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Park-Use Behavior and Perceptions by Race, Hispanic Origin, and Immigrant Status in Minneapolis, MN: Implications on Park Strategies for Addressing Health Disparities

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Abstract The study examines the connections between minority status, park use behavior, and park-related perceptions using recent survey data from three low-income neighborhoods in Minneapolis, MN. Blacks and foreign-born residents are found to underutilize parks. Blacks, Asians, and American Indians perceive fewer health benefits of parks than whites, including the benefits of parks for providing exercise/relaxation opportunities and family gathering spaces. Foreign-born residents, blacks, and Hispanics perceive greater and unique barriers to park use in terms of not feeling welcome, cultural and language restrictions, program schedule and pricing concerns, and/or facility maintenance and mismatch concerns. When designing park strategies for addressing health disparities, we recommend to focus the efforts on increasing awareness of park-related health benefits and removing specific park use barriers among minority and foreign-born communities.

Keywords Parks · Behavior · Perceptions · Minority · Race · Ethnicity · Immigrant · Health disparities · Health equity

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Introduction

Racial/ethnic minority populations in the US face greater health challenges than the majority population [1, 2]. Immigrants, especially those from politically unstable countries, also face greater health risks and disadvantages than the US-born population [3, 4]. It is reasonable to expect that health disadvantages faced by race/ethnic minorities and specific immigrant communities may be ameliorated by promoting park use among these communities. Researchers have found that parks have positive impacts on both physical and mental components of health by providing infrastructure for physical activity, restorative settings for stress mitigation, and opportunities for social interactions [5–9]. And there has been evidence that Whites and Hispanics use parks more frequently than other racial groups [10–12].

Designing park strategies for addressing health disadvantages faced by minority communities requires a deep understanding of the connections between minority status, park-use behavior and park-related perceptions. A review of the relevant literature shows that studies on minority groups' park-use behavior and perceptions tend to focus on racial and ethnic minorities [10–13] and rarely focus on immigrants as a minority group. In addition, studies on park-related perceptions tend to focus on perceived barriers to parks, identifying limited spatial access to parks, inadequate or poorly maintained facilities, lack of bilingual staff and perceived safety as common barriers among racial and ethnic minorities [14–16]. Little is known about how minority groups may perceive health benefits of parks differently.

This study responds to the gaps in the literature. It offers a detailed examination of park-use behavior and park-related perceptions across minority groups including

immigrants, in Minneapolis, MN. The city of Minneapolis is a promising site to study park-use behavior and perceptions by race, ethnicity, and immigrant status. First, Minneapolis' public park system has been ranked the best in the U.S.: 94 % of its residents live within a 10-min walk of a park; and the city has a median park size of 7.1 acres [17]. Secondly, the city is culturally diverse and has high percentages of minority groups. In 2010, the city was 21 % black, 10 % Hispanic, 7 % Asian, 3 % American Indian, and 15 % foreign-born [18]. More importantly, the Federal Office of Refugee Resettlement has targeted the Minneapolis-St. Paul (MSP) region as a primary refugee resettlement area [19]. Minneapolis—the largest city in the MSP region—has an unusually large refugee population from countries that are either currently experiencing political instability or have suffered political instability in recent decades, including Somalia, Liberia, Laos and Vietnam [20].

The objective of this paper is to inform policy makers who are interested in developing park strategies for addressing health disadvantages in minority communities by: (1) adding to the existing knowledge regarding patterns of, and barriers to, park use by racial/ethnic minorities, including for the first time, immigrants as a minority group; and (2) exploring perceived health benefits of parks and how they differ between groups to better understand existing patterns of park use.

Methods

Data Collection and Sample Participants

Study data were collected from three low-income neighborhoods in Minneapolis, MN through a collaborative survey effort between the University of Minnesota and the Minneapolis Park and Recreation Board. The survey used a three-stage probability sample design. The first stage was to use the "probability proportionate to size" sampling method to select 50 census blocks per neighborhood based on the number of low-income minority families with children in the block. Blocks with a higher number of these families had a higher chance of selection. This stage resulted 150 selected blocks out of a total of 230 blocks in the three neighborhoods. The second stage involved recruiting as many households as possible from each of the selected blocks. The recruitment was done by dropping off postcards with information about the survey in four different languages (English, Spanish, Somali, and Hmong) at each residence; followed by visiting each residence up to three different times. The third stage consisted of randomly selecting an adult (aged >18 years) from each household by asking the adult who had the birthday most recently to participate.

