What Brings Children to the Park?

Analysis and Measurement of the Variables Affecting Children's Use of Parks

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Problem: Children make little use of many neighborhood parks even though they have facilities for active recreation.

Purpose: We examined the factors that bring children to parks, and aimed to understand how park visitation patterns differ between boys and girls, among children of different races and ethnicities, and between inner-city and suburban children.

Methods: We surveyed children and their parents in 12 middle schools and analyzed the results. Our team also observed children at 50 inner-city and 50 suburban parks, and we used multiple regression models containing park- and neighborhood-level variables to relate them to the numbers of children using parks.

Results and conclusions: The study confirms that many middle-school children make little use of parks. This is primarily explained by their own lack of interest in the existing park activities and their households' lack of time and concerns about safety. Active recreation facilities and organized sport programs, natural features, and good levels of maintenance and cleanliness are the most significant factors attracting middle-school children to parks. Our survey found some significant gender, racial, and ethnic differences in preferences for park equipment, perceptions of park safety, and park visitation patterns. Additionally, our regression models confirmed that inner-city and suburban children were attracted to parks of different sizes and containing different facilities, and that the association between park safety and park use was also different in these two settings.

Takeaway for practice: Neighborhood parks provide the potential for active recreation, but they are often underutilized and attract only a subset of neighborhood children. Planners should take into account that different factors attract different groups of children to parks.

Keywords: children, neighborhood parks, physical activity, park planning

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Historically, urban parks have been considered important city assets for youth, allowing physical exploration and social development. The outdoor setting of a park can give younger children opportunities to get involved in free play or discovery and exploration of nature (Proshanski & Fabian, 1987). Parks and open spaces allow children to burn off surplus energy, improve their motor skills, and interact with other children in environments that are usually less restrictive than those of home and school. Such play advances children's social and cognitive development (Hart, 1978; Saegert & Hart, 1978). For older children and teenagers, parks provide important settings for socializing with peers and getting involved in sports and physical activity. Parks are often described as an antidote to the commercialization of leisure, contrasting with the passive and insular experiences offered to children by electronic toys, computers, and television (Burgess, Harrison, & Limb, 1988).

Neighborhood parks also have the potential to increase leisure-time physical activity for both children and adults because they offer a variety of active

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recreation options close to where people live (Floyd, Spengler, Maddock, Gobster, & Suau, 2008). This is extremely important in light of the rising epidemic of obesity in U.S. cities.[1] Unfortunately, however, there is evidence that many 10- to 13-year-old children do not use neighborhood parks and playgrounds. A *New York Times* article attributes this to their uninspired and standardized designs, prompted by the fear of lawsuits.

> American playgrounds often seem anything but playful. Their equipment is designed not so much to let children have fun as to make sure they don't hurt themselves. . . . Well meaning efforts to reduce risk of injury have overwhelmed opportunities for self-expression and creativity." (Arieff, 2007, n.p.)

Parental anxiety over children's safety and the proliferation of sprawl in many metropolitan areas also contribute to decreased levels of walking and biking among children (Loukaitou-Sideris & Stieglitz, 2002).

In the last decade, a number of studies have looked at the possible role of various environmental factors in childhood obesity, hypothesizing that the layout and design of urban form affects the level of physical activity (Krizek, Birnbaum, & Levinson, 2004; Sallis & Glanz, 2006). While evidence is still circumstantial, many researchers believe that parks, which are present and already equipped with active recreation facilities in many neighborhoods, may assist in combating obesity. Nevertheless, we lack knowledge about which specific park characteristics are more related to children's use of parks (Bedino-Rung, Mowen, & Cohen, 2005) and how park visitation and utilization patterns differ between boys and girls, children of different races and ethnicities, and between inner-city and suburban children. This study tackles these questions through empirical research at 50 inner-city and 50 suburban parks in Los Angeles.

Children's Use of Parks: A Brief Literature Review

A review of the literature on children's use of parks indicates that neighborhood attributes, park attributes, and children's sociodemographic characteristics all affect the frequency and type of use children make of neighborhood parks. Studies have consistently shown that more men and boys than women and girls visit and use neighborhood parks (Floyd et al., 2008; Loukaitou-Sideris, 1995), and more boys participate in physical activity programs than girls (D. A. Cohen et al., 2007; Moody et al., 2004). Some studies have also shown that younger children are more active than adolescents and adults (Floyd et al., 2008).

A few studies have specifically focused on children of different ethnic and socioeconomic backgrounds and their patterns of physical activity and park use (Floyd et al., 2008; Gordon-Larsen, Adair, & Popkin, 2002; Gordon-Larsen, McMurray, & Popkin, 1999; Kimm et al., 2002). Some researchers have found more intense use of parks in high density, poor, inner-city communities than in low-density suburban and exurban areas where children have ample access to private recreation facilities (Johnston, 1987; Lawrence, 1984; Loukaitou-Sideris & Stieglitz, 2002), despite the fact that Black and Hispanic populations typically have poorer access to parks and recreation facilities (Gordon-Larsen, Nelson, Page, & Popkin, 2006; Powell, Slater, & Chaloupka, 2004; Wolch, Wilson, & Fehrenbach, 2005). Researchers find that low-income groups face barriers to physical activity and that recreation centers in poor neighborhoods have difficulty reaching inner-city youth (Cordell, McDonald, & Teasley, 1999).

Prompted by concerns about the negative outcomes of sedentary lifestyles on health, some researchers have started investigating attributes of the built environment that may contribute to park use and physical activity. Certain park characteristics seem to attract users (Bedino-Rung et al., 2005). Empirical studies of parks have found that park size (Corti, Donovan, & Holman, 1996), the availability of active recreation facilities and programs at the park (Gordon-Larsen, McMurray, & Popkin, 2000; Sister, Wilson, & Wolch, 2008), aesthetic features like water and trees (Corti et al., 1996), a park's level of maintenance, and its perceived safety (Tinsley, Tinsley, & Croskeys, 2002) may affect patterns of visitation and physical activity. Also, individuals who use neighborhood recreation centers are more likely than others to participate in moderate or vigorous physical activity (Gordon-Larsen, McMurray, & Popkin, 2000).

Other studies, mostly studying adult park use, have found that neighborhood characteristics may also affect visitation and physical activity at neighborhood parks. The total park acreage in the neighborhood, which translates to proximity of park land to the place of residence, has been found to be an important determinant of park visitation (Bedino-Rung et al., 2005; D. A. Cohen et al., 2007; Giles-Corti & Donovan, 2002; Grow et al., 2008). Neighborhood sociodemographic characteristics and racial composition have also been found to affect park use (Zakarian, Hovell, Hofstetter, Sallis, & Keating, 1994). Finally, a number of studies have found that both objective and subjective measures of neighborhood safety can affect park use. Parental perceptions of neighborhood safety affect children's

level of park use, but fear of strangers and rates of actual crimes reported affect girls more than boys. Thus, the density of violent crimes reported within one half mile of participants' homes has been found to be inversely associated with outdoor physical activity for girls, but not for boys (Gomez, Johnson, Selva, & Sallis, 2004).

While the aforementioned studies are promising, many call for identifying specific park characteristics that lead to park use and physical activity among particular groups of children (Bedino-Rung et al., 2005; Godbey, Caldwell, Floyd, & Payne, 2005; Moody et al., 2004). To address some of the gaps in the literature, we turn to our empirical study.

Research Design and Methods

Based on this literature, we hypothesize that a combination of both objective and subjective (perceptual) variables account for young people's active use of parks (see Figure 1). The purpose of this empirical study is to respond to the following questions: Which sociodemographic, neighborhood, and park characteristics have important relationships to children's use of parks? How do gender, race, ethnicity, and location of residence relate to a child's park use?

