

Characteristics of urban parks associated with park use and physical activity: A review of qualitative research

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ABSTRACT

Given that recent literature reviews on physical activity in urban parks deliberately excluded qualitative findings, we reviewed qualitative research on this topic informed by a published classification scheme based on quantitative research. Twenty-one studies met our inclusion criteria. These studies relied mainly on semi-structured interviews with individuals or in focus groups; only five studies involved *in situ* observation. Our synthesis aligns with previous quantitative research showing that attributes including safety, aesthetics, amenities, maintenance, and proximity are important for encouraging park use. Furthermore, our synthesis of qualitative research suggests that perceptions of the social environment entwine inextricably with perceptions of the physical environment. If so, physical attributes of parks as well as perceptions of these attributes (formed in relation to broader social contexts) may influence physical activity patterns. Both qualitative and quantitative methods provide useful information for interpreting such patterns, and in particular, when designing and assessing interventions intended to improve the amount and intensity of physical activity.

Keywords: physical environment; social environment; neighborhood; recreational facilities; leisure

BACKGROUND

Physical activity participation provides mental and physical health benefits and can also reduce the risk of many chronic diseases (Bauman, 2004, Warburton et al., 2006, Kohl, 2001). Evidence regarding the influence of the built environment on physical activity behavior is beginning to accumulate. This evidence suggests that the built environment can both enable and limit physical activity participation. Specifically, neighborhood characteristics such as the proximity and mix of land uses, pedestrian connectivity, aesthetics and interesting scenery, and traffic and personal safety are important correlates of physical activity (Wendel-Vos et al., 2007, McCormack et al., 2004). Nevertheless, certain types of facilities and amenities likely support specific types of behaviors among different segments of the population (Giles-Corti et al., 2005b). The proximity of recreational facilities and amenities appears to influence physical activity participation (Kaczynski and Henderson, 2007). Moreover, urban parks provide local opportunities for different types of leisure pursuits and play an important role in encouraging physical activity among various subpopulations (i.e., different age, ethno-cultural, and socioeconomic groups). Urban parks support physical activity through their accessibility; their provisions to facilitate active pursuits; their capacity to provide opportunities to a wide range of users; and their semi-permanent nature. Thus, park design, redesign, and upkeep are vitally important for population health.

Parks offer a unique setting within the urban landscape, providing opportunities for physical activity, enjoyment of nature, social interaction, and escape (Hayward and Weitzer, 1984). Participation in these opportunities is likely to help explain how parks contribute to improving health and wellbeing of users. Access to nearby parks and natural settings is associated with improved mental health (Sugiyama et al., 2008, Payne et al., 2005), positive affect and reduced anxiety (More and Payne, 1978), physical health (Payne et al., 2005), and healthy weight among children (Potwarka et al., 2008). Moreover, park users are more likely to achieve recommended levels of physical activity compared with non-users (Giles-Corti et al., 2005a, Deshpande et al., 2005). There is also evidence that distance from parks and open space is inversely associated with use and physical activity behavior (Kaczynski and Henderson, 2007), which might suggest that creating more neighborhood parks within walking distance to most residents could encourage

physical activity participation in the population. Nevertheless, the quality of parks and open space must also be considered. Attributes such as park size (Giles-Corti et al., 2005a); the presence of sports fields (Floyd et al., 2008); wooded areas, trails, paths and sidewalks (Shores and West, 2008, Reed et al., 2008, Kaczynski et al., 2008); and the total number of features and amenities (Kaczynski et al., 2008, Giles-Corti et al., 2005a) may promote park use and physical activity, while the presence of litter, vandalism, and unclean washrooms may deter use (Gobster, 2002). Features such as playgrounds, basketball courts, walking paths, running tracks, swimming areas, lighting, shade, and drinking fountains may also be particularly important for encouraging physical activity among children and their caregivers (Cohen et al., 2006).

Research into the associations between parks and physical activity has relied mainly on quantitative methodologies (Kaczynski and Henderson, 2007). While this research has advanced our understanding, much of the evidence regarding the influence of parks on physical activity is mixed (Kaczynski and Henderson, 2007, Librett et al., 2007). Qualitative methods (e.g., in-depth individual interviews, focus group interviews, direct observation, and participant observation) could complement quantitative findings and provide unique contributions to our understanding of the influence urban parks have on physical activity behaviors. Notably, qualitative research might help explain inconsistencies found in quantitative research to date on urban parks and physical activity. The dynamics of user characteristics, the park itself, and the setting—physical, cultural, social, and political—in which parks exist are often overlooked in quantitative research.

By their very nature, qualitative studies evolve during the research process and rely heavily on interpretations based on participant language and actions. They also tend to involve purposeful sampling of participants and settings (Crabtree and Miller, 1999). Qualitative methods provide a means of gathering detailed and specific information and, most importantly, go beyond statistical associations by enabling investigation of the localized and complex mechanisms of both events and process (Miles and Huberman, 1994). The strong emphasis on contextualization in qualitative research could be particularly beneficial in elucidating how various attributes of parks and user groups interact to influence physical activity patterns, and in drawing inferences about the unequal benefits current arrangements might provide for different groups. While quantitative research has

contributed to knowledge regarding the proximity of parks and physical activity, more localized qualitative inquiry could assist in informing park design and park-based programs that are tailored to meet the specific needs of the local community (Kaczynski and Henderson, 2007). Moreover, although federal, provincial, or municipal government entities regulate the planning and location of parks, the quality and functionality of these facilities might be greatly influenced by local recreation, park, and community associations (Godbey et al., 2005).

Recent literature reviews on urban form and physical activity – including reviews of studies examining associations between parks and physical activity (Kaczynski and Henderson, 2007) – deliberately exclude qualitative findings (Humpel et al., 2002, Saelens and Handy, 2008, McCormack et al., 2004, Wendel-Vos et al., 2007, Davison and Lawson, 2006). This exclusion is purposeful and does not weaken these reviews in any way, given their goal of synthesizing studies that closely resemble each other, particularly in terms of methodology. Nevertheless, excluding qualitative studies and the dearth of reviews of qualitative research examining associations between the urban environment and physical activity might erroneously suggest that qualitative findings do not contribute important or unique knowledge. Indeed, following their review of the literature exploring associations between recreational facilities and physical activity, Kaczynski and Henderson (2007) suggested the need for more qualitative research, noting that qualitative findings could be used to improve the design of public parks and recreational amenities and programs. Similarly, to elucidate relationships between environmental attributes and physical activity patterns within urban parks, Berdimu-Rung and colleagues (2005, p 159-160) called for transdisciplinary field research.

