

Florida State University Libraries

2011

Greenways as green magnets: The relationship between the race of greenway users and race in proximal neighborhoods

Christopher Coutts and Rebecca Miles



Greenways as Green Magnets: The Relationship between the Race of Greenway Users and Race in Proximal Neighborhoods

Christopher Coutts

Rebecca Miles

Department of Urban and Regional Planning
Florida State University

Abstract

Although advances have been made in research examining race and the use of public parks, there has been little attention paid to urban greenways. Using Geographic Positioning System (GPS) and Geographic Information System (GIS) technology, this exploratory study examines whether the racial composition of neighborhoods surrounding two urban greenways in Michigan acts as a barrier to trail use or whether these urban greenways operate as “green magnets,” facilitating links between neighborhoods of varied racial composition. The results of this study revealed that the racial composition of the neighborhoods greenway users passed through did not predict the race of users on a given segment. These findings suggest that greenways might facilitate racial comingling in urban public space.

KEYWORDS: *Greenway, race, neighborhood, GIS, public space*

Author note: This is original research not supported by a grant.

Author correspondence should be sent to Christopher Coutts, 607 Bellamy Bldg., 113 Collegiate Loop, Tallahassee, FL 32306-2280. Phone: (850)644-5015. Fax: (850)645-4841. Email: ccoutts@fsu.edu

Introduction

From Ebenezer Howard's Garden Cities to Frederick Law Olmsted's green urban oases and lasting to this day, urban green space, often in the form of parks, has been held up as essential to the physical and social well-being of urban residents. Distinct from parks, and to date understudied, are the unique social and environmental benefits of urban greenways. Urban greenways can serve a number of social and environmental functions, such as creating opportunities for active recreation and transportation as well as filtering non-point source pollution entering waterways. Although some of the benefits of greenways come simply from their presence in a community, many of the social benefits depend upon their access and use. Since people are most likely to use parts of greenways and trails closest to their home (Abildso et al., 2007; Gobster, 1995; Lindsey et al., 2001), residents living near greenway access points are likely to benefit more from these public facilities as compared to residents living farther away. However, greenway use is not only determined by access. Similar to other public facilities, the social environment of neighborhoods surrounding greenways helps shape opportunities for use. Although research examining the influence of the physical and social environments surrounding trails and greenways is relatively sparse, it is slowly growing (Reynolds et al., 2007; Wolch et al., 2010).

Unlike public parks, greenways have the potential to intersect and connect neighborhoods that are very different in racial composition. Therefore, they create the possibility for persons using the greenway to traverse a variety of neighborhoods with varying racial characteristics. To the extent that residents of one race are uncomfortable and unwilling to use greenway segments in neighborhoods that are predominantly of another race, they may not reap the benefits of greenway use. The salience of the issues stemming from this dynamic is likely only to increase (Shinew et al., 2006).

Research suggests that racial discrimination can take place in the spaces where leisure activities occur (Floyd, 1998). In urban environments, the public spaces that support these activities are often parks or, where they exist, linear parks or greenways. Gobster (2002) found that African-Americans were the most likely among an assortment of racial and ethnic groups in Chicago to report that they felt discriminated against in parks. Other results indicate that African-Americans were more likely to use parks where there were other African-American users (Ho et al., 2005). This suggests that African-Americans and others may be less likely to traverse places on greenways where there are no others of the same race even if those places are made accessible through proximity. A finding by Philipp (1999) that "middle-class African-Americans feel much less welcome in most leisure activities than middle-class European-Americans believe" (p. 385) demonstrates that even when there is no cognizance of discrimination by one group, perceptions in another still exist. One must feel comfortable enough to access the greenway and travel some distance through areas likely to be of varied racial compositions to perform active leisure or nonmotorized utilitarian transportation.

This exploratory study examines the effect of the racial composition in surrounding neighborhoods on greenway use by African-American and non-

Hispanic whites¹ in two cities in Michigan. Both cities have a substantial proportion of African-American residents, and their urban greenways are similar in length, topography, and aesthetics. This paper begins by providing an overview of park and greenway use and users. This overview is intended to demonstrate how this study complements previous research on greenways and the equitable distribution of public facilities. Following this is an explanation of the unobtrusive data collection method using Geographic Positioning System (GPS) and Geographic Information System (GIS) technology and regression analyses used to examine the relationship between user and neighborhood racial characteristics. This paper concludes with a discussion of the implications for policy change and research in this area.

