healthy Kids project in Saskatoon, SK, a city of 240,000 people. In 2010, 24 children in Grades 5-8, representing a range of residential neighbourhood types in Saskatoon, and the mothers of the children were interviewed to find out what influence they felt their neighbourhood had on the children's activity levels.

The 455 families whose children had worn accelerometers in an earlier phase of our study were invited to take part in this qualitative component. We used purposive sampling to achieve representativeness of neighbourhood types, and of those families that volunteered we selected 24 living in 18 neighbourhoods, with the goal of having the full range of neighbourhood designs represented. Before the interviews, each child was loaned a camera to take pictures of aspects of the built environment that they felt either encouraged or discouraged their physical activity. Semi-structured, in-person interviews were conducted separately with the child and with one of the child's parents. In all cases, this ended up being the mother (or in one instance, the step-mother); in two interviews, fathers were also present. The photos the child had taken were used as a starting point for talking with him or her about the impact of the neighbourhood on activity (but not in the parental interview). The interviewers, two of the authors of this paper, have social science backgrounds and extensive experience in qualitative research. The interviews covered a range of questions, including perceptions of safety, general feelings about the neighbourhood, barriers to physical activity, time management and exercise habits.

Each interview was audio-recorded and transcribed. Using NVIVO 9 (QSR Int.), the two interviewers created independent coding lists and then collaborated to create a master coding list based on themes they had identified in the interviews.^{22,23} A long list of themes emerged that related to a range of topics, including perceptions about the neighbourhood, school and work environments, screen time, family values and rules, financial considerations, transportation habits, social and recreation preferences, concerns about safety, the role of gender, the presence of siblings and pets, and technology. Although many of the themes

appeared in both interview types, the interviews were coded according to whether they were child or parent interviews. The child and parent interviews within each dyad were then cross-compared to examine the points of similarity and divergence between child and parent perceptions of neighbourhood features and barriers or aids to physical activity.

This study included a diverse group of neighbourhoods, ranging from lowest to highest median income and representing the three main neighbourhood design types found in Saskatoon. Neighbourhood boundaries are designated by the City, and neighbourhood SES was determined by neighbourhood demographic information from the 2006 census, made available by the City of Saskatoon.²⁴ The median household income in the city, based on the 2006 census, was \$66,507. For the purposes of the study, low-income neighbourhoods were those with median household incomes below \$50,000, and high-income neighbourhoods were those with median household incomes above \$85,000. *Urban* neighbourhoods, built prior to the 1930s, have a traditional grid design, consisting of straight, intersecting streets and back alleys; they typically have higher population density and are of mixed use. *Semi-suburban* neighbourhoods surround the urban core and were built between 1931 and 1966; they have a mix of grid-based and curvilinear streets, are of lower density, predominantly residential, and are increasingly car-oriented as they are located further away from the urban centre. *Suburban* neighbourhoods, built after 1966, are on the periphery of the city, follow curvilinear street patterns, are low-density, almost exclusively residential and highly car-oriented. Ten of the participating families resided in urban neighbourhoods, eight in semi-suburban neighbourhoods and six in suburban neighbourhoods. Although the trend is not consistent across all neighbourhoods, generally speaking there is the least amount of park space in Saskatoon's low-income urban neighbourhoods and the greatest in the high-income suburban neighbourhoods. Suburban parks tend to be located in low-traffic, low-crime areas, whereas urban park space is closer to busy traffic intersections and areas often perceived to be unsafe, either because of the presence of strangers or a total absence of people (i.e., no surveillance). Semi-suburban parks tend to resemble suburban parks in that they are often relatively well equipped and maintained spaces and are perceived to be safer from both traffic and crime than most urban parks.

RESULTS

Participants talked about the factors influencing children's use of active transportation as well as other types of physical activity, both within and outside their neighbourhood. While they sometimes mentioned aspects of the built environment, social factors were more likely to be cited, and the influences on children's activity were reported to be different from the factors that affect adults.

Active transportation and schools

A key reason that neighbourhood walkability is considered important is that it facilitates active transportation. For children, the most frequent opportunity to use active transportation is travelling to and from school. In this study, children's use of active transportation to school was related to the type of neighbourhood in which they lived, mostly because of the location of schools.

Of the children living in urban neighbourhoods, only one walked to school consistently, primarily because most of these chil-

dren attended schools outside their neighbourhoods. Children living in suburban or semi-suburban neighbourhoods were much more likely to attend local schools and walked or biked to school some or all of the time. This was seen positively by some parents, for interpersonal as well as health reasons:

[My daughter] walks back and forth [to school] and she's coming home at lunch, too... At the end of the day if time permits and schedules are such that I can walk and go and meet her, I still do, and though she's in Grade Six... it's a good end of the day chat time.