Qualitative research has been undertaken on physical activity in urban parks, but unlike the quantitative evidence, the qualitative evidence has yet to be synthesized. In contrast to the corpus of standardized guidelines available for undertaking systematic quantitative literature reviews (e.g., MOOSE: Stroup et al., 2000, QUOROM: Moher et al., 1999), qualitative research may be less amenable to standardized review procedures and more difficult to synthesize (Eakin and Mykhalovskiy, 2003, Sandelowski et al., 2007). Nevertheless, procedures exist to facilitate aggregation of qualitative findings and synthesis of both qualitative and quantitative results (e.g.,

Sandelowski et al., 2007). Such procedures apply various established approaches for qualitative analysis (Miles and Huberman, 1994).

In light of the current shift from describing population health problems to planning and analyzing interventions (Hawe and Potvin, 2009), mechanisms related to the “how” and “why” of park characteristics, park use, and physical activity at a more localized, in-depth level must be better understood. Qualitative methods may be especially well suited for answering such questions. The purpose of this paper, therefore, is to review qualitative evidence that explores the associations between urban parks and physical activity patterns. Furthermore, we present the results of this review in a manner that will facilitate comparison with recent quantitative reviews. Specifically, this paper will 1) synthesize qualitative research findings on how urban parks might influence park use and potentially physical activity patterns; and 2) assess concordance or discordance between the qualitative and quantitative evidence on parks, park use, and patterns of physical activity.

METHODS

Search strategy

In February 2009, we searched for English-language studies on parks and physical activity from all available years in health, leisure, and social science databases (i.e., PsycInfo, PubMed, LeisureTourism Abstracts, and Web of Science). Keyword and phrase searches within titles and abstracts were undertaken for the following terms: physical activity; exercise; inactivity; or walking combined with environment; neighborhood; urban design; park; trail; greenway; or environmental design. The search was then refined to capture qualitative studies by using the following terms: qualitative; focus group; interview; ethnographic; case study; anthropology; cultural/instrumentation; and cultural/methods. Duplicate records were removed, and we screened article titles and abstracts for relevance.

Study selection

To be considered for this review, studies must have: 1) reported using at least one qualitative

research method; 2) examined urban parks either exclusively or in addition to other recreational settings, and; 3) examined park use or park-based physical activity behavior in any form (e.g., sports, walking, dog-walking, vigorous exercise, and playground use). Studies of urban parks that supported both formal and informal activities were included, but we excluded studies focusing on parks designed for formal activities only (e.g., sports-specific fields), and walking trails that, judging from the research reports, were not located within parks. Furthermore, to meet inclusion criteria, a study had to investigate the social or physical qualities or characteristics of parks in relation to both general patterns of use and physical activity participation. Only peer-reviewed primary studies published in academic journals were included, resulting in the exclusion of literature reviews, conceptual papers, strictly methodological papers, and government reports. The reference lists of articles satisfying these criteria were manually searched to help identify additional studies that met inclusion criteria for the review. Studies were also screened for duplicate publication.

Data extraction

To begin, we classified the articles meeting the inclusion criteria in relation to manifest content, including setting characteristics, methods used, and results obtained. These data were entered into a matrix based on a pre-structured case, which Miles and Huberman (1994, p 83-85) describe as an outline that can aid analysis if, based on previous experience, the research questions, sampling plan, and framework have already been established. Next, the techniques of constructing tables, counting, and drawing comparisons were employed to create another matrix based on conceptual clustering (Miles and Huberman 1994, p 127-129). This preliminary analysis highlighted salient similarities as well as differences vis-à-vis quantitative research on park use and, where possible, park-based physical activity.

Next, two reviewers (i.e., the first and second authors) independently extracted the following methodological information: whether the researchers described the setting; described the sample; reported on the sampling methods; indicated the use of incentives to encourage participation; reported on the data collection methods; reported on the analytical process and approach, and; presented examples and extracts of original data. In instances of disagreement, articles were re-

assessed independently and consensus was reached. We did not exclude any study on methodological grounds, as our aim was to be as inclusive as possible. This bias toward inclusion was appropriate as these studies appeared in journals with divergent audiences and disciplinary orientations, and yet the total number of studies meeting our inclusion criteria was small.

To extract, classify, and synthesize the findings reported in this review, we adapted an existing taxonomy for conducting research on the relationships between physical activity patterns and the physical characteristics of parks (Bedimo-Rung et al., 2005). Accordingly, we used the following six categories to extract and compile park-related environmental attributes: *features* (i.e., facilities and amenities); *condition* (i.e., maintenance and incivilities); *access* (i.e., availability and proximity); *aesthetics* (i.e., attractiveness and appeal); *safety* (i.e., personal security and fear), and; *policies* (i.e., management and budget). This taxonomy was derived from the quantitative literature on parks and physical activity and thus suited our purpose of consolidating insights obtained from both qualitative and quantitative methods. Yet as acknowledged by Bedimo-Rung et al., the categories in this taxonomy overlap in practice. For example, incivilities such as broken bottles and graffiti may be associated with perceptions of park safety, condition, and aesthetics, and the visible presence of such incivilities may reflect “unwritten policies of building and maintaining facilities” (Bedimo-Rung et al., 2005). Since none of the studies included in this review specifically linked their results to policies, we do not present results under the category of ‘policies’, but we do return to policy implications in the discussion. More generally, our classification of the reported findings hinged on how the researchers had reported them in the original study.

RESULTS

Our initial search, after screening titles and abstracts for topical relevance, yielded 696 unique references. After applying our inclusion criteria to these references and to additional studies located through reference list searches, we identified 21 studies to review. None of the 21 studies that met our inclusion criteria involved multiple references.

Study characteristics

All studies provided information regarding their setting and sample characteristics. Focus group interviews were the most common method of collecting data (68%), followed by individual interviews (67%), and *in situ* observation (24%). Six studies also included multiple data collection methods (29%). All but one study (95%) supplied information regarding the selection of participants and nine (43%) reported the use of incentives to encourage study participation. Specifically, studies offered honorariums (i.e., \$10-\$20) (Ries et al., 2008, Sanderson et al., 2002, Wilbur et al., 2002, Griffin et al., 2008, Gearin and Kahle, 2006, Evenson et al., 2002, Giles-Corti et al., 2005a, Veitch et al., 2006, Cutt et al., 2008) or other incentives such as childcare, transportation, or food (Adams et al., 2008) to encourage participation (Table 1).