Greenways, Greenway Use, and Greenway Users

A greenway is a “linear open space established along either a natural corridor, such as a riverfront, stream valley, or ridgeline, or overland along a railroad right-of-way converted to recreational use, a canal, a scenic road, or other route” or, alternately, an “open space connector linking parks, nature reserves, cultural features, or historic sites with each other and with populated areas” (Little, 1990, p. 1). The popularity of greenways both nationally and internationally (Fabos & Ahern, 1995) is being spurred by the numerous social functions of these ecological corridors. In addition to protecting assets of cultural or historical significance, providing an outdoor laboratory for environmental education, creating habitat for wildlife migration, and reclaiming brownfields, greenways along river corridors have the dual-edged anthropocentric benefits of securing water quantity and quality and providing an attractive setting in which to perform non-motorized forms of activity. This social perspective not only acknowledges the potential human benefits of a functioning ecosystem and the conservation of natural resources, but also recognizes the greenway’s potential for significant use by persons performing multiple forms of locomotion (Lindsey & Nguyen, 2004). The multiuse greenway with a maintained path has the potential to act as a venue for physical activity. Existing studies have found that the presence of accessible trails is not only associated with maintaining and increasing activity achieved through walking but also with meeting recommended levels of physical activity (Brownson, 2000; Brownson et al., 2001; Sharpe et al., 2004). The simplest of all forms of activity, walking, has been found to be a popular activity among a wide variety of demographically distinct groups (Cordell et al., 2002).

The activities performed on greenways such as walking, running, and biking can occur on regional greenways separated from population centers, but greenways in urban settings compound their potential benefits through their ability to connect diverse populations and also because of their proximity to a larger number of people and the varied opportunities afforded by a mix of land

¹The cases examined here were not conducive to studying other racial and ethnic groups because there were not significant numbers of residents of other groups living in the neighborhoods around the greenways. For example, there were no Chinese-American or Mexican-American enclaves around the greenway nor were they represented as users of the greenway.

uses (Coutts, 2008). The proximity of this public facility to a large number of people creates convenience, and a mixture of land uses increases the number of potential destinations. This is important to support the potential for activity pursued not only for recreational but also utilitarian purposes.

The greenway potential for use is great in a town or city setting due to the “localness” (Gobster, 1995) it creates or proximity to a large number of people. It has been shown that people use parts of the greenway close to their home (Gobster, 1995; Lindsey et al., 2001; Wolch et al., 2010). This seems logical due to the convenience and sense of ownership that come with a local neighborhood amenity like a park or greenway. What is unique about the greenway and what differentiates it from parks or other public spaces is that, by its very form, one can use this nonmotorized green freeway to go places. Yet unexplained is, once on a local segment of the greenway, do users also travel on other segments that may be close to “their” part of the greenway but that pass through other neighborhoods where people of a different race live? It is on urban greenways where short physical distances can often translate into very different and segregated neighborhood compositions.

Others have proposed that a green space such as a park can act as a “green wall” to separate people (Solecki & Welch, 1995) or a “green magnet” where persons of different races mingle in a public setting (Gobster, 1998). The green space of community gardens have also been examined for their role in interracial mingling (Shinew, Glover, & Parry, 2004). Loukaitou-Sideris (1995) lays out this dichotomy with a park as a “melting pot or battleground.” The study undertaken here takes a slightly different view in that it does not examine social cohesion or tension on the greenway as a public space but instead examines the ability of the greenway to connect its users to racially disparate neighborhoods. The hypothesis is that greenways that intersect areas with different racial compositions create a physical connection between these areas and have a green magnet type of effect. If what Loukaitou-Sideris (1995) found to be true in Los Angeles parks also holds true on greenways, we would expect persons of a particular social group or race to coexist. This would be evidenced by persons of a particular race using segments of the greenway in areas where there are others of their same race. What is proposed here is that, unlike a static park, the ability of the greenway to carry and transport encourages persons to enter one another’s neighborhoods. Similar to how one may use an automobile on a roadway that dissects diverse areas—areas they may never consider walking through—maybe the greenway corridor allows a means for people to travel and recreate in places they normally would not.

