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Effects of Transportation on Racial/Ethnic Diversity of National Park Visitors

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ABSTRACT

The demographic composition of the United States is increasingly diverse, but racial/ethnic minority groups are substantially underrepresented in visiting national parks. Transportation is needed to provide access to national parks but may not be equally accessible to all groups in society. This study uses a general population survey of New York City residents to examine the role of transportation in visiting national parks by three racial/ethnic groups (Hispanic, Black, and White). Principle study variables were perceived barriers to visiting national parks and the importance of transportation-related incentives in encouraging visits to national parks. Study results identified three categories of barriers: comfort and safety, expense, and accessibility; Hispanics perceive higher levels of barriers than do Whites and Blacks. Transportation incentives may increase national park visitation, especially by Hispanics. Survey findings partially support the marginality and discrimination hypotheses, and suggest potentially effective strategies to increase park visitation by minority racial/ethnic groups.

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barriers; ethnicity; national parks; leisure diversity; leisure travel; race

Introduction

Although the racial/ethnic composition of the United States population is increasingly diverse, racial and ethnic minorities have historically been underrepresented in the national parks (Chavez, 2000; Manning, 2011; Solop, Hagen, & Ostergren, 2003; Taylor, Grandjean, & Gramann, 2011). This issue has been identified by both park and recreation agencies such as the National Park Service (NPS) (Solop et al., 2003; Taylor et al., 2011) and in a long string of studies in the scientific and professional literature (Chavez, 2000; Solop et al., 2003; Stodolska, Shinew, & Floyd, 2013; Taylor et al., 2011). National parks are open to all, but there may be barriers to visiting national parks that are more acutely felt by minority groups than by the White majority, yielding disproportionate visitation rates to national parks. Research has identified several types of barriers to visiting national parks and related areas by racial/ethnic minorities, including unaffordable transportation (Byrne, Wolch, & Zhang, 2009), limited social-economic resources and information (Chavez, 2000), and discrimination (Blahana & Black,

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1993). Moreover, the effects of these barriers varied among different types of parks and different recreational activities.

Access to transportation is critical to connect the public to national parks and can act as either a barrier or a bridge for visitation by minority groups. Research has shown that Hispanics and Blacks are particularly economically vulnerable and have more limited transportation options in visiting national parks than do Whites (Solop et al., 2003; Taylor et al., 2011). For example, a study of Denver residents' experiences in Rocky Mountain National Park found that traveling to the park was not an affordable activity for many Black residents (Erickson, Johnson, Kivel, & Arai, 2009). However, in other cases, transportation innovations have served as a bridge rather than a barrier, helping to connect underrepresented groups to the national parks. For example, the PresidiGO urban shuttle system serving Golden Gate National Recreation Area in the San Francisco area has provided access to parks for more than 5,000 riders every month (National Park Service, 2003). Although studies have shown that transportation can have an important impact on racial and ethnic minority groups' visitation to national parks, few have explored this relationship quantitatively (Scott & Munson, 1994). Furthermore, most studies have focused on White and Black differences (Floyd, 1999; Johnson, Bowker, & Cordell, 2001), rarely addressing Hispanic and White differences (He & Baker, 2005).

Given the importance of the underrepresentation of racial/ethnic groups in national parks and its connections with transportation, the main research objectives for this investigation are identifying different types of barriers to visiting national parks and estimating the effects of transportation-related barriers and incentives on visiting national parks by racial/ethnic groups.

Literature review

Underrepresentation of racial/ethnic minority groups in national parks

Underrepresentation of minority groups in national park visitation has been noted for decades and continues today. For example, the National Recreation Survey in the early 1980s found that 13% of Black respondents had visited a national park, while the visitation rate of Whites was 58% (Gramann, 1996). The NPS commissioned a Comprehensive Survey of the American Public (CSAP 1) and found lower rates of visitation among minority groups; only 27% of Hispanics and 13% of Blacks had visited NPS areas within the last two years compared to 36% of Whites (Solop et al., 2003). More recently, the NPS conducted a second Comprehensive Survey of the American Public (CSAP 2) and found a similar visitation pattern to CSAP 1; 32% of Hispanics and 28% of Blacks had visited NPS areas within last two years compared to 53% of Whites (Taylor et al., 2011). This trend of underrepresentation of minority groups in national parks has been apparent in many park-specific studies as well. For example, a survey at Santa Monica Mountains National Recreation Area (California) found that 95% of visitor groups included Whites, but only 8% included Hispanics and 4% included Blacks (Littlejohn, 1993). Similar patterns were identified at Bent's Old Fort National Historic Site (Colorado) and Whitman Mission National Historic Site (Washington) (Madison, 1994). In general, research from national and regional surveys about race/ethnicity in national parks has consistently found higher visitation rates by Whites than non-Whites.

Constraints/barriers to visitation by racial/ethnic minority groups

Research has postulated three main hypotheses why minorities have lower visitation rates to national parks and related areas: marginality (Washburne, 1978), subculture/ethnicity

(Chavez, 2000), and discrimination (Blahana & Black, 1993). The marginality hypothesis suggests that minorities visit less because of limitations in their socio-economic resources, such as unaffordable transportation and inability to pay lodging costs and park fees. Several empirical studies have supported this hypothesis. A study of public use of parks in the greater Cleveland area, for example, found that respondents' household income was the best predictor of perceived barriers to park visitation (Scott & Munson, 1994). A study of regional park visitation patterns examined different visitation rates of Blacks and Whites to Detroit city parks and surrounding regional parks and found that economic barriers were important reasons why Blacks were underrepresented (West, 1989). Another study examined the relationship between race and leisure preferences based on a national survey (Shinew, Floyd, McGuire, & Noe, 1995). Results indicated that middle class Blacks and Whites have similar recreation patterns; however, recreational patterns were different between poor working class Black women and middle-class White men. A study of beach recreation identified factors associated with the differences in recreation preferences by race/ethnicity (Wolch & Zhang, 2004). In that study, Whites reported a higher frequency for beach recreation than did non-Whites, and the model showed that economic class was an independent factor impacting the frequency of beach recreation.