Fourteen studies (67%) described their procedures for data analysis. Several studies indicated use of grounded theory or thematic coding as part of their data analysis (Veitch et al., 2007, Ries et al., 2008, Sanderson et al., 2002, Wilbur et al., 2002, Strath et al., 2007, Gill and Simeoni, 1995, Evenson et al., 2002, Veitch et al., 2006, Day, 2008, Cutt et al., 2008) while others referred to approaches such as open, axial, and selective coding (Lloyd et al., 2008), constant comparison method (Henderson et al., 2001), and inductive content analysis (Tucker et al., 2007, Griffin et al., 2008, Adams et al., 2008). The majority of studies used computer software (i.e., Nvivo, NUDIST, ATLAS) to assist in their data analysis (Veitch et al., 2007, Ries et al., 2008, Yen et al., 2007, Sanderson et al., 2002, Wilbur et al., 2002, Strath et al., 2007, Griffin et al., 2008, Evenson et al., 2002, Tucker et al., 2007, Veitch et al., 2006, Day, 2008, Cutt et al., 2008) while others used manual methods (Lloyd et al., 2008). Several studies reported the use of multiple researchers to independently transcribe and code data (Yen et al., 2007, Wilbur et al., 2002, Strath et al., 2007, Griffin et al., 2008, Evenson et al., 2002, Tucker et al., 2007, Veitch et al., 2006, Adams et al., 2008). One study used member-checking as a method for verifying results from the data analysis (Adams et al., 2008). Extracts of the original data (i.e., quotes) were presented in all studies (Table 1).

[INSERT TABLE 1 HERE]

Synthesis of study findings

Overall, the target populations and subsequent sample characteristics were heterogeneous among the studies reviewed. Studies reviewed were published between 1995 and 2008 and undertaken in six different countries including the U.S.A. (Adams et al., 2008, Evenson et al., 2002, Gearin and Kahle, 2006, Griffin et al., 2008, Henderson et al., 2001, Krenichyn, 2006, Ries et al., 2008, Sanderson et al., 2002, Strath et al., 2007, Wilbur et al., 2002, Yen et al., 2007), Australia (Veitch et al., 2007, Corti et al., 1996, Cutt et al., 2008, Gill and Simeoni, 1995, Lloyd et al., 2008, Veitch et al., 2006), Scotland (Day, 2008), Canada (Tucker et al., 2007), South Africa (Kruger and Chawla, 2005), and Spain (Ferré et al., 2006). Among studies, the smallest sample size was 11 and largest was 132, with two studies not providing precise information about the number of participants (Kruger and Chawla, 2005, Ferré et al., 2006). Most studies recruited participants from specific neighborhoods or communities. Three studies included a sample of park users only (Krenichyn, 2006, Lloyd et al., 2008, Tucker et al., 2007), while another included only dog-owners (Cutt et al., 2008). Physical activity levels of participants, if presented, varied from sedentary or low to moderate activity (Corti et al., 1996, Evenson et al., 2002, Sanderson et al., 2002, Wilbur et al., 2002) to regular activity (Henderson et al., 2001, Strath et al., 2007). Seven studies included data collection from children or adolescents (Veitch et al., 2007, Gearin and Kahle, 2006, Gill and Simeoni, 1995, Kruger and Chawla, 2005, Lloyd et al., 2008, Ries et al., 2008, Ferré et al., 2006) and four collected data from caregivers (Adams et al., 2008, Tucker et al., 2007, Veitch et al., 2006, Yen et al., 2007). Six studies specifically sampled women (Evenson et al., 2002, Sanderson et al., 2002, Wilbur et al., 2002, Yen et al., 2007, Krenichyn, 2006) or girls (Lloyd et al., 2008), while no studies focused on males only. Several studies sampled from specific ethnic groups including African-Americans (Griffin et al., 2008, Ries et al., 2008, Sanderson et al., 2002, Wilbur et al., 2002), Native Americans (Adams et al., 2008), and Latino and Hispanics (Evenson et al., 2002, Gearin and Kahle, 2006). Socioeconomic status levels of participants varied across studies (i.e., from low to high) (Table 2).

Attributes associated with park use and physical activity

Features

Several features of parks positively and negatively influenced park use, although the importance of these features differed according to the characteristics of the study samples (Table 2). Findings

from studies involving children and adolescents indicated that access to a variety of facilities in parks that supported active and passive recreational activities including those for structured (e.g., sports) and unstructured (e.g., play) activities were important. Facilities that supported children's play such as playgrounds and trees for climbing were also important. Specifically, caregivers and children mentioned play equipment that was age-inappropriate, poorly equipped, out-dated, or mentally or physically unstimulating as negatively affecting park use, as one parent mentioned: "...We want to go to parks that are interesting. The closest park, we can walk to, but it does not interest my kids. It's a big park but the play equipment is too small and it only caters for younger children, 7-8 year olds are not challenged there" (Veitch et al., 2006, p 389). Constructed and natural trails were important for park use mostly among adults, although Lloyd (2008) also found these features to be important among adolescent girls. Nevertheless, park amenities such as barbecues, seating, water fountains, picnic tables, and bathrooms appeared to be important regardless of age. Other specific attributes reportedly encouraged or discouraged park use by some groups. For example, one study found that dog owners identified dog litter bins and bags and dog-specific agility equipment as important park features (Cutt et al., 2008), while the presence of shade and appropriate placement of shading-providing devices were linked to park use by children and caregivers (Tucker et al., 2007, Veitch et al., 2006, Ferré et al., 2006).

Condition

Lack of maintenance was often identified as an issue influencing the use of parks (Table 2). In particular, characteristics of playing surfaces or cleanliness within parks were regularly identified as important among adults and children alike. Several studies reported uneven ground or playing surfaces, lack of grass, and poor quality sidewalks as problems in parks, as noted by one participant: "...And it would be nice to have somewhere to go where the cement isn't all cracked and the clay isn't all like rubbery due to the usage. I mean, just a nice park. You don't need more, you just need nice. Just fix it up" (Gearin and Kahle, 2006, p 37). Characteristics of parks affecting cleanliness included dirty or unkept areas, the presence of litter, and overfull rubbish bins. Moreover, the presence of dog feces was raised as an issue both in the context of the condition of the park and in relation to park aesthetics. For example, one respondent commented: "...they [the dogs] use it [the park] and mess it up"(Corti et al., 1996, p 18).

Accessibility

Most findings related to accessibility and park use were related to park proximity, although this characteristic was not mentioned relative to park use in seven studies (Table 2). Generally, having more local parks within walking distance was positively associated with park use, while the necessity of driving to reach a park often deterred use. However, other park attributes may override proximity as factors influencing use. For example, one study involving African-American women from a relatively low income neighborhood found that although some women would use neighborhood parks, most would not because of personal safety concerns, reflected in one respondent's comment: "I have a park right across from my house, and I wouldn't go over there if you paid me" (Wilbur et al., 2002, p 22). Moreover, access to specific park attributes may influence park use, for example dog-owners wanting to access dog exercise areas (Cutt et al., 2008), or people wishing to use parks with pools that have specific hours of operation (Tucker et al., 2007). Access to public transportation was also identified as an enabler of physical activity for some, as illustrated by the quote: "Yesterday we walked down [to the seafront] from here and took a rest and then finished up going almost to [...]. Coming back, catching the bus and coming home" (Day, 2008, p 306). Playgrounds in parks on regularly walked routes (i.e., to and from school) were also observed to be used more often than those located elsewhere (Ferré et al., 2006).