To respond to the research questions we used a three-part method. We surveyed children and parents in 12 middle schools of the Los Angeles Unified School District, six in the suburban San Fernando valley region of Los Angeles, and six in Los Angeles' inner city, to help us identify factors contributing to both use and nonuse of parks, including subjective and perceptual influences. We also collected information on the attributes of 100 parks and their surrounding neighborhoods, 50 in Los Angeles' inner city, and 50 in the suburban valley region, both on weekdays and weekends, noting the distribution of children by gender, race, and ethnicity at each park. The two regions are quite different in their sociodemographic characteristics, with much higher levels of concentrated poverty and larger shares of the population being Hispanic and Black in the inner city than in the valley, allowing us to compare park use patterns among children belonging to different socioeconomic levels. We also observed children's utilization of each of these parks. We concentrated on middle-school children 10–13 years of age. This age group is still dependent on their parents, but has some freedom to play or get involved in sport activities in different areas of the park without direct adult supervision. Finally, we conducted regression analyses to identify which park attributes and sociodemographic and locational characteristics of children were strongly associated with children's park visitation.

Surveys

To compare the levels of park use as well as the perceptions of inner-city and valley children and their parents, we distributed 600 survey questionnaires to children through their schools and sent home 600 survey questionnaires to parents in each of the two study districts, receiving responses from a total of 159 parents and 451 children (226 girls and 225 boys) from Los Angeles public schools in the

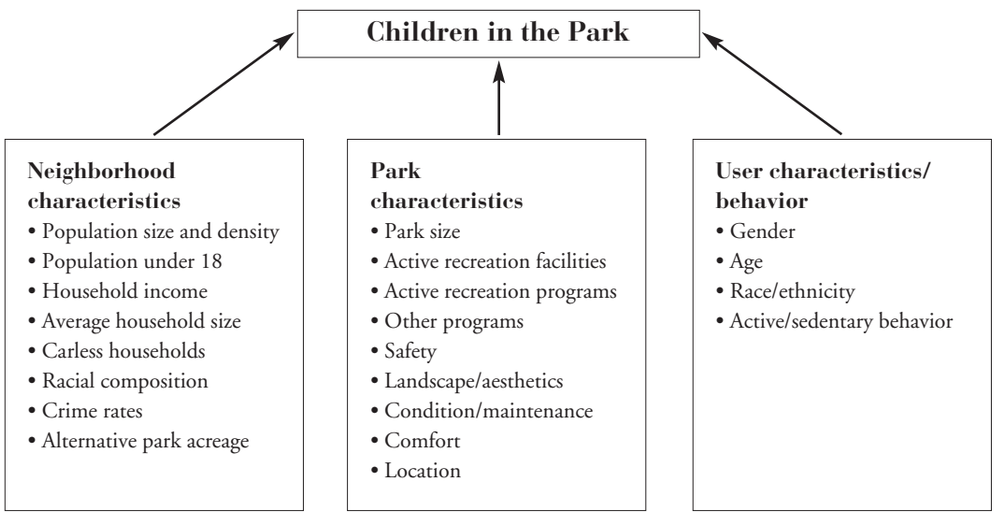

Figure 1. Conceptual model of the study.

inner city, and 189 parents and 446 children (240 girls and 206 boys) from Los Angeles public schools in the San Fernando valley. Each of the 12 public schools selected was in a different neighborhood. Originally, we identified all 32 public middle schools located within one mile of each of the study parks. However, in 10 of these schools, we did not receive the principal's consent to conduct surveys.[2] From the remaining 22 schools, we chose 12 from geographically diverse neighborhoods in the two regions. School principals in the final 12 schools each asked three of their teachers to distribute and later collect the surveys in their classes.

Our survey included both closed- and open-ended questions, and the questions used in this analysis are listed in the Appendix. To test the questionnaire, we first carried out a pilot survey with a small sample of students in two schools, leading us to modify a few questions to make them clearer. We were unable to carry out a test–retest design to evaluate the survey's reliability due to financial and time constraints. Nevertheless, we found responses of parents and children to be generally consistent, suggesting that both groups understood the concepts behind our survey questions.

We compared the sociodemographic characteristics of the survey respondents to the sociodemographic characteristics of the census tracts containing their schools and found that the sample was representative of the population living near the schools. Table 1 shows survey respondents' self-reported race or ethnicity,[3] which we found generally matched that of the census tracts containing their schools (Nielsen Claritas, 2007). In addition, valley households have, on average, higher incomes than inner-city households, and this was also reflected in the parents' surveys. About 47% of inner-city respondents reported earning less than $20,000, while only 20% of valley households reported belonging to this lowest income category. In contrast, only 15% of inner-city households said they earned more than $50,000, while about 35% of valley households said they were in this income bracket. About 66% of valley respondents lived in single-family homes as compared to 38% of inner-city respondents. More valley households (about 80%) than inner-city households (68%) responded that they had access to private open space (yards) for play.

Park Attributes and Park Observations

We chose to study parks possessing at least some areas, facilities, and equipment that allowed children to engage in physical activity, free and spontaneous play, and/or organized sport activities. For sample selection purposes, we categorized parks by size into *mini-parks* (occupying from 0.1 to 1.0 acres), *neighborhood parks* (from 1.1 to 25.0 acres), and *community parks* (from 25.1 to 200.0 acres).[4] We also classified parks as providing low, medium, or high numbers of active recreation facilities and programs. We expected, based on the literature, that certain physical and programmatic characteristics of parks might attract children. Thus, using fieldwork, observation, and archival information, we collected data on the following attributes of each park, which are defined in the Appendix: park size, active recreation facilities, active recreation programs, other (nonactive) child-oriented programs, park safety, park comfort, park condition and maintenance, and park landscape. These summary indices are similar to those used by

Table 1. Survey respondents' self-reported race or ethnicity.[a]

	Inner city				Valley			
	Parents		Children		Parents		Children	
Hispanic	108	69.7%	291	68.6%	97	53.3%	222	51.2%
African American	10	6.5%	26	6.1%	6	3.3%	12	2.8%
Asian American	14	9.0%	42	9.9%	24	13.2%	47	10.8%
American Indian	0	0.0%	2	0.5%	1	0.6%	1	0.2%
White	9	5.8%	22	5.2%	45	24.7%	95	21.9%
Mixed	6	3.9%	16	3.8%	5	2.7%	26	6.0%
Other	8	5.1%	25	5.9%	4	2.2%	31	7.1%
Total responding	155	100.0%	424	100.0%	182	100.0%	434	100.0%
No response or multiple responses	4		27		7		12	
N	159		451		189		446	

Note:

a. The survey question asked, "What is your race/ethnicity?" and allowed the respondent to choose only one answer from those listed above.

Sister et al. (2007) in their study of parks and open space resources in Los Angeles County. In selecting our sample of parks, we sought to represent these attributes in proportion to their availability and aimed to make the total area of studied parks in both regions roughly equal.

Our observations at the 100 parks took place in May and June 2007, when the weather was generally sunny and pleasant.[5] In addition to the park characteristics, like the presence and number of various types of athletic fields, park facilities, equipment, safety features, and landscaping described above, we made observations of the gender, race or ethnicity, and level of activity (sedentary, walking, or very active) of children of about middle-school age who were using the park.

Direct observation can give researchers a wealth of data, but also has drawbacks. For example, it provides only a snapshot of the activity level of the observed child at one particular time. The observer may also misidentify the child's race, ethnicity, or age, and this can be a source of error in modeling. For this study, we sought to count active and inactive children using a modified version of the System for Observing Play and Leisure Activity in Youth (SOPLAY) developed by McKenzie (2006), but decided against including the data on physical activity in our regression models. The fact that we only observed in parks for two months is also a drawback, since year-round averages would have been a better indicator of overall park usage.