Whites and African-Americans may be more likely to visit parks with someone of their own race (Ho et al., 2005), but it is unknown if, once on a greenway, they will traverse neighborhoods with substantial proportions of residents of a race different than their own. Uncovering this dynamic is only pertinent if greenways are equitably distributed across different segments of the population. As Talen (1998) points out, there are different ways that equity can be achieved. It can occur by 1) everyone receiving the same public benefit, 2) those in need receiving more, 3) those with greater demand receiving more, or 4) using market criteria to determine cost efficiency. In the context of greenways, this would translate

into 1) all segments of the population having equal access, 2) people who need non-motorized routes or environmental supports for physical activity receiving more, 3) more greenways being built closer to those who use them most, or 4) constructing or expanding greenway systems along the path of least fiscal or social resistance or cost. If equitable access to greenways was based on demand, access points would be located in predominantly white neighborhoods since middle-aged white males have been found to be the most frequent users (Lindsey et al., 2006). If it was based on who needs more support for physical activity, access points would be located near neighborhoods with more African-Americans since this population subgroup tends to show lower rates of physical activity than whites (Centers for Disease Control and Prevention, 2007; Folsom et al., 1991). Equity, as defined for the purposes of this study, aligns most closely with definition number one where everyone receives the same benefit of proximity to the greenway. That is, considering the ability of the greenway to traverse significant distances, the equitable distribution of greenways requires their intersection and proximity to neighborhoods such that the racial mix of surrounding neighborhoods closely approximates that of the city as a whole.

This study examines the distribution of greenway users according to their race in two cases where greenways extended far enough along the respective city river corridors to intersect many racially disparate neighborhoods. A previous study has documented the kinds of neighborhoods greenways intersect and serve (Lindsey, Maraj, & Kuan, 2001), but still lacking is an analysis of the relationship between the racial composition of the surrounding neighborhood and the race of users. This paper begins to fill the gap. It asks the question: Given that greenways traverse neighborhoods of different racial compositions, does this equitable proximity result in people using the greenway in one another's neighborhoods? In other words, are urban greenways that connect different neighborhoods possibly acting as the "green magnet" between them?

Methods

A case study design was used to analyze race and greenway use in two cities in southern Michigan, Lansing and Battle Creek. Both have a substantial proportion of African-American residents, with percentages slightly higher in Lansing (21.9) than in Battle Creek (17.8). An examination using GIS at the census block group level was done to uncover the demographic variation among areas close to the greenway and not apparent at the aggregated city level of analysis. This addressed the issue of whether greenways pass through and have access points in neighborhoods of varied racial composition and therefore create access, through proximity, for people with different racial characteristics.

The river greenways in both cities were similar in length, topography, and aesthetics. Both were under city management and intersected city centers where the highest concentration of commercial activity was located. Both river greenways were also contiguous, relatively long for greenways that intersect cities (Battle Creek = 12 miles, Lansing = 8 miles), and extended for many miles through

areas with varying population density and land use mixture characteristics. The two cases were also similar in their topography (Rodriguez & Joo, 2004; Troped et al., 2001), trail surface (Antonakos, 1994; Gobster, 1995; Lindsey, 1999), and aesthetics (Gobster, 1995; Lindsey, 1999) which have been shown previously to be associated with greenway and/or trail use. Both of the greenways under study had limited variation in topography (Battle Creek $\sigma=17.6$ feet elevation, Lansing $\sigma=16.8$ feet elevation) and largely consisted of an asphalt trail surface six feet in width. In selected areas where there was no space along the riverbank for an asphalt path, boardwalks maintained the continuity of the trail. The greenways in both cities avoided intersections with streets through the presence of underpasses and occasional overpasses at road and railroad intersections. Landscaping was consistently maintained in both cases by a narrow strip of brush, grass, and/or small trees separating the asphalt trail from the river. The natural environment aesthetic was also enhanced in both cases due to the fact that the path passes through both small and large city parks. Aside from the similarities in natural beauty, both cities had made attempts to improve the aesthetic appeal of structures. Along the greenway route in both cities, when the trail came within close proximity of structures or streets, aesthetics had often been enhanced by covering potentially empty views with art such as murals on street underpasses.