Aesthetics

Aesthetics were important among adults as well as children and adolescents (Table 2). Graffiti and vandalism discouraged park use. Moreover, although mentioned as a condition of the park in some studies, litter, uncleanliness, and dog feces also negatively affected park aesthetics. Notably, the presence of wildlife in parks was considered to be both negative and positive. The presence of wildlife was a negative attribute of parks among some dog-owners because of possible encounters between their dogs and wildlife (Cutt et al., 2008), while for some children, fear of some wildlife may have discouraged use of certain parks in which these animals dwell (Gearin and Kahle, 2006). In contrast, wildlife resulting from the creation of the park provided positive experiences as supported by a quote from one child: "My brother, we went up to walk around the park and in the trees he found a nest and there was a mother and two babies and she was feeding them" and

another quote from an adult male: “there’s a lot of birds starting to come around now. I seen two rosellas...haven’t seen rosellas flying around here for ages” (Gill and Simeoni, 1995, p 256). Positive attributes of parks also included the presence of trees and bushes, gardens, grass, flowers, natural settings, and water features. Air quality and the presence of distinctive smells in parks contributed to park aesthetics, as suggested by one woman: “The park is, you know, just being outside and being surrounded by trees. And the smell—you know, the greenery, and flowers when the flowers are in bloom, but even just grass”(Krenichyn, 2006, p 636), and another from an adolescent girl: “Just being able to go down there and have a good time with friends or just play around with your dog or play sports. Those spaces are very important. It’s good to spend time out in fresh air when you’re studying and have a break from it” (Lloyd et al., 2008, p 30). The sense of fresh air made park use more enjoyable, while the presence of smog or fumes made using parks unpleasant. Similarly, the presence of nature sounds and the quietness of parks made them attractive to some individuals.

Safety

Most personal safety concerns mentioned in studies were associated with the presence of undesirable users of parks (e.g., drug users, homeless persons, loiterers) (Table 2). The presence of older children and teenagers in parks was a safety concern for young children and their caregivers (Veitch et al., 2007, Veitch et al., 2006, Adams et al., 2008). As mentioned by one 11-year old boy: “At around 5pm there’s like a gang. You don’t want to go there. They all sit down and they’re all drinking and stuff” (Veitch et al., 2007, p 414). Specific park attributes identified as influencing safety from crime included the presence of lighting, presence of law-enforcement, increased security and surveillance, presence of homeless and drug users/dealers, and the presence of secluded paths and areas. Park attributes related to safety from injury included the presence of glass, syringes, rocks, debris, heavy traffic, and other users of paths (e.g., cyclists). As mentioned by one child: “You fall down and you scratch yourself. There’s a lot of glass. And basically they don’t really keep up this park...you’ll go there and there’ll be like a syringe on the ground. Or you’ll have a broken bottle and most of the time you’ll have to have somebody clean up and walk the entire field before you can do anything. And it’s really more trouble than it’s worth” (Ries et al., 2008, p 46-47). The separation of dogs from other park users by fences enclosing off-leash

areas as well as dog-specific signage were considered important for encouraging park use among dog owners: “Clear notices so that people know that it is a dog-friendly park” (Cutt et al., 2008, p 122). In the case of a ‘natural experiment’ involving the creation of a new park, one participant reported, “There’s an elderly lady that likes to take her dog for a walk and she used to take her dog up on to the main street and was terrified because of the traffic and everything, so she used to maybe go once or twice a week. Since the parks [sic.] been there she goes everyday [sic.], twice a day!” (Gill and Simeoni, 1995, p 255). The physical attributes of parks seemed to be inextricable from perceptions of them as either safe or unsafe.

[INSERT TABLE 2 HERE]

Social environments

Social and physical environments appear to inform one another in ways that influence park use and park-based physical activity. The direction of influence may be negative or positive. For example, one study identified organized festivals and celebrations in a local park as bringing together people from divergent backgrounds, thereby encouraging democratic park use (Gill and Simeoni, 1995). Opportunities to socialize in safe and supportive social environments appeared to be important, notably for women and girls (Evenson et al., 2002, Krenichyn, 2006, Lloyd et al., 2008, Veitch et al., 2007). For girls, meeting friends at local parks facilitated both active and passive leisure pursuits: “...it’s good. You can meet your friends half way and just go for a walk, talk, hang out” (Lloyd et al., 2008, p 29). Noteworthy, was that the opportunity to socialize in the park independent of adults was an important contributor to park use for adolescents, even in cases where the physical environment within the park was less supportive of physical activity (i.e., patchy grass, broken goal posts, no play equipment) (Veitch et al., 2007). Moreover, among adolescents the impact of cleaning up and planting open space was recognized as important for developing a sense of community and neighborhood pride: “It could offer like a lift in morale” (Gearin and Kahle, 2006, p 35). Similarly, social clubs and neighborhood associations were also linked positively to park use, physical activity patterns, as illustrated by the following direct quote: “[The park organization] was born in the 1990s...so I’m over there every day...It might be weeding, it might be nature walks, it might be for concerts in the summer, so there’s a purpose to go over there” (Strath et al., 2007, p 418).

DISCUSSION

The main objective of this study was to synthesize qualitative research findings on how urban parks might influence park use and potentially physical activity. In keeping with Bedimo-Rung et al.'s (2005) conceptual framework, we found that the results of qualitative studies on park attributes and park use reflected features, condition, accessibility, aesthetics, and safety, and that these categories overlap, reinforcing one another in positive as well as in negative ways. Another objective of this study was to assess concordance or discordance between the qualitative and quantitative evidence on park environments and park use. In concordance with quantitative evidence, we found relationships between park attributes and use among the reviewed qualitative studies. Similar to quantitative research (Kaczynski and Henderson, 2007), qualitative evidence suggests that the accessibility of parks is important for encouraging park use in most, but not all, cases. Our review also suggests that park qualities are also important for encouraging use, supporting quantitative findings reported elsewhere (Giles-Corti et al., 2005a, Ries et al., 2009, Shores and West, 2008). Furthermore, this review highlights the importance of assessing both the physical and social environments of parks in relation to usage and physical activity patterns. While this finding is consistent with quantitative studies on park-based physical activity patterns, the qualitative evidence that we reviewed suggests that social environments are crucially important and that understanding their influence on physical activity patterns may require somewhat different methodological strategies than physical environments. In fact, qualitative research may be particularly useful for assessing the interplay between social environments, physical environments, and physical activity in parks.