Four graduate students served as park observers. They were trained by a postdoctoral research assistant during visits to the park sites. They conducted trial observations to check the appropriateness and validity of the observation forms and inter-observer reliability. Kappa scores for inter-observer reliability were between 0.82 and 0.97, well within acceptable limits (Landis & Koch, 1977). Before beginning to gather data, the observers made visits to each park to identify its different sub-areas (e.g. playground, picnic area, baseball field, etc.). They then conducted two two-hour observation sessions for each park, one on a weekday from 3:30 to 5:30 p.m. and one on a weekend from 10:00 a.m. to noon. The observer visually scanned each sub-area of the park three times during each observation session, categorizing and counting all middle-school-age children by gender and race or Hispanic ethnicity and recording the data on a standardized form.

Statistical Models

We used counts of children from our park observations as dependent variables in our statistical models, and used both park attributes (described above and defined in the Appendix) and neighborhood attributes (also defined in the Appendix) as explanatory variables. We defined a park's *neighborhood* as a quarter mile, nondynamic (linear) buffer around the GIS shapefile we created for each park (California Protected Areas Database, 2009; GreenInfo Network, 2009; Nielsen Claritas, 2007). For each park's buffer neighborhood, we obtained data for the following variables: total population, population density, Whites, Blacks, Hispanics, Asians, American Indians/Alaskan Natives, Native Hawaiians/Pacific Islanders, persons of two or more races, persons of other races, population under 18, carless households, average household income, average household size, households of more than seven people, and reported crime.[6] We obtained all but the crime data from 2007 estimates by Claritas (Nielsen Claritas, 2007). From the same source, we also obtained 2007 estimates of Hispanic population broken down by primary race, which we used to adjust our primary data to ensure that Hispanics were not double counted.

We obtained counts of total reported crime and severe (Type I) reported crime per square mile in 2006 and 2007 from the Los Angeles Police Department. We also considered as a potential factor in a park's utilization (or lack thereof) the availability of alternative park area within one, two, three, four, and five miles from each of our 100 parks (California Protected Areas Database, 2009; GreenInfo Network, 2009).

We used ordinary least squares (OLS) multiple linear regression modeling to test the statistical significance of the previously considered independent variables as factors affecting children's visits to parks. We also constructed three additional models to investigate how such significance may vary with respect to gender, region of the city, and Hispanic ethnicity. In constructing these models, we kept variables that the literature suggests add important dimensions to our modeling, while excluding variables highly collinear with those.[7] Thus, our basic model includes 14 independent variables. The highest variance inflation factor in all our models was 3.26 and the average was 1.73, indicating that there were no issues of multicollinearity in the models. After examining partial residual plots and a Box-Cox multivariable transformation analysis (Chatterjee & Hadi, 2006), we concluded that certain variables should be transformed in order to better satisfy the linearity and normality assumptions of OLS. Thus, we logarithmically transformed park size, population under 18, average household income, and area of alternative parks within a three-mile radius, and used the square root of the variable measuring total crime. We also used a square root transformation of the dependent variable in all our models. Finally, we analyzed influential and outlier observations based on Cook's distance measure and robust regression (Chatterjee & Hadi, 2006) leading us to omit a small

number of observations from each model as explained below. Since we were interested in a model revealing the relative importance of explanatory variables, we standardized all variables before using them in the models. Finally, after each regression, we validated each model by inspecting plots of standardized residuals.

Results

Survey Responses

Our chi-square tests of the independence of survey responses revealed some significant differences in patterns of park use and physical activity between children of different regions, genders, races, and ethnicities.

Park Use and Nonuse. Almost half of the surveyed children from both regions reported going to a park twice per week or more. Significantly more Hispanic children (60%) than children of other groups go to parks with their families. Most of the children stay at the park longer than an hour, especially on the weekends, with Hispanic children staying significantly longer than children of other groups. A significant minority of children (about 20%) stated that they never go to the park. Boys tend to visit parks more often than girls, and Hispanic children visit more often than children of other groups; these differences were statistically significant at the 0.05 and 0.01 levels, respectively. Park characteristics such as cleanliness, perceived safety, and superiority of facilities figured prominently in the reasons that children in both regions gave for choosing one park over another. Friends going to the same park, and the park's proximity to their residence were two additional reasons given by many children.

A prominent reason children gave for never visiting parks was that they or their parents lacked the time. Some children, primarily girls, said that they had outgrown parks, elaborating that they found the park "boring" and preferred other activities such as spending time at friends' houses or at the mall or playing videogames at home. Additional reasons given to explain nonuse related to perceptions of the park as "unsafe," "dirty," or "too far from home." Children who did not use parks included more females than males, and more Blacks and Asians than other groups. Conversely, boys and Hispanic children were overrepresented among park users.

Preferred Park Equipment. Playground equipment was the type of park facility girls reported using most frequently, while boys reported using playing fields most frequently. Thirty-nine percent of girls and 19% of boys responded that they used the swings and slides more often than other park facilities. In contrast, 25% of girls and 45% of boys said that they used the playing fields more often than other park facilities. These differences were statistically significant at the 0.01 level. Soccer fields were the most frequently used sport facilities for both boys and girls, followed by basketball courts, and baseball or softball diamonds. We found statistically significant differences in most commonly used park facilities not only by gender but also by race or ethnicity. Soccer fields were the facility most commonly used by Hispanic children, basketball courts by Black and Asian children, and baseball or softball diamonds by White children. Other facilities mentioned included indoor gyms, bike paths, and ramps and rails for skateboarding.

Physical Activity. Children who did not use parks seemed to have more sedentary lifestyles, indicating that they were mostly driven to school, and participated in outdoor activities and active sports less frequently than children who were more frequent park users. Most children who visited parks reported that organized activities for active recreation (e.g., little leagues, dance classes, etc.) exist in the park they frequent, but only a minority of children using the parks (less than one third) took part in them. More boys than girls, and more White and Hispanic children than Asian or Black children participated in physically active organized park activities such as little leagues; these findings were statistically significant at the 0.01 level. Interestingly, the majority of children in both regions (53.5% in the inner city and 60% in the valley) stated that they preferred physically active organized activities. Responding to a survey question asking them why this was the case, many children reported that "they are more fun," "they offer more structure," "they give you a chance to play with other people," "they get you fit and healthy." On the flip side, children who did not prefer organized activities argued that they "don't like rules" and "free play is more fun." According to parents, who overwhelmingly thought it was important for parks to offer organized activities for their children, more parks in the valley charge fees for park activities than do parks in the inner city. Many more parents in the valley (70%) than in the inner city (56%) responded that their parks offer activities year round.

Children in both regions reported preferring similar park activities. Soccer, basketball, and playground play were the three most popular activities, followed by baseball and football. Other activities reported as preferred by more than 10 respondents included: running around, biking, skateboarding, playing tag, swimming, tennis, volleyball, family picnics, playing with a dog, hanging out, or simply lying on the grass.

A small majority of children in both regions reported that they were involved in sports in settings other than

parks. Significantly more valley children, more boys, and more White and Black children said this. Children reported that most of their physical activities took place at schools (35%), parks (25%), backyards (19%), and on neighborhood streets (15%). Examining the impact of gender on the locations of active recreation, we found that parks and streets are more common settings for active recreation among boys than girls, while girls favor backyards more than boys. We also observed significant differences in the choice of settings for active recreation by race or ethnicity. For example, 58.4% of Asian children listed school as the setting where most of their physical activity takes place, followed by their backyards (14.6%), parks (13.5%), and the street (5.6%). In contrast, White children listed school (32.5%), parks (29.8%), the street (15.8%), and their backyards (13.2%) as locations of physical activity.