Approved and monitored by the University of Minnesota Institutional Review Board, the survey was conducted in-person (English only) during home visits between September 1 and November 7, 2010. While attempts were made to conduct interviews at varied times (morning, afternoon and evening) and days, most were conducted on weekday evenings and over the weekend. In case of non-English speaking participants, the survey allowed English-speaking family members to translate (n = 38; 6 % of the participants). With a response rate of 41 percent, the survey had a final sample of 568 participants (see Table 1).

Measures

Table 1 shows characteristics of the final sample. Means are presented for continuous variables and totals and percentages are presented for binary and for ordinal variables by introducing meaningful cutoff points. Park-use frequency was measured by asking respondents to report past-year park use in warm weather, past year park use in cold weather (both ordinal scale 1–5 from never to more than 4 times a week), and the number of park trips they had made in the three days preceding the interview day (count variable). Individual perceptions of health benefits of parks were measured by asking respondents to rate the extent to which they agree or disagree with four benefits on a 4-point Likert scale: 1 = strongly disagree, 2 = somewhat disagree, 3 = somewhat agree, and 4 = strongly agree. The four benefits include the benefits of parks providing exercise opportunities, relaxation opportunities, and spaces for family and social gathering (i.e., social interaction opportunities). Individual perceptions of barriers to park use were measured by asking respondents to rate the extent to which 11 different barriers limited their use of parks on a 4-point Likert scale: 1 = not at all, 2 = somewhat, 3 = a great deal, and 4 = completely. These barriers include language barriers, cultural restrictions, lack of companionship, safety concerns, lack of information, inconvenient program schedules, program pricing concerns, lack of maintenance, facilities not meeting needs, programs not meeting needs, and not feeling welcomed.

Questions on race, ethnicity and being foreign-born (all self-reported by respondents) were used to create three minority race variables—Black, Asian and American Indian (all coded as 1 = yes, 0 = no), one ethnicity variable—Hispanic (1 = yes, 0 = no), and a variable describing immigrant status—being foreign born (1 = yes, 0 = no). Control variables (listed in Table 1) included additional individual socio-demographic variables, distance from home to the nearest park (calculated using existing road networks in GIS from respondent's home parcel to the nearest park), and an ordinal indicator

Table 1 Characteristics of the final sample (N = 568)

Dependent variables	N (%) or Mean	Cutoff point description for ordinal variables
Park-use behavior		
Warm weather park use	374 (67.63)	Participants who responded "two to four times a week" or "more than four times a week"
Cold weather park use	164 (30.54)	
# of park visits in the past 3 days	1.2	–
Perceived roles of parks		
Exercise opportunities	526 (93.26)	Participants who responded "somewhat agree" or "strongly agree"
Relaxation opportunities	528 (93.61)	
Family gathering spaces	526 (93.6)	
Social gathering spaces	523 (93.06)	
Perceived barriers to park use		
Language barriers	26 (4.59)	Participants who responded "a great deal" or "completely"
Cultural restrictions	27 (4.78)	
Lack of companionship	39 (6.89)	
Safety concerns	149 (26.28)	
Lack of information	144 (25.49)	
Inconvenient program schedules	87 (15.88)	
Program pricing concerns	59 (11.06)	
Lack of maintenance	61 (10.78)	
Facilities not meeting needs	56 (9.96)	
Programs not meeting needs	52 (9.63)	
Not feeling welcomed	48 (8.64)	
Key explanatory variables		
White	331 (58.27)	–
Black	138 (24.30)	–
Asian	29 (5.11)	–
American Indian	55 (9.68)	–
Hispanic	93 (16.40)	–
Foreign born	129 (22.71)	–
Control variables		
Male	225 (40.18)	–
Age 18–29	175 (31.47)	–
Age 60 and older	47 (8.47)	–
Employed full-time	277 (48.85)	–
Spouse/partner present	289 (50.97)	–
Child under 18 present	296 (52.11)	–
Age of youngest child	3.4	–
General health status	477 (84.28)	Reported "good", "very good" or "excellent"
Education	331 (58.80)	Reported "some college", "bachelor's" or "graduate degree"
Household income 2009	318 (63.60)	Reported an household income of $24999 or more
Number of cars owned	1.4	–
Renter	313 (55.69)	–
Years in neighborhood	7.2	–
Distance to nearest park (miles)	0.2	–
Lack of interest in parks	38 (6.7)	Participants who responded "a great deal" or "completely"
# of weekend days in the past 3 days	0.7	–
# of days > 65 °F in the past 3 days	1.6	–
# of days with precipitation in the past 3 days	0.5	–