Quantitative studies to date have predominantly examined the role of park proximity and accessibility for encouraging park use and physical activity, although research examining the quality of parks is beginning to accumulate (Giles-Corti et al., 2005a, Ries et al., 2009, Shores and West, 2008). Although mixed evidence exists, some research has found increased accessibility to parks to be associated with park use and physical activity (Kaczynski and Henderson, 2007). Our review of qualitative evidence also supports the importance of accessibility for encouraging park use among children and adults regardless of gender, ethnicity,

and socioeconomic status. Accessibility to parks is important not only for encouraging physical activity however, some qualitative evidence suggests that having a park close to home or within walking distance does not always result in use. One study included in our review found that safety concerns (i.e., homelessness, violent crime) deterred African-American women from using local neighborhood parks (Wilbur et al., 2002), while another reported similar concerns affecting use of local parks among children (Kruger and Chawla, 2005). In support, a quantitative study by Cronan et al. (2008) found that park-specific physical activity among Latino women was constrained by insufficient lighting, and fear of physical or sexual assault and theft.

Qualitative evidence from our review suggests that poor conditions (e.g., uneven playing surfaces, courts with cracks, poor quality footpaths) might deter park use. While poor maintenance and condition in themselves can discourage park use, poor maintenance likely negatively affects aesthetics, perceptions of safety, functionality, and the overall perception of park quality as well. Unsafe or poorly maintained parks may discourage use even when they are located within easy walking distance of home (Powell et al., 2003). Moreover, a decline in general usage may decrease informal monitoring of park activities, further increasing the risk of encountering undesirable behaviors (e.g., vandalism, graffiti, drug dealing and drug use). Thus poorly maintained park environments may discourage general usage but encourage usage by people who commit minor incivilities, which then may spiral into more serious crimes—reflecting the “broken windows” scenario whereby the appearance of the physical condition of the environment can act to encourage either permitted or prohibited behaviors (Wilson and Kelling, 1982). Actual and perceived safety within parks may be achieved by providing sufficient lighting and sight lines (i.e., field of view) thereby increasing opportunities for users to see and be seen by other park occupants, introducing a police presence in parks known for anti-social behavior, and building parks designed to facilitate informal monitoring of behavior (i.e., house fronts overlooking parks, networks routing pedestrians through or near parks). Moreover, regular maintenance and upgrading of park features and facilities could reduce the risk of injury, while at the same time contributing to aesthetics and functionality within park settings.

Parks containing a variety of features and amenities may support a wider range of users

(Kaczynski et al., 2008, Giles-Corti et al., 2005a). Our review showed that both adults and children report multiple attributes within parks that encourage use, including those that support active and passive pursuits. Washrooms, water fountains, barbeques, picnic areas, seating, signage, and shade were all identified as important amenities within parks. Similar attributes associated with park use are reported among quantitative research (Cronan et al., 2008, Reed et al., 2008, Kaczynski et al., 2008, Giles-Corti et al., 2005a, Floyd et al., 2008, Gobster, 2002, Shores and West, 2008). We also found that features of parks that facilitated both structured (i.e., sports fields, courts) and unstructured (i.e., paths, trails) physical activity were important for encouraging park visits, and recent quantitative research suggested that parks with walking paths and trails were visited more often than parks containing sports-related facilities (Reed et al., 2008). Parks that support passive activities such as sitting may contribute to incidental physical activity if individuals seeking these activities use an active mode of transport to travel to or through the park. Moreover, the provision of amenities such as water fountains and washrooms may allow parks to be used for longer periods (Ries et al., 2008), which in turn may encourage increased levels of physical activity.

As is the case among adults reported elsewhere (Cohen et al., 2007), quantitative evidence suggests that parks also support both physical activity behavior and socializing among children (Ries et al., 2009). In addition to the home and local streets, parks are a popular setting for physical activity among children (Veitch et al., 2008). However, children do not always visit the closest park and may be willing to travel further to use certain parks with desired features or facilities (Veitch et al., 2008). In our review, some children in Gearin and Kahle's (2006) study indicated that they would travel outside their neighborhood to visit parks because of the attributes they offered (e.g., wildlife, sports fields). The social as well as the physical environment of parks was important for children. A quantitative study by Reis et al. (2009) indicated that park use by a friend, perceived park quality, and proximity were associated with park use and weekly physical activity among adolescents. Studies included in our review also pointed to the importance of social connectedness and interaction, such as playing and socializing with friends at parks, among children and adolescents (Lloyd et al., 2008, Gearin and Kahle, 2006, Veitch et al., 2007). Based on quantitative evidence dog signage, shade trees, playgrounds, paths, and sports facilities in local

parks are found to be positively associated with non-school physical activity among adolescent girls (Timperio et al., 2008, Cohen et al., 2006). The presence and quality of playground equipment and facilities for children are important for park use and mentioned by both children and caregivers in the studies reviewed. In particular, age-appropriate and maintained play equipment was important for encouraging park use (Adams et al., 2008, Ferré et al., 2006, Lloyd et al., 2008, Tucker et al., 2007, Veitch et al., 2006, Veitch et al., 2007). Quantitative findings suggest that parks containing many playgrounds may encourage physical activity among boys while parks with many recreational facilities may discourage physical activity among girls (Timperio et al., 2008). Reis et al. (2008), based on qualitative data, noted that adolescent males were attracted to facilities that enable camaraderie and competition. Developing parks that facilitate active play, sports, and opportunities for social interaction may encourage greater park use among children and adolescents, both male and female, which in turn may result in more physical activity participation.

To the best of our knowledge, this is the first study to synthesize qualitative research on the physical and social environment of parks and park use. Nevertheless, several limitations should be considered when interpreting the findings of this review. Our study included only published peer-review journal articles, thus similar to most reviews of quantitative literature; the potential issues of publication bias likely exist. The rigor of studies included in the review limits the strength of our review findings. Given the way in which results of qualitative studies are presented, we extracted information that was both presented as extracts (i.e., from interview transcripts) and commentary made by the authors of such papers. The selective presentation of data within articles resulting from the authors' perspectives or points-of-view cannot be ruled out and will likely affect the findings of our review. All studies that we reviewed collected data at one time point and most used a single method for data collection. We located few examples using visual methods (photographic database, engaging participants through photography, mapping, drawings) and few using *in situ* observation and *in situ* interviews in parks, yet these methods have been used successfully (Low et al., 2005, Low, 1996, Coen and Ross, 2006). The use of multiple qualitative data techniques or a mixed methods research design could combine quantitative "checklists" with *in situ* qualitative methods, which might strengthen and generate new knowledge regarding park

environments, use, and physical activity.

