

NEW JERSEY ACCESS TO OPEN SPACE REPORT

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About

This report was developed by the New Jersey Bicycle and Pedestrian Resource Center within the Alan M. Voorhees Transportation Center (VTC) at Rutgers, The State University of New Jersey.

The Alan M. Voorhees Transportation Center (VTC) is a national leader in the research and development of innovative transportation policy. Located within the Edward J. Bloustein School of Planning and Public Policy at Rutgers University, VTC has the full array of resources from a major research university on transportation issues of regional and national significance.

The New Jersey Bicycle and Pedestrian Resource Center (BPRC) assists public officials, transportation and health professionals, and the public in creating a safer and more accessible walking and bicycling environment through primary research, education and dissemination of information about best practices in policy and design. The Center is supported by the New Jersey Department of Transportation through funds provided by the Federal Highway Administration.

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Introduction

Numerous studies have shown that walking, bicycling, and other physical activities have positive physical and mental health benefits to people of all ages. Although people exercise in fitness centers, bicycle on bike paths and bike lanes, and walk on sidewalks, shopping centers, and even in parking lots, public open spaces such as parks and playgrounds provide a safe and low- or no-cost opportunity to undertake many different forms of physical activities. Such open spaces provide the opportunity for combining relaxation, recreation, and social interaction with physical activities. Furthermore, many parks and playgrounds are used for recreational sporting events, runs, and group walks that can attract people who are not physical-activity enthusiasts. It is, therefore, not surprising that there is a growing interest among researchers about access and use of open space, as well as real and perceived barriers that prevent people from utilizing open spaces even when they are located in close proximity.

Utilization of public open spaces (Figure 1) is beneficial not only for the users but also for public agencies such as municipalities and counties that provide such spaces. For one, there is an opportunity cost involved in providing public open spaces because the land allocated to such uses could be used for other purposes. Second, significant investments are made by public agencies when converting vacant land to parks and playgrounds. Third, continuous investments are needed to maintain and police public open spaces. Because the presence of visitors makes parks more secure, the use of a public open space by a large number of people can reduce the cost of policing, not to mention making visitors feel safer.

There are many reasons for people not utilizing open spaces, including lack of motivation and time. However, negative attributes often attached to open spaces, such as crime and drug use, can also deter people from utilizing open spaces. As discussed in the literature review of this report, park use is sometimes associated with people's socioeconomic characteristics. Furthermore, cultural interpretation of open spaces can also vary among population groups, such as immigrants and non-immigrants. Other factors, such as major roads between neighborhoods and open spaces and unsafe traffic conditions near open spaces can also deter people from utilizing parks. There can also be differences between the sexes and people of different ages because women and older adults often feel more vulnerable and apprehensive of visiting open spaces without company. Finally, there is at least a hypothesis that minority populations may not feel they are welcome to use public open spaces. Among the young minority populations, there is also the apprehension that they may be unduly harassed by police because of their race and/or ethnicity.



Figure 1. Roosevelt Park, Metuchen



Figure 2. Warinanco Park, Roselle

With that background, this study investigates how public open spaces (Figure 2) are utilized by people in New Jersey with special attention to cities that contain large public open spaces. A pedestrian intercept survey was conducted in the summer and early fall of 2019 in nine cities containing 12 parks. A total of 699 adults aged 18 or older took the survey. The survey included questions on proximity to open space, distance, mode of access, ease of access by sidewalks and bike lanes, frequency of use, purpose of use, attractive park attributes, reasons for not using open spaces more often, specific types of barriers to using open spaces, the use of activity monitoring devices such as Fitbit, and also several questions pertaining to demographic and socioeconomic attributes of the respondents.

Literature Review

Numerous studies have shown that there is a positive effect of physical activities, such as walking and bicycling, on people's physical and mental health (Trost et al., 2002; Warburton et al., 2006; Lee and Buchner, 2008; Johansson et al., 2011; Roe and Aspinall 2011). Some studies have shown that the availability of open spaces can promote physical activities, which in turn can affect health (Addy et al., 2004; Lee and Maheswaran, 2011). While a large number of studies have been conducted in the context of the general population or in the context of older adults, some studies have shown that the availability of parks and playgrounds can promote physical activities of adolescents and young adults (Babey et al., 2008). The availability of public open spaces is considered particularly beneficial in urban environments where a large proportion of residents live in apartments with little private space for physical activities (Babey et al., 2008; Lee and Maheswaran (2011).

Although many studies show that there is an association between the availability of public open spaces and people's physical activity level, such relationships may be complex and sometimes difficult to observe. Witten et al. (2008) concluded that access to parks was not significantly related to sedentary behavior or physical activity. By reviewing studies on the relationship between parks and physical activities, Bancroft et al. (2015) observed that five studies found a distinct positive association between parks and physical activities, nine studies found no relationships, and six studies found mixed results. The study concluded that the results of different studies varied because of the heterogeneous nature of the studies and the measures they used.

A difficulty for empirical studies in finding a relationship between parks and physical activity level of community dwellers is that parks have different characteristics in terms of geographic location, size, aesthetics, cleanliness, security, cleanliness, facilities, and amenities. Geographic location in relation to potential visitors is important because people living in close proximity to parks are more likely to visit parks (Kaczynski et al., 2009). The study also found that larger parks attracted more visitors than smaller parks. Another study that examined attributes and amenities of parks (Kaczynski et al., 2008) found that the diversity of park features increased parks' attractiveness and the availability of trails enhanced physical activity among park visitors.

It is not merely objective proximity to parks, but also perceived accessibility that affects attractiveness of parks (Scott et al., 2007; Ijatuyi and Ajenifujah-Abubakar, 2014; Wang et al, 2015). Scott et al. (2007) found that the number of recreational facilities near homes increased the perception of accessibility for young people and also increased their physical activity participation. Wang et al. (2015) concluded that both physical proximity to parks as well as a pleasant walking experience to parks increase the perceived accessibility to parks, but other factors such as perceived safety and security and perception of other users are also important factors. The study also found that perceived accessibility to parks was lower in areas with lower socioeconomic quality.

Neighborhood socioeconomic quality has often been the subject matter of studies regarding access to open spaces. However, the evidence of the effect of socioeconomic quality on park access appears to be mixed. In a study pertaining to Maryland, USA, Abercrombie et al. (2008) found that low-income and high-minority neighborhoods are not necessarily deprived of access to parks or recreational facilities. In the context of Melbourne, Australia, Timperio et al. (2007) found that neighborhood socioeconomic quality was unrelated with the number or total area of open spaces across neighborhoods.

This literature review revealed that access to open space and the impact of that access on physical activity, health, and overall well-being are important for both researchers, planners, and policy makers. The evidence on the effect of physical activity is quite well-established. However, the effect of open spaces on physical activities and health is yet to be established. Similar is the case with the effect of neighborhood socioeconomic characteristics on the use of parks and other open spaces.

Survey Results

Description of the Survey

The pedestrian intercept survey was conducted by Rutgers University students who were certified to conduct human subjects research by the Institutional Review Board (IRB) of Rutgers University. The survey questionnaire, consisting of 24 questions, was also approved by the IRB. The surveyors intercepted pedestrians inside the park as well as on sidewalks within walking distance of the parks as seen in Figure 3. Table 1 shows the parks targeted by



Figure 3. Surveyors intercepting pedestrians

the survey, along with the city where the parks are located as well as the number of respondents who participated in the survey.

The parks targeted for the survey were selected primarily on the basis of convenience, geographic diversity, and size of parks. Neighborhood parks were not included with the assumption that people living in other parts of the city might not be aware of those parks. Of all respondents, 61% were intercepted at locations outside a park, whereas the remaining 39% were intercepted inside a park. However, many people intercepted inside parks were not park visitors, but pedestrians walking through parks between their trip origins and destinations.

