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Park Use in Low-Income Urban Neighborhoods: Who Uses the Parks and Why?

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Abstract We examined individual and environmental influences on park use among residents of two low-income predominantly African American neighborhoods to identify determinants of park use in lower-income urban neighborhoods. We analyzed data from interviews of 1003 individuals randomly selected from the neighborhoods, systematic observations of neighborhood parks, and police-recorded crime incidence within a .5-mi buffer around each park. Most participants (82.4%) had previously visited a neighborhood park, and nearly half (46.2%) had visited one in the past month. However, only 8.5% of participants were aware of their closest park. Compared with the parks closest to home, parks that participants reported visiting most were larger and had more amenities and features and fewer incivilities and reported crimes of a serious nature. Park use among residents of lower-income neighborhoods may be increased by offering more amenities and features and ensuring the presence of a well-appointed park within easy walking distance of residents' homes.

Keywords Crime-related · Low income · Recreation/leisure · Parks/trails · Urban

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Neighborhood parks are an important but underutilized resource in the United States [1]. Parks afford opportunities for physical activity, space for social gatherings and community events, and exposure to nature and are posited to confer an array of physical, social, and psychological benefits [2]. An important part of the built environment, parks are increasingly viewed as a key resource in promoting public health [3]. Given the potential benefits of park use, researchers and policymakers have sought to understand individual and environmental influences on park use to inform policies and interventions to increase park use.

At the individual level, park use varies by sociodemographic characteristics and physical health. Specifically, park use has been shown to be less frequent among African American/Blacks [4, 5], females [5, 6], older age [6], and those in poorer health [4] in studies that assessed park use through self-report or direct observations.

Characteristics that are more directly relevant to parks, such as proximity to and perceptions of parks, have also proven useful in understanding individual variation in park use. Residential proximity to parks has been shown to be a robust predictor of park use [6–9]. Findings on the role of safety in park use are

mixed, with some evidence that perceived safety is associated with park use [9] and some studies that indicate no association with park use [6, 10].

A growing literature also attests to the importance of park characteristics as determinants of park use. In studies using objectively measured park characteristics, frequency of park use was greater in parks that were larger [7, 8], had more facilities (e.g., basketball courts, tennis courts) [9, 11], and offered supervised activities (i.e., activities directed by a person such as a park staff member or coach) [1]. In addition, certain types of features, such as walking paths (Cohen et al., in press) and paved trails [11], are strongly associated with park use. Moreover, some research suggests that people might be willing to travel greater distances to visit parks that have much to offer: In one study of parks in San Francisco, researchers found that a sizable proportion of park users traveled more than .5 mi from home to visit parks that were well-equipped and had attractive features [12].

As a public good, neighborhood parks may be a particularly valuable resource for socioeconomically disadvantaged individuals who may not have the financial resources to exercise at a private gym or fee-based recreational center. At the same time, neighborhood parks in lower-income areas have been found to be less-commonly used than those in higher-income areas in a national study in which park use was measured via direct observations [1]. Similarly, socioeconomically disadvantaged individuals are less physically active [13] and have higher rates of chronic conditions [14] that can be prevented or mitigated through physical activity [15]. Thus, finding ways to increase park use among lower-income individuals may help to achieve the broader public health objective of reducing socioeconomic disparities in health.

In the current study, we sought to expand our understanding of both individual and environmental influences on park use among residents of two low-income, predominantly African American neighborhoods in Pittsburgh, PA. A previous study conducted on the same sample suggested that the parks in these neighborhoods were empty most of the time (i.e., underutilized), despite the majority of residents reporting that the parks were accessible and safe [1], and lacked programming and features that might draw residents to the parks. Extending this line of research, we examined neighborhood residents' self-reported frequency of park use, both overall and with respect to their closest park; the roles of individual-level characteristics in residents' park use, including their sociodemographic characteristics, physical functioning, and proximity to and perceptions of parks; and objectively-measured characteristics of parks that distinguish parks that are more vs. less frequently used.