Qualitative research in the physical activity field often precedes quantitative research (i.e., for instrument design and theory development). We envision a broader scope for qualitative research in the physical activity field, and for research on park-based physical activity in particular. Given that much of the quantitative research on physical activity in parks involves *in situ* observation, we suggest integrating qualitative observations and interviews in such studies to complement the quantitative research, by suggesting rival explanations and deepening interpretations. Mixed-method designs could combine quantitative checklists with *in situ* qualitative methods, in other words, which would offer advantages over research relying on quantitative data alone and could generate new insights regarding park environments, use, and physical activity. In addition to mixed-method research designs, we also recommend further qualitative research, designed and conducted independently from quantitative studies. Future qualitative studies on physical activity patterns in parks should be designed to employ more than one type of data collection method, to make more use of visual methods, to collect at least some of the data *in situ*, to permit longitudinal analysis, and to analyze the findings with reference to sociocultural theories that take into account the interplay of material surroundings, symbolism, and embodiment (Mykhalovskiy et al., 2004, Murdoch, 1997).

As well as supporting quantitative evidence regarding the influence of physical attributes of parks on use, a chief contribution of this review was to highlight the importance of social environments for park use. Specifically, the socio-demographic characteristics of ambient neighborhoods, as well as the presence of community groups or social clubs as park users and in park governance, can influence how people perceive parks, whether they use them, and how they use them. Just like physical environments, social environments may be amenable to amelioration. For example, allocating resources to strengthen neighborhood associations and other community development processes could lead to improvements in physical activity patterns. From an urban and social planning perspective, attributes of parks appear to be as important as their location in influencing usage. The findings of this review suggest that maintained parks, containing amenities suited to use across the life-span, and facilities that are clean, aesthetically appealing, and safe have the

potential to encourage use. Involving community members in the planning process with regard to the creation, redesign, and ongoing management of parks may result in parks that more effectively balance the needs of specific population groups (i.e., socio-cultural and gender- and age-specific groups) and user preferences (Low et al., 2005). Moreover, involving community members and local residents in the planning process may provide them with a sense of place and guardianship over parks, contributing to greater use of parks and to higher levels of physical activity across populations. Ensuring that parks provide opportunities for participation in different types of activity while serving the needs of different populations will be challenging for local governments and urban developers, yet this approach to planning and design is needed if more people are to be encouraged to use parks.

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Table 1. Presentation of contextual, data collection, sampling, and data analysis procedures for studies reviewed (n=21)

| Reference | Contextual information | | Data collection | Sampling | | | Data analysis | |
|--------------------------|-----------------------------------|----------------------------------|--|------------------------------------|------------------------------|--|----------------------------------|---|
| | Setting characteristics presented | Sample characteristics presented | Focus group (F), individual interviews (I), or observation (O) | Data collection protocol described | Sampling method(s) described | Participation encouraged with incentives | Data analysis approach described | Extracts from the original data presented |
| Adams et al. (2008) | Yes | Yes | F, I, O | Yes | Yes | Yes | Yes | Yes |
| Corti et al. (1996) | Yes | Yes | F | Yes | Yes | Yes | No | Yes |
| Cutt et al. (2008) | Yes | Yes | F | Yes | Yes | Yes | Yes | Yes |
| Day (2008) | Yes | Yes | F, I, O | Yes | Yes | Not stated | Yes | Yes |
| Evenson et al. (2002) | Yes | Yes | F | Yes | Yes | Yes | No | Yes |
| Gearin and Kahle (2006) | Yes | Yes | F, I | Yes | Yes | Yes | No | Yes |
| Gill and Simeoni (1995) | Yes | Yes | F | Yes | Yes | Not stated | Yes | Yes |
| Griffin et al. (2008) | Yes | Yes | F | Yes | Yes | Yes | Yes | Yes |
| Henderson et al. (2001) | Yes | Yes | F | Yes | Yes | Not stated | Yes | Yes |
| Krenichyn (2006) | Yes | Yes | I | Yes | No | Not stated | No | Yes |
| Kruger and Chawla (2005) | Yes | Yes | F | Yes | Yes | Not stated | No | Yes |
| Lloyd et al. (2008) | Yes | Yes | I | Yes | Yes | Not stated | Yes | Yes |
| Ferré et al. (2006) | Yes | No | I, O | Yes | Yes | Not Stated | No | Yes |
| Reis et al. (2008) | Yes | Yes | I, O | Yes | Yes | Yes | Yes | Yes |
| Sanderson et al. (2002) | Yes | Yes | F | Yes | Yes | Yes | Yes | Yes |
| Strath et al. (2007) | Yes | Yes | I | Yes | Yes | Not stated | Yes | Yes |
| Tucker et al. (2007) | Yes | Yes | I, O | Yes | Yes | Not stated | Yes | Yes |
| Veitch et al. (2006) | Yes | Yes | I | Yes | Yes | Yes | Yes | Yes |
| Veitch et al. (2007) | Yes | Yes | F | Yes | Yes | No | Yes | Yes |
| Wilbur et al. (2002) | Yes | Yes | F | No | Yes | Yes | Yes | Yes |
| Yen et al. (2007) | Yes | Yes | F | Yes | Yes | Not stated | Yes | Yes |

Table 2. Summary of findings related specifically to park characteristics, use, and physical activity extracted from the reviewed studies (n=21)

| Study | Demographic characteristics of sample | | | | Park characteristics found to be important for use and physical activity | | | | |
|---------------------|---|---|--|--|--|---|--|---|---|
| | Place study conducted | Gender and age | SES and ethnicity | Other characteristics | Features | Condition | Access | Aesthetics | Safety |
| Adams et al. (2008) | Three Wisconsin Tribal Communities, U.S.A (Menominee, Lac du Flambeau, Bad River) | Focus groups: N=42 caregivers of children <8 yrs of age living on reservations Mostly females 75% ≥ 30 yrs of age Interviews: N=35 key informants including practitioners from health care, education, and elder, child, and family programs | All American-Indian 85% completed high school 38% attended some college 53% employed outside the home | Majority of FG sample recruited through a nutritional program for women, infants, and children | (-): Playgrounds outdated; no swings | (-): Not well maintained; playgrounds wrecked | (-): Not easily accessible | (-): Vandalism | (-): Older children |
| Corti et al. (1996) | Perth, Western Australia | N=24 Mean age=40.8yrs (range 25-67 yrs) | Sample from suburbs of low and high social advantage | Sample were sedentary or low-to-moderate exercisers | (+): Variety/interesting; different paths; walk/bike tracks; suitable children's recreation; play equipment; amenities; barbeques; park size (-): Insufficient variety; too small | (-): Dog feces; not maintained | (+): Proximity/ accessibility | (+): Aesthetically pleasing; gardens; ponds/lakes; birdlife; trees; greenery (-): Graffiti | (-): Heavy traffic |
| Cutt et al. (2008) | Perth, Western Australia | N=51 Mean age=39 yrs (range 23-73 yrs) Female=73% | 50% completed high school | All dog owners 58% with children <18 yrs of age at home 22% regularly walked their dog | (+): Meeting areas; barbeques; seating; footpaths; large open grassed areas; variety of open space designs; water fountains; user-friendly signage; dog litter bins/bag; water sources for dogs; dog-agility equipment | (-): Poor quality footpaths | (-): Poor access to dog exercise areas | (+): Attractive; trees and bushes (-): Wildlife-concerned with dog walking | (+): Lighting; off-leash areas; fencing around off-leash areas (-): Near busy road |