In order to isolate the characteristics of users on different sections of the extensive greenways, the greenways in both cities were divided into segments based on the location of trail access points. Access points were delineated as both formal and informal points on the greenway where there was some provision for entering and exiting the trail. There are many places along the two greenways where adjacent built and natural environmental features prohibit access and therefore minimize potential traffic and influence from the surrounding neighborhoods. Segment boundaries were set at the mid-points between access points. This resulted in segments of varying length but was deemed a better approximation of how greenway users actually enter and exit the system. Although it could be argued that more people are likely to be recorded on a longer segment, longer segments only have one access point and are therefore operating under the same constraints as shorter segments. This segmentation procedure was deemed an improvement over arbitrarily dividing the greenway into segments of equal length but that may or may not contain access points and therefore not represent the possibility of either entering or exiting the system. The segmentation procedure resulted in 14 segments in Lansing and 16 segments in Battle Creek. Since the entire greenway in each city was divided into segments, the total number of segments in each city constitutes a census of segments rather than a sample.

The area surrounding a given segment, or segment neighborhood, was delineated using a 10-minute walking "road-network" distance from each greenway access point in both cities. A "road-network" distance differs from a simple Euclidian or straight-line distance because it measures distance using the roadway network people are likely to use to move between places. The time of 10 minutes was used because previous studies reveal that between 67% and 84% of greenway users report living no more than 10 minutes from the trail (Lindsey et al., 2001). Ten minutes was translated into a walking distance from an access

point by considering that the average person walks at a speed of 3 mph (TRB, 2005) and could therefore cover a distance of 0.5 miles (804 meters) in 10 minutes. The creation of “segment neighborhoods” based on travel distance and centered on access points was determined to be an improvement over an aerial distance buffer surrounding the entirety of the greenway or amalgam of block groups adjacent to any part of a given segment.

Racial composition was measured using data from the 2000 U.S. Census at the block-group level. The bounds of these smaller units fell more neatly within the 10-minute buffer as compared to larger census tracts. A block group was considered as part of the neighborhood surrounding a segment if over 50% of the block overlapped the calculated segment neighborhood bounds and this overlapping area also contained residential land uses. Adding the residential land use criterion assured that we were not adding blocks simply because their geography overlapped the bounds of the segment neighborhoods. Their overlapping geography also had to have people living within it.

The uses on different greenway segments were observed and recorded by making multiple bicycle passes over the entire length of the greenway. A bicycle handlebar-mounted Garmin GPS Map 60® Global Positioning System handheld receiver unit was used to mark the geographic location of each person, and an observation matrix was used to record user characteristics and activities. Both greenways were traversed on the bike on two separate occasions on each of the seven days of the week. The second pass on a particular day of the week began on the end of the greenway opposite the first pass. This procedure resulted in 14 days of data collection per city greenway. Fourteen passes over the 14 segments in Lansing and the 16 in Battle Creek (30 segments total) resulted in 420 observations. Data were collected during the same peak use periods (4-6 p.m. weekdays, 10-2 p.m. weekends) in both locations. The potential confounding effect of weather on use was accounted for by collecting use data on days with similar climatic conditions. These were days that could be considered pleasant spring weather by most Michiganders (>60°F or 16°C).

A mixed-model regression analysis was performed to test the effect of neighborhood block group racial composition on trail uses and associated characteristics of users on corresponding segments. The use on each segment (i) took into account the observation period (j), or pass on the bike, in which the use data were collected. For example, if 11 uses were found on segment 15 in the seventh observation period (pass on the bike) Y_{ij} would be represented as: $11_{15,7}$. The independent variables of the racial composition of the neighborhood, land use mixture, and population density did not vary by pass (j), and the city variable did not vary by segment (i) or pass (j).

A number of other independent variables were included in the model to account for other known influences on use. The important effect of land use mixture and population density on use has been summarized elsewhere (Coutts, 2008). The inclusion of the age and sex composition variables was based on findings which reveal that greenway and trail users were typically not ≤ 5 or ≥ 65 years of age and were disproportionately male (Lindsey et al., 2006; Reed et al., 2004). Children and seniors were combined into a single AgeComp variable to

account for their potential increased sensitivity to environmental perceptions of safety.