describing the extent to which the respondent lacked interest in park use. Variables describing the characteristics of the past three days (including weekday/weekend status and weather from the National Climatic Data Center) were included as additional controls when estimating the 3-day park-use frequency.

Table 2 provides a cross tabulation of the dependent variables with minority explanatory variables to illustrate utilization and perception patterns by minority status. A higher percentage of White respondents reported park use of two times per week or more in both warm and cold weather, compared to other groups. For 9 of the 11 barriers, a lower percentage of White respondents reported that the barrier limited their park use a great deal or completely. American Indian respondents had the highest average park visitation frequency in the last 3 days. For 3 of the 4 perceived health benefits of parks, a higher percentage of Hispanic respondents reported positive perceptions (i.e., somewhat agree or strongly agree). While informative, direct comparisons of park-use behavior and perceptions by minority status could be misleading without controlling for other socio-demographic and contextual factors. Regression analysis below is more important in understanding the differences in park-use behavior and perceptions by minority status.

Regression Analysis

Regression models of dichotomous minority indicators (including race, ethnicity, and immigrant indicators) on recalled past-year park use in warm and cold weather, as well as on perceived park health benefits and perceived park-use barriers, were estimated using ordered logistic regression and interpreted using odds ratio (OR), given the ordinal scale of the dependent variables. The model on the recalled 3-day park-use frequency was estimated using negative binomial regression and interpreted using incident rate ratio (IRR), given the count nature of the dependent variable. In all regression models, neighborhood area indicators were added to adjust for clustering within neighborhoods [21], and a robust variance estimate was obtained to adjust for clustering within census blocks [22].

Results

Models of Park-Use Frequency

After controlling for various socio-demographic and neighborhood variables (Table 3), the odds of blacks reporting park-use frequency of more than 4 times a week

Table 2 Descriptive statistics of dependent variables by minority status (N = 568)

	White (N = 331)	Black (N = 138)	Asian (N = 29)	American Indian (N = 55)	Hispanic (N = 93)	Foreign born (N = 129)
	N (%) for ordinal variables or Mean for the count variable					
Park-use behavior						
Warm weather park use	247 (75.53)	68 (52.71)	12 (42.86)	35 (66.04)	68 (73.11)	80 (62.5)
Cold weather park use	124 (39.11)	23 (18.86)	4 (14.81)	16 (30.19)	16 (17.59)	14 (11.11)
# of park visits in past 3 days	1.45	0.77	0.59	1.75	0.95	0.64
Perceived role of parks						
Exercise opportunities	320 (97.26)	120 (87.59)	26 (89.66)	47 (87.03)	86 (92.47)	115 (89.85)
Relaxation opportunities	318 (96.66)	121 (88.32)	27 (93.10)	46 (85.19)	90 (96.78)	119 (92.97)
Family gathering spaces	310 (94.80)	125 (91.24)	26 (89.65)	47 (87.03)	90 (96.77)	118 (92.18)
Social gathering spaces	309 (93.92)	126 (91.97)	26 (92.85)	44 (84.62)	88 (94.62)	119 (94.44)
Perceived barriers to park use						
Language barriers	6 (1.81)	11 (8.09)	2 (6.9)	1 (1.82)	12 (12.9)	16 (12.5)
Cultural restrictions	7 (2.11)	14 (10.29)	2 (6.9)	2 (3.64)	9 (9.78)	16 (12.59)
Lack of companionship	13 (3.92)	13 (9.56)	1 (3.45)	6 (10.91)	9 (9.68)	13 (10.15)
Safety concerns	66 (19.94)	51 (37.23)	8 (27.58)	17 (30.91)	22 (23.65)	41 (32.03)
Lack of information	65 (19.7)	48 (35.29)	8 (27.59)	14 (25.45)	26 (27.95)	46 (35.94)
Inconvenient program schedules	41 (13.06)	32 (23.36)	3 (10.35)	11 (20.37)	17 (18.89)	24 (19.04)
Program pricing concerns	21 (6.96)	22 (16.41)	2 (7.14)	10 (18.52)	14 (15.39)	20 (16)
Lack of maintenance	18 (5.44)	19 (13.87)	7 (24.13)	5 (9.09)	20 (21.74)	24 (18.9)
Facilities not meeting needs	22 (6.69)	15 (11.03)	3 (10.34)	10 (18.87)	20 (21.74)	20 (15.75)
Programs not meeting needs	22 (7.09)	16 (11.76)	3 (10.34)	7 (13.46)	15 (16.85)	19 (15.32)
Not feeling welcomed	12 (3.72)	20 (14.6)	2 (6.9)	8 (15.09)	12 (13.19)	20 (15.75)