—Mother, semi-suburban middle SES neighbourhood

Even when the distance between home and school makes walking feasible, parents' attitudes play a role in determining how often children actually do walk.

[In winter] I just say, "Put on more clothes." She still has to walk to school. I'm not a parent that drives to school all the time. She's a big girl and I'm a mean mother.

—Mother, suburban high SES neighbourhood

Numerous factors may be taken into account when deciding whether a child will walk to school or be driven on a given day, as this mother explains:

[Whether or not my children walk or bike to school] does depend on the season. It also depends on whether it's a band day or not, because biking with a big saxophone doesn't really work well. We also consider their afterschool activity; if they have two-and-a-half hours of sport in the evening, I don't push them to bike.

—Mother, urban middle SES neighbourhood

While children's use of active transportation is most likely to be limited to their neighbourhood, other types of physical activity can and do occur outside the neighbourhood they reside in. However, this usually requires transportation by parents. A number of participants reported leaving their neighbourhood by car to walk or bike in a more desirable area.

It's difficult biking safely with children around our neighbourhood. I have been almost pushed off my bike by people... I would not put my girls on this road... When their dad has time we'll put the bikes into the truck and leave our neighbourhood and go down to the Meewasin Trail [dedicated walking/biking trail along the riverbank].

—Mother, urban low SES neighbourhood

Thus, low levels of neighbourhood-based physical activity do not necessarily correspond to low levels of physical activity overall. The ease of travel to other areas where opportunities for recreation are found influences how likely families are to be active outside their neighbourhood:

Saskatoon still isn't such a big city that it's difficult, I mean, you have to plan your routes and think about where you're going... to get there in an efficient amount of time, but it's still very achievable to get around.

—Mother, urban middle SES neighbourhood

Neighbourhood social characteristics, amenities and role modeling

Participants cited two key neighbourhood characteristics – safety and recreational facilities – as influences on children's activity, as well as two social factors: the presence of other children in the neighbourhood and parents' own activity patterns.

The perceived safety of the neighbourhood, in terms of traffic, crime or both, played a substantial role in whether parents allowed their children to engage in outdoor activity. Children generally

shared their parents' perceptions of whether or not their neighbourhood was safe, and their behavioural choices reflected this.

[Biking in my neighbourhood is dangerous because] there's a lot of cars there. There's a lot of pawnshops around that area too. There's not really a lot of safe places for bikers to ride.

—Girl, aged 13 years, urban low SES neighbourhood

The kids around here are very active because there're so many parks around here and it's a really nice neighbourhood... It's one of the most safe neighbourhoods, so I could walk outside, like really late at night.

—Girl, aged 11 years, urban middle SES neighbourhood

In some low SES neighbourhoods, parks and green spaces are perceived as sites of criminal activity and other misuse. This creates a vicious cycle, in which parks become less used by families and children for active play and recreation, as they were intended, which in turn increases the level of illicit activities.

Along with safety, the presence of recreational facilities in a neighbourhood supports children's activity. Neighbourhood amenities facilitate children's activity because their proximity reduces the time required to get to them, which is often in short supply for families.

The availability of having that soccer centre right here was awesome... Let's say if I was working, and my husband works till 5:30, if he had to worry about getting home and getting [my son] to a football game on the other side of town, [it] might not have happened. You'd have to do more arranging with other parents and that kind of thing.

—Mother, suburban high SES neighbourhood

Social influences, in terms of the presence of other children and parents, were cited by many participants as important to children's activity. The presence of other children in the neighbourhood facilitates activity, both because parents consider it safer and because children enjoy being active with others. Parents reported that they were more willing to allow their children to play or travel outside in groups than on their own. This could include siblings as well as other children. Even children who were heavily restricted in their independent travel were often allowed to travel or play with friends or siblings. One mother commented of her 11-year-old daughter:

Do you know, there isn't really anywhere I send her by herself. She's allowed to go with her brother to the neighbourhood park. She's allowed to go with her brother to friends' houses on the street. On a busy bright day, I'd let them take the underpass together if there was a yard sale that they wanted to get to or something. But for the most part, I don't let her do a lot by herself.

—Mother, urban high SES neighbourhood

Thus, parental perceptions of safety and resulting restrictions, regardless of actual risk, play a significant role in children's opportunities to be active outdoors in their neighbourhood, and the presence of other children can mitigate these restrictions.

The children who attend local schools tend to have friends nearby, which facilitates afterschool and weekend activity. Most children are allowed to travel to friends' houses, corner stores or parks with one or more other children. Other than school, these are the main destinations that children use active transportation to get to, and children living in semi-suburban and suburban neighbourhoods generally have better access to them, in terms of both perceived safety and proximity.