Park Proximity and Access. According to the literature, whether one uses a park depends on its accessibility and proximity to one's residence (D. Cohen et al., 2006; D. Cohen et al., 2007). More valley children (44%) and parents (50%) than inner-city children (27%) and parents (37%) reported living one to five minutes from a park, and these differences were statistically significant at the 0.01 level. Significantly more White children than others reported living close to a park. Despite the better overall access to parks that valley children seemed to enjoy, a higher proportion of valley children never visited parks compared to inner-city children. This finding may be explained by the availability of alternatives to the park. More valley children reported living in single-family dwellings and having access to private open space than did inner-city children, and these differences were significant at the 0.01 level. Additionally, significantly more valley children reported being physically active outside park settings (e.g. at athletic clubs, private pools, private ballet classes, etc.).

While it is commonly expected that people walk to their neighborhood parks, only a minority of parents and children reported doing so. One third of inner-city children (33%) and less than one quarter of valley children (23.5%) reported walking to the park. A significantly higher percentage of inner-city children walked to the park, and this may be attributed to the lower levels of car ownership among households in the inner city. There was no significant difference between boys and girls in terms of walking to the park. However, a higher percentage of boys (13.5%) than girls (7.2%) biked to the park.

Perceptions of Safety. Perceived lack of safety may deter people from using parks and open spaces (Molnar, Gortmaker, Bull, & Buka, 2004). More than three quarters of all the parents surveyed in both regions stated that they do not allow their children to go to the park without an adult, mostly because of concerns about crime and traffic. Girls had decidedly less independent mobility than boys. Interestingly, a significant majority of parents (77%) and children (79%) in the valley considered their neighborhoods safe. Perceptions of safety were significantly lower in the inner city, where only about half of the parents and 60% of children characterized their neighborhoods as safe. A majority of children in both the valley (79%) and the inner city (70%) felt safe at the park. However, more boys than girls reported feeling safe, and this was statistically significant at the 0.01 level. Parents' responses regarding the safety of the park setting were more ambivalent than those of their children. Indeed, 44.5% of inner-city parents and 34% of valley parents did not consider their neighborhood park safe. These findings highlight adults' anxiety about children's safety in public spaces, which ultimately shapes the way that play settings are utilized. Other researchers have also found that such fears lead parents to impose more restrictions on their children's use of public settings than they experienced in their own childhoods (Jones, 2000; Valentine & McKendrick, 1997).

Numbers of Children Observed in Parks

Our observations revealed that many parks were significantly underutilized. Eight parks contained no children at all during our observation times, while another 10 parks contained no more than 10 children each. As shown in Figure 2, half of the parks each contained no more than 50 children. Only five parks in the inner city and four parks in the valley had more than 200 children during our observation sessions. Figure 3 shows that when park acreage is taken into account it is even clearer that inner-city parks are utilized more intensely than those in the valley.

Our observations confirmed other research results as well our own survey findings that boys utilize parks in greater numbers than girls (Figure 2). This may happen because girls find less attractive programs and activities at the parks or because parents are more reluctant to leave them there without adult supervision. As previously reported, many girls in our survey mentioned that the playground was their favorite park facility. Yet, many playgrounds are geared toward younger children and have little to offer children in this group (10–13 years old).

The vast majority of children encountered in the parks of both regions were Hispanic. Most of the White and Asian children were observed at the valley parks, while most of the Black children were observed at inner-city parks. However, certain parks tended to attract more visitors than others. To better understand the factors that encourage children's park visits, we turn to statistical modeling.

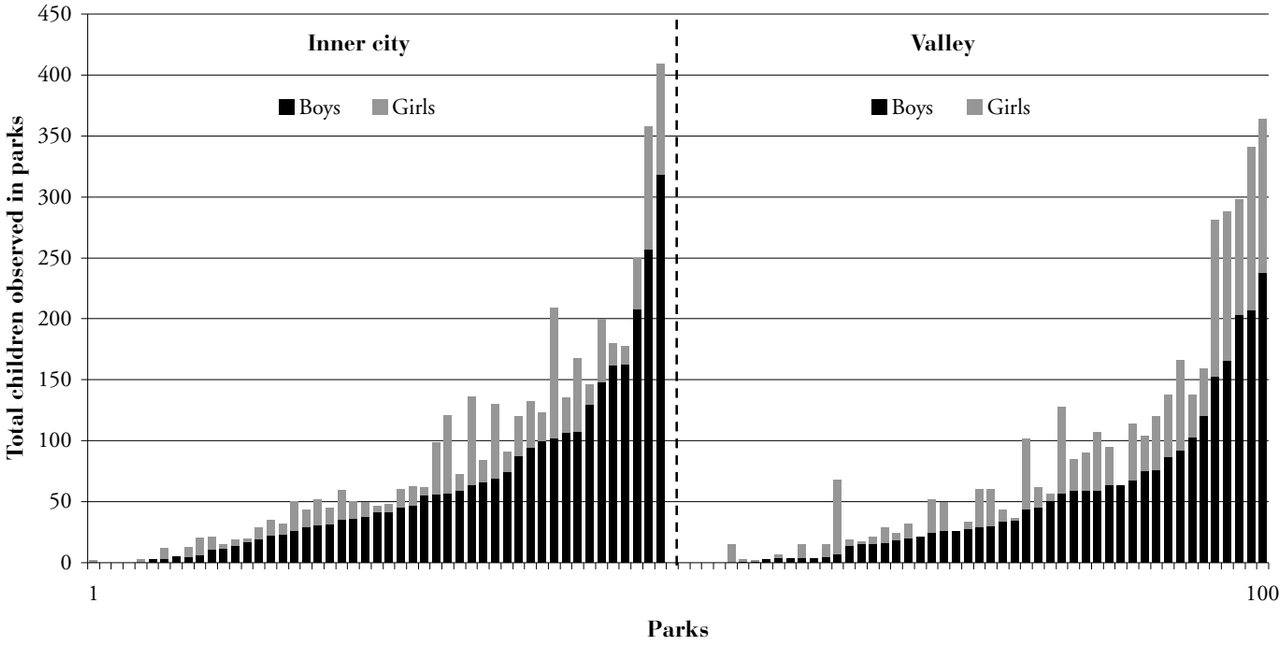

Figure 2. Total numbers of children, boys, and girls observed in inner-city and valley parks.