Figure 1 shows the location of the parks and Table 1 shows that the number of respondents varied widely across the targeted parks. Although it was not the intent to collect data from a specific number of respondents that is proportional to the size of parks, data was collected from more respondents in and around parks that are larger in size. Respondents from Branch Brook Park in Newark, Johnson Park in Highland Park, Peters Brook Greenway in Somerville, and Warinanco Park in Roselle accounted for almost 64% of all respondents, whereas the respondents from the other parks accounted for the remaining.

Forty percent of the respondents lived in the cities where the parks were located whereas 60% lived in surrounding cities. That is not surprising, given that the selected parks are of regional nature and municipalities in New Jersey are relatively small.

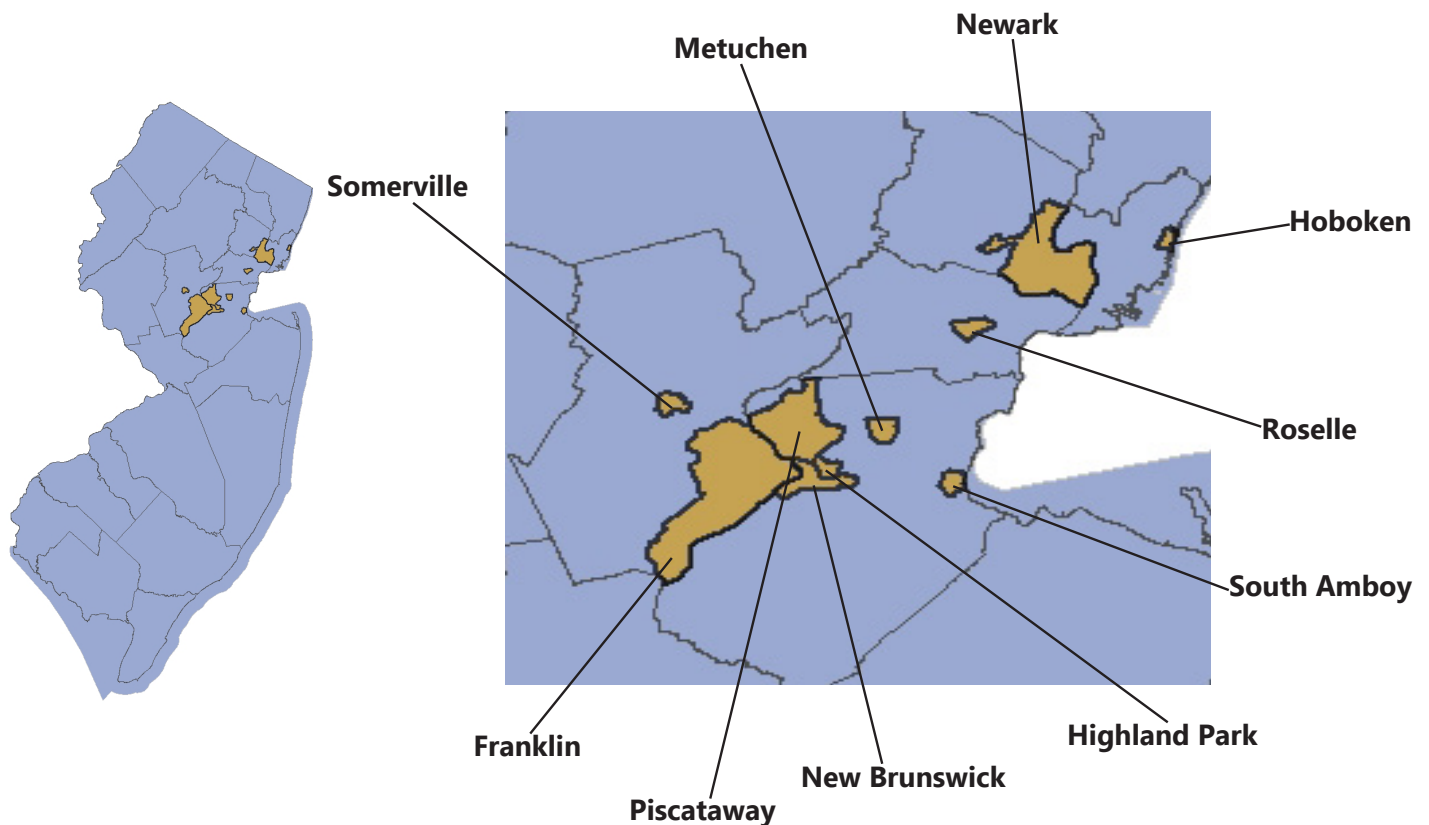


Figure 4. Location of the open spaces targeted for the survey

Table 1 – Parks targeted by the intercept survey

Park Name and City	Number of Respondents	Percent of Respondents
Boyd Park, New Brunswick	44	6.3
Branch Brook Park, Newark	169	24.2
Bucleuch Park, New Brunswick	15	2.1
Donaldson Park, Highland Park	41	5.9
Johnson Park, Highland Park/Piscataway	86	12.3
Naaman Williams Park, Franklin	25	3.6
Peters Brook Greenway, Somerville	98	14.0
Raritan Bay Waterfront Park, South Amboy	8	1.1
Riverbank Park, Newark	29	4.1
Roosevelt Park, Metuchen	41	5.9
Warinanco Park, Roselle	91	13.0
Waterfront Park, Hoboken	23	3.3
Unknown parks*	29	4.1
Total	699	100.0

* These respondents could not be distinguished between parks because of surveyor’s inability to record park name or respondents’ knowledge of multiple parks.

Demographic and Socioeconomic Characteristics of the Survey Respondents

A slightly larger share of females (53%) took the survey compared to males (46%), whereas a small proportion (1%) reported their sex as “other.” The survey respondents were generally young, but that is not surprising because the survey was completed by people who were walking either inside or outside parks. As Table 2 shows, almost 20% of the respondents were between the ages of 18 and 24 and almost 42% were below age 35, whereas only 8% of the respondents were aged 65 or over.

Of the survey respondents, 40% were white, 33% were Black or African American, 13% were Asian, 12% were multiracial, and 2% were American Indian or Alaska Native. Hispanic respondents constituted 27% of all respondents. In sum, the share of minority respondents was higher than the share of minority populations in New Jersey, but their shares were commensurate with the share of minority populations in urban parts of New Jersey generally and the cities where the parks are located.



Figure 5. Surveyors interacting with survey respondents

Table 2 – Age distribution of the respondents

Age	Number of Respondents	Percent of Respondents
18 to 24	137	19.9
25 to 34	150	21.8
35 to 44	152	22.1
45 to 54	103	15.0
55 to 64	89	13.0
65 to 74	45	6.6
75 or over	11	1.6
Total	687	100.0

The survey respondents included people from all economic strata, but most belonged to middle-income households (i.e., income between \$50,000 and \$100,000). While 24% respondents belonged to households with annual income less than \$25,000, 16% belonged to households with income between \$25,000 and \$50,000, 30% belonged to households with income between \$50,000 and \$100,000, 15% belonged to households with income between \$100,000 and \$150,000, whereas the remaining 15% belonged to households with income above \$150,000.

Similar to household income, educational attainment of the respondents also varies widely, with 6% not having completed high school, 18% having completed high school, 31% having attended some college or having obtained an associate degree, and 46% having obtained a bachelor’s degree or higher level of education. Almost half of the respondents (47%) were full-time workers, 13% part-time workers, 16% students, 8% retired, and 5% reported being unemployed, whereas the remaining 13% reported other occupations or not being in the labor force.

Frequency and Purpose of Visiting Parks

Table 3 shows the frequency of visiting the specific parks by female, male, and all respondents. Of all respondents, 21% reported never visiting the parks and another 25% reported visiting parks only once a month, indicating that a large proportion of the respondents are not habitual park users. At the other end of the spectrum, 10% reported using the parks five or more times a week and 18% reported visiting the parks two to four times. Table 3 shows that park visit frequency is slightly lower among the female respondents than male respondents. For example, almost 25% of the female respondents never visited the parks compared to only 17% male respondents, whereas 24% female respondents visited parks multiple times a week compared to 32% male respondents.