Familiarity with neighbours increased parents' perceptions of neighbourhood safety. In neighbourhoods where parents knew many of their neighbours and trusted them, children were more

likely to be encouraged to play outside the home. Having other children nearby who they know and with whom they are allowed to play makes it easier and more enjoyable for children to be active:

One of the nice things we liked about this neighbourhood is that in this area, in this crescent, [my son] can just go out and go...You feel like kids need to have a play date these days and it's nice to just say, "Go out and go find a friend."

—Mother, semi-suburban middle SES neighbourhood

One 14-year-old girl underscored the importance of having friends around to do things with outdoors:

When you're outside you just want to go for a walk, if you go alone it's not really fun, you get bored easily and you're just walking around and then if you're with friends you can just talk to them and walk around or go and play a game that you can't really, like, play football by yourself or go play basketball by yourself, so it's not as fun as with a bunch of people.

—Girl, semi-suburban middle SES neighbourhood

In fact, parents often commented that their children are unlikely to initiate physical activity on their own.

Parents also felt that being active themselves contributed to their children's likelihood of activity by providing a positive role model. Physical activity was encouraged in both parents and children when family time is spent engaging in physical activity together. In neighbourhoods perceived to be unsafe, companionship was an especially important facilitator in increasing neighbourhood-based physical activity. A positive cycle of influence can operate within families, with parents striving to be active so that their children will be, too.

One of my motivators is just to be . . . the role model for my kids. Like when I go out running, I always ask them if they want to come.

—Mother, semi-suburban medium SES neighbourhood

Thus, neighbourhood-based activity is most likely to occur when 1) parents are active themselves and encourage their children to be active, 2) other children are present, 3) places for recreation are nearby and 4) the neighbourhood is perceived to be safe.

We're just active people... we're active with our kids so that I think that's the biggest thing but... I mean it's a decent neighbourhood; you can go out and play in the park or do whatever.

—Mother, suburban high SES neighbourhood

DISCUSSION

Parents and children in this study underscored the importance of safe environments for children's physical activity: streets or paths they can cycle on without feeling threatened, parks and green spaces free of criminal activity, and neighbourhoods where people know each other and children have friends to play with. Although urban, grid-pattern neighbourhoods with a high density of destinations may in principle promote active transportation or walkability, the higher levels of crime and traffic danger that tend to exist in these areas may hinder both leisure and utilitarian walking, as well as cycling,²⁵ especially for children. In our study, while adult participants acknowledged that their own behaviour is influenced by environmental factors consistent with the concept of walkability (e.g., proximity to commercial destinations, walking trails and beautiful scenery), children's patterns were different. Those living in neighbourhoods with more commercial destinations were actually less likely to walk there, mostly because of the heavy vehicle traffic in these areas and, in some cases, reduced personal safety.

Thus, what makes a neighbourhood "walkable" appears to be different for children than for adults, and children's physical activity may be more influenced by social factors, including their parents' behaviour, and particularly safety, than the built environment.

US research has demonstrated that crime levels in neighbourhoods are negatively related to physical activity levels.²⁶ Consistent with our findings, other research has demonstrated that inner-city neighbourhoods have higher obesity rates and lower levels of neighbourhood-based physical activity than do suburban neighbourhoods.²¹ Regardless of actual crime levels, perceptions of safety have an impact on physical activity levels. US and Canadian studies have demonstrated that parents' perceptions of neighbourhood safety influence the type and level of their children's activities, with the result that children residing in neighbourhoods perceived to be unsafe are more likely to be overweight or obese.²⁷⁻²⁹ Canadian studies have found that, among children, BMI increases in low SES neighbourhoods²⁹ and that among adults the perception of traffic danger in many low SES neighbourhoods is a barrier to neighbourhood walking.⁹ Our study corroborates this finding by showing that low SES neighbourhoods are perceived to be unsafe and consequently deter neighbourhood-based physical activity.

Active transportation for children mostly relates to their travel between home and school, as well as to friends' houses and parks. In Saskatoon, while most neighbourhoods are home to at least one elementary school, children may attend any elementary school in the city. Many children in this sample living in urban neighbourhoods attended schools some distance away, preventing them from walking or cycling to school. Further research examining the degree to which proximity figures into parents' choices regarding schools for their children would be worthwhile. Parents who place a lower value on their children being able to walk to school may be less likely to encourage physical activity in any case. As we found, even when it is feasible for children to walk or bike to school, other variables, such as a parent's own transportation habits, enter into parents' decision whether to drive them or require them to make their own way.