N (%) values in this table correspond to the same cutoff points for ordinal variables in Table 1

Table 3 Regression models of park-use frequency

	Warm weather park use (ordered logit, OR)	Cold weather park use (ordered logit, OR)	Past 3 Day park use (negative binomial, IRR)
Minority status			
Black	**0.59****	**0.35*****	**0.73****
Asian	0.64	0.94	0.64
American Indian	1.20	1.26	**1.65*****
Hispanic	1.72	1.29	1.11
Foreign born	0.91	**0.52****	**0.61*****
Control variables			
Male	0.81	1.03	1.06
Age 18–29	1.22	**0.71***	1.01
Age 60 and older	**0.49***	0.56	0.78
Employed full-time	0.72	1.34	1.09
Spouse/partner present	0.96	1.30	1.21
Child under 18 present	**2.54*****	1.29	1.22
Age of youngest child[a]	**0.92*****	0.97	**0.96*****
General health status	**1.26*****	**1.37*****	**1.17*****
Education	1.13	**1.32*****	**1.10****
Household income 2009	**1.20****	0.88	0.97
Number of cars owned	1.10	0.97	0.98
Renter	0.88	0.77	1.15
Years in neighborhood	**1.03***	1.02	**1.02*****
Distance to nearest park	0.41	0.16	**0.15*****
Lack of interest in parks	**0.49*****	**0.59*****	**0.64*****
# of weekend days	NA	NA	1.08
# of days >65 °F	NA	NA	1.04
# of days with precipitation	NA	NA	0.99
Neighborhood indicator 1[b]	0.90	**0.49*****	**0.76****
Neighborhood indicator 2[b]	**0.53****	**0.41*****	**0.59*****
Threshold 1[c]	−3.65***	−2.18***	NA
Threshold 2[c]	−2.15***	−0.65	NA
Threshold 3[c]	−0.34	1.01	NA
Threshold 4[c]	1.38*	2.47***	NA
Constant	NA	NA	1.32
Ln alpha[d]	NA	NA	−0.92***
Summary statistics			
Number of observations	508	495	518
Log Likelihood	−614.13	−681.41	−732.10

Bold values indicate regression coefficients $p < 0.1$

[a] Interpretation: Adults who live with older children have lower odds of visiting parks in the warm weather and lower likelihood of making park visits in the past 3 days compared to adults with younger children

[b] Two neighborhood indicator variables were added in all models to account for clustering within neighborhoods for a total of three neighborhoods

[c] Thresholds 1–4 are used to differentiate the adjacent levels of the ordinal-scale dependent variables. For example, Threshold 1 is the estimated cutpoint on the dependent variable to differentiate "Never" from all other response categories when values of the predictor variables are evaluated at zero

[d] Ln alpha = Natural log of the over dispersion parameter in the negative binomial regression

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

versus all lesser frequencies are 0.59 times lower (OR = 0.59, $p < 0.05$) in the warm weather and 0.35 times lower (OR = 0.35, $p < 0.01$) in the cold weather compared to white respondents. Park visits made in the past 3 days (Table 3) is 27 percent (IRR = 0.73, $p < 0.05$) lower for blacks and 65 percent (IRR = 1.65, $p < 0.01$) higher for American Indians compared to their white counterparts. No statistically significant results were found for Hispanic and Asian respondents.