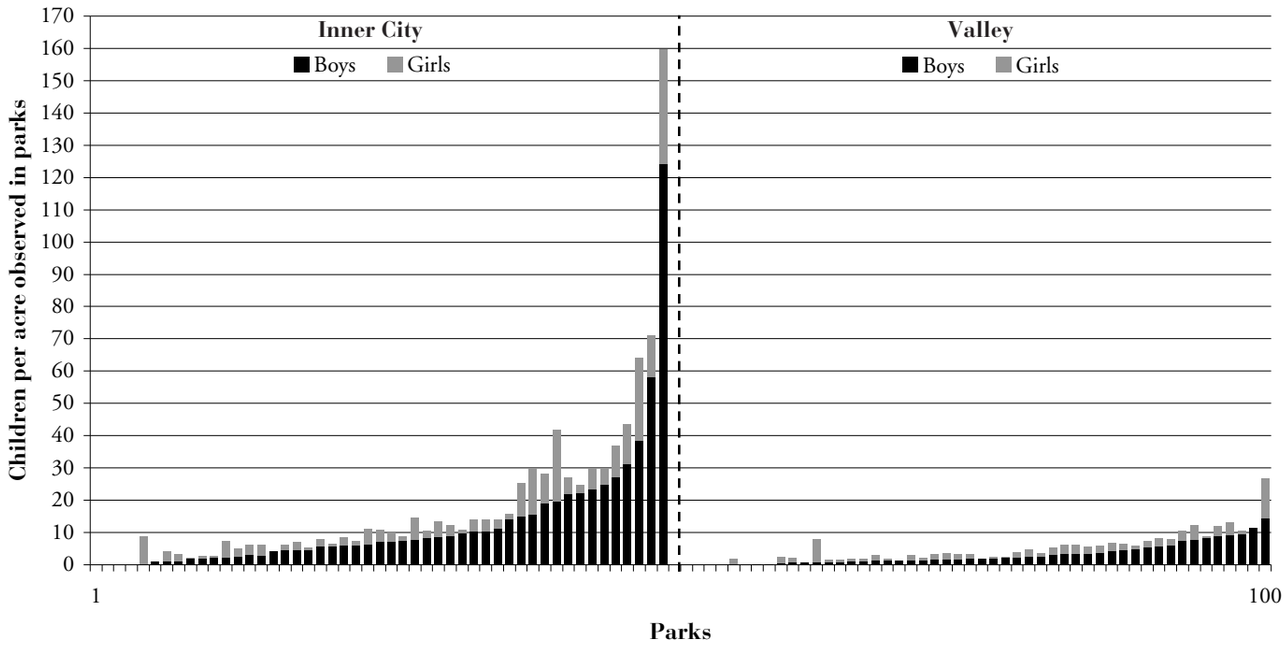

Figure 3. Numbers of total children, boys, and girls per acre observed in inner-city and valley parks.

Results of the Basic Model: What Brings Children to the Park?

The results from our basic OLS model are reported in Table 2. From the total of 100 parks, we excluded two parks as outliers because soccer and baseball tournaments were occurring during some observation sessions, bringing an atypically high number of children to these parks. Our results indicate that the most significant factors (at the 0.01 level) attracting children to the parks appear to be the existence of active recreation facilities and the park's landscape. Other important variables (at the 0.05 level) are the park's size (larger parks tended to attract more children), active recreation programs (sports), the level of maintenance (well-maintained parks and those with more sports programs typically had more children), and safety. Interestingly, the park safety variable was negatively related to the number of children at the park. This may be explained by the fact that this variable only measured the availability of safety features at the park (e.g., police substations, park staff, lighting, emergency phones) and not actual crime. We hypothesize that enhanced safety features in parks may represent responses to high crime in the neighborhood, which may deter children's visits. For example, the presence of a police substation in a park may be indicative of a high-crime area. An alternative interpretation is that perceptions of safety may or may not match actual crime rates or existing safety features.

Table 2. Regression model relating the square root of the number of children observed using parks.

	Stand. coeff.	*t*
Park attributes		
Park size (ln)	0.1885	2.0318*
Active recreation facilities	0.4652	4.6949**
Active recreation programs for children	0.2400	2.2031*
Other child programs	0.1162	1.1131
Park safety	−0.2037	−2.0078*
Park landscape	0.1885	2.6953**
Park condition/maintenance	0.1845	2.1780*
Park comfort	0.0981	1.2516
Neighborhood attributes		
Population under 18 (ln)	0.2001	1.3658
Average household size	−0.0302	−0.3146
Average household income (ln)	−0.2267	−1.4555
Percentage of carless households	−0.0917	−0.6800
Density of reported crime (square root)	0.1776	1.1205
Area of alternative parks (ln)	−0.0814	−0.9902
N	98	
Residual standard error	0.3280	
Adjusted R^2	0.6720	
F	15.1954	

Note:
See the Appendix for explanations of and sources for variables.

*$p < 0.05$ (two-tailed) **$p < 0.01$ (two-tailed)

What Brings Boys and Girls to the Park?

To examine the gender differences in children's usage of parks, we next treated the counts of male and female children from each park as separate observations and ran two separate regressions. We excluded the same two parks from the boys' model as we had from the basic model (the excluded parks hosted boys' tournaments only) as unusual observations. The results appear in Table 3. Most of the variables that were significant in the basic model (active recreation facilities and programs, natural features, and park maintenance) were also significant in this model. Active recreation facilities were significant at the 0.01 level for both boys and girls, but the other variables were significant at the 0.05 level for both boys and girls. For girls, additional significant variables (at the 0.05 level) were the population of children under 18 and the average household size in the park's surrounding area. The latter variable was negatively related to the number of girls visiting the park and, although the corresponding coefficient for boys was slightly positive, it was not statistically significant. One can perhaps conclude that household overcrowding negatively affects children's visits to the park, and more so for girls than boys. A plausible explanation is that the larger family size typically translates into less discretionary time for parents. This affects girls more, since, according to our survey, they are more dependent than boys on their guardians for taking them to the park.

To statistically evaluate the differences in the importance of the explanatory variables between the models for boys and for girls, we employed Chow's (1960) test.[8] We found no discernible statistical differences between the model for boys and that for girls, or between individual variables in the models. This is in contrast to our survey results, in which we found some significant gender differences in the patterns of park use and nonuse, preferred park equipment, and perceptions of safety. This is likely because parents greatly influence whether children in this middle-school age group use the park, while our survey questions probed children directly and in detail about their perceptions and preferences.

Table 3. Regression models relating the square root of the number of male and female children observed using parks and the difference between the models.

	Male children using parks		Female children using parks		
	Stand. coeff.	*t*	Stand. coeff.	*t*	Chow *F* test of difference
Park attributes					
Park size (ln)	0.1580	1.6140	0.1807	1.6286	0.0238
Active recreation facilities	0.4507	4.3113**	0.4332	3.6607**	0.0125
Active recreation programs for children	0.1791	1.5574	0.2626	2.0184*	0.2334
Other child programs	0.1859	1.6885	−0.0200	−0.1610	1.5484
Park safety	−0.1638	−1.5298	−0.2362	−1.9598	0.2032
Park landscape	0.1925	2.6085*	0.1368	1.6297	0.2508
Park condition/maintenance	0.1174	1.3136	0.2182	2.1515*	0.5606
Park comfort	0.0842	1.0170	0.1017	1.0748	0.0197
Neighborhood attributes					
Population under 18 (ln)	0.1482	0.9585	0.3526	2.0250*	0.7762
Average household size	0.0267	0.2638	−0.2271	−2.0936*	2.9291
Average household income (ln)	−0.1695	−1.0314	−0.3463	−1.8752	0.5153
Percentage of carless households	−0.1585	−1.1137	0.1413	0.8790	1.9655
Density of reported crime (square root)	0.2559	1.5296	−0.1999	−1.1046	3.4274
Area of alternative parks (ln)	−0.0545	−0.6288	−0.1413	−1.4518	0.4457
N	98		100		
Residual standard error	0.3652		0.4813		
Adjusted R^2	0.6348		0.5187		
F	13.0424		8.6194		
Chow *F* test between models					0.7429

Note:
See the Appendix for explanations of and sources for variables.

*$p < 0.05$ (two-tailed) **$p < 0.01$ (two-tailed)

What Brings Inner-City and Suburban Children to the Park?

To examine how park location (valley as opposed to inner city) influences children park visits, we constructed separate regression models for the valley and the inner-city observations. We used the same 14 explanatory variables as in the previous models and the dependent variables are the total numbers of children observed in the parks of each region. We excluded three inner-city parks and one valley park as outliers.

The results of the two regression models are reported in Table 4. The Chow test comparing the two models reveals significant statistical differences that are corroborated by several individual variable Chow tests reported in the rightmost column of Table 4. Park size was positively related to child usage of parks in both areas, but was significantly more important for inner-city children. On the other hand, active recreation facilities were more important for valley children. Park safety and maintenance were also significant in both models, but, interestingly, the safety variable had a positive coefficient in the inner-city model and a negative coefficient in the valley model. The significance of this difference at the 0.01 level was confirmed by the Chow test. We hypothesize that parks in the inner city are less safe than parks in the valley, and that enhancing security in inner-city parks attracts more children, while in the valley safety features are more likely added in response to a specific incident that has already made the park appear

Table 4. Regression models relating the square root of the number of children observed in inner-city and valley parks and the difference between the models.