The resulting model was therefore:

$$Y_{ij} = \beta_{oi} + \beta_1 \text{RaceComp}_{ij} + \beta_2 \text{SexComp}_{ij} + \beta_3 \text{AgeComp}_{ij} + \beta_4 \text{Mix}_{ij} + \beta_5 \text{Density}_{ij} + \beta_6 \text{City}_{ij} + e_{ij}$$

Y_{ij} = proportion of users who were white on segment (i) on pass (j)

RaceComp_{ij} = % white population in area surrounding segment

SexComp_{ij} = % female users

AgeComp_{ij} = % of children and senior users

Mix_{ij} = level of land use mixture in area surrounding segment

Density_{ij} = population density in area surrounding segment

City_{ij} = dummy variable for case city

i= segment

j= observation period when data is collected (pass)

e= error term

Results

Table 1 is a summary of the use data collected with the Global Positioning System device and the corresponding user characteristics collected using the observation matrix. Lansing had approximately 2.5 times the number of total uses as Battle Creek, which is a close approximation of the total population difference between the two cities. The overall population of Lansing (119,128) is 2.2 times greater than the population of Battle Creek (53,364).

Table 1 also reveals that users of the Battle Creek greenway were slightly more likely to be biking (+9.3%) and users of the Lansing greenway were more likely to be running (+7.8%). The percent of persons walking on both greenways was nearly equivalent. Walking proved to be the most popular activity in Lansing and was a close second as the most popular activity in Battle Creek. Cycling may have been slightly more popular in Battle Creek due the greenway being longer and therefore more conducive to this more rapid form of non-motorized activity.

The summary of sex, race, and age user characteristics is consistent with previous findings revealing that greenway users are typically male, white, and ≥ 5 or ≤ 65 years of age (Lindsey et al., 2006). Recent findings that neither race nor gender were significantly related to the frequency of trail use (Wolch et al., 2010) raises the issue that this likely varies by location. The difference between the percentage of white and African-American users within each city was very similar, but these differences were not proportional to the racial distribution of the city population as a whole. In Battle Creek, the 15.1 percent of African-American users nearly matched the percent of African-Americans in the city as a whole (17.8%). On the other hand, in Lansing, the 11.8 percent of users that were African-American represents approximately half of the total percent of African-Americans in the city as a whole (21.9%) (U.S. Census Bureau, 2000). More users in Battle Creek fell within the child and adolescent categories (+3.2% and +13.0%

Table 1

Total Greenway Use and Summary of User Characteristics in Lansing and Battle Creek

Descriptor	Battle Creek		Lansing		Percent difference between two sites	Total	Total percent
	Number	Percent of total	Number	Percent of total			
Number of uses	489	100	1,266	100	-	1,755	100
Range of uses/ segment	0-18	-	0-31	-	-	-	-
<i>Activity</i>							
Walk	221	45.2	585	46.2	1	806	45.9
Bike	246	50.3	519	41	9.3	765	43.6
Run	17	3.5	143	11.3	7.8	160	9.1
<i>Sex</i>							
Male	307	62.8	748	59.1	3.7	1,055	60.1
Female	181	37	518	40.9	3.9	699	39.8
<i>Race</i>							
White	406	83	1,031	81.5	1.5	1,437	81.9
African-Am	74	15.1	146	11.5	3.6	220	12.5
<i>Age</i>							
Child	53	10.8	96	7.6	3.2	149	8.5
Adolescent	120	24.5	146	11.5	13	266	15.1
Adult	274	56	914	72.2	16.2	1,188	67.7
Senior	42	8.6	110	8.7	1	152	8.6

respectively). In Lansing, the presence of a large state university in an adjoining municipality may have contributed to the trail users without children. This could also account for the fact that more people were riding bicycles in Battle Creek and running in Lansing as cycling appeared to be a popular family activity and adult runners did not appear to be accompanied by children.

Figures 1 and 2 are presented to demonstrate, in a descriptive fashion, the distribution of access points by racial composition of surrounding census block groups, and the relationship between the of greenway users and the racial composition of persons in census block groups adjacent to the greenway. The four classes of the proportion of white residents in the block groups were created using a Natural Breaks (also known as Optimal Breaks or Jenks') classification method. This classification method creates the bounds and cut-off points of a particular class where there are significant gaps between values. "In this manner, the data distribution is explicitly considered for determining class breaks; this is the major advantage of the Natural Breaks classification method" (Centers for Disease Control and Prevention, 2010). This classification method lets the data "speak for itself" and was therefore considered an improvement over an arbitrary classification. Natural Breaks was also used to create the four classes of the proportion of white

greenway users. In both cases, the “natural” break values were rounded up slightly so that the class bounds were consistent between the percent white users and the percent white in neighborhoods in both cities. This increased their interpretability.