The subculture/ethnicity hypothesis suggests that racial/ethnic differences in recreation behaviors are driven by different norms, value systems, and socialization practices of racial and ethnic groups (Floyd, 1999). Several studies have found empirical support for this hypothesis. For example, one study examined park usage patterns in Chicago and associated benefits of park usage by respondents' race/ethnicity (Tinsley, Tinsley, & Croskeys, 2002). Findings from this investigation indicated that park usage patterns by Blacks and Hispanics were different and that these different patterns were related to psychological benefits perceived by each race/ethnicity group. Another study of visits to Chicago urban parks found that Black visitors reported a higher level of enjoyment of cultural facilities than did White visitors (Gobster, 2002), and that racial/ethnic minority groups were more likely to engage in passive, social activities in parks than Whites.

The discrimination hypothesis posits that perceptions of discrimination or actual experiences with discrimination can be a barrier for park visitation by racial/ethnic minority groups (Floyd, 1999; Manning, 2011). This hypothesis has been empirically supported. For example, data from the National Survey on Recreation found that Blacks were more likely than Whites to feel personal safety concerns that limited their outdoor recreation opportunities (Johnson et al., 2001). In a more recent study of racial discrimination in parks and outdoor recreation, researchers conducted a visitor survey at Grand Canyon National Park (Stanfield, Manning, Budruk, & Floyd, 2005). Respondents were asked to evaluate perceived crowding and comfort in response to a series of photographs with different numbers and groupings of White and Black hikers in the park. White respondents rated their comfort as lower for photographs showing all Black visitors versus those showing all White visitors, suggesting some support for discrimination as a barrier for participation in outdoor recreation by Blacks. Another study examined the effects of events of September 11 on leisure behaviors of American Muslim immigrants and found that discrimination experienced by Muslim Americans affected both their choices of leisure-related settings and leisure activities (Livengood & Stodolska, 2004).

Role of transportation in park visitation

Research has also examined the effects of transportation-related factors on park visitation and recreation behaviors, especially for accessibility to recreation areas. For example, a study

examined the effects of travel distance on the use of national parks (Hanink & White, 1999). This study used NPS visitor statistics data and simulated both regional and national models of park demand by controlling the variables of distance, population of nearest metropolitan area, quality of park, and year of park establishment. Results indicated that park demand was more associated with park quality, although distance decay was embedded in the spatial demand for park use. Another study examined the spatial accessibility to parks for U.S. residents and found that accessibility to local neighborhood parks varied significantly among states: rural states in the western and midwestern United States had lower park accessibility than urban states (Zhang, Lu, & Holt, 2011). Another study examined the spatial pattern of demand for national battlefield parks (Hanink & Stutts, 2002). Study results suggested that a battlefield's proximity to metropolitan areas was critical for its level of visitation.

Given the importance of transportation and accessibility in park visitation, a few studies have begun to examine the effects of transportation-related factors on recreation and park visitation by racial/ethnic groups. For example, West (1989) compared the perceived barriers for Black and White Detroit residents to visiting regional, Detroit-area parks. This study found that limited access to automobile transportation was the primary barrier for Blacks to visiting regional parks. A study of parks in the Cleveland area found evidence that limited regional transportation systems could be a factor in lower visitation levels for Blacks (Payne, Mowen, & Orsega-Smith, 2002). Another Cleveland-based study found that non-users of outdoor recreation areas would increase their visitation to parks if transportation access was provided (Scott & Munson, 1994). A national survey of the American public in 2000 found that about 60% of Hispanic and Black respondents agreed that travel distance was a barrier to visiting national parks (Solop et al., 2003). More recently, a study measured the accessibility to 285 national parks and examined the factors associated with visitation to national parks by racial/ethnic minority groups (Weber & Sultana, 2013). Study results found that geographic distance was an important factor in explaining the variation in national park visits by racial/ethnic groups. However, distance was not the only variable that influenced park visitation; cultural differences could be another important factor because racial/ethnic minority groups were more likely to visit theme parks. A few studies found that transportation might not be a barrier for minority groups in certain recreation settings. For example, a study of urban parks in Chicago indicated that even though public transportation was accessible to city parks, the majority of racial/ethnic minority visitors used cars instead to visit parks (Gobster, 2002). In this setting, accessibility was not a significant factor in increasing minority groups' visitation. In general, research about the effects of transportation on visitation to parks by racial/ethnic minority groups has mainly focused on the Black-White differences; very few have addressed the effects of transportation on Hispanic visitation to these areas. Furthermore, most approaches have been qualitative in nature; the quantitative relationship between transportation and visitation by minorities to parks has yet to be studied in the depth it deserves.

Methods

Survey of New York City residents

The principal study method was a survey of residents of New York City, which was chosen for the study because of its racial/ethnic diversity and the location of several units of the national park system in or near the city. An online panel was used for the survey. Although there are multiple racial and ethnic groups in the United States, the three largest groups were addressed in this study: Hispanics, Blacks, and non-Hispanic Whites. The panel included large enough

samples of each of the three racial/ethnic groups to yield sufficient sample sizes for data analysis. The survey was designed to measure visitation rates to NPS units, perceived barriers to visiting national parks (including transportation related barriers), and attitudes about the perceived effects of transportation incentives on visitation to national parks.