Methods

The current study used data collected in two predominantly African American, low-income neighborhoods in Pittsburgh as part of a quasi-experimental study of the effects of greenspace renovations on physical activity (Pittsburgh Hill/Homewood Research on Exercise, Neighborhoods, and Health study, called "PHRESH Plus"). Collected prior to the beginning of greenspace renovations, data analyzed in this study come from baseline household interviews conducted with a cohort of randomly selected local residents about their use and perceptions of neighborhood parks, systematic observations of the amenities and features present in all parks within the neighborhoods, and publicly available municipal records of all crime incidents in and around the parks from the City of Pittsburgh Police.

Household Interviews

Most of the households enrolled in PHRESH Plus were originally selected for a related, earlier study about household food purchasing patterns and diet of residents of the same neighborhoods, the Pittsburgh Hill/Homewood Research on Eating, Shopping, and Health (PHRESH) study (see Dubowitz et al. [16], for more details). In 2011, households were selected for PHRESH from a stratified random sample of 4002 addresses zoned as residential from a list of addresses obtained after merging Allegheny County Office of Property Investment data with the Pittsburgh Neighborhood and Community Information System (PNCIS). Trained data collectors went door-to-door to 4002 sampled addresses, determined that 2900 of these were not vacant, and reached a household member in 1956 addresses. Of these members, 1649 met the eligibility criteria for PHRESH, i.e., were over 18 years old and the primary household food shopper and indicated that this address was their primary residence; 1434 (87%) of eligible residents agreed to participate in the study. After excluding 62 residents who provided incomplete or unusable data, the final sample comprised 1372 households.

To recruit participants for PHRESH Plus, the data source for the current study, we attempted to recontact all 1372 PHRESH study participants by phone in 2013. Participants who had moved were eligible for PHRESH Plus if their new address was within 30 min of their original address (so that it would be feasible to conduct in-home interviews). Because we originally sampled addresses, we also made in-person visits to try to recruit the new primary household food shoppers residing at the former addresses of PHRESH study participants who had moved. In total, we attempted to contact 1507 households regarding participation in PHRESH Plus, of which 1190 could be contacted and were eligible (i.e., primary household food shopper over 18 years old and indicated that the sampled address was their primary residence).[1] Of these households, 1051 (88%) completed the PHRESH Plus baseline household interview. For the current study, the sample was further limited to the 1003 participants who currently lived in one of the two main study neighborhoods because many of the interview questions asked about use of parks in one of the two main study neighborhoods. Participants were paid $45 for completing the nearly 60-min interview.

Project staff interviewed residents who were part of the PHRESH Plus cohort about their use and perceptions of neighborhood parks, physical functioning, and sociodemographic characteristics between May and October 2013. They also measured height and weight during the interview to allow for calculation of body mass index (BMI), which is the ratio of weight (kg) to height (m^2).

We constructed a comprehensive list of parks in the two study neighborhoods to assess frequency of park use. Participants were asked whether they had ever visited each park in their neighborhood and, for each park visited, the frequency of their visitation over the past month on a scale that included response options of *at least once a day*, *3–6 times per week*, *1–2 times per week*, *2–3 times per month*, *once a month*, and *never*. Total frequency of visitation of parks and playgrounds in the neighborhood was computed with a two-step process: (1) the frequency intervals in the original response options were converted to number of visits per month to standardize the unit of measurement (where the response option referred to a range of visits, the midpoint of the range was used), and (2) the number of visits per month to each park was summed across all parks to derive the participant's total number of visits to all neighborhood parks in the past month. Participants were also asked to identify the neighborhood park on the list that was closest to their home.

We assessed perceived accessibility of all parks within the neighborhoods[2] with a single item created for this study in which participants were asked how much they agreed or disagreed that "The playgrounds and parks in (insert name of participant's neighborhood) are difficult to get to" on a scale that ranged from *strongly disagree* (1) to *strongly agree* (5). Responses were reverse scored so that higher scores indicate greater perceived accessibility.