For foreign-born respondents, the odds of reporting park-use frequency of more than 4 times a week versus all lesser frequencies in the cold weather are 0.52 times lower (OR = 0.52, $p < 0.05$) than US born respondents. No significant differences in park-use frequency during the warm weather are observed between US and foreign-born respondents. Park visits made in the past 3 days is 39 percent (IRR = 0.61, $p < 0.01$) lower for foreign-born respondents compared to US born respondents.

Models of Perceived Health Benefits of Parks

When asked whether parks provide opportunities to exercise, the odds of black respondents reporting that they strongly agree versus other responses are 0.51 times lower (OR = 0.51, $p < 0.05$) than white respondents after controlling for socio-demographic and various neighborhood variables (Table 4). For Asians, such odds are 0.29 times lower (OR = 0.29, $p < 0.01$) than white respondents. Asians and American Indians are also less likely to strongly agree that parks provide opportunities to relax than whites (OR = 0.35, $p < 0.01$ for Asians; OR = 0.60, $p < 0.1$ for American Indians). American Indians are less likely to strongly agree that parks provide family gathering spaces than white respondents (OR = 0.58, $p < 0.1$), yet Hispanics are more likely to strongly agree that parks provide family gathering spaces than non-Hispanic respondents (OR = 2.06, $p < 0.1$). Foreign-born respondents showed no significant differences in perceived health benefits of parks, when compared to U.S.-born respondents.

Models of Perceived Barriers to Park Use

After controlling for various socio-demographic and neighborhood variables (Table 5), the odds of blacks reporting that a barrier completely limits their use of parks versus all other categories are 2.08 times greater (OR = 2.08, $p < 0.1$) for 'cultural restrictions', 1.89 times greater (OR = 1.89, $p < 0.05$) for 'inconvenient program schedules' and 1.89 times greater (OR = 1.89, $p < 0.05$) for 'program pricing concerns' than white respondents. Hispanics are more likely to perceive 'lack of maintenance' (OR = 2.20, $p < 0.05$), 'facilities not meeting needs'

(OR = 1.94, $p < 0.1$), and 'not feeling welcome' as park-use barriers than non-Hispanics. No statistically significant results were found for Asian or American Indian respondents regarding perceived barriers to park use. Foreign-born respondents are more likely to perceive 'language barriers' (OR = 3.82, $p < 0.01$), 'cultural restrictions' (OR = 4.45, $p < 0.01$), and 'lack of companions' (OR = 1.86, $p < 0.05$) as park-use barriers when compared to U.S. born respondents.

Conclusions and Discussion

This research provides evidence that minority groups (including immigrants) in Minneapolis, MN underutilize parks, are less likely to perceive parks as places providing health benefits, and face greater barriers to park use than their majority counterparts. Between minority groups, the extent to which respondents perceive specific health benefits of parks and specific barriers to park use differ substantially. More specifically, blacks appear to have low awareness of parks providing exercise opportunities and are prone to having cultural restrictions, inconvenient program schedules, and program pricing concerns limit their park use. Asians appear to have low awareness of parks providing exercise and relaxation opportunities, but do not appear to have any specific barriers to park use. American Indians appear to have low awareness of parks providing relaxation opportunities and family gathering spaces, but do not appear to have any specific barriers to park use. Hispanics do not have low awareness of parks' health benefits (in fact, they have higher awareness of parks providing family gathering spaces than non-Hispanics), but are prone to having concerns of parks lacking maintenance, facilities not meeting needs, and not feeling welcome limiting their park use. Foreign-born residents do not have low awareness of parks' health benefits, but they are prone to having language barriers, cultural restrictions, and lack of companions limiting their park use.

These findings warrant consideration by policy makers and practitioners. First, there is an underutilization of parks by minority groups who are already at a health disadvantage, which raises concerns that a lack of equitable park use may be adding to this health disadvantage. Second, more attention should be paid to how minority groups perceive parks. For people to use parks, parks have to be safe, welcoming, aesthetically pleasing, be equipped for multiple activities and encourage a sense of community [16, 23]. If minority groups do not perceive the parks in such a manner, regardless of what a park really has to offer, they will have no motivation to use them. Third, within minority groups there are significant differences in how they perceive parks' health benefits and what they perceive as