Potential respondents from the panel were solicited via email to participate in the survey. The sampling process used convenience sampling methods. Respondents were recruited from users of a commercial website maintained by Lightspeed/GMI, a company operating online panel surveys. The survey could also can be referred to respondents' affiliates through email links. The survey provided a small cash incentive for respondents who completed the survey questionnaire. The solicitation and survey administration occurred January 3–10, 2014. Survey respondents were solicited until at least 600 questionnaires were completed, with at least 200 from each of the three racial/ethnic groups. A paragraph explaining the purpose and significance of the survey was included in the email message. A direct link to the survey instrument was provided in the email message. Both English and Spanish versions of the questionnaire were provided. A second-invitation reminder email was sent to non-respondents after the first message did not meet the minimum respondent quota for Hispanics and Blacks. Overall, 19,837 panelists were invited to access the survey and 1,081 attempted to answer the questionnaire, a response rate of 6%. The majority of those who responded to the survey completed the survey questionnaire, resulting in 718 completed questionnaires (66% completion rate). None of these respondents chose to complete the Spanish version of the questionnaire. Hispanic, Black, and White respondents accounted for 28% (n = 200), 29% (n = 209), and 43% (n = 309) of the sample, respectively. Research has found that the response rates of online surveys for tourism and recreation related studies range from 6% to 75%, and the majority of response rates are lower than 28% (Sheehan & McMillan, 1999). Moreover, the response rates of general population surveys are generally lower than surveys of homogeneous samples (e.g., students) (Sheehan & McMillan, 1999). In this study, the response rate was underestimated because it used a quota-based sampling approach. The quota for a minimum of 200 samples from White respondents was filled quickly and no more White respondents were allowed to complete the survey, whereas the quotas for Hispanic and Black respondents were more slowly filled. This issue was exacerbated because of generally low rates of Internet access by Hispanics and Blacks (Fox & Livingston, 2007; Porter & Donthu, 2006) and the high quota requirements of Hispanic and Black samples.

NPS units in the New York metropolitan area

National parks in the New York metropolitan area include 22 natural, historic, and recreational sites (National Park Service, 2014b). These areas include a wide range of recreation settings, including internationally important cultural areas such as Statue of Liberty National Monument; coastal recreation areas such as Fire Island National Seashore; and many small, diverse historical/cultural units such as African Burial Ground National Monument and General Grant National Memorial. Together, these areas attracted more than 16 million visits in 2014 (National Park Service, 2014c). A variety of transportation alternatives are provided to these sites.

Study variables

Four main areas of questioning from the survey were used in this investigation. The first question collected respondents' social-economic information, including respondents'

Table 1. Socio-Demographic Characteristics of Respondents (After Weighting).

		Racial/ethnic Group		
Socio-demographic Variable[1,2]	Response Category	Hispanic	Black	White
Gender	Male	46	34	48
	Female	54	66	52
Age	Under 18	0	1	0
	18–24	23	11	3
	25–39	33	21	26
	40–59	37	44	38
	60 and above	7	23	33
Household Size	Adults	2.38	2.01	2.02
	Children	1.15	0.53	0.41
Education	High school graduate or under	56	44	29
	Some college or associate degree	27	32	19
	Bachelor's degree	12	16	35
	Master's degree	4	6	17
	Doctoral or professional degree	1	2	9
Annual Household Income	< $24,999	31	28	14
	$25,000 – $34,999	16	18	7
	$35,000 – $49,999	14	15	14
	$50,000 – $74,999	16	20	19
	$75,000 – $99,999	9	12	17
	$100,000 – $149,999	7	4	13
	$150,000 – $199,999	6	1	10
	> $200,000	1	2	6

[1]Cell entries for gender, age, education, and annual household income are percentage (%).
[2]Cell entries for household size are means.

race/ethnicity, gender, age, education level, and annual household income (Table 1). For the purpose of analysis, categorization of the three racial/ethnic groups of concern (Hispanic, Black, and White) was done as follows. First, respondents who indicated a Hispanic ethnicity were categorized as Hispanic. Second, respondents who did not indicate a Hispanic ethnicity were grouped by racial identity. Non-Hispanic respondents who indicated (a) more than one racial group or (b) any racial group other than Black or White, or (c) no racial group were excluded from analysis within the racial/ethnic comparisons. Thus, respondents were classified into the discrete groups of Hispanic, Black, and White for the race/ethnicity analyses of study findings.

The second part of the questionnaire addressed the issue of visitation status. Respondents were asked whether they had visited any NPS units within the last two years (Table 2). Research has shown that defining respondents' visit status can be challenging because different criteria exist to define a "visitor" (e.g., ever visit during life time, visit within last two years, visit as a child), and respondents are sometimes unaware of the specific designation of a protected area (Perry, Needham, Cramer, & Rosenberger, 2014). In this study, visitor status

Table 2. Visitation to a National Park Service (NPS) Area in Last Two Years by Race/Ethnicity.

	Race/Ethnicity			
Have you visited an area that is managed by the National Park Service in the last two years?[1]	Hispanic	Black	White	Total
Yes	31[a]	23[b]	37[a]	31
No	69	77	63	69

[1]Cell entries in are percentage.
[a,b]Superscripts indicate statistically significant differences among groups at the $p < 0.05$ level.

Table 3. Frequencies and Means of Barriers to Visiting National Parks.