Perceived neighborhood safety was measured with four items adapted from a scale used in a previous study [17]. On a 5-point scale ranging from *strongly disagree* (1) to *strongly agree* (5), participants rated the extent to which they agreed or disagreed that "You feel safe walking in your neighborhood during the day", "You feel safe walking in your neighborhood during the evening," Your neighborhood is safe from crime," and "Violence is a problem in your neighborhood." The last item was reverse scored prior to summing item responses to create a composite scale score so that higher scores indicate perceptions of greater neighborhood safety. Internal consistency reliability for this scale was acceptable (Cronbach's alpha = .71).

Physical functioning was measured with the SF-36 Physical Functioning subscale, an extensively validated 10-item scale that assesses participants' perceptions of the extent to which their health limits their performance of several daily activities, including, for example, "doing vigorous activities, such as running, lifting heavy objects, participating in strenuous sports, climbing one flight of stairs, and walking one block" [18]. Possible scores range from 0 to 100. Higher scores indicate higher (better) physical functioning. Internal consistency reliability in the current study was excellent (Cronbach's alpha = .93).

Sociodemographic characteristics assessed included gender, race/ethnicity, age, marital status, presence of

[1] Because PHRESH and PHRESH Plus were linked, longitudinal studies of the same cohort, the same eligibility criteria used for PHRESH were used for PHRESH Plus.

[2] The list of all parks in the study neighborhoods was constructed based on a list from the Pittsburgh Parks and Recreation Department. The list was then "ground truthed" with members of the project's Community Advisory Board.

children in the household, household size, highest level of educational attainment, employment status, vehicle access, and per capita annual household income (computed as a ratio of household income to household size).

Park Observations

Trained data collectors observed all 18 publicly accessible parks and playgrounds in Pittsburgh's Hill District and Homewood neighborhoods from August to October 2012 using the System for Observing Play and Recreation in Communities (SOPARC) [19], a validated method for assessing the characteristics of parks.[3] Prior to conducting observations, we mapped each park, dividing it into distinct target areas. Field staff systematically rotated through all target areas in each of the parks and playgrounds four times on each of the four days of observation during the week, for a total of 16 scans over the data collection period at each location. Park scans were expected to last up to 1 h and completed on the following schedule: Tuesdays (9:30 a.m., 12:30 p.m., 3:30 p.m., 6:30 p.m.), Thursdays (7:30 a.m., 10:30 a.m., 1:30 p.m., 4:30 p.m.), Saturdays (8:30 a.m., 11:30 a.m., 2:30 p.m., 5:30 p.m.), and Sundays (9:30 a.m., 12:30 p.m., 3:30 p.m., 6:30 p.m.). If the scan took less than 30 min, data collectors were instructed to complete a second scan during that hour. When multiple scans were made during the same window of time, the mean of the scans was computed to obtain a single score for that window. In the event of rain or other inclement weather, scheduled observations were canceled and rescheduled for the same time and day of week.

Eight community-based data collectors were trained in the SOPARC methodology, completing approximately 35 h of training in the classroom and supervised practice in the field. Data collectors were tested and certified at the end of the training period before they were allowed to begin fieldwork. Data collectors always observed the parks and playgrounds in pairs during fieldwork.