Table 3 – Frequency of visiting parks, male and female

	Female		Male		Total	
	Respondents	Percent	Respondents	Percent	Respondents	Percent
Never	87	24.6	54	17.3	141	21.2
About once a month	91	25.8	77	24.7	168	25.3
About twice a month	54	15.3	41	13.1	95	14.3
About once a week	35	9.9	39	12.5	74	11.1
2 to 4 times a week	57	16.1	65	20.8	122	18.3
5 or more times a week	29	8.2	36	11.5	65	9.8
Total	353	100.0	312	100.0	665	100.0

A comparison similar to that in Table 3 for respondents' age groups indicated that young people are less likely to visit parks than older people, including those aged 75 and over. While 31% of those aged 18 to 24 reported never visiting parks, 27% of those aged 75 and over reported never visiting parks and only 11% of those aged 65 to 74 reported never visiting parks. The share of respondents who visited parks multiple times a week was the highest for respondents aged 65 to 74 (40%), followed by respondents aged 35 to 44 and 45 to 54 (both 30%). In contrast, 25% of those aged 18 to 24 and 24% of those aged 25 to 34 visited parks multiple times a week.

Table 4 shows the frequency of visiting parks by race of respondents. The table shows the share of respondents (percent) for each level of frequency for specific races and for all respondents. At the bottom of the table the total number of respondents for each race is shown so that one can estimate the number of respondents for each frequency level. The table shows that the share of respondents never visiting parks is the highest for Asian or Pacific Islanders (23.4%), closely followed by Black or African Americans (22.8%), whereas the share is the lowest for multi-racial people (13.5%). Although the share of people never visiting parks is high for Black or African American people, the share of people who visit parks multiple times a week is also the highest for that race (30%).

Table 4 – Frequency of park use among the races

	Black or African American	Asian or Pacific Islander	White	American Indian or Alaskan Native	Multi-racial	Total
Never	22.8	23.4	20.7	20.0	13.5	20.8
About once a month	22.8	39.0	24.4	20.0	27.0	26.0
About twice a month	13.2	14.3	17.8	20.0	13.5	15.4
About once a week	11.6	5.2	9.9	20.0	18.9	11.1
2 to 4 times a week	15.3	14.3	18.6	10.0	20.3	17.1
5 or more times a week	14.3	3.9	8.7	10.0	6.8	9.6
Total	100.0	100.0	100.0	100.0	100.0	100.0

A separate analysis showed that the share of respondents never visiting parks is lower for Hispanics (15%) compared to non-Hispanics (22%), whereas the share of those visiting parks multiple times in a week is higher for Hispanics (34%) compared to Non-Hispanics (25%). Although this analysis is rudimentary, it does not show evidence supporting that minority populations visit parks less frequently. The only exception may be Asians or Pacific Islanders, among whom the share of people never visiting parks is higher than other races.

Purpose of Visiting Parks

Those who visited parks were asked about the purpose of their visits. Because a person can visit parks for multiple purposes, they were asked to select all the purposes for which they visited parks. The responses to the question are shown for male, female, and all respondents in Table 5. It is evident from the responses in Table 5 that relaxing and walking are the two most common purposes for visiting parks for both women and men. Socializing, running or jogging, and supervising children are also common, but a greater proportion of men visit parks for running, whereas a greater proportion of women visit parks for supervising children. The results show that visiting parks for biking and cultural events are not uncommon. The proportion of people visiting parks for water-related activities such as swimming, fishing, and boating is small, but that is not surprising because most parks do not have provisions for

such activities.

An analysis of visiting purpose by age of respondents showed some expected variations. For example, the share of persons visiting parks for relaxation was the highest for people aged 65 to 74 (34%), followed by people aged 75 and over (30%), whereas the share of persons visiting parks for running or jogging was the highest among people aged 18 to 24 (14%) and people aged 25 to 34 (12%). In contrast, little variation was observed between age groups regarding park visits for walking. As expected, the share of people who visited parks for supervising children was the highest for those age groups (25 to 34, 35 to 44, and 45 to 54) when people are likely to have young children in their households.

Table 5 – Purpose of visiting parks, male and female

	Female		Male		Total	
	Respondents	Percent	Respondents	Percent	Respondents	Percent
Relax	161	24.1	145	23.8	306	24.0
Walk	155	23.2	130	21.4	285	22.4
Jog/run	55	8.2	77	12.7	132	10.4
Bike	33	4.9	40	6.6	73	5.7
Swim	3	0.4	7	1.2	10	0.8
Supervise or play with children	70	10.5	38	6.3	108	8.5
Participate in sports	16	2.4	33	5.4	49	3.8
Fishing and/or boating	8	1.2	7	1.2	15	1.2
Socialize with friends or family members	76	11.4	59	9.7	135	10.6
Attend sporting or cultural event	40	6.0	29	4.8	69	5.4
Other purposes	50	7.5	43	7.1	93	7.3
Total	667	100.0	608	100.0	1275	100.0

An analysis was also undertaken to examine how park visiting purposes varied across races. However, the analysis showed that the share of people visiting parks for specific purposes varied little between races. For all the major visiting purposes, such as relaxation, walking, jogging/running, and socializing, the share of visitors from various races differed by only one or two percentage points. In sum, variations of visiting purpose are most noticeable among age groups, least noticeable among races, and somewhat noticeable between the sexes.

Proximity to Parks

To gauge the respondents' proximity to open spaces, they were asked how long it took them to walk to the specific parks in their community. The responses to that question are summarized in Table 6. Proximity seems to vary widely between the respondents. Although 29% of the respondents could walk to the parks in less than 10 minutes, for 31% of the respondents it took more than 20 minutes. As it takes about 20 minutes to walk one mile for average people, for 31% of the respondents, the parks are more than one mile away. A comparison of walking duration to parks for men and women revealed that there is no discernible different between the two groups. Similarly, a comparison of walking duration to parks for different races revealed that the differences were very small.

Table 6 – Walking duration from home to parks

	Frequency	Percent	Valid Percent
Less than 5 minutes	86	12.3	16.5
5 to 9 minutes	64	9.1	12.3
10 to 14 minutes	87	12.4	16.7
15 to 19 minutes	54	7.7	10.4
20 minutes or more	162	23.1	31.2
Don't know	67	9.6	12.9
Total	520	74.2	100.00
No response	181	25.8	
Grand total	701	100.00	

One important question for researchers is the relationship between proximity and frequency of visiting parks. Figure 6, where percent of respondents for three levels of frequency are plotted against walking duration, provides some preliminary insights about that relationship. As expected, it shows that people living within short walking distance visit parks more frequently than people living at greater distances. For example, among the people living within five minutes of parks, more than 50% visit the parks multiple times a week, whereas among the people who live beyond 20 minutes, less than 28% visit the parks multiple times a week. While only 34% of the people living within five minutes visit the parks less than once a week, 58% people living beyond 20 minutes visit the parks less than once a week. Although these results are intuitive, to fully comprehend the relationship between park proximity and frequency of park visits, other factors such as mode of travel to parks and the respondents' demographic and socioeconomic characteristics have to be controlled for by a multivariate model. For example, park visit frequency may be higher for those people who travel to parks by car than those who walk to parks even when walking duration for the former may be greater than the latter.