Please tell us why you have not visited areas managed by the NPS more often.[1]	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree	Mean
I don't feel welcome in National Park Service areas because of who I am	41	16	30	6	7	2.23
National Park Service areas are unpleasant places for me to be	32	18	35	8	7	2.40
I don't feel comfortable visiting National Park Service areas because I'm afraid of wild animals	38	16	30	8	8	2.33
I just don't like to visit National Park Service areas	28	22	34	8	8	2.45
National Park Service employees give poor service to visitors	23	18	43	10	6	2.58
National Park Service areas are not safe places to visit	31	23	33	7	6	2.35
I am physically unable to visit National Park System areas	37	15	30	9	9	2.38
My friends and family don't like to visit National Park Service areas	27	18	37	10	8	2.54
National Park Service areas are not accessible to persons with physical disabilities	20	17	47	10	6	2.64
Lodging costs are too high	12	9	44	22	13	3.14
Food costs are too high	12	13	39	22	14	3.14
Entrance fees are too high	13	15	46	16	10	2.96
Overall, it is too expensive to visit areas managed by the National Park Service	11	13	41	21	14	3.13
Transportation costs getting to the park are too high	9	9	36	30	16	3.35
Getting to National Park Service areas is too difficult	10	16	39	23	12	3.11
It takes too long to get to National Park Service areas	9	16	38	27	10	3.14
Travel within National Park Service areas is too difficult	13	18	44	16	9	2.92
I just don't know that much about National Park Service areas	10	13	31	27	19	3.31
I don't have enough time to visit National Park System areas	16	16	36	20	12	2.95
It is difficult to find a parking space in NPS areas	11	16	52	14	7	2.91

[1]Cell entries in the value of percentage.
[2]Means on a 1–5 scale from strongly disagree (1) to strongly agree (5)

was determined using the same criteria as in the CSAP2 survey, which was defined as having visited a NPS unit in the past two years (Taylor et al., 2011). To assist respondents in defining whether a recreation area is managed by NPS, the questionnaire listed the NPS units in the New York metropolitan area, as well as several NPS units outside this area (e.g., Grand Canyon National Park, Acadia National Park). Overall, 37% of respondents were categorized as visitors.

The third part of the questionnaire addressed barriers to visiting national parks. Respondents were asked: "Why don't you visit areas that are managed by the National Park Service more often?" Twenty reasons for potentially not visiting were listed in the questionnaire (Table 3). The barrier questions were designed to align with CSAP 2 (Taylor et al., 2011), with the addition of several transportation related factors. Respondents were asked to rate each reason on a five-point Likert scale for agreement: Strongly Disagree (1), Somewhat Disagree (2), Neither Agree nor Disagree (3), Somewhat Agree (4), and Strongly Agree (5).

Table 4. Frequencies and Means of Respondents' Agreement with Transportation Incentives.

To what extent would the following make you more likely to visit NPS areas?[1]	No More Likely	More Likely	Much More Likely	Mean
Faster means of transportation to and from parks	30	45	25	1.94
Less expensive means of transportation to and from parks	25	43	32	2.06
More/better forms of public transportation (e.g., buses) to and from parks	26	41	33	2.07
More/better forms of public transportation (e.g., shuttle buses) within parks	29	41	30	2.01
More opportunities to walk and bike within parks	42	34	24	1.82
More opportunities to walk and bike to and from parks	45	34	21	1.76
More information (brochures, maps, on-line, apps) about transportation to and from parks	30	39	31	2.01
More parking at parks	41	36	23	1.82

[1]Cell entries in the value of percentage.
[2]Means on a 1–5 scale from strongly disagree (1) to strongly agree (5)

Finally, the questionnaire asked respondents to report how likely they would be to increase their visitation to national parks in response to a series of eight transportation incentives (Table 4). A three-point response scale was used: No More Likely (1), More likely (2), Much More Likely (3).

Sample weighting

Because the survey panel used in the study was based on a recruited online population, representativeness of the sample was tested by comparing key respondent characteristics to those reported for New York City respondents in the American Community Survey (one of the most comprehensive socio-demographic studies in the country) (American Community Survey, 2010). It was found that reported education levels of Hispanics and Blacks in the panel-based sample were higher than those reported in the American Community Survey. For example, nearly 40% of Hispanic and Black respondents reported a bachelor's degree or higher educational level compared to 17% for Hispanics and 25% for Blacks in the latest American Community Survey (2010). The primary reason for this is that Hispanics and Blacks with higher educational levels are more likely to be present in Internet and email-based panels and to answer online questionnaires (Fox & Livingston, 2007). Sampling data were weighted to help ensure the representativeness of the study. The weighting procedure adjusted sample data based on the educational level data of the American Community Surveys of 2006–2010. After the sample weighting process, the weighted samples were compared with the American Community Survey for several variables, including gender, age, and household income, to determine whether a multiple-factor weighting process was needed. The resulting Pearson Index ranged from 0.90 to 0.98, indicating that variables in the weighted samples were significantly correlated with variables in the American Community Survey. Thus, weighting for education alone was valid and multiple-factor weighting was not needed.

Results

Socio-demographic characteristics

Socio-demographic characteristics of respondents (after weighting) are presented in Table 1. Males and females responded with similar frequency. The average age of respondents was 45. White respondents were oldest ($M = 50$) and Hispanic respondents youngest ($M = 35$).

Respondents' average household size was 2.3 adults and 0.8 children. Average household size of Hispanic respondents was larger than that of Black or White respondents. White respondents reported higher educational levels than Hispanics and Blacks. About 17% of Hispanics and 25% of Blacks reported attaining a bachelor's degree or higher educational level, while more than 60% of White respondents reported attaining a Bachelor's or higher educational level. The same pattern was reported in respondents' annual household income: Hispanic and Black respondents were more likely to report an annual income lower than $25,000, while White respondents were more likely to report their annual income as higher than $200,000.