Within each park and during each period of observation, all target areas were rated on whether they were usable, accessible, empty, supervised, organized, dark, or equipped (data from the SOPARC tool). Composite scores for target area conditions were computed as follows: (1) each target area was given a score ranging from 0 to 7, where one point was assigned for each positive attribute: being usable, accessible, not empty, supervised, organized, not dark, and equipped; and (2) the average (mean) number of positive attributes across all target areas was then computed for each park. We also examined park amenities, features, and incivilities using an assessment tool from Bridging the Gap [20]. In each park, the same pair of data collectors that conducted park observations with SOPARC noted the presence of 11 different amenities, including open green spaces, other water features, shelters, shaded picnic tables, unshaded picnic tables, benches, drinking fountains, decorative water fountains, trash containers, grills/fire pits, and trails. For each park, a composite score was computed as the total number of amenities present, with possible scores ranging from 0 to 11. Data collectors also documented the presence of various sports or activity features (e.g., courts and fields, playgrounds, wading pools/spray grounds, pools, running/walking paths, trails, and exercise stations) and other features such as restrooms/portable toilets and parking on-site in each park. Using a scale that ranged from *none* (0) to *a lot* (3), data collectors also recorded the amount of nine types of incivilities in each park, including garbage/litter, broken glass, graffiti/tagging, vandalism, evidence of alcohol use, evidence of substance abuse, sex paraphernalia, overgrown grass/weeds, and broken park equipment. A composite score for each park was computed as the total amount (sum) of incivilities observed, with possible scores ranging from 0 to 27.

We used GIS data downloaded from the City of Pittsburgh's website (http://pittsburghpa.gov/dcp/gis/gis-data-new) to find park size and to calculate the distance from participants' homes to the closest park using ESRI's network analyst.

Finally, we assigned each of the 18 parks to one of 2 categories: (1) the park that participants reported was closest to their home but not the most frequently visited, or (2) the most frequently visited but not the closest park to the participant's home.[4] Park classifications were made by examining household interview responses of participants for two questions: (1) which park was closest to their home and (2) the park that they reported

[3] SOPARC is best known as a tool for assessing park users and their physical activity levels, which was done for the quasi-experimental study. However, analyzing observational data on park use was beyond the scope of the current study, and thus we do not describe the assessment of park use or any related indicators.

[4] For ease of reference, we shorten the labels for categories 1 and 2 to "parks closest to home" and "parks most frequently visited," respectively, throughout the remainder of the manuscript.

visiting most often. For each park that at least one respondent reported was closest to their home but not the most frequently visited or vice versa, the percentage of interview responses indicating that the park was the closest vs. most frequently visited was examined. If more than half of interview responses suggested that the park was the closest, the park was assigned to that category; if more than half of responses suggested that the park was the one of the top three most frequently visited parks, the park was assigned to that category.

Crime Reports

Data on reported crimes that occurred in Pittsburgh were obtained from the Pittsburgh Police Department. We analyzed data on crimes for which the recorded location was within a .5-mi buffer of each park during the year prior to the beginning of data collection for the baseline household interview (May 2012–April 2013). The distance between the crime and the park was computed as the street distance between the street address of the crime's recorded location and the closest point along the perimeter of the park. Two of the 18 parks in the study neighborhoods had incomplete crime data because they were not entirely within city boundaries and were therefore excluded from analyses of crime data. We examined several categories of crimes, including non-sexual assault/violence (aggravated assault, simple assault, family violence, homicide), sexual crimes (prostitution, sex offense other than rape, rape), drug offenses/misconduct (drug violations, public intoxication, disorderly conduct, vandalism), and robbery/theft (robbery, motor vehicle theft, theft), and weapons violations. For each type of crime, we computed a park-level indicator to represent the total number of crimes committed within a .5-mi buffer of the park between May 2012 and April 2013.

Data Analysis

First, we computed univariate descriptive statistics to describe the sample in terms of sociodemographic characteristics, frequency of park visitation, and proximity to and perceptions of parks. Next, we estimated a multivariate zero-inflated negative binomial regression model to examine sociodemographic characteristics, physical functioning, perceived accessibility of parks, proximity to the park closest to one's home, and perceived neighborhood safety as predictors of the total frequency of visitation of parks in the respondent's neighborhood over the past month. Zero-inflated negative binomial regression was used because the distribution was characterized by a large proportion of zeros and over-dispersion. Finally, we compared the two groups of parks described above (closest to home vs. most frequently visited) on their size, amenities, incivilities, features, and crimes reported within a .5-mi buffer of the park. Due to the small number of parks in each group, power was inadequate to justify significance testing. Instead, we computed effect sizes to convey the magnitude of group differences (Hedges' g[5] for unequal sample sizes in each group, Cohen's d for equal sample sizes in each group) based on accepted conventions for small ($d = .20$), medium ($d = .50$), and large ($d = .80$) effect sizes [21]. Analyses were conducted in SAS, version 9.4, of the SAS System for Windows (SAS Institute, Inc., Cary, NC).