Table 2. Summary of findings related specifically to park characteristics, use, and physical activity extracted from the reviewed studies (n=21)

| Study | Demographic characteristics of sample | | | | Park characteristics found to be important for use and physical activity | | | | |
|-------------------------|---|--|---|---|---|---|---|--|--|
| | Place study conducted | Gender and age | SES and ethnicity | Other characteristics | Features | Condition | Access | Aesthetics | Safety |
| Day (2008) | Three urban neighborhoods, Glasgow, Scotland | N=45 Ages≥62 | Inner city neighborhood (in the 20% most deprived areas, 22.1% of pension age); suburban estate (in the 40% most deprived areas, 23.1% of pension age); small coastal town (27% of pension age) | Majority of sample lived independently | | (-): Ground uneven; overgrown | | (-) Dog feces; vandalism | (-): Broken glass; unsafe |
| Evenson et al. (2002) | Two North Carolina counties, U.S.A | N=49 Females Median age=32 yrs (range 20-50 yrs) | Latino immigrants (low-acculturated) Median education=11 yrs | Sample included non-regular exercisers | (+): Family-friendly parks (i.e., also include features for kids to play and run) | | (+): More parks (-): Parks not close to home | | (-): Unsafe |
| Ferré et al.(2006) | Manresa and Sant Feliu de Llobregat, Catalonia, Spain | Sample N not stated Adults (interviews and systematic observation or playgrounds/open space) Children (systematic observation only) Males and females | | Systematic observation of 4 playgrounds, 2 in each city (1 from historic city centre and 1 from newer neighborhood) | (+): Age-appropriate play equipment; equipment for games; benches; facilities; More empty spaces for creative play (-): Space too small for older children activities including sports or play; lack of toilets; lack of water fountains; lack of shade trees; inappropriate placement of shade-providing elements | (-): Broken playground equipment; dog waste; graffiti; lack of conservation of grassy areas | (+): Located along daily walking routes; convenient | (-): Noise pollution; fumes, presence of dog waste (+): Cleanliness and maintenance of vegetation | (+): Soft/grassy playing surfaces; fences around playground equipment (-): Lack of lighting; high traffic volume; playground design; presence of dogs |
| Gearin and Kahle (2006) | Central city neighborhood, Los Angeles, California, U.S.A | N=11 boys / N=5 girls all high school seniors | N=15 Hispanic N=1 Asian 90% of homes in neighborhood were rentals | Study neighborhood had no parks, swimming pools, or recreation centers | (+): Variety of active/passive recreational opportunities; basketball courts, soccer/softball fields, indoor gym; water fountains; picnic tables; barbeque pits; multi-use facilities including for unstructured activity | (-): Dirty; pollution; unkept; litter; cracked concrete /impacted earth in recreational playing areas | | (+): Wildlife; gardens; grass; plants (-): Wildlife; smog | (-): Homeless; violence; traffic |

Table 2. Summary of findings related specifically to park characteristics, use, and physical activity extracted from the reviewed studies (n=21)

| Study | Demographic characteristics of sample | | | | Park characteristics found to be important for use and physical activity | | | | |
|--------------------------|---|---|--|---|--|---|-----------------------------------|--|--|
| | Place study conducted | Gender and age | SES and ethnicity | Other characteristics | Features | Condition | Access | Aesthetics | Safety |
| Gill and Simeoni (1995) | Cringila, Wollongon, New South Wales, Australia | N=55 including a primary school=20; secondary school=12; resident group=5, and; community leaders=9 | Community consisted of a large number of migrants from Southern Europe and the Middle East. Cringila is an industrial working-class community | | | | | (+): Scenery; wildlife; nature sounds; trees | (+): Safety; safe alternative high traffic streets |
| Griffin et al. (2008) | One suburban, southeastern community, U.S.A | N=27 70% female 66% ≥50 yrs of age | Sample African American 44% with college degree or higher 44% with high school diploma | 48% with children residing at home 44% married | | | (-): Necessity to drive to a park | | (-): Violent crime |
| Henderson et al. (2001) | Community, Southeast U.S.A | N=52 including N=36 females / N=16 males from community stakeholders Mean age=45 yrs (range 22-75 yrs) | 46% African-American; 54% European-American 36% earning \$20,000/yr 36% earning >\$40,000/yr | 24% of sample inactive | (+): More water fountains | (+): Equipment /signs in good condition | (-): Necessity to drive to a park | | (+): Safe during daytime; security; law enforcement in parks |
| Krenichyn (2006) | Prospect Park, Brooklyn, New York, U.S.A | N=41 Females Age range=18-58 | N=31 White N=5 African American N=2 Filipina N=1 Latina-Asian American N=1 Jamaican N=1 Cuban | Sample consisted of park users | (+): Topographic contours; stairs; hills; looped continuous paths; trails; challenging /varying terrain; drinking fountains; bathrooms | | (+): Local/ conveniently located | (+): Nature; greenery; colorful; fresh air; cooler in hot weather; trees; flowers; grass | (+): Controlled traffic on perimeter roads (i.e., one-way and car-free times) (-): Cyclists on paths; trails; harassment from males |
| Kruger and Chawla (2005) | Four neighborhoods, Johannesburg, South Africa (Joubert park, Malvern/Kingston, Riveriea Extension, Pimville) | Sample N not stated Boys and girls Age range=10-14 yrs | Sample from a range of SES backgrounds and multiethnic groups | | (+): Soccer fields; pools; tennis courts; play facilities; tuck-shop | (-): Overfull rubbish bins | (+): More parks | (+): Cleanliness (-): Litter | (+): Increase security; fencing around park (-): Dangerous; the homeless/street children; violence/ theft/ harassment |