	Inner-city children using parks		Valley children using parks		
	Stand. coeff.	*t*	Stand. coeff.	*t*	Chow *F* test of difference
Park attributes					
Park size (ln)	0.3829	2.8393**	0.0847	0.6634	2.6606
Active recreation facilities	0.1427	1.1057	0.6351	5.0815**	7.7309**
Active recreation programs for children	0.0207	0.1421	0.2610	1.9088	1.4885
Other child programs	−0.0601	−0.4695	0.0873	0.5825	0.5672
Park safety	0.4278	3.3836**	−0.3846	−3.0675**	21.3820**
Park landscape	0.1321	1.2314	0.0429	0.5262	0.4605
Park condition/maintenance	0.2414	2.5799*	0.1744	2.4782*	0.3433
Park comfort	−0.2400	−2.0653*	0.2044	2.1380*	9.0890**
Neighborhood attributes					
Population under 18 (ln)	0.4826	2.9345**	0.0774	0.3942	2.5339
Average household size	−0.4130	−3.4387**	0.0765	0.5847	7.7424**
Average household income (ln)	−0.1294	−0.7748	−0.2412	−1.3458	0.2125
Percentage of carless households	−0.1546	−1.0228	−0.1260	−0.7319	0.0160
Density of reported crime (square root)	−0.1561	−0.9704	0.1275	0.5861	1.1024
Area of alternative parks (ln)	0.1040	1.1825	−0.2190	−2.0841*	5.6261*
N	47		49		
Residual standard error	0.2297		0.1965		
Adjusted R^2	0.7703		0.8035		
F	12.0206		15.0237		
Chow *F* test between models					4.3900**

Note:
See the Appendix for explanations of and sources for variables.

*$p < 0.05$ (two-tailed) **$p < 0.01$ (two-tailed)

unsafe. Our measure of park comfort was significant for both inner-city and valley parks, but had opposite effects in the two regions, both significant at the 0.01 level of the Chow test. Park comfort attracted more children to parks in the valley, but not in the inner city. The presence of nearby alternative parks reduced children's use of valley parks, but not of parks in the inner city, possibly because there were too few alternatives available. Additionally, the population under 18 and average household size in the neighborhood around the park appeared significant for the inner-city parks, but not for valley parks, possibly signaling that household overcrowding reduces children's visits to inner-city parks, as reasoned previously.

What Brings Hispanic and Non-Hispanic Children to the Park?

To investigate differences in how children of different races and ethnicities use parks we used separate counts of Hispanic, White, Black, and Asian children obtained during the observations at each park. However, our data did not support a four-way comparison among Hispanics, Whites, Blacks, and Asians, and so our models predict Hispanic and *non-Hispanic* children (defined as the combined counts of White, Black, and Asian children) observed in parks. In addition to the 14 explanatory variables in the previous models, we added as explanatory variables the population of Hispanics and the combined population of Whites, Blacks, and Asians (adjusted to exclude those of

Hispanic ethnicity) in the area surrounding each park and dropped population under 18 as a variable, as it was highly correlated with the population of Hispanics. We transformed these variables logarithmically, and used the square root transformation of the dependent variable as previously. In each of the two models, we excluded one park as an outlier for hosting special tournaments.

The results for each of these models are reported in Table 5. The Chow test showed significant differences between the two models. Active recreation facilities in parks were significant for both Hispanic and non-Hispanic children. Park size was statistically significant with a positive coefficient in the Hispanic model, indicating that higher numbers of Hispanic children used larger parks. This may be because many Hispanic children like soccer (as indicated by our survey), and soccer fields (official or impromptu) require a significant amount of park space. Additionally, as our survey indicated, many Hispanic children visit the park with their families and extended families, who may favor larger parks. Park safety and natural features were significant in predicting use by Hispanic children, while availability of alternative parks was significant for non-Hispanic children. Chow tests also showed statistically significant differences between the two populations with respect to safety and alternative park area. As expected, the counts of Hispanic and non-Hispanic children were positively related at a statistically significant level to the populations of their corresponding neighborhoods. On the other hand, counts of Hispanic children were negatively related to the neighborhood's non-Hispanic population and counts of non-Hispanic

Table 5. Regression models relating the square root of the number of Hispanic children observed in parks and the difference between the models.

	Hispanic children using parks		Non-Hispanic children using parks		
	Stand. coeff.	*t*	Stand. coeff.	*t*	Chow *F* test of difference
Park attributes					
Park size (ln)	0.2460	2.3942*	–0.0415	–0.3307	3.1860
Active recreation facilities	0.4010	3.6972**	0.3863	2.9449**	0.0076
Active recreation programs for children	0.1355	1.1559	0.1205	0.8560	0.0068
Other child programs	0.1636	1.4059	0.0371	0.2657	0.4891
Park safety	–0.3119	–2.8114**	0.1530	1.1307	7.1519**
Park landscape	0.1755	2.2990*	0.0449	0.4841	1.1965
Park condition/maintenance	0.1225	1.3566	0.1438	1.2706	0.0220
Park comfort	0.0602	0.7055	0.0166	0.1590	0.1061
Neighborhood attributes					
Hispanic population	0.7740	4.9094**	–0.5999	–3.0867**	30.5966**
Non-Hispanic population	–0.1462	–1.1356	0.3252	2.1097*	5.5614*
Average household size	–0.1961	–1.3511	0.2040	1.2422	3.3280
Average household income (ln)	0.1127	0.6179	–0.3421	–1.5264	2.5130
Percentage of carless households	0.0046	0.0307	–0.2453	–1.3372	1.1256
Density of reported crime (square root)	0.0803	0.4287	0.2668	1.1974	0.4138
Area of alternative parks (ln)	0.0390	0.4519	–0.2308	–2.2037*	3.9551*
N	99		99		
Residual standard error	0.3899		0.5738		
Adjusted R^2	0.6101		0.4262		
F	11.2243		5.8518		
Chow *F* test between models					4.4198**

Note:
See the Appendix for explanations of and sources for variables.

*$p < 0.05$ (two-tailed) **$p < 0.01$ (two-tailed)

children were also negatively related to the neighborhood's Hispanic population; the second of these relationships was statistically significant. Since our data showed little correlation (0.075) between the Hispanic and non-Hispanic populations in neighborhoods around parks, our models provide possible evidence of segregation. Thus, even in neighborhoods with both Hispanic and non-Hispanic populations, non-Hispanics frequent different parks than Hispanics and vice versa. Frederick Law Olmsted's vision of the American park as a place where different social groups come together (Todd, 1982) does not seem to be realized in most of the parks we studied.

Conclusions and Recommendations

The previous analysis leads to a number of conclusions and policy implications. Parks may represent an important amenity for middle-school children and contribute to the fight against obesity and a more active lifestyle. Our survey showed that parks are second only to schools as settings where youth participate in physical activity. We observed that parks are more intensely utilized in the inner city, where low-income children do not have many alternatives for activities that require open space. In many instances, however, we found that parks were underutilized, especially on weekdays. Our surveys revealed that about 20% of children do not use parks at all. Reasons included lack of interest in the activities and facilities that the neighborhood park has to offer, lack of time for children and their parents, and parental concerns about children's safety. These reasons do not affect all children equally. What can planners and parks and recreation departments do to attract more children to the parks? Based on the findings of this study, we have eight suggestions.