Results

As shown in Table 1, most participants were female and non-Hispanic black. On average, participants were 56 years old. Slightly over half of the sample had a high school education or less and access to a vehicle when needed. On average, participants' per capita annual household income was less than $14,000. Most participants were not employed; single, divorced, separated, or widowed; had no children residing in the household; and had at least two residents in the household (including themselves). Roughly three-quarters of participants were considered to be overweight or obese based on BMI.

Participants' responses suggested a fair amount of variation in the frequency of park visitation. As shown in Table 2, the great majority (over 80%) of participants reported having visited a neighborhood park at some point in the past, and more than half had visited at least three neighborhood parks (61.2%). Slightly less than half of participants (46.2%) reported having visited a neighborhood park in the past month. Of those who had visited a neighborhood park in the past month, one-fifth visited neighborhood parks on a daily basis, nearly half visited neighborhood parks at least once a week, and slightly over one-third visited neighborhood parks one to three times a month.

[5] Hedges' g can be interpreted using the same effect size conventions used to interpret Cohen's d.

Table 1 Characteristics of participants ($N = 1003$)

leftacteristic	*n*	%	*M*	*SD*
Male	237	23.6		
Non-Hispanic black	933	93.6		
Age (years)			55.6	16.6
Married or living with partner	201	20.0		
Children under 18 in household	273	27.2		
Number of household members (including self)				
1	509	50.8		
2	235	23.4		
3 or more	259	25.8		
Education				
High school or less	549	54.7		
Some college	314	31.3		
College	140	14.0		
Employed part- or full-time	373	37.2		
Owns or has access to a vehicle	567	56.5		
Per capita annual household income (USD)			13,536.27	13,944.43
Weight status				
Not overweight or obese (BMI < 25)	226	22.5		
Overweight (BMI 25–29)	284	28.3		
Obese (BMI 30+)	493	49.2		

BMI body mass index, *USD* United States dollars

Table 2 Residents' visitation of neighborhood parks

Visitation of parks/ playgrounds in neighborhood	All participants ($N = 1003$) %
Number of parks and playgrounds in neighborhood ever visited	
0	17.6
1–2	21.2
3–5	24.9
≥ 6	36.3
Number of neighborhood parks and playgrounds visited in past month	
0	53.7
1–2	27.4
≥ 3	18.8
Current park users[a] ($n = 464$)	
Total past-month frequency of visitation of parks and playgrounds in the neighborhood	
At least once a day	20.0
1–6 times/week	45.1
1–3 times/month	34.9
Frequency of park visitation and proximity to home	
Visited park/playground closest to home[b] in past month	65.5
Most-frequently visited park/ playground is the one closest to home[b]	49.4

[a] Current park users refer to participants who visited at least one neighborhood park or playground in the past month

[b] The park/playground closest to home is based on self-report in these calculations

We asked participants to identify the park closest to their home and report their frequency of visitation and perceptions of this park. Of participants who had visited at least one park in the past month, nearly two-thirds (65.5%) had visited the park that they identified as closest to their home; however, the park that participants identified as closest to home was *not* the most frequently visited park for just over half (50.6%) of past-month park visitors. Nearly three-fourths (73.1%) of participants perceived that the park they identified as closest to home was safe or very safe. Of interest, participants' responses suggested limited awareness of the park that was actually closest to home: Only 8.5% of participants correctly identified the park closest to home, i.e., the park that participants identified as closest to home on the survey was the same park determined to be closest to their home based on GIS street network distance.