These figures reveal that the segments and corresponding access points intersect areas with varying proportions of residents of different races in both cities. This is important to discern because the equitable distribution of access points is a prerequisite if we intend for greenways to connect a diversity of neighborhoods. In both cities, a majority of the access points were close to census block groups that were at least 20 percent African-American. In Lansing, there was only one (number 11) of a total of 14 access points that was adjacent to an almost exclusively white block group. Although Battle Creek had some access points near almost exclusively white block groups, there were also a number in areas with a significant African-American representation.

Table 2 provides a slightly different perspective on the same relationship. Recall from the methods section that the areas or neighborhoods surrounding segments were centered on access points. These neighborhoods were composed of all census block groups that were within a 10-minute walking distance. These tabular data revealed that the neighborhoods surrounding segments and extending from access points ranged from 49-75 percent white in Lansing and 20-100 percent white in Battle Creek.

Table 2

Greenway User and Population Characteristics in Census Block Groups Adjacent to Greenway

Segments	Lansing		Battle Creek	
	Proportion white users	Proportion white surrounding	Proportion white users	Proportion white surrounding
1	47.4	64.9	100.0	44.0
2	76.9	70.9	94.4	89.8
3	84.2	65.4	88.9	78.2
4	83.3	66.1	100.0	79.1
5	64.7	67.1	69.7	63.7
6	84.1	49.3	93.8	20.6
7	86.4	62.1	50.0	19.9
8	78.1	64.7	85.3	55.3
9	74.9	62.9	70.7	67.3
10	80.9	74.6	78.1	62.2
11	88.7	0.0 ¹	73.7	59.9
12	86.4	72.9	60.9	70.5
13	93.9	69.5	68.3	79.2
14	79.1	75.0	95.9	83.2
15	-	-	100.0	100.0
16	-	-	97.6	83.8

¹There are 0 persons living in the surrounding area.