Table 4 Ordered logistic regression models of perceived health benefits of parks

	Exercise opportunities	Relaxation opportunities	Family gathering spaces	Social gathering spaces
Minority status				
Black	**0.51****	0.80	0.83	0.87
Asian	**0.29*****	**0.35*****	0.70	1.13
American Indian	0.74	**0.60***	**0.58***	0.61
Hispanic	0.73	0.97	**2.06***	1.17
Foreign born	0.83	0.87	0.84	1.07
Control variables				
Male	1.25	1.39	1.07	0.92
Age 18–29	0.94	0.80	1.12	1.01
Age 60 and older	0.86	0.62	1.20	0.95
Employed full-time	1.12	1.15	1.30	1.32
Spouse/partner present	0.91	1.12	1.10	1.15
Child under 18 present	1.24	1.17	1.17	0.86
Age of youngest child	0.95	1.00	1.01	1.03
General health status	1.18	1.12	1.17	**1.28*****
Education	1.08	0.96	1.03	0.99
Household income 2009	**1.32***	1.10	0.94	0.94
Number of cars owned	1.05	1.18	0.87	0.98
Renter	0.86	1.11	**0.56****	0.92
Years in neighborhood	1.01	1.00	0.99	1.00
Distance to nearest park	2.30	2.80	2.38	1.42
Lack of interest in parks	**0.36*****	**0.48*****	**0.65****	**0.66****
Neighborhood indicator 1[a]	**0.60***	**0.49*****	0.67	**0.51*****
Neighborhood indicator 2[a]	0.72	0.65	0.80	**0.58****
Threshold 1[b]	−4.43***	−4.42***	−4.51***	−4.71***
Threshold 2[b]	−3.14***	−3.11***	−3.03***	−2.73***
Threshold 3[b]	−1.05	−0.97	−0.96	−0.77
Summary statistics				
Number of observations	515	515	513	513
Log Likelihood	−352.13	−401.18	−418.21	−424.04

Bold values indicate regression coefficients $p < 0.1$

[a] Two neighborhood indicator variables were added in all models to account for clustering within neighborhoods for a total of three neighborhoods

[b] Thresholds 1–3 are used to differentiate the adjacent levels of the ordinal-scale dependent variables. For example, Threshold 1 is the estimated cutpoint on the dependent variable to differentiate "Strongly Disagree" from all other response categories when values of the predictor variables are evaluated at zero

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

barriers to park use. A better understanding of the perceptions associated with specific minority groups help to develop culture-sensitive park improvement strategies. The need for a culture-sensitive approach has been recognized by other researchers [24, 25] and recent interventions using the approach have shown promise in significantly increasing park use and improving safety perceptions across minority groups [26], and refugee populations in particular [27]. Finally, increasing awareness of parks' health benefits and reducing perceived barriers to park use among minority groups are mutually beneficial for minority users and park systems. Given the rapid population

growth in minority communities, it is critical for park agencies to promote park use among these communities to solidify public support of park investments [13].

The study admittedly has limitations. Some important variables such as neighborhood safety and security, the quality of park facilities, and the availability of park program are not included in the study either due to data unavailability or limited data collection resources. The study only includes three neighborhoods in the City of Minneapolis. The study may not be generalized to other cities without caution. Nonetheless, this study contributes to the literature on park-use behavior and park-related

Table 5 Barriers to park use (ordered logistic regression)