We also compared the distances from participants' homes to the closest park based on their self-report, the closest park based on GIS street network distance, and the park that participants reported having visited most frequently over the past month. In general, participants lived much further from the park that they identified as closest to their home than the park that was actually closest to their home: On average, participants resided more than 3 mi from the park they identified as being closest to their home ($M = 3.3$ mi, $SD = 2.0$ mi) but less than .5 mi from the park actually closest to their home ($M = 0.4$ mi, $SD = 0.6$ mi). Participants also lived, on average, more than 3 mi from the park that they reported having visited most often in the past month ($M = 3.1$ mi, $SD = 2.0$ mi). Although the parks that

participants identified as closest to home and the parks that they reported visiting most frequently were, on average, more than 3 mi away, and thus more than an easy walking distance from home, the majority (73.4%) of participants perceived that, in general, parks and playgrounds in their neighborhood were accessible.

To understand which participants visited parks most frequently, we also examined participants' perceptions and characteristics as predictors of park visitation in the past month. As shown in Table 3, in a multivariate adjusted zero-inflated negative binomial regression model, participants who were younger and had access to a vehicle had significantly higher odds of having visited a park, and those who reported higher physical functioning and access to a vehicle had significantly more visits to the park.

Table 3 Individual predictors of park use in multivariate zero-inflated negative binomial regression model ($N = 1003$)

Predictor	*OR*	*IRR*
Perceived accessibility of parks	1.20	1.15
Distance from home to closest park[a]	.85	.97
Perceived neighborhood safety	.51	.82
Physical functioning	1.00	1.01**
Sociodemographic characteristics		
Male	.82	1.22
Mean age (years)	1.10***	.99
Married	1.17	.73
Household with children under 18	.31	1.18
College degree	.20	.77
Employed	1.57	.76
Annual household income	.99	1.00
Owns or has access to a vehicle	.35**	1.67**
Neighborhood of residence	2.14	.98

Parameter estimates are from a multivariate zero-inflated negative binomial regression model predicting total frequency of park visitation in the past month. The same sets of predictors were included in both the zero-inflated and count portions of the model. Parameter estimates presented for the zero-inflated (i.e., binary logistic) and count portions of the model are odds ratios and incident rate ratios, respectively. The zero-inflated model portions were estimated to predict zeros in the distribution. Accordingly, odds ratios are interpreted such that values greater than 1 indicate that higher scores on the predictor are associated with greater odds of not having visited a park and values less than 1 indicate that higher scores on the predictor are associated with greater odds of having visited a park. *OR* odds ratio, *IRR* incident rate ratio

[a] Closest park refers to the park that participants identified as closest to their home in the household interview

*$p < .05$; **$p < .01$; ***$p < .001$

We also contrasted the features of parks that were closest to home but not the most frequently visited with the features of parks that were the most frequently visited but not closest to home. As shown in Table 4, relative to parks that are closest to home, parks that were most often visited had more acres (Hedges' $g = 1.26$), fewer incivilities (Hedges' $g = -.80$), and more amenities (Hedges' $g = .65$); all of these effect sizes are of at least medium size. Parks most often visited also had more features that were relevant to active sports and fitness, such as courts and fields, pools, running/walking paths, and exercise stations, and more restrooms and on-site parking. Parks that were closest to home, by contrast, had more features that would likely appeal primarily to people with children, e.g., playgrounds, wading pools/spray grounds, and adjacency to schools. However, parks in the two categories were very similar on the average number of target area conditions (i.e., usability, accessibility, supervised, organized, equipped, not dark, not empty) (Hedges' $g = .11$).