1. Overall, the most significant factors attracting children to parks are active recreation facilities and sport programs, the presence of natural features, and good maintenance and cleanliness. Offering more programs and facilities in parks and keeping them clean and green are, therefore, minimum requirements.
2. In particular, our analysis indicated that organized activities and programs (both sport related and other) draw children to parks. Organized activities are typically supervised by adults, which eases parental concerns about safety. Parks and recreation departments should consider offering more organized activities and hiring more play supervisors in order to attract more children to parks.
3. Children of different genders, races and ethnicities, and residence locations have different park preferences. Thus, park designs, equipment, and programming should seek to address these differences rather than seeing children as a homogeneous group with uniform needs, supposedly satisfied by the provision of standardized facilities (Loukaitou-Sideris & Stieglitz, 2002). Our study suggests that parks should have programs and facilities determined by the neighborhoods where they are located and their demographics. Inner-city locations may need to adopt different park provision strategies than suburban locations. For example, inner-city Hispanic children seemed to favor larger parks, well equipped with athletic fields and facilities. In built-up inner-city contexts, where new large plots of land are difficult to acquire and convert into parks, it may be better to concentrate limited resources on retrofitting and adding facilities and athletic fields to larger parks than seeking to convert small lots into mini-parks devoid of facilities for active recreation. Nonetheless, more research is required to specify how user needs should best be addressed in park provision and design.
4. The underrepresentation of girls in parks is particularly problematic. It is no coincidence that public health officials warn that teenage girls are more susceptible to sedentary lifestyles. We found that girls are more dependent on their parents to take them to the park, and are generally less satisfied than boys by the current park equipment and programs. As already mentioned, the increase of supervised activities in parks may appease parents' concerns about girls' safety. Additionally, offering more programs geared toward girls and girls' sports may help increase the numbers of girls using parks.
5. Park designers should address the claims of some children (especially nonusers) that park settings are "boring." Design of playground equipment has been rather standardized and unimaginative and can hardly excite older children (Loukaitou-Sideris, 1995). We observed that parks with skateboarding facilities were well attended by children (especially boys) in this age group. Other programs such as films, crafts, water games, rock climbing, or electronic games could provide incentives for children to visit parks, but more research is necessary to identify the appeal of such programs for particular groups of children.
6. Middle-school children are highly dependent on their parents and, as we observed, many come to the

park accompanied by parents and family. Making the park more appealing to adult family members and designing more family-oriented activities and programs will help attract more children to parks.

7. While parks are supposed to be neighborhood amenities easily accessed on foot, the great majority of children in our survey were driven to parks, even in cases when parks were within walking distance of their residences. This increases children's dependency on parents. Planners should make parks as accessible as possible to children by considering links to the surrounding neighborhoods, the safety of the routes, and the pedestrian and bicycling environment leading to the park (e.g., bike lanes, wide sidewalks, overpasses, traffic lights, etc.).
8. In an era of limited public funding for parks and other public services, planners should identify what works and what doesn't. Parks and recreation departments should audit their facilities and programs to identify which are less utilized and should be discontinued, and which should be supported and expanded.

This study adds to the literature on parks by comparing the differences between factors that attract children of different genders, intra-urban locations and races and ethnicities to parks. We studied a large number of parks using a multi-method approach and reached both park users and nonusers. However, further research is necessary to understand why certain parks remain underutilized, what types of playgrounds and programs different groups of children favor, and which specific design and programmatic elements of parks encourage physical activity among children.

An important neighborhood asset, the park is much more than meets the eye (Harnick, 2000). It has represented a significant urban amenity for children and adults for the last 100 years. The needs of children have changed, however, and often parks have not responded. It is time for planners and park and recreation officials to carefully consider the variables that attract children to parks and to provide facilities, activities, and programs that increase parks' attractiveness to children and their parents. This study was an effort toward this goal.

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Notes

1. The situation is particularly severe among children and adolescents. A study by the California Center for Public Health Advocacy (2005) found that 28% of children in California in grades 5, 7, and 9 are overweight, and the percentage of overweight children has increased by 6.1% since 2002.

2. Prior to contacting school principals, we had received approval for the survey from the appropriate offices at UCLA and the Los Angeles Unified School District.

3. See the Appendix for the wording of this question on the survey, which asked respondents to self-identify by race or Hispanic ethnicity, rather than asking these as separate questions.

4. We excluded *regional parks* (those larger than 200 acres) from our study because we wished to focus on parks serving primarily the neighborhoods in which they are located.

5. We repeated two observation sessions because of high temperatures (above 88° F), which may have influenced visits to the park.

6. As noted in the Appendix, the neighborhood for which the density of reported crime was calculated was actually a half-mile buffer around the park, unlike the other variables, which were calculated for a quarter-mile buffer.

7. We discarded the variable measuring Type I crime, which was highly correlated with the variable measuring total crime and the variables measuring alternative parks within one, two, four, and five miles, which were highly correlated with those within three miles. We also found that adding together the White, Black, Asian, and Hispanic populations nearly replicated the population total, while Hispanic population was highly correlated with population under 18 and with households having seven or more members. Thus, from this group of variables we used only population under 18 in all models except that predicting counts of Hispanic and non-Hispanic children.

8. Given a regression model with n observations and p coefficients, this test can be used to test whether m additional observations belong to the same regression. The Chow test employs a statistic distributed as $F(p, m+n-2p)$ under the hypothesis that the additional observations belong to the model, where $F(k, l)$ denotes the F distribution with k, l degrees of freedom. For example, in the gender comparison models, $p = 14$, $n = 98$, and $m = 100$, and the resulting F value of the test is shown in the last row of Table 3. The Chow test (reported in the rightmost column of Table 3) can also be used to detect statistically significant differences between the coefficients of a single explanatory variable in the two models. The latter test is based on an $F(1, m+n-2p)$ statistic under the hypothesis of no difference between the coefficients in the two models.

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Appendix: Variables used to analyze children's use of parks and their sources.

Variable	Description	Source
Survey questions		
Gender	Male, female	Surveyed children
Race/ethnicity	The survey question asked, "What is your race/ethnicity?" and allowed the respondent to choose among the following: "Hispanic," "African American," "Asian American," "American Indian," "White," "Mixed," "Other."	Surveyed children and parents
Household income	The survey question asked, "What is your income range?" and allowed the respondent to choose among the following: "less than $10,000," "$10,000–$19,999," "20,000–$29,999," "$30,000–$39,999," "$40,000–$49,999," "$50,000 or more."	Surveyed parents
Live in a single-family home?	The survey question asked, "Do you live in an apartment or a single-family home?" and allowed the respondent to choose among the following: "apartment," "single-family home."	Surveyed children and parents
Access to private open space?	The survey question asked, "Is there an outdoor area at your home where children can play, like a yard?" and allowed the respondent to choose among the following: "yes," "no."	Surveyed children and parents
Frequency of visits to neighborhood park	The survey question asked, "How often do you [does your child] visit your neighborhood park?" and allowed the respondent to choose among the following: "twice per week or more," "once a week," "less than once a week," "never (explain why)."	Surveyed children and parents
Go to park as family?	The survey question asked: "Do you go to the park as a family?" and allowed the respondent to choose among the following: "regularly," "only for special occasions," "never."	Surveyed children and parents
Who accompanies the child to the park?	The survey question asked: "Are you allowed [Do you allow your child] to go to the park with older children?" and allowed the respondent to choose among the following: "yes," "no."	Surveyed children and parents
May child go to park alone?	The survey question asked: "Are you allowed [Do you allow your child] to go to the park without an adult?" and allowed the respondent to choose among the following: "yes," "no (explain why)."	Surveyed children and parents
May boys go to park alone?	The survey question asked: "If you have a boy do you allow him to go to the park alone?" and allowed the respondent to choose among the following: "yes," "no," "I don't have a boy."	Surveyed parents
May girls go to park alone?	The survey question asked: "If you have a girl do you allow her to go to the park alone?" and allowed the respondent to choose among the following: "yes," "no," "I don't have a girl."	Surveyed parents
Duration of park visit	The survey question asked, "How long do you [does your child] usually stay at the park?" and allowed the respondent to choose among the following: "more than an hour," "less than an hour," "it depends (please explain)."	Surveyed children and parents
Why go to this neighborhood park (instead of other parks)?	The survey question asked, "Why go to this park?" and allowed the respondent to choose among the following: "better facilities," "cleaner," "safer," "friends go there," "easy to reach," "near school," "school outdoor activities held there," "other reason (explain)."	Surveyed children and parents
Why not go to the neighborhood park?	Children who responded that they never go to the park in the frequency of visits question (see above) were asked to explain why.	Surveyed children