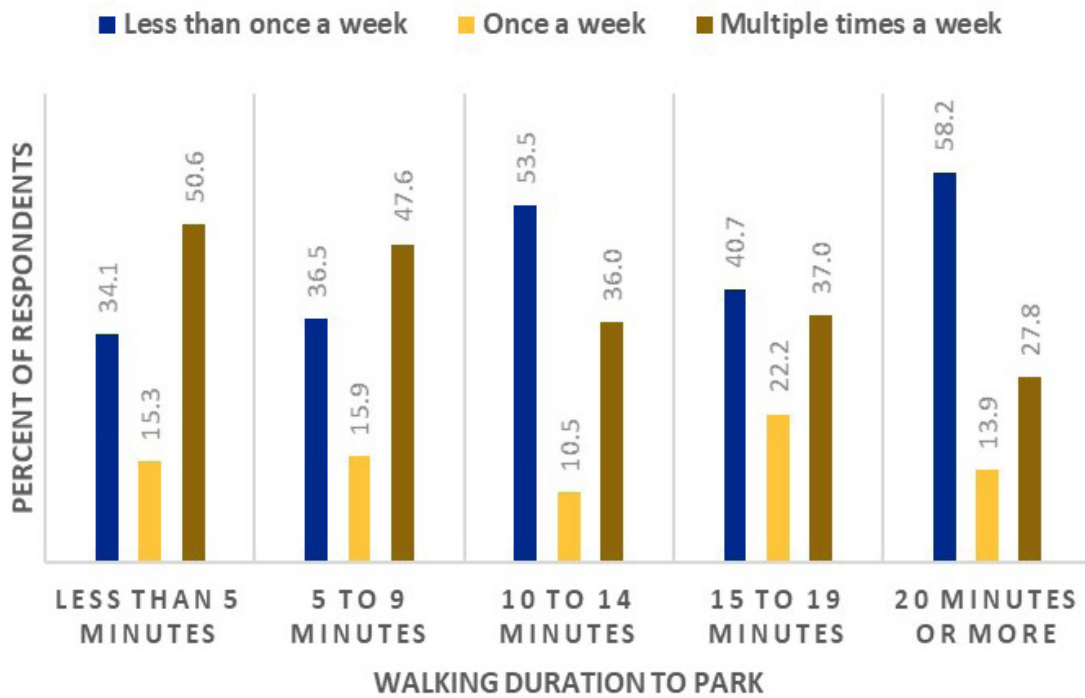


Figure 6. Park visiting frequency by walking duration to park

Travel Mode to Parks

The survey respondents were asked what travel mode they most commonly used to visit the parks. The responses are summarized in Table 7. It shows that the most common modes for men and women combined is walking (47%), followed closely by driving (43%), whereas other modes are used far less commonly. Although both walking and driving are common for both men and women, the most common mode for men is walking (50%), but the most common mode for women is driving (48%).

Table 7 – Most common travel mode to visit parks

	Female		Male		Total	
	Respondents	Percent	Respondents	Percent	Respondents	Percent
Walk	112	43.4	123	50.0	235	46.6
Drive	125	48.4	85	34.6	210	41.7
Bike	8	3.1	22	8.9	30	6.0
Other modes	13	5.0	16	6.5	29	5.8
Total	258	100.0	246	100.0	504	100.0

A difference between men and women is also evident for bicycling, for the share of men who bicycle to parks is almost three times larger for men than women. Although women are known to bicycle less than men generally, one can only speculate why they drive more commonly than men. One reason could be their apprehension of being harassed when walking to parks, but that hypothesis needs to be tested.

Figure 7 shows the park visiting frequency of the survey respondents by their travel mode to park. As expected, people who walked or bicycled to parks visited parks more often than people who visited parks by driving or using some other mode. For example, 52% and 46% of those who bicycle and walk, respectively, make multiple visits to parks per week, whereas only 25% of those who drive to parks make park visits that frequently. The share of those using other modes visit parks even less frequently. Thus, the ease of traveling to parks by walking and bicycling may increase the frequency of park visits.

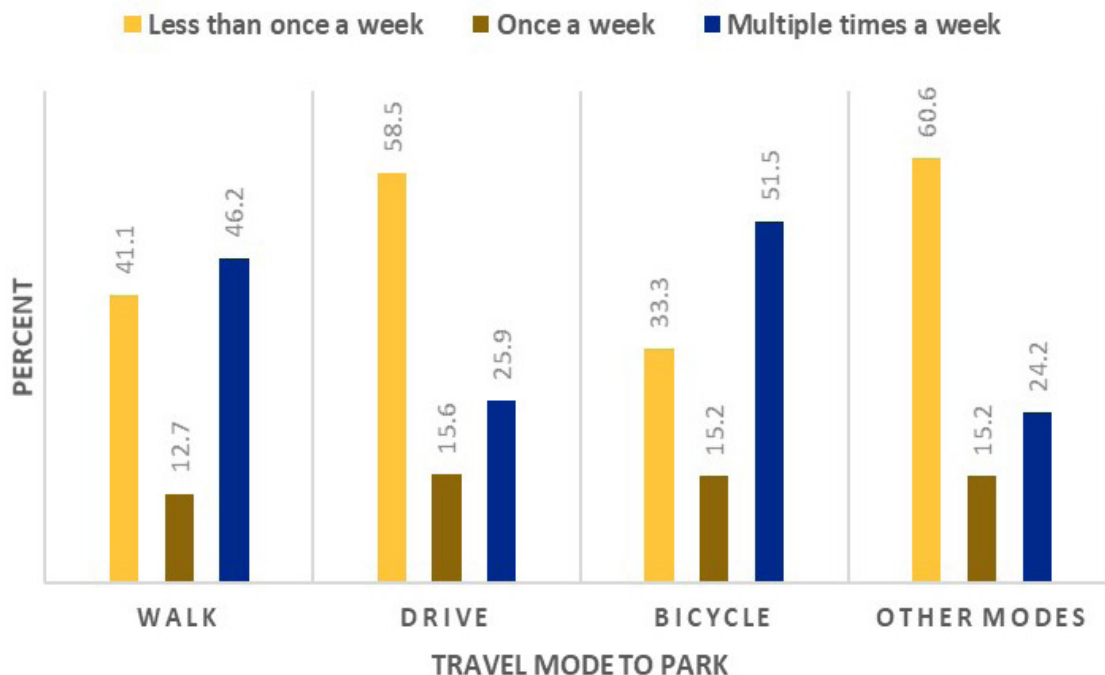


Figure 7. Park visiting frequency by most common travel mode to park

Ease of Access to Parks by Walking and Bicycling

The survey respondents were asked how easy it was to walk and bicycle to the specific parks from their homes, with due consideration of “sidewalk availability and quality” for walking and “bike lane or path availability and quality” for bicycling. The responses to the two questions are summarized in Table 8. It shows that 57% of the respondents considered walking to the parks very easy or somewhat easy, whereas 45% of the respondents considered bicycling to the parks very easy or somewhat easy. Only 25% of the respondents considered walking to the parks very difficult or somewhat difficult and slightly over 20% considered bicycling very difficult or somewhat difficult.

Table 8 – Ease of visiting parks by walking and bicycling

	Walking		Bicycling	
	Respondents	Percent	Respondents	Percent
Very easy	251	36.8	166	25.3
Somewhat easy	138	20.2	129	19.6
Neither easy nor difficult	52	7.6	76	11.6
Somewhat difficult	67	9.8	57	8.7
Very difficult	104	15.2	77	11.7
Don't know	71	10.4	152	23.1
Total	683	100.0	657	100.00

With the expectation that people with greater ease of walking to parks would visit the parks more often, the park visit frequency of the survey respondents was compared by ease of walking access. The results are shown in Figure 8. It shows that people who visit parks more often have greater ease of walking to parks. For example, among those who never visit parks, only 26% believe walking to the parks is very easy, whereas almost 35% believe access to the parks is very difficult. In contrast, among those who visit the parks five or more times a week, more than 71% believe walking to the parks is very easy and only ten percent believe walking to the parks is very difficult. Because ease of walking to the parks was considered by the respondents in relation to the availability and quality of sidewalks leading to the parks, the results indicate that having quality sidewalk connectivity to parks from neighboring areas can promote park visits for people living in nearby areas.