National park visitation by race/ethnicity

Black respondents had the lowest visitation rate to NPS units in the last two years, whereas White respondents had the highest (Table 2). A test for differences in visitation rates among the three race/ethnicity groups was determined through use of a Chi-square statistic. The difference between White and Black respondents was significant ($p < 0.001$), with a minimal to typical effect size (Cramer's V = 0.15) (Vaske, 2008). The difference between Black and Hispanic respondents was also significant ($p = 0.031$), with a minimal to typical effect size (Cramer's V = 0.10). However, the difference between Hispanic and White respondents was not significant ($p = 0.208$).

Barriers to visiting national parks

Among the 20 listed barriers to visiting national parks, respondents reported the highest agreement on the barrier of transportation costs related to getting to a park as being too high ($M = 3.35$) and the lowest agreement with the barrier of not feeling welcomed in NPS areas because of who they are ($M = 2.23$) (Table 3). To categorize barriers to visiting national parks, an exploratory factor analysis (EFA) was employed (Table 5). EFA is a technique within factor analysis, where the overarching goal is to identify the underlying relationships between measured variables (Norris & Lecavalier, 2010). To ensure the effectiveness of the EFA, Kaiser-Meyer-Olkin (KMO) and Bartlett tests for the data were first run. The literature suggests that factor analysis has an acceptable level of reliability when the KMO is larger than 0.70 (Zhang, 2004). The KMO value of all barrier factors included in this study was 0.936 (Table 5). In the EFA, common factors were determined by principal components analysis, and factor loadings were calculated through varimax rotation. To guarantee the effectiveness of the EFA, items with rotated loadings lower than 0.40 were removed (Zhang, 2004). EFA results indicated that the barriers to visitation could be divided into three main dimensions: (a) comfort and safety, (b) expense, and (c) accessibility. The Cronbach alpha was calculated to examine the reliability of EFA. Generally, the EFA has good reliability if Cronbach's alpha is larger than 0.60 (Spector, 1992). Results showed that Cronbach's alpha values for three dimensions were 0.94, 0.91, and 0.82, respectively. These three dimensions represented approximately 62% of total variance, with factor loadings ranging from 0.42 to 0.88. The three barrier factors in the dimension of comfort and safety with the highest loading factors were "I don't feel welcome in National Park Service areas because of who I am," "National Park Service areas are unpleasant places for me to be," and "I don't feel comfortable visiting National Park Service areas because I'm afraid of wild animals." For the dimension of expense, the three highest loading factors were "Lodging costs are too high," "Food costs are too high," and "Entrance fees are too high." Transportation cost was also an important barrier for people in visiting NPS units, with a

Table 5. Factor Analysis Results for Barriers to Visitation.

Please tell us why you have not visited areas managed by the NPS more often.[1]	Dimension 1	Dimension 2	Dimension 3	Cronbach α	Explained Variances
Comfort and Safety				0.94	30%
I don't feel welcome in National Park Service areas because of who I am	0.86	0.16	0.15		
National Park Service areas are unpleasant places for me to be	0.81	0.19	0.25		
I don't feel comfortable visiting National Park Service areas because I'm afraid of wild animals	0.79	0.18	0.23		
I just don't like to visit National Park Service areas	0.78	0.11	0.29		
National Park Service employees give poor service to visitors	0.77	0.25	0.28		
National Park Service areas are not safe places to visit	0.75	0.27	0.18		
I am physically unable to visit National Park System areas	0.73	0.14	0.16		
My friends and family don't like to visit National Park Service areas	0.69	0.12	0.29		
National Park Service areas are not accessible to persons with physical disabilities	0.69	0.27	0.23		
Expense				0.91	20%
Lodging costs are too high	0.20	0.88	0.08		
Food costs are too high	0.24	0.86	0.11		
Entrance fees are too high	0.26	0.80	0.10		
Overall, it is too expensive to visit areas managed by the National Park Service	0.23	0.76	0.33		
Transportation costs getting to the park are too high	0.14	0.73	0.27		
Accessibility				0.82	17%
Getting to National Park Service areas is too difficult	0.20	0.24	0.80		
It takes too long to get to National Park Service areas	0.20	0.23	0.72		
Travel within National Park Service areas is too difficult	0.24	0.29	0.67		
I just don't know that much about National Park Service areas	0.16	0.17	0.58		
I don't have enough time to visit National Park System areas	0.29	0.02	0.57		
It is difficult to find a parking space in NPS areas	0.27	0.23	0.42		
KMO = 0.936 Barlett's = 9087.10 P<0.001					

[1]Cell entries in the value of loading factor in that common factor.

loading factor of 0.73. The third dimension of barriers is accessibility, which primarily concerns the difficulties in access to or obtaining information about NPS units. The three highest loading factors of accessibility barriers were "Getting to National Park Service areas is too difficult," "It takes too long to get to National Park Service areas," and "Travel within National Park Service areas is too difficult."

To further understand the importance of perceived barriers for the race/ethnicity groups, a set of ANOVA tests were conducted based on factor scores from the EFA (Table 6). Among the three racial/ethnic groups, Hispanic respondents reported the highest levels of agreement with all three barriers, whereas Whites reported the lowest. The post hoc tests for ANOVA (Scheffe's and Tamhane's T2) indicated that the differences between Hispanics and Whites for all three barriers were significant, with expense ($\eta = 0.19$) and accessibility barriers ($\eta = 0.14$) having larger effect sizes than comfort and safety ($\eta = 0.11$). Black respondents reported

Table 6. ANOVA Tests for Barriers to Visitation.