	Language barriers	Cultural restrictions	Lack of companions	Safety concerns	Lack of information	Inconvenient program schedules	Program pricing concerns	Lack of maintenance	Facilities not meeting needs	Programs not meeting needs	Not feeling welcomed
Minority status											
Black	1.46	2.08*	1.01	1.34	1.30	1.89**	1.89**	1.46	0.92	1.33	1.16
Asian	0.24	0.58	0.37	1.38	0.52	0.87	1.76	2.32	1.10	0.57	0.88
American Indian	0.66	0.91	0.59	0.93	0.77	1.27	1.18	0.72	1.16	0.83	1.78
Hispanic	1.77	1.25	1.18	0.69	0.77	1.15	1.24	2.20**	1.94*	1.02	2.01*
Foreign born	3.82***	4.45***	1.86**	1.04	1.41	1.38	1.06	0.68	0.83	1.23	1.18
Control variables											
Male	0.95	1.07	0.72	0.38***	0.74	0.88	0.86	1.24	0.83	0.59**	0.61**
Age 18–29	1.64	1.98*	1.04	0.97	1.23	1.10	1.15	1.90**	1.17	0.84	0.86
Age 60 and older	0.57	0.77	1.12	1.25	0.74	0.46**	0.99	1.23	0.89	0.65	0.69
Employed full-time	0.87	0.92	1.02	1.11	0.83	0.94	1.04	0.98	0.76	0.66*	0.50**
Spouse/partner present	0.77	0.99	0.75	0.95	0.75	0.83	1.39	0.90	0.93	1.25	0.42***
Child under 18 present	2.70**	1.83	0.49**	1.16	1.27	1.48*	1.86**	1.96**	1.72**	1.47	1.52
Age of youngest child	0.96	0.96	1.05	0.98	0.97	0.97	0.99	0.97	0.97	0.96	1.00
General health status	1.15	1.20	1.02	0.88	0.97	0.84*	0.96	0.86	0.96	0.92	1.17
Education	0.81*	0.84	0.97	0.94	1.00	1.22***	1.09	1.03	1.09	1.14	0.90
Household income 2009	1.05	1.03	0.84*	0.89	1.00	0.98	0.68***	0.97	0.96	0.91	1.28**
Number of cars owned	0.82	0.62***	1.02	1.15*	1.19*	1.15	1.09	1.11	1.21*	1.21	1.03
Renter	0.98	0.68	1.07	0.77	0.94	0.82	0.92	0.83	0.78	0.78	0.99
Years in neighborhood	0.95**	0.99	1.01	1.00	0.98	1.02*	1.03***	1.01	1.02**	1.04***	1.03**
Distance to nearest park	1.45	0.85	1.25	0.52	0.46	1.89	0.32	0.71	0.17	0.06***	0.14
Lack of interest in parks	2.29***	2.22***	1.53**	1.97***	1.83***	1.74***	1.58**	1.94***	2.08***	2.19***	2.68***
Neighborhood indicator 1[a]	1.60	1.11	1.20	1.16	1.26	1.15	1.42	1.19	1.41	1.14	1.99*

Table 5 continued

	Language barriers	Cultural restrictions	Lack of companions	Safety concerns	Lack of information	Inconvenient program schedules	Program pricing concerns	Lack of maintenance	Facilities not meeting needs	Programs not meeting needs	Not feeling welcomed
Neighborhood indicator 2[a]	**2.94***	2.27	1.28	0.95	0.85	1.02	1.08	1.12	1.10	0.88	0.97
Threshold 1[b]	4.24***	3.85***	0.78	−1.14*	−0.05	1.54**	1.47*	1.82**	1.63**	0.99	2.83***
Threshold 2[b]	5.39***	5.07***	2.70***	0.57	1.41**	3.09***	2.76***	3.42***	3.38***	2.92***	4.31***
Threshold 3[b]	7.22***	6.18***	4.43***	2.02***	2.97***	5.00***	4.02***	4.95***	5.02***	4.67***	5.55***
Summary statistics											
Number of observations	517	516	517	518	516	499	485	517	513	492	507
Log Likelihood	−190.17	−203.49	−400.96	−613.89	−614.27	−510.73	−396.92	−442.83	−449.70	−413.93	−347.73

Bold values indicate regression coefficients $p < 0.1$

[a] Neighborhood indicator variables were added to account for clustering within neighborhoods

[b] Thresholds 1–3 are used to differentiate the adjacent levels of the ordinal-scale dependent variables

$* p < 0.1; ** p < 0.05; *** p < 0.01$

perceptions among minority populations in several ways: it focuses on low-income racial/ethnic minorities in urban neighborhoods, it includes foreign-born residents as a minority group, it uses both recent and longer-term recalled measures of park use, and it captures diverse dimensions in perceived health benefits of parks and barriers to park use. This study also raises important questions for future research. Why are minority groups less likely to perceive parks as places for health benefits and more likely to perceive barriers to park use? Will a diversified workforce in parks, help counter the cultural and language barriers reported by Black and foreign-born residents? Probing deeper could identify whether park use promotion efforts should focus on improving park facilities/programs, addressing misperceptions or both (when feasible). If there is a lack of information and misperception among minorities about health benefits of parks, social marketing campaigns might be more effective in promoting park use than physical improvements. Answering these questions require additional research that explore the causal mechanisms underlying the differences in park-related perceptions by race, ethnicity, and immigrant status.

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