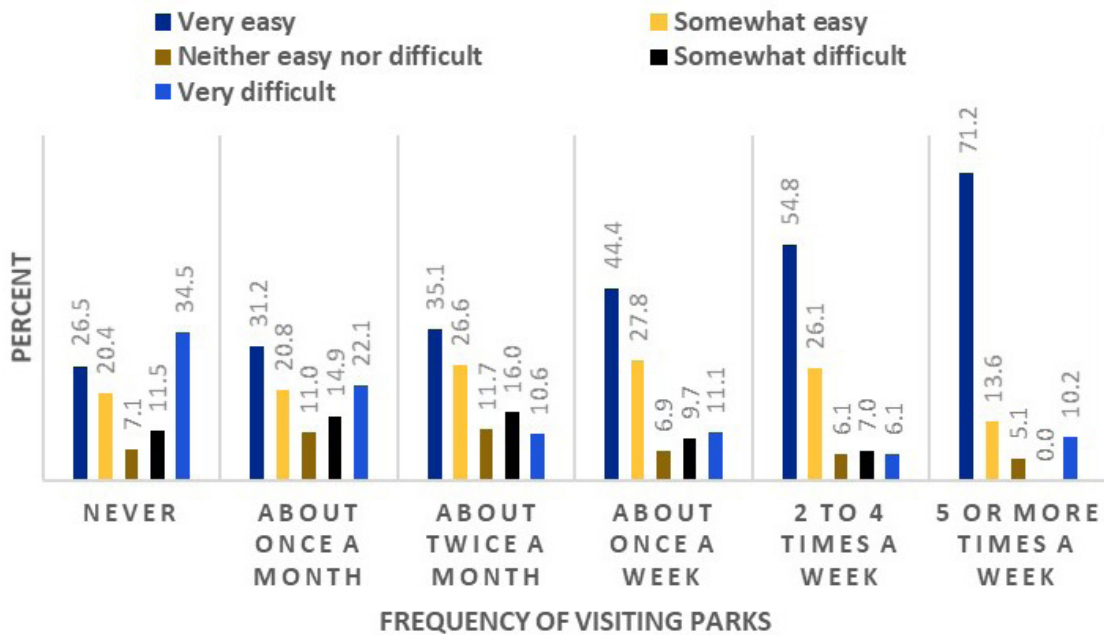


Figure 8. Ease of walking to park and park visit frequency

Reasons for Not Visiting Parks More Often

All respondents, irrespective of how frequently they visited the parks, were asked why they did not visit parks more often. Figure 9 shows the responses separately for all respondents and respondents who never visited parks. Lack of time and walking distance to parks are the two most commonly cited reasons for both groups, but among all respondents, lack of time is the most commonly cited reason, whereas for non-visitors, distance to park is the most commonly cited reason. This difference indicates that walking distance to park is a more significant barrier to the people who never visit parks than others. No reason other than walking distance and lack of time was mentioned by a large proportion of respondents, but lack of desire to visit parks and the need to cross major roads are also mentioned by about 8% of those who never visit parks.

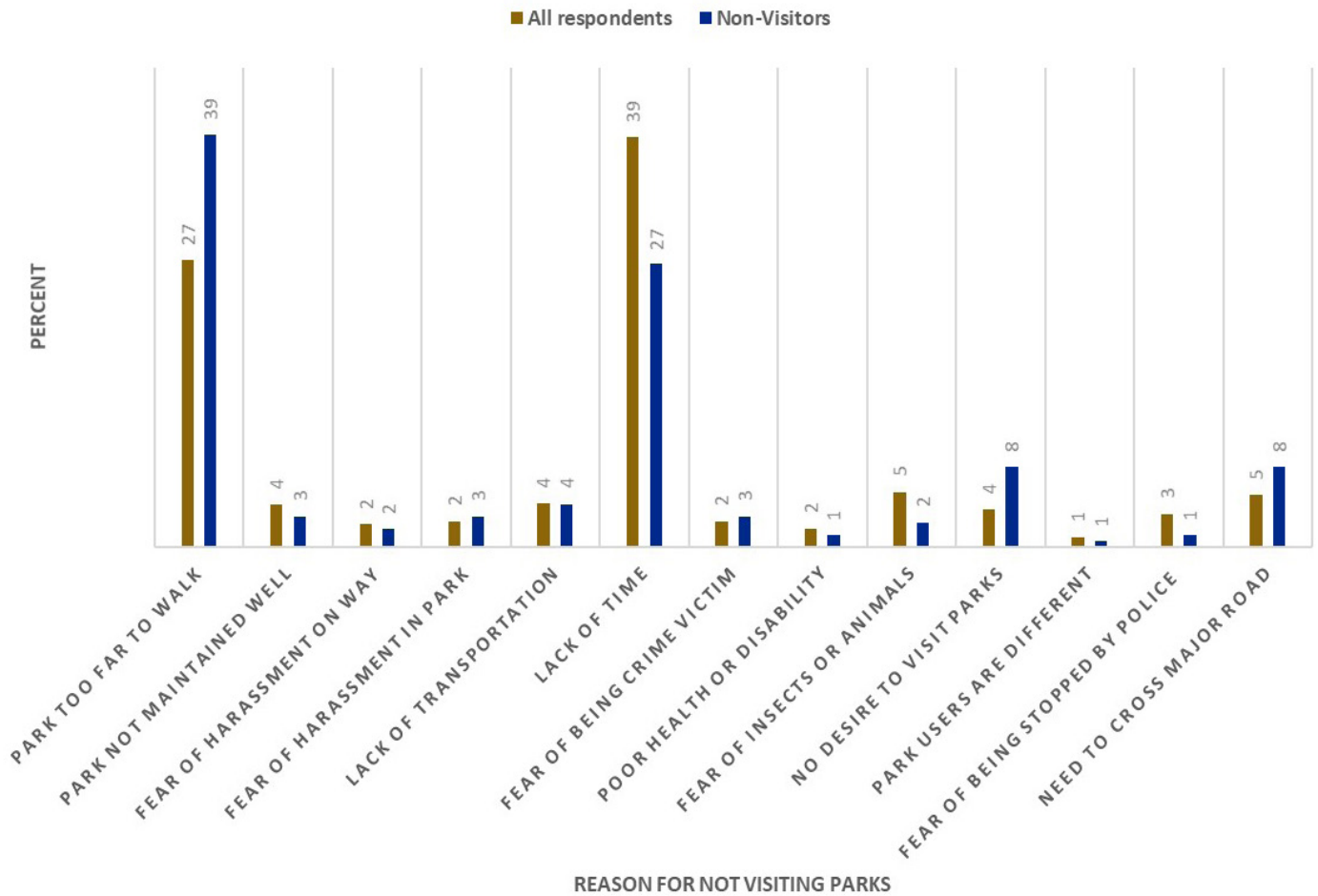


Figure 9. Reason for not visiting parks more often

Concerns About Visiting Parks

In an effort to understand what may inhibit people from visiting parks, the survey respondents were asked about the concerns they may have about being harassed by people in the park, being a victim of crime, being hit by a car, being hit by a bicycle, being stopped by police, and being attacked by animals or bitten by insects. The respondents were given an 11-point scale to choose from, ranging from 0 to 10, where 0 represented no concern and 10 represented very high concern.

The results indicated that the respondents had little concern for any of the categories asked about. As shown in Table 9, the median score for all categories was 0, while the mean varied between 1 and 2. Although some people expressed greater concern than others, Figure 6 shows that most of the respondents expressed a low level of concern. Being attacked by animals and being hit by cars were the two

greatest concerns, but even for them, the scores were low.

A separate analysis was conducted to examine differences between men and women regarding the concerns shown in Table 9. Although the median score for all categories was 0 for both men and women, mean scores were discernibly higher for all categories except the concern about being stopped by police. For that category, the concern for men was slightly higher.