Children's activity is not, and should not be, limited to active transportation. Not surprisingly, having places for children to play and engage in sports and recreation that are easy and safe to get to was seen as facilitating their activity. This includes both neighbourhood facilities, such as parks and biking paths that children can go to on their own or with friends (if their parents allow them to), and amenities that are outside the neighbourhood but can still be reached quickly and easily by driving. Where neighbourhood facilities are lacking, children are more dependent on their parents' support to be active; for example, if neighbourhood streets are considered unsafe for cycling, parents may choose to drive their children to safer areas to go for a bike ride. While this works for some families, not all children have parents who are willing and able to take them to recreational facilities outside their neighbourhood.

Our findings regarding the importance of safety and easy access to recreational opportunities have important implications for health equity. Studies have shown that outside of school hours, parks are the primary location in which play and physical activity occur for low-SES children, who tend to have limited access to other open spaces or recreational venues³⁰ and are least likely to access registered sports because of cost constraints.²⁹ Children in low-

income families could thus benefit greatly from having free, easily accessible recreational opportunities in the form of parks and associated programming within their neighbourhoods. However, in our study, suburban and semi-suburban neighbourhoods were viewed by participants as quieter and safer from traffic and crime for children than urban neighbourhoods, which are where low-income families are more likely to find affordable housing.

Active transportation and reduced car use have numerous positive environmental and social benefits, and for this reason designing neighbourhoods to facilitate walking holds much merit. On the surface, the findings of this study might be seen as endorsing suburban neighbourhood design as a way to promote activity in children, because such neighbourhoods provide safer places for children to play and travel. In fact, facilitating activity in children is more complex; it requires understanding the barriers to physical activity in all neighbourhoods and finding ways to expand the opportunities experienced by suburban children into urban neighbourhood settings. These could include measures to improve actual and perceived safety, such as providing more supervised recreational activities through increased neighbourhood surveillance and organized group activities, and ensuring that parks in urban neighbourhoods are up to date, well maintained and adequately lit. Even more fundamentally, broader initiatives need to be envisioned to increase community cohesion, reduce social inequities and promote neighbourhood safety by reducing the root causes of crime and social disorder.

Limitations

In this qualitative sample, we found that children residing in urban neighbourhoods attended schools outside their neighbourhoods, and as a result, took part in less neighbourhood-based physical activity. This finding may not be applicable to cities in which children living in urban neighbourhoods are more likely to attend their neighbourhood school. An additional limitation of the study is that the relatively small sample of participants in the qualitative component may have provided only a small number of perspectives. Expanding the study to a larger group of participants representing a larger range of neighbourhood types could possibly provide additional information.

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RÉSUMÉ

Objectifs : Jusqu'à maintenant, très peu d'études se sont penchées sur le processus par lequel le design communautaire, le milieu bâti et l'environnement social influent sur l'activité physique des gens, en particulier les enfants. Les enquêtes qualitatives sont utiles pour explorer les perceptions et la prise de décisions, et pour comprendre les processus en jeu dans les interactions des gens avec leur environnement. Notre étude fait appel à des méthodes qualitatives pour approfondir la compréhension des liens entre l'environnement du quartier et le profil d'activité des enfants.

Méthode : Des données ont été recueillies à la faveur d'entrevues semi-dirigées auprès de 24 dyades parents-enfants (les enfants ayant de 10 à 14 ans). Les familles habitaient des quartiers au revenu médian variable (du plus faible au plus élevé) et qui représentaient les trois grands types de design observés à Saskatoon : urbain, semi-suburbain et suburbain.

Résultats : Parents et enfants ont souligné l'importance que l'environnement soit sûr pour l'activité physique des enfants : des rues ou

NEIGHBOURHOODS AND CHILDREN'S PHYSICAL ACTIVITY

des sentiers où l'on peut faire de la bicyclette sans se sentir menacé, des parcs et des espaces verts sans activités criminelles, et des quartiers où les gens se connaissent et où les enfants ont des camarades avec qui jouer. Bien que les quartiers urbains aux rues quadrillées, denses en points d'intérêt, favorisent en principe le transport actif, les taux de criminalité plus élevés et les dangers de la circulation qui ont tendance à exister dans ces quartiers peuvent entraver l'activité physique des enfants.

Conclusion : Tenter de comprendre ce qui facilite l'activité chez les enfants est une tâche complexe. Elle exige de connaître les obstacles à l'activité physique présents à l'échelle des quartiers ainsi que les facteurs sociaux et perceptuels qui agissent de façon interdépendante pour favoriser ou entraver l'activité physique des enfants.

Mots clés : milieu bâti du quartier; enfants; méthode qualitative; sécurité; activité physique