We also compared parks that were closest to home with parks that were the most frequently visited on total numbers of different types of crimes reported to have occurred within a .5-mi buffer of the park during the 13 months prior to conducting the household interview. As shown in Table 5, these categories of parks did not differ on the numbers of simple assaults, prostitution, vandalism, drug violations, thefts, robberies, or motor vehicle thefts reported during this time frame; that is, all effect sizes for differences between categories were less than a "small" effect of .2 per established conventions [21]. However, parks that were closest to home had more incidents of aggravated assaults, family violence, homicide, rape, disorderly conduct, public intoxication, and weapons violations than parks that were the most frequently visited, i.e., all effect sizes were at least "small" in magnitude ($d >= .20$). Only one type of crime, sex offenses other than rape, was more commonly reported in most frequently visited parks. Thus, there is some evidence of a trend for parks that were closest to home to have more reports of some types of crime, particularly crimes of a more serious nature, than parks that were most frequently visited.

Table 4 Characteristics of parks closest to home and parks visited most often based on audit

Park characteristic	Park closest to home that is not most often-visited ($N = 8$) *M(SD)* or %	Most-often visited park that is not closest ($N = 10$) *M(SD)* or %
Park size (acres)	1.38 (1.32)	8.2 (7.10)
Incivilities	6.06 (3.19)	4.06 (1.78)
Amenities	4.38 (1.77)	3.28 (1.64)
Target area conditions (total)	3.04 (0.05)	3.05 (0.11)
Presence of specific active/sports features[a]		
Courts and fields	62.5	90.0
Playground	100.0	60.0
Wading pool/spray grounds	37.5	20.0
Pool	0.0	10.0
Running/Walking path	0.0	10.0
Exercise stations	0.0	10.0
Presence of specific features (other)		
Restrooms/portable toilets	0.0	40.0
Parking on-site	0.0	20.0
Adjacent to a school	14.3	0.0

[a] For each feature/characteristic, the percentage of parks in each category that have at least one of the features/characteristics was computed

Discussion

Overall, our findings reveal an appetite for park use among residents of the lower-income neighborhoods in our study. Park use was more typical than atypical among study participants: Over 80% of participants had visited a neighborhood park at some point in the past, and nearly half had visited a neighborhood park in the past month. Moreover, roughly two-thirds of those who had visited a park in the past month had done so at least once a week. Collectively, these findings suggest that parks are valued enough to have been visited recently by a nontrivial proportion of participants and highlight the unexploited potential to increase park use in this population. Our findings of associations between individual and environmental characteristics and park use indicate several possible avenues for interventions to increase park use.

Surprisingly, participants' proximity to and perceptions of parks did not explain individual differences in overall park use, as park use was not significantly predicted by the distance between participants' homes and the closest park, perceived accessibility of parks, or perceived neighborhood safety. In general, participants perceived that neighborhood parks were accessible and that the park closest to their home (based on self-report) was safe. Despite participants' perceptions of parks as accessible, participants lived, on average, more than 3 mi from the park that they identified as closest to home—far more than an easy walking distance. By contrast, participants lived, on average, .5 mi from the park that was actually closest to their home based on calculations derived in GIS. However, very few participants (less than 10%) correctly identified the park closest to their home, suggesting limited awareness of the closest parks. Thus, raising participants' awareness of their closest parks may help to increase park use.

Although not significantly predicted by participants' residential proximity to parks or perceptions of parks, park use was significantly predicted by the individual characteristics of age, physical functioning, and access to a vehicle. Consistent with past research [4, 6], park use was more frequent among those who were younger and in better physical health. In addition, those who had access to a vehicle had greater odds of having visited a park and more park visits in the past month. Notably, all of these characteristics are indirect indicators of how easily one can get to the park and, once there, be active. Thus, addressing individuals' physical and practical constraints may help to promote park use in this population. For example, as previously noted [1], parks should have equipment designed for seniors and those with physical impairments, and the neighborhood's physical infrastructure (e.g., curbs, sidewalks) should have appropriate accommodations to ensure the safety of those with physical limitations.