Please tell us why you have not visited areas managed by the NPS more often.[1,2]	Hispanic	Black	White
Comfort and safety	2.74[a]	2.55[b]	2.49[b]
Expense	3.36[a]	3.02[b]	2.96[b]
Accessibility	3.25[a]	2.99[b]	2.97[b]

[1]Responses are means recorded on a scale of 1–5: Strongly disagree (1); Somewhat disagree (2); Neither agree nor disagree (3); Somewhat agree (4); Strongly agree (5).
[2]Cell entries in the value of means
[a,b]Superscripts indicate statistically significant differences between groups at the $p < 0.05$ level for that item.

a slightly higher level of agreement with the three barriers than did White respondents, with expense tending to be the largest barrier limiting park visitation for Black respondents.

Transportation incentives for visiting national parks

The frequency and means analysis showed that respondents' agreement with transportation incentives for increasing the likelihood of visitation ranged from a low ($M = 1.76$) with more opportunities to walk and bike to and from parks to a high ($M = 2.33$) with more/better forms of public transportation to and from parks (Table 4). ANOVA tests were employed for the eight transportation incentives; results indicated that likelihood of greater NPS visitation with transportation incentives varied significantly among racial/ethnic groups (Table 7). For all eight incentives, Hispanics reported the highest likelihood of increased visitation and Whites the lowest. For five of the measures, the difference between Hispanics and Blacks/Whites were significant ($p < 0.001$); for three measures (less expensive means of transportation to and from parks, more/better public transportation within parks, and more opportunities to walk and bike to and from parks), the differences among all three race/ethnicity groups were significant ($p < 0.001$).

Table 7. ANOVA Tests for Transportation Incentives.

To what extent would the following make you more likely to visit NPS areas?[1,2]	Hispanic	Black	White
Faster means of transportation to and from parks	2.20[a]	1.90[b]	1.81[b]
Less expensive means of transportation to and from parks	2.33[a]	2.05[b]	1.89[c]
More/better forms of public transportation (e.g., buses) to and from parks	2.33[a]	2.02[b]	1.92[c]
More/better forms of public transportation (e.g., shuttle buses) within parks	2.28[a]	2.00[b]	1.85[c]
More opportunities to walk and bike within parks	2.07[a]	1.76[b]	1.68[b]
More opportunities to walk and bike to and from parks	2.01[a]	1.78[b]	1.58[c]
More information (brochures, maps, on-line, apps) about transportation to and from parks	2.23[a]	1.98[b]	1.88[b]
More parking at parks	2.05[a]	1.78[b]	1.69[b]

[1]Responses are means recorded on a scale of 1–3: No more likely (1); More likely (2); Much more likely (3);
[2]Cell entries in the value of means.
[a,b,c]Within each response item, superscripts indicate statistically significant differences between groups at the $p < 0.05$ level for that item.

Logistic regression models of visitation

Although ANOVA tests identified the differences in perceived barriers and agreement with transportation incentives, the effects of transportation on visiting national parks for each racial/ethnic group could be analyzed more definitively using a multivariate approach. Therefore, binary logistic regression models were conducted that incorporated the variables of perceived barriers and transportation incentives. The dependent variable in these models was the respondents' visitation status (visited or not visited a NPS unit in last two years). The model coefficients were estimated by using maximum likelihood techniques. The 95% confidence interval was used to determine if a particular factor had a statistically significant impact on the probability that a respondent had visited a NPS area within the last two years. The independent factors included respondents' perceptions of the three categories of barriers to visiting national parks and respondents' attitudes toward transportation incentives. The regression models were estimated for all three race/ethnicity groups. The binary logistic regression model produced estimates of parameters which could be used to calculate odds ratios (OR) of the categories being analyzed. The OR was the relative likelihood of an event (i.e., a visit to a national park) occurring for the first category relative to the second. In this study, the odds ratio represented the likelihood of visitation for different factors.

For Hispanic respondents, the binary logistic model included 12 independent variables (−2 log likelihood value = 198.86, Nagelkerke $R^2 = 0.20$) (Table 8). Three variables were significant. For barriers, only the accessibility barrier was significant and it had a negative effect on Hispanic respondents' visitation. The barrier of accessibility would decrease the likelihood of NPS visitation (OR = 0.55). Two transportation incentives variables were significant: faster means of transportation to connect NPS units (OR = 2.96), and more opportunities to walk and bike to and from parks (OR = 3.60); these would increase the likelihood of NPS visitation.

For Black respondents, the binary logistic model identified two significant variables (−2 log likelihood value = 207.25, Nagelkerke $R^2 = 0.15$) (Table 8). The barriers of comfort and safety and expense were significant. However, none of the eight transportation incentive variables were significant in the Black respondents' visitation model. The comfort and safety barrier had a positive effect on Black respondents' visitation (OR = 3.24). However, the expense barrier would decrease the likelihood of park visitation for Blacks (OR = 0.36).

For White respondents, the binary logistic model identified two significant variables (−2 log likelihood value = 343.559, Nagelkerke $R^2 = 0.25$) (Table 8). None of the barrier variables had a significant impact on Whites' visitation to NPS units. However, two transportation incentive variables were significant: faster means of transportation to NPS units (OR = 2.19), and more opportunities to walk and bike within parks (OR = 3.44); these would increase the likelihood of NPS visitation by Whites.

Discussion

Study findings generally corroborate earlier racial/ethnic recreation and park visitation research. As in previous studies, this survey has found that minority racial/ethnic groups are underrepresented in national park visitation. The survey results show that 37% of White residents living in New York City had visited an NPS area within the last two years compared to 31% of Hispanics and 23% of Blacks. This is an important issue for the NPS because national parks are a fundamentally democratic idea: they are supposed to be accessible to all. If racial/ethnic minorities do not have equal access to the national parks, this undercuts the democratic foundation of the national park system. Moreover, the population of minority

Table 8. Binary Logistic Models for National Park Visitation by Racial/ethnic Groups.