Table 2. Summary of findings related specifically to park characteristics, use, and physical activity extracted from the reviewed studies (n=21)

| Study | Demographic characteristics of sample | | | | Park characteristics found to be important for use and physical activity | | | | |
|-------------------------|--|---|--|---|--|---|---|--|---|
| | Place study conducted | Gender and age | SES and ethnicity | Other characteristics | Features | Condition | Access | Aesthetics | Safety |
| Lloyd et al. (2008) | One suburb in Brisbane, Queensland, Australia suburb | N=11 Girls N=3 14 yrs of age N=2 15 yrs of age N=2 16 yrs of age N=4 18 yrs of age | Middle class, family-orientated suburb with low unemployment and high home ownership | Sample consisted of park users | (+): Passive activities; play equipment; places to play sports; place to play with dog; trees for climbing (-): Play equipment (if age inappropriate) | | (+): Within walking distance of home | (+): Wildlife; nature; fresh air; lack of noise | (+): Feeling safe |
| Reis et al. (2008) | Baltimore City, Maryland, U.S.A | N=24 girls/N=24 boys N=12 9 th grade N=14 10 th grade N=7 11 th grade N=15 12 th grade Sample from from two high schools | African-American | N=34 used parks N=26 used recreational facilities Study included direct observation of behavior in public recreational facilities | (+): Age-suitable facilities; sports facilities such as open fields, basketball courts, tennis courts, pools, and tracks; bathrooms; water fountains | (-): Cracks in the court; missing nets; inoperable lights; leaves on courts; uneven playing surfaces; lack of grass (-) | (+): Proximity to home; within walking distance | (+): Flowers; trees (-): Trash, vandalism | (+): Surveillance; security; lights (-) Secluded paths and areas; violence; crime; assault; drug dealing; glass; rocks; syringes |
| Sanderson et al. (2002) | Wilcox County, Southwest Alabama, U.S.A | N=61 Females (n=61) Mean age=36±8.4 (Age range=20-50 yrs) | African American 85% employed 67% with a high school education | Sample from a rural community Sample non-regular exercisers 66% were obese 66% not married 77% perceived health as good/very good | (+): Children's playground equipment (-): Poorly equipped; | (-): Inadequately maintained | | (+): Cleanliness (-): Litter | |

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|----------------------|---|--|--|--|--|-----------|---|--|--|
| | Place study conducted | Gender and age | SES and ethnicity | Other characteristics | Features | Condition | Access | Aesthetics | Safety |
| Strath et al. (2007) | Four neighborhoods, southeastern Wisconsin (Village of Elm; Village of Mequon; Village of Shorewood; City of Milwaukee) | N=37 from low (n=16) and high (n=21) walkable neighborhoods Mean age= 64.1±4.8 yrs (low walkable) and 62.6±5.9 yrs (high walkable) | Completed college/ university (20-100% in low, 50-80% in high walkable neighborhoods) Income in low walkable=\$35-50000 and in high walkable = \$35-45000 neighborhoods | Time living in the neighborhood =12-24 yrs Majority were physically active (75-100% across neighborhoods) Majority with good health (50-100% across neighborhoods) | (+): Specialized features such as tennis courts or multipurpose features that allow walking, running, cycling, skiing | | | | |
| Tucker et al. (2007) | 235 parks in London, Ontario, Canada | N=82 caregivers of children at parks 56% were mothers 24% were fathers 7% were grandparents 13% daycare providers Children of caregivers were between 1-13 yrs of age with 85% ≤7 yrs | | Mean travel distance to reach park=1 kilometer (range 20 meters to 10 kilometers) Mean times visiting park in past week=2.5 65% of parents alone decided which park to take children | (+): Water feature/splash pads/ wading pool; shade; sufficient number of swings; age-appropriate play equipment; ground covering underneath play equipment including woodchips, sand or pebbles; drink fountains; pavilions; picnic tables | | (+): Proximity (among those attending the closest park to home, less important for those travelling further) (-): Limited hours of operation (i.e., for water features requiring lifeguards) | (+): Cleanliness; cleanliness of washrooms | (-): Dangerous debris (+):Lighting |
| Veitch et al. (2006) | Metropolitan and outer-urban Melbourne, Victoria, Australia | N=78 parents of students from 5 primary schools 90% were mothers ≥40 yrs=49% | N=20 from high SES area N=35 from mid SES area N=23 from low SES area (SES based on Socio Economic Index for Areas) 69% had completed high school | All parents had at least one child in grade 1-6 attending school 79% were married 88% ≥2 children at home | (+): Playgrounds; age-inappropriate play equipment; range of physical/mentally challenging/stimulating play equipment; bike paths; picnic facilities; clean bathroom; shade; open spaces | | (+): Proximity | | (-): Strangers; syringes; traffic; loitering teenagers |

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| Study | Demographic characteristics of sample | | | | Park characteristics found to be important for use and physical activity | | | | |
|----------------------|---|---|---|---|--|---|--|---|---|
| | Place study conducted | Gender and age | SES and ethnicity | Other characteristics | Features | Condition | Access | Aesthetics | Safety |
| | | | 36% had university /tertiary education | 67% of children used public open space 59% owned a dog | | | | | |
| Veitch et al. (2007) | Five primary schools from metropolitan and outer-urban Melbourne, Victoria, Australia | N=132 children (71 girls and 61 boys) Age range 6-12 yrs | N=41 from low SES area (2 schools) N=63 from middle SES area (2 schools) N=28 from high SES area (1 school) | Children grouped according to whether they had used public open space at least once in previous week (i.e., POS user versus POS non-user) N=77 POS users N=55 POS non-users | (+) Natural environment including trees for climbing and bushes for hiding; open space; physically challenging and exciting play equipment; provision of spaces and facilities that allow activities such as bike riding, ball sports, and skateboarding (-): Uninteresting/non challenging playground equipment; lack of variety of playground equipment among different parks | | (-): Parks not within walking distance | (+): Cleanliness; attractiveness; gardens | (-): Presence of teenagers; having to cross busy roads to access parks |
| Wilbur et al. (2002) | Four communities in Chicago, Illinois, U.S.A | N=48 females Age range=20-50 yrs | African American 40% had at least a high school education 33% were unemployed | Non-participants in regular leisure physical activity 85% unmarried Mean children under 18 yrs at home=2.9±2.9 | | | | | (-): Unsafe; police presence in parks; Homeless/mentally ill in parks; verbal threats |
| Yen et al. (2007) | Three neighborhoods (low, medium, and high income) in Salinas, California, USA | N=52 females with at least one child under 18 yrs of age at home Age range=21-66 yrs | 57% were Hispanic 29% were white 13% were American Indian/Eskimo, Asian or Pacific Islander | | | (+): Upgraded facilities; increased maintenance | | | (+): Police presence (-): Unsafe; crime; violence; loitering; undesirable behavior |

(+) Park characteristic supports park use or physical activity; (-) Park characteristic discourages park use or physical activity

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