Park use might also be enhanced by ensuring that individuals have well-maintained and equipped parks within easy walking distance of their homes, which would make it easier for individuals without a vehicle to get to the park. Indeed, over 40% of study participants reported that they do not have access to a vehicle. This issue may be particularly important to address for this population given that, as noted above, the park closest to home (of which participants were aware) was, on average, over 3 mi away. Past research has shown that proximity to parks is an important correlate of park use; for example, 19% of residents who lived within .5 mi of a park were infrequent users vs. 38% of residents who lived within 1 mi of a park [6].

Table 5 Reported crimes in parks based on data from the city of Pittsburgh, May 2012–April 2013

Type of crime	Parks closest to home[a] *M*(*SD*)	Most-often visited parks[a] *M*(*SD*)	Effect size Cohen's *d*
Non-sexual assault/violence	74.75 (40.23)	72.5 (34.99)	.06
Simple assault	58.38 (32.22)	58.63 (29.03)	−0.01
Aggravated assault	14.25 (8.10)	12.50 (6.72)	0.24
Family violence	1.38 (1.06)	0.88 (0.64)	0.56
Homicide	0.75 (1.04)	0.50 (0.53)	0.31
Sexual crimes	6.88 (5.06)	7.00 (3.30)	−.03
Prostitution	2.75 (1.83)	2.75 (1.04)	0.00
Sex offense other than rape	2.50 (2.56)	3.50 (2.56)	−0.40
Rape	1.63 (1.06)	0.75 (0.89)	0.84
Drug offenses/misconduct	101.75 (56.63)	92.75 (36.96)	0.19
Vandalism	52.63 (28.07)	48.25 (19.56)	0.19
Drug violations	31.63 (18.33)	31.00 (13.62)	0.04
Disorderly conduct	13.38 (10.21)	10.75 (3.77)	0.35
Public intoxication	4.13 (2.42)	2.75 (1.58)	0.66
Robbery/theft	142.25 (82.31)	132.00 (63.36)	0.14
Theft	117.0 (72.96)	107.50 (52.67)	0.15
Robbery	15.88 (8.54)	14.63 (8.90)	0.15
Motor vehicle theft	9.38 (5.01)	9.88 (6.01)	−0.09
Weapons violation	7.13 (4.02)	5.13 (2.59)	0.58

[a] Each of these categories contains eight parks

Our findings regarding environmental influences on park use identified several potential opportunities for improving parks to attract more users. First, it seems that there is not much in the parks closest to home (as identified by participants) to attract people to them. Comparison of parks that were closest to home and not the most often visited with those that were the most often visited and not the closest to home revealed that the most often visited parks were larger and had more amenities, restrooms, parking, and features that allowed for active sports and fitness (e.g., fields, trails). Thus, it is not surprising that half of current park users reported that their most frequently visited park was not the park closest to home. This is consistent with other research suggesting that people are willing to travel further to visit parks that offer more amenities and features [12]. Accordingly, increasing the availability of these types of features in parks closer to home might increase use of those parks. Second, there is some objective evidence that the parks closest to home have more deterrents to use than those most frequently visited, including more incivilities and crimes, particularly more violent crimes. However, most participants did not perceive the parks closest to home as unsafe, despite the higher rates of serious crime in those parks relative to those most frequently visited. Thus, it is not entirely clear that participants perceived or were influenced by crime in the parks. There is some evidence that park features that generate activity (e.g., courts, sports fields) may help to decrease crime in parks [22]. Improving the amenities and features in parks might therefore reap additional dividends (above attracting more park users) by reducing crime.

Limitations

Our findings should be interpreted in light of the study's limitations. First, the study's cross-sectional design precludes causal inferences regarding the associations between individual characteristics and park use. Second, given the small number of parks observed, we had insufficient power to test for significant differences between parks that were most frequently visited vs. closest to home. Consequently, the reliability of differences described in terms of magnitude is unclear. Moreover, these comparisons were not adjusted for potential

confounds. Thus, our findings can be interpreted only as consistent with the notion that the influences examined causally influence park use, and our recommendations for how to increase park use must be viewed tentatively.

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