Racial/ethnic Groups Variables	Hispanic			Black			White		
	B	p-value	Odds ratio	B	p-value	Odds ratio	B	p-value	Odds ratio
Barriers									
Comfort and Safety	0.03	0.91	1.03	1.18	< 0.01*	3.24	− 0.10	0.68	0.91
Expense	0.14	0.65	1.14	− 1.02	0.01*	0.36	0.04	0.87	1.04
Accessibility	− 0.61	0.05*	0.55	0.06	0.87	1.07	− 0.27	0.36	0.77
Transportation incentives									
Faster means of transportation to and from parks	1.09	0.02*	2.96	− 0.13	0.75	0.88	0.78	0.01*	2.19
Less expensive means of transportation to and from parks	− 0.17	0.70	0.84	0.38	0.40	1.46	− 0.38	0.23	0.69
More/better forms of public transportation (e.g., buses) to and from parks	− 0.65	0.18	0.52	− 0.01	0.99	0.99	0.45	0.16	1.56
More/better forms of public transportation (e.g., shuttle buses) within parks	0.60	0.22	1.82	0.54	0.20	1.71	− 0.07	0.81	0.93
More opportunities to walk and bike within parks	− 0.56	0.14	0.57	0.53	0.26	1.70	1.24	< 0.01*	3.44
More opportunities to walk and bike to and from parks	1.28	< 0.01*	3.60	− 0.27	0.51	0.76	− 0.17	0.56	0.84
More information (brochures, maps, on-line, apps) about transportation to and from parks	− 0.46	0.19	0.63	− 0.22	0.54	0.80	− 0.27	0.30	0.77
More parking at parks	− 0.67	0.06	0.51	− 0.08	0.80	0.92	0.40	0.09	1.49
Constant	− 0.38	0.69	0.69	− 3.73	0.00	0.02	− 3.14	0.00	0.04

*Significant at $p < 0.05$

racial/ethnic groups is growing faster than Whites, and Whites may be in the minority within the next several decades (Pollard & O'Hare, 1999). If national parks are not relevant to most Americans, they may become endangered. This study provides insights into how different racial/ethnic groups perceive barriers to visiting national parks and to what extent transportation incentives may overcome some of these barriers.

Results of this study partially support the discrimination hypothesis that has been presented in the literature about why visits to national parks and related areas are comparatively low by racial/ethnic minorities. The barriers to visitation in this study are divided into three main dimensions: comfort and safety, expense, and accessibility. Hispanics report a significantly higher level of the comfort and safety barriers than do Whites. The differences in the comfort and safety barrier between Hispanics and Whites support the discrimination hypothesis, which suggests that minority racial and ethnic groups visit national parks less frequently than Whites because they do not feel welcome, comfortable, or safe in these places. However, no significant difference has been found in the comfort and safety barrier between Blacks and Whites. Perhaps the lower visitation rate of Blacks is associated with the subculture hypothesis, that differences in visitation patterns by racial/ethnic groups were driven by subculture values (Krymkowski, Manning, & Valliere, 2014), but more direct measures of the subculture hypothesis is needed. The results of logistic regression indicate that Black visitors perceive a

significantly higher level of the comfort and safety barrier than do Black non-visitors. These results suggest that Black visitors may be perceiving less comfort and safety in NPS units based on actual experiences of discrimination or discomfort while visiting these areas and that this barrier is not as evident to those who have not had a recent visitor experience.

Study results also partially support the marginality hypothesis. Of the three barriers, Hispanics and Blacks perceive expense (including cost of transportation, food, entrance fees, and lodging) as the greatest limitation to their visitation. Additionally, Hispanic respondents report a significantly higher level of the perceived expense barrier than do Whites, which supports the marginality hypothesis. However, the differences in the expense barrier between Blacks and Whites are not significant. The accessibility barrier includes factors mainly related to transportation, such as difficulty to travel to and from parks, length of time required to get to national parks, and difficulty in finding a parking space. Each of the three racial/ethnic groups report a higher level of agreement with the accessibility barrier than with the comfort and safety barrier. Hispanic respondents perceive a significantly higher level of the accessibility barrier than do White respondents. Correspondently, Hispanics report significantly higher levels of agreement with transportation incentives than do Whites, especially for the incentives of a less expensive means of transportation to and from parks and better forms of public transportation to and within parks. These results demonstrate that the marginality hypothesis can play an important role in influencing NPS visitation by Hispanics.

Finally, study results estimate the effects of transportation on NPS visitation by race/ethnicity. Logistic regression models show that the accessibility barrier is a significant factor in limiting visitation by Hispanics. Also, the expense barrier, including the factor of transportation cost, is identified as a significantly negative variable for NPS visitation by Blacks. The findings of the expense and accessibility barriers illustrate that transportation is a barrier for Hispanics and Blacks to visit national parks. Regression models indicate that transportation incentives can encourage Hispanics and Whites to visit national parks. The regression model for Hispanics indicates that transportation incentives such as faster means of transportation and better forms of alternative transportation can be potential approaches to facilitate visitation by Hispanics. These two approaches can also increase visitation by Whites, though to a lesser extent. Study results link the barriers and the marginality hypothesis with the role of transportation incentives quantitatively, and indicate that transportation initiatives may be a crucial component in attracting a more representative audience to the national parks.