Variable	Description	Source
Favorite park facilities	The survey question asked, "What facilities or equipment do you [does your child] most often use at the park?" and allowed the respondent to choose among the following: "swings, slides, playground equipment," "basketball courts," "baseball diamonds," "soccer fields," "tennis courts," "swimming pool," "indoor gym," "grassy areas," "barbeque pits," "other (explain)."	Surveyed children and parents
Existence of organized sport activities	The survey question asked, "Are there physically active organized activities in the park?" and allowed the respondent to choose among the following: "yes," "no," "don't know.",	Surveyed children and parents
Participation in physically active organized activities	The survey question asked, "Do you [does your child] participate in physically active organized activities in the park?" and allowed the respondent to choose among the following: "yes," "no."	Surveyed children and parents
Fee for park activities	The survey question asked, "Is there a fee for organized park activities?" and allowed the respondent to choose among the following: "yes," "no," "don't know."	Surveyed children and parents
Park activities year round?	The survey question asked, "Are there organized park activities year round?" and allowed the respondent to choose among the following: "yes," "no," "don't know."	Surveyed parents
Importance of organized park activities?	The survey question asked, "Do you think it is important for parks to provide organized activities" and allowed the respondent to choose among the following: "yes (explain why)," "no (explain why)."	Surveyed parents
Favorite park activities	The open-ended survey question asked, "What activities do you prefer to do at the park?" and allowed the respondent to list activities.	Surveyed children
Preference for organized activities? Why?	The survey question asked, "Do you prefer organized park activities?" and allowed the respondent to choose among the following: "yes (explain why)," "no (explain why)."	Surveyed children
Involved in sports outside the park?	The survey question asked, "Are you [Is your child] involved in sports outside park settings?" and allowed the respondent to choose among the following: "yes," "no.",	Surveyed children and parents
Where physically active?	The survey question asked, "Where do you [does your child] spend most time playing sports and being physically active?" and allowed the respondent to choose among the following: "school," "park," "backyard," "neighborhood street," "other (explain)."	Surveyed children and parents
Park proximity	The survey question asked, "How far is the nearest park to your residence?" and allowed the respondent to choose among the following: "less than 5 minutes walk" "5–10 minutes walk," "more than 10 minutes walk," "don't know."	Surveyed children and parents
How do you get to the park?	The survey question asked, "How do you [does your child] usually go to the park?" and allowed the respondent to choose among the following: "walk," "bike," "take public transportation," "adults drive," "other (explain)."	Surveyed children and parents
How do you get to school?	The survey question asked, "How do you [does your child] usually go to the school?" and allowed the respondent to choose among the following: "walk," "bike," "take public transportation," "adults drive," "other (explain)."	Surveyed children and parents
Neighborhood safety	The survey question asked, "Do you consider your neighborhood safe?" and allowed the respondent to choose among the following: "yes," "no."	Surveyed children and parents
Park safety	The survey question asked, "Do you feel safe at the park?" and allowed the respondent to choose among the following: "yes," "no."	Surveyed children and parents
Park supervision	The survey question asked, "Is there supervision at the park?" and allowed the respondent to choose among the following: "yes," "no," "don't know."	Surveyed children and parents

Variable	Description	Source
Regression independent variables: Park[a] attributes		
Park size	Acreage of the park (ln)	GreenInfo Network, California Protected Areas Database
Active recreation facilities	Numbers of active recreation facilities in the park (swimming pools, athletic fields, etc.)	Park observations
Active recreation programs for children	Numbers of active recreation programs in the park (little leagues, swimming, dancing, cheerleading, boxing, etc.)	Park observations, park websites
Other child programs	Numbers of other (nonactive) programs in the park (arts and crafts programs, after-school enrichment programs, chess clubs, reading clubs, free lunch/snack programs, free classes/tutoring, music, etc.)	Park observations, park websites
Park safety	Sum of the following in the park: police substation (2 points), park personnel (up to 4 = 1 point, more than 4 = 2 points), lighting (1 point), emergency phones (1 point).	Park observations
Park landscape	Sum of the following in the park (1 point each): lush trees and shrubs, wooded area, grassy area, flowers, water features, varied topography.	Park observations
Park condition/maintenance	Sum of ratings for the following in the park: graffiti, overgrown vegetation, potholes, dry grass patches, deteriorating buildings, deteriorating facilities.	Park observations
Park comfort	Sum of the following in the park (1 point each): picnic/BBQ areas, restrooms, adequate seating, shade over 50% or more of the park, drinking fountains, vending machines, community center, snack bar, etc.	Park observations
Regression independent variables: Neighborhood[b,c] attributes		
Hispanic population	Hispanic population residing in a ¼ mile nondynamic (linear) buffer around each park (ln)	Nielsen Claritas
Non-Hispanic population	Sum of White, Black, and Asian populations residing in a ¼ mile nondynamic (linear) buffer around each park, excluding the portion estimated to be of Hispanic ethnicity (ln).	Nielsen Claritas
Population under 18	2007 estimates of children under 18 residing in a ¼ mile nondynamic (linear) buffer around each park (ln).	Nielsen Claritas
Average household size	2007 estimates of average size of households residing in a ¼ mile nondynamic (linear) buffer around each park.	Nielsen Claritas
Average household income	2007 estimates of average income of households residing in a ¼ mile nondynamic (linear) buffer around each park.	Nielsen Claritas
Percentage of carless households	2007 estimates of households without vehicles residing in a ¼ mile nondynamic (linear) buffer around each park.	Nielsen Claritas
Density of reported crime	Total crimes reported per square mile in 2006 and 2007 in a ½ mile nondynamic (linear) buffer around each park (square root).	Los Angeles Police Department
Area of alternative parks	Total acreage of other parks within 3 miles of each park in the sample (ln).	GreenInfo Network, California Protected Areas Database
Regression dependent variables: Counts of children		
Numbers of middle-school children using the park, categorized by gender, race, and ethnicity	Each child observed during a park scan and determined to be of approximately middle-school age was categorized by gender (male or female), and a combined race and ethnicity variable with four categories: White, Black, Asian, and Hispanic. Each park was observed twice, and scanned three times during each observation. All observations were averaged to obtain the values used in the regression analysis.	Park observations

Notes:

a. We used shape files (California Protected Areas Database, 2009; GreenInfo Network, 2009; Nielsen Claritas, 2007) to ascertain park sizes and to define buffers around the sample parks.
b. We obtained 2007 estimates from Nielsen Claritas (2007) of variables for 2000 census tracts, and apportioned these to buffers around each park based on the share of each tract's area falling within the buffer. We refer to the buffer around each park as that park's *neighborhood.*
c. We obtained from the Los Angeles Police Department the total number of crimes reported per square mile for each census tract in 2006 and 2007, and calculated an average value for crimes reported per square mile within each park's half-mile buffer weighted by the share of each tract's area falling within that buffer.