Table 9 – Mean scores for concerns about visiting parks

	Mean	Median	Std. Deviation
Being harassed in the park	1.31	0.00	2.37
Being a crime victim	1.46	0.00	2.56
Hit by a car	1.75	0.00	2.67
Hit by a bicycle	1.14	0.00	2.15
Stopped by police	1.25	0.00	2.51
Attacked by animal or bitten by insects	1.89	0.00	2.72

Importance of Park Amenities

To examine what type of park amenities are attractive to people, the survey respondents were asked to score 11 amenities by using an 11-point scale, ranging from 0 to 10, where 0 was not at all important and 10 was very important. The mean and median scores for each amenity are shown in Figure 11. The results show that all amenities are valued by the respondents, but some are valued more than others. Benches and year-round restrooms appear to be valued the most, but street lights along paths, picnic areas, parking lots, and trails and paths separated from cars are also highly valued as seen in Figure 11.

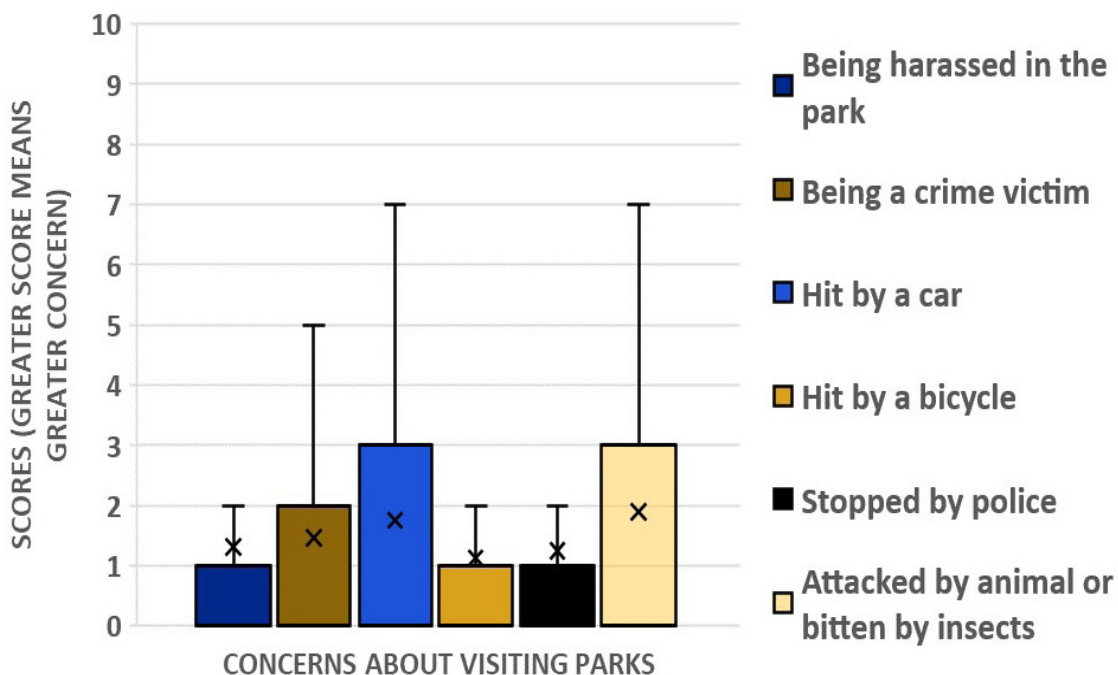


Figure 10. Concern about visiting parks

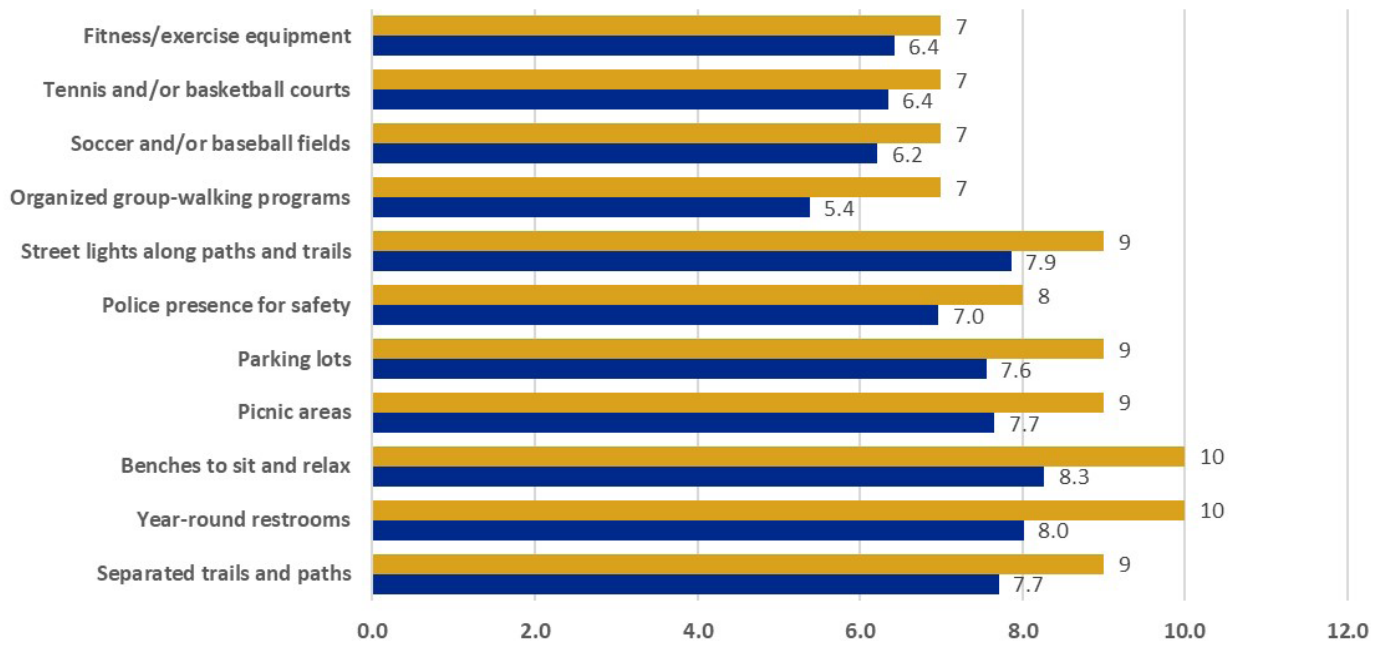


Figure 11. Mean and median scores for park amenities

It is evident from Figure 11 that people value organized group walking programs the least. Sports and fitness amenities also seem to have lower appeal than amenities such as benches and restrooms. A reason for lower appreciation for organized walking programs and sporting/fitness amenities may be that people visit parks less often for those purposes than for relaxing or walking on their own.

A comparison of mean scores between male and female respondents, presented in Table 10, showed that women value each and every amenity more than men. The differences in mean scores for men and women were the highest for street lights, followed by organized group walking, police presence, and parking lots. In addition to showing that women are more concerned than men about safety and security, these results show that women value organized programs more than men. Paying attention to these amenities can potentially increase the propensity and frequency of park visits by women.



Figure 12. Park amenities in Peters Brook Greenway

Table 10 – Differences in mean score for park amenities between male and female

	Female Mean	Male Mean	Difference between Female and Male Mean
Separated trails and paths	8.09	7.39	0.70
Year-round restrooms	8.40	7.70	0.70
Benches to sit and relax	8.62	7.97	0.65
Picnic areas	8.04	7.31	0.73
Parking lots	7.97	7.17	0.80
Police presence for safety	7.39	6.58	0.81
Street lights along paths and trails	8.42	7.30	1.12
Organized group-walking programs	5.78	4.96	0.82
Soccer and/or baseball fields	6.27	6.17	0.10
Tennis and/or basketball courts	6.46	6.27	0.19
Fitness/exercise equipment	6.72	6.11	0.61

Relation between Park Visit and Physical Activity

The survey respondents were asked how frequently they walked and bicycled outdoors for exercise at least 15 minutes at a time, irrespective of whether that be in the parks they were asked about or somewhere else. The results are summarized in Table 11. As expected, a substantially larger proportion of the respondents walk and they walk more frequently than bicycling. The table shows that more than 50% of the respondents never bicycle for 15 minutes or more, whereas only 15% of the respondents never walked 15 minutes or more. Consistently, 51% of the respondents walked multiple times a week for 15 minutes or more, but only 19% respondents bicycled multiple times a week for 15 minutes or more.