Implications

This study has implications for park management and planning and for further study. With the increasing proportion of the population that will be represented by racial/ethnic minorities in next few decades, providing equitable access to national parks for all groups is increasingly urgent. In this study, the expense and accessibility of travel are identified as the most important barriers in visiting national parks by Hispanics and Blacks. Thus, transportation incentives and lower costs can play an important role in diversifying the demographic of visitors to national parks. To mitigate these barriers for minorities, transportation planners and managers can reinforce the importance and effectiveness of public transit systems in national parks, subsidize the cost of public transit, and provide more information on cost and time-efficient public transit opportunities. These types of initiatives have been successful, such as a public transit program to Muir Woods National Monument (California) that instituted a low-cost weekend shuttle bus for visitors to travel between the park and San Francisco's Golden Gate Bridge (National Park Service, 2011). Additionally, the NPS may promote transportation

education programs about available public transit opportunities (especially in urban areas), the generally low cost of public transit, and relatively short transit times to a broader audience (Pettebone et al., 2011). Public transit to and within national parks is a higher priority for racial/ethnic minorities, probably due to a lower rate of car ownership. However, there are still some challenges to facilitate public transit service in NPS areas, such as limited transportation funding, high cost of long-term transportation system maintenance, and NPS transportation-related funding that may not prioritize public transit opportunities over more conventional automobile-related travel (e.g., road and parking lot improvements). Currently, fewer than 20% of NPS units have provided visitors with public transit systems (National Park Service, 2014a). Providing effective transit service in NPS units is expensive and usually requires long-term funding and partnerships with state, metropolitan, and local transportation agencies, especially for park units located in rural areas. For parks units located in more urbanized areas, public transit networks already exist and are widely available. However, the accessibility barriers found in this study suggest that the NPS should collaborate with local transportation agencies to highlight existing transportation options to NPS units by emphasizing the identity and accessibility of these areas to a more diverse population.

Expense is also rated as a perceived barrier, and the NPS should work to provide more information about the many free-entrance park units and free entrance days. Only one-third of NPS units charge entrance fees, and entrance fees range from a few dollars to $30, depending on the park. Although the ANOVA tests suggest that entrance fees can be a barrier for racial/ethnic minority groups to visit national parks, it is challenging for some NPS units to reduce entrance fees because of the high cost of maintenance of park facilities and services. However, more than 280 NPS units do not charge fees for entrance, and the NPS has designated several free entrance days every year (e.g., Martin Luther King Jr. Day, Presidents Day weekend, opening weekend of the season, NPS birthday) (National Park Service, 2015). The NPS should help make the public aware of these free-entrance opportunities through more educational programs, and expand partnerships with communities to make this information known, especially to minority racial/ethnic groups.

This study also illustrates that transportation alternatives such as walking, biking, and public transit opportunities in national parks can increase visitation by racial/ethnic minority groups. This offers a potentially fruitful approach to attracting racial/ethnic minorities to national parks, especially to national parks in urban areas that already have well-developed alternative transportation systems. In previous studies, Whites have been found to be more likely to use natural and undeveloped recreation settings, whereas minorities prefer more developed recreation facilities (Erickson et al., 2009). The higher interests in transportation incentives by Hispanics in particular may be a good way for the NPS to attract more minority visitors to urban parks. Starting in 2002, the NPS initiated the Alternative Transportation Program Strategic Action Plan and many national parks (e.g., Zion, Acadia, Sequoia, Grand Canyon, Yosemite, Rocky Mountain) have used alternative transportation systems as a tool to achieve their mission and ultimately the mission of the NPS (Manning, Lawson, Newman, Halo, & Monz, 2014; Taff et al., 2013). Moreover, the New York City population studied in this survey has access to multiple forms of transportation (walking, biking, public transit) that serve the NPS units in this area (Boch, 2011). Information about this transportation network, however, may be confusing to potential park visitors. Greater emphasis on information about these alternative transportation options and how they encompass access to local national parks may enhance visitation by minority racial/ethnic groups.

Study limitations and future research

Given the continued expansion of Internet service in the United States and globally, it is likely that more online general population panel surveys will be conducted and reported in the literature. This study highlights some of the strengths and weaknesses and associated issues of this type of survey that will need to be addressed more fully. Panel surveys can be very cost-effective and can recruit respondents from both park visitor and non-visitor populations (Pan, 2010). Conventional on-site surveys address only park visitors. However, response rate is one of the primary concerns of conducting an online panel survey. This study used several approaches to address this issue, including incentives to respondents and follow-up reminders. Other approaches to address this issue, such as conducting the survey in multiple modes (e.g., mail, phone, face-to-face), may be means to address this issue in the future, however, this may be cost prohibitive. The representativeness of samples from panel surveys may be tested through multiple approaches to reduce non-response bias. In this study, well-educated respondents were overrepresented, especially for Hispanics. The study used weighting methods to improve the representativeness of the survey sample, and study findings of visitation rates to national parks by racial/ethnic groups are generally aligned with related studies in the literature (Solop et al., 2003; Stodolska et al., 2013; Taylor et al., 2011). As the use of online panel surveys becomes more common in the scientific and professional literature, a set of best practices should be developed to guide this work. This study identifies and addresses some of the issues that should be included in these guidelines.

This study identifies some of the barriers to visiting national parks, as well as transportation-related incentives that may increase visits to national parks by different racial/ethnic groups. This information can help guide the NPS in diversifying the demographic composition of its visitors. Future directions for research on this topic include extending this work to a greater range of racial and ethnic groups (e.g., Asian Americans, Native Americans, bi/multiracial Americans) and other underrepresented groups, such as those based on age, socio-economic class, gender, and family size. Another direction to extend this research is to explore the differences in outdoor recreation preferences among racial/ethnic groups and the relationship between barriers to visitation and recreation preferences. In terms of transportation, future studies might conduct before-and-after case studies at national parks that implement enhancement to transportation services, including alternative transportation opportunities, to examine whether transportation incentives are effective with the targeted groups.

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