Table 11 – Frequency of walking and bicycling outdoors for exercise for 15 minutes or more

	Walking		Bicycling	
	Respondents	Percent	Respondents	Percent
Never	102	15.1	353	52.5
About once a month	76	11.2	82	12.2
About twice a month	70	10.3	62	9.2
About once a week	82	12.1	46	6.8
2 to 4 times a week	219	32.4	80	11.9
5 or more times a week	128	18.9	50	7.4
Total	677	100.0	673	100.0

The relationship between the frequency of park visits and frequency of walking for exercise is shown in Figure 13. It is evident from the figure that there may be a direct correspondence between the two variables, meaning that people who visit parks more often also walk for exercise more often and people who never visit parks are more likely not to walk 15 minutes or more. For example, among the people who visit parks multiple times a week, 72% walk for 15 minutes or more multiple times a week, whereas only 8% do not walk 15 minutes or more and 20% walk once a week or less. In contrast, among the people who never visit parks, only 41% walk for exercise multiple times a week, 30% do not walk for exercise, and 29% walk for exercise once a week or less. A Spearman correlation test confirmed a significant positive correlation between walking frequency and park visit frequency, indicating that greater frequency of park visits may promote people’s walking for exercise ($\rho=0.24$, $p<0.001$, $N=677$). It is possible that park visits also promotes bicycling, but because far fewer people reported bicycling than walking, a similar

analysis was not conducted to examine the relationship between park visits and bicycling frequency.

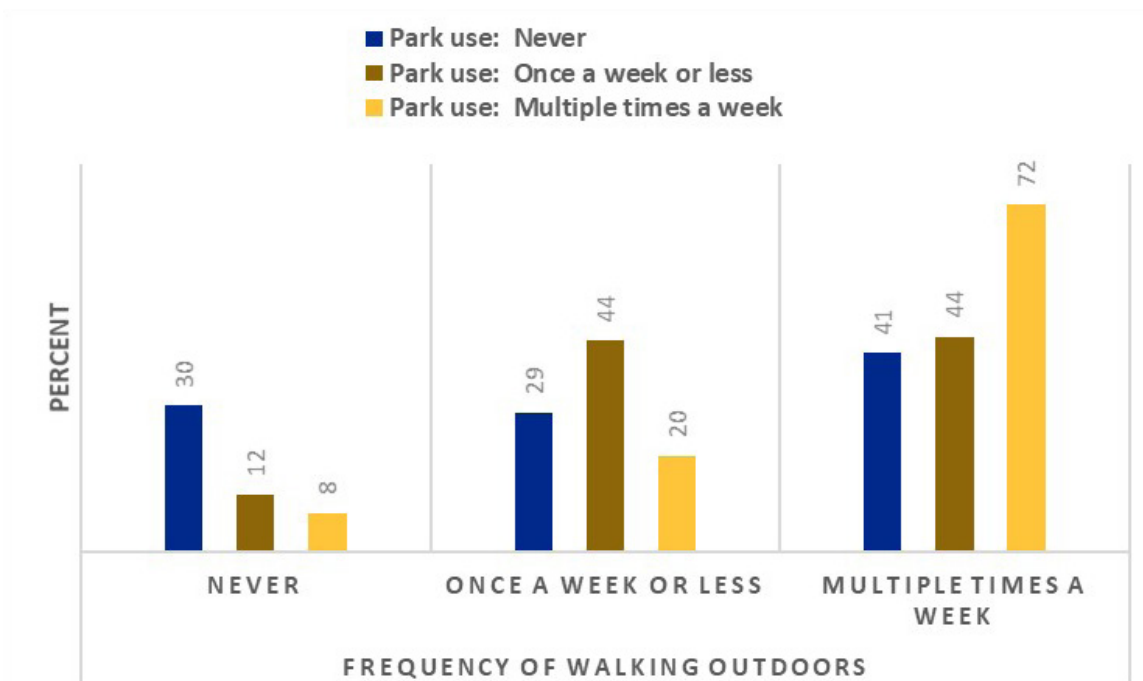


Figure 13. The relationship between frequency of walking outdoors for exercise and park visits

Relation between Park Visit and Perception of Benefit from Exercise

A question was included in the survey inquiring about the perception of health benefit from physical activities, including bicycling and walking. Responses to that question were compared with the frequency of park visits to examine how benefit perception is related to park visits. The comparison is shown in Figure 14.

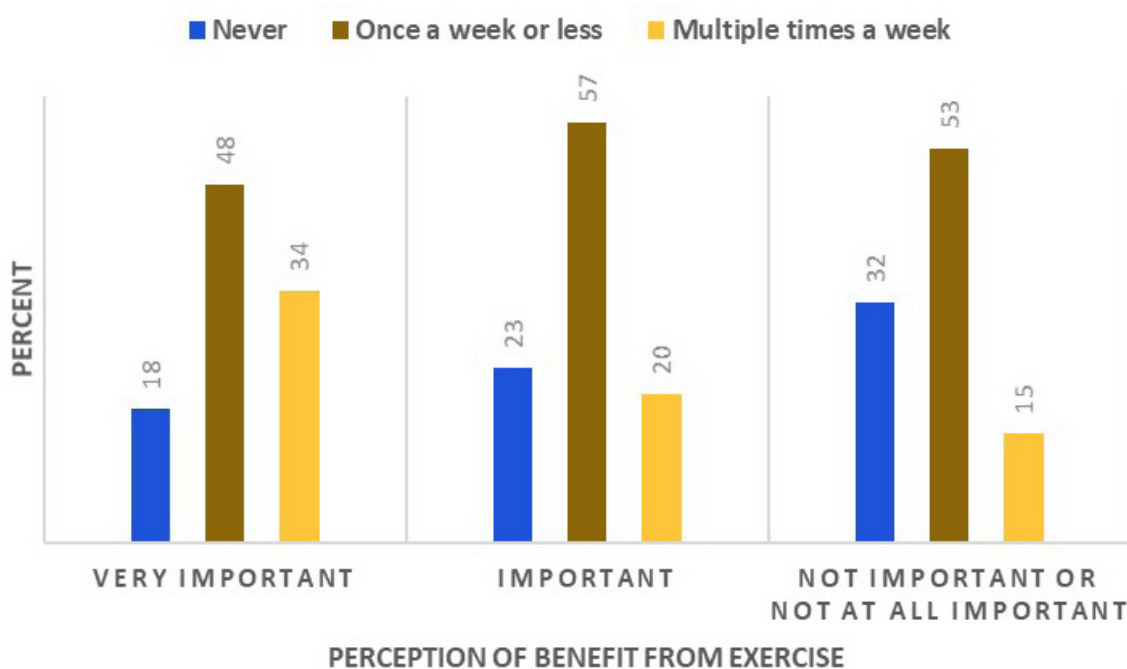


Figure 14. The relationship between perception of benefits from exercise and park visits

Figure 14 shows that among the people who perceive benefit from walking to be very important, 34% visited parks multiple times a week, whereas 18% never visited parks. In contrast, among those who

perceive benefits from exercise to be not important or not at all important, only 15% visited parks multiple times a week and 32% never visited parks. Thus, there appears to be a positive association between perception of health benefits from exercise and park visits.

Relation between Physical Activity Monitoring and Park Visits

The survey respondents were asked if they used Fitbit or a similar device to monitor their daily steps or physical activities. The survey responses revealed that 29% of the respondents used such a device, whereas 71% did not. A comparison was made between the device users and non-users to examine the variation in park use frequency between the two groups. That comparison is shown in Figure 15. It shows that the difference between the two groups modest at best. While 21% of the device non-users never visited parks, 19% of the device users never visited parks. Among the device users, 11% visited parks five or more times a week, whereas 9% of the device non-users visited parks five or more times a week. No other pattern emerges from the results, indicating that the effect of Fitbit or similar devices may have an effect on park visits only at the two extreme ends of the park visit frequency.

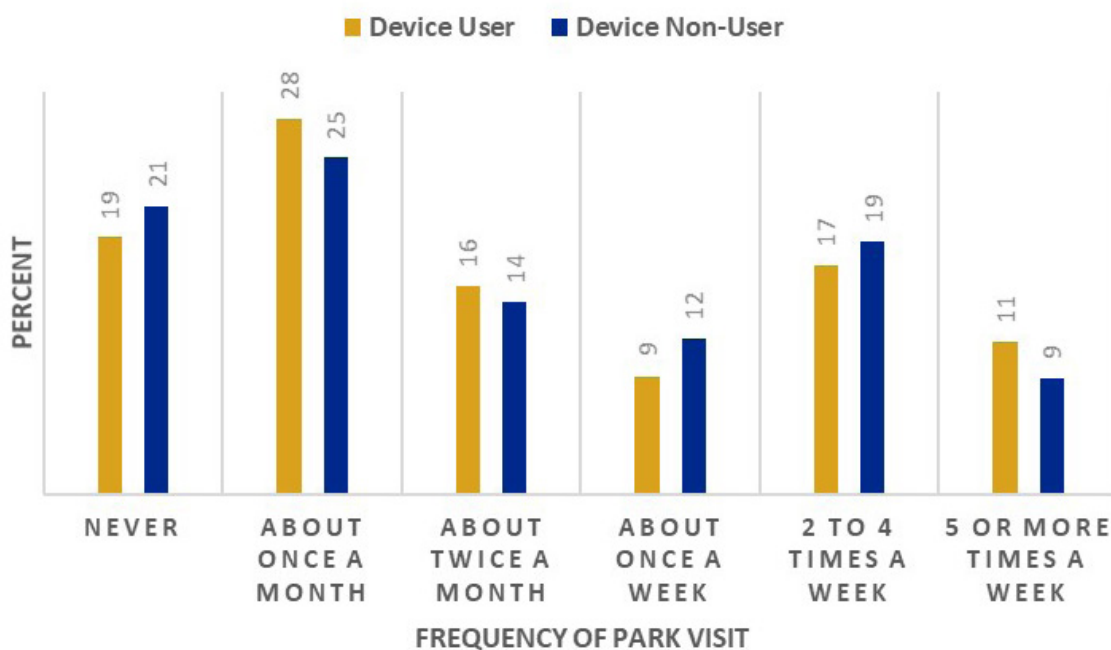


Figure 15. The relationship between the use of physical activity monitoring and park visit

Summary and Conclusion

In view of a growing interest among researchers and urban planners about the effect of public open spaces on physical activity of community dwellers, this research examined various aspects of park visits by focusing on areas near 12 major parks in nine cities of New Jersey. An intercept survey conducted as part of this research helped to collect data from 699 adults living in and around the communities.

The analysis of survey data was preceded by a literature review that showed that the effect of neighborhood parks on physical activity of residents of those communities is not clear. Some studies found a clear positive effect, but others did not, prompting researchers to conclude that the study context and measurements make a difference in study results. The review also showed the effect of socioeconomic characteristics on park usage is uncertain. Other studies showed that geographic proximity, size, and attributes of parks affect whether and how frequently people use parks.

Men and younger adults visit parks more often

The empirical component of this study began with a description of the survey and the survey respondents. Subsequent analyses focused on the propensity and frequency of visiting parks by the survey respondents. The first set of analysis showed that the proportion of women and people aged 65 and older who never visit parks is slightly higher than men and younger adults, indicating a lower propensity to use parks among women and older adults. However, differences between races regarding park visit propensity and frequency were found to be small. The results did not indicate that racial and ethnic minority populations visit park less frequently than others.

Walking, relaxing, jogging, running, socializing, and bicycling are common reasons for park visits

The analysis pertaining to the purpose of visiting parks showed that most people visit parks for walking and relaxing, but jogging, running, socializing, and bicycling are also common reasons for visiting parks as seen in Table 5. The differences between male and female visitors vary little regarding the purpose of park visits, other than that it is less common for women to visit parks for bicycling. A comparison of park visit purpose across races revealed that people from different races visited parks for more or less the same reasons. Thus, this study found little evidence of differences between races regarding both park visit frequency and the purpose of park visits.



Figure 16. People biking on the trail in Peters Brook Greenway

Ease of walking proportional to park visits

Walking distance from homes to parks varied widely for the survey respondents, but those who lived close to the parks visited the parks more frequently. The largest proportion of park visitors travel to the parks by walking, but the proportion of people who visit the parks by driving is also substantial. However, the analysis showed that people who walk to the parks visit the parks more often than the people who travel to the parks by driving. Thus, ease of walking to parks may be critical to increase attractiveness of the parks.

Distance to parks the main reason for not visiting

This research also provides useful insights about barriers to park use. Although lack of time and distance to parks are the two most commonly cited barriers to park visits, some people are also concerned about having to cross major roads. However, only a very small proportion of people have concerns about being harassed in parks, being a victim of crime, being hit by cars or bicycles, or being attacked by animals or bitten by insects. Thus, distance to parks appears to be the most serious concern for people not visiting parks.

Park amenities are very important

Among the park amenities most desired by people are benches to sit and relax and year-round restrooms. However, street lights along paths and trails, parking lots, picnic areas, and separated paths and trails

also appear to be highly desired. The survey results showed that women feel the desire for all of the park amenities more than men. Considering that park visit propensity is somewhat lower for women than men, by providing the desired amenities, local governments or park authorities can make parks more attractive to women and potentially improve overall health and well-being of the community.

People with more positive perception about health and exercise visit parks more frequently

This study also examined the relationship between the frequency of walking or bicycling for exercise and the frequency of park visits. The analysis showed that there is a direct correspondence between the two, indicating that park visits may increase overall exercise level of people in surrounding areas. A similar analysis showed that people with a more positive perception about the health benefits from physical activities visit parks more frequently than people with less positive perception. However, a similar analysis comparing the use of physical activity monitoring devices such as Fitbit and park visit frequency showed only weak results.

Recommendations to promote park use in New Jersey

This research provides some insights about ways to promote park use in New Jersey communities. First, provision of easy walking access to parks from surrounding areas through the improvement of sidewalk quality and connectivity will help to increase the number of park visitors. The provision of benches and year-round restrooms in parks, as well as street lights along paths and trails will also have the same effect. Providing parking lots in parks may increase the number of park visitors, but because people who drive to parks visit parks less frequently than those who walk or bike, there may not be an increase in overall park visit frequency from the addition of parking lots. Providing easy walking access or biking access as seen in Figure 7, in contrast, will increase both number of visitors and frequency of visits.

Recommendations for future analysis

Finally, the authors acknowledge that much of the analysis in this report is preliminary. Rigorous statistical methods will be needed to fully comprehend the associations described in this report. Recourse will have to be taken to multivariate analysis to control for other variables when examining the relationship between park visit frequency and some of the key variables, such as walking access to parks. It may also be important to integrate secondary data from the American Community Survey (ACS) to control for variations in socioeconomic characteristics of the neighborhoods surrounding the parks. The research team will undertake such endeavors for future academic publications.



Figure 17. Bike and walking trail in Peters Brook Greenway

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