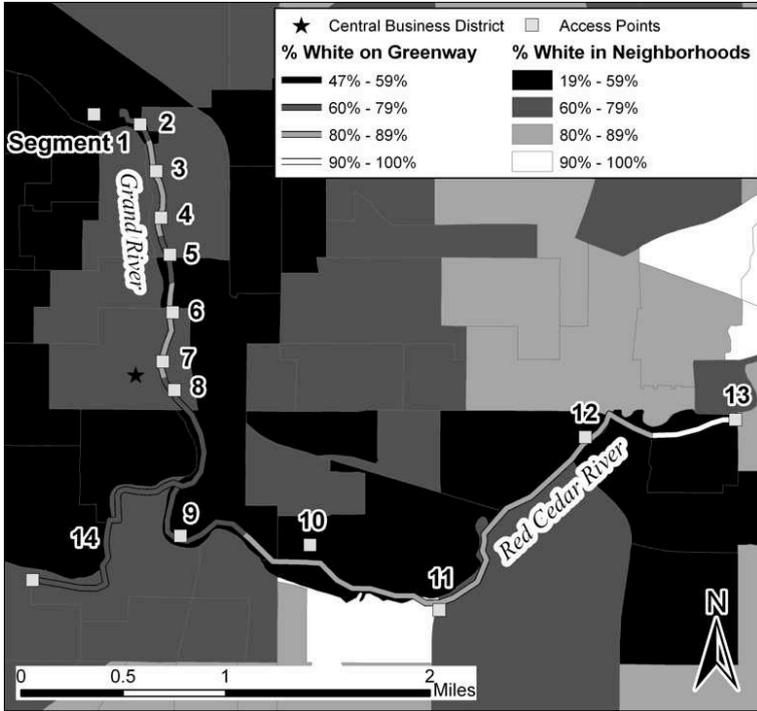


Figure 1. Distribution of Users Per Segment by Race in Lansing

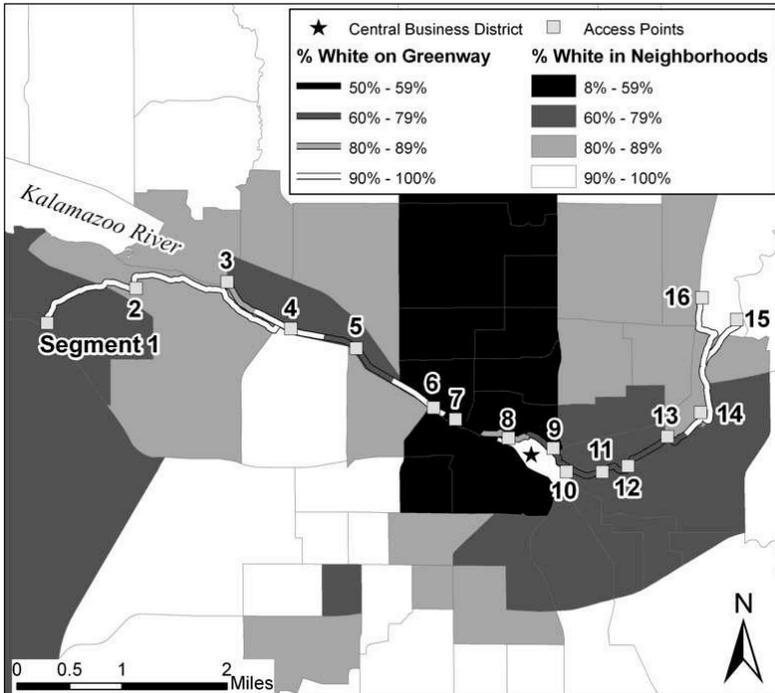


Figure 2. Distribution of Users Per Segment by Race in Battle Creek

Access points provide trail entry and exit for residents of segment neighborhoods. If greater access is linked to greater use, we would expect segment neighborhoods with a higher percentage of African-American residents to have a smaller proportion of white users on nearby segments. Table 2 reveals that in Lansing the proportion of white greenway users is greater than the proportion of white persons in surrounding neighborhoods in all but two cases (segments 1 and 5). Similarly, in Battle Creek the proportion of white greenway users is greater than the proportion of white persons in surrounding neighborhoods in all but two cases (segments 12 and 13).

There does appear to be a pattern in which segments that are somewhat isolated and in wooded areas (adjacent segments 11-13 in Lansing and 1-2 in Battle Creek) display a high proportion of white users (near or above 90 percent). This coincides with findings from the literature which suggest that whites were more comfortable than blacks with more remote and wooded settings (Viriden & Walker, 1999) and another study which revealed that these areas experience a high proportion of overall use (Coutts, 2009).

The descriptive data revealing a possible, but not definitive, pattern between the race of users and race in surrounding neighborhoods are supported by the regression analysis. The regression results in Table 3 reveal that the racial composition of segment neighborhoods is not a significant predictor of the racial composition of greenway users on corresponding segments in either city. However, the proportion of users who were female and the proportion who were seniors or children were both significant predictors of the proportion of white users on a greenway segment.

Table 3

Regression Results with the Dependent Variable of Proportion of White Users and Greenway Segments

Variables	β	SE	p
% white in neighborhood	5.67	16.77	0.74
% female users	0.41	0.07	0.00
% children/senior users	0.30	0.08	0.00
Land use mix	0.002	0.00	0.13
Population density	-0.002	0.00	0.60
City	8.23	6.78	0.24

Because greenway segments were not selected randomly and therefore are likely to have many similarities, Moran's I tests were performed to test for spatial autocorrelation among the dependent variable. The distribution of white users was random in Battle Creek (0.18, $p > 0.05$) but somewhat clustered in Lansing (0.43, $p < 0.01$). If this clustering were found to be more pronounced in the two cities, it may have led to inflated standard errors and potential Type II error. If significant clustering occurs, introducing a coefficient in the model that corrects for spatial autocorrelation can prevent such errors. We feel that it was not warranted here, but future studies examining spatial phenomena such as this should certainly test for this possibility. Although not examined here, this clustering of use on certain segments could certainly have an effect on how hospitable certain segments are perceived by persons of other races or ethnicities. The dynamic between race on these segments and in the surrounding neighborhoods may be different than the non-relationship found in the overall dynamic in the two cities.

Discussion

If greenways serve neighborhoods and not just communities (Furuseth & Altman, 1994) and if access through proximity leads to use, we would expect to find a relationship between the racial composition of the neighborhoods surrounding the greenway and the users on corresponding segments. This was not the case. Despite the equitable proximity to access points, we did not find a significant pattern of a higher proportion of African-Americans using the greenway on segments in neighborhoods with a higher proportion of African-American residents nor of white users on segments in white neighborhoods.

If, on the other hand, greenways serve larger communities, they may provide a public space in which people of different races coexist regardless of how close they live to access points. For this potential to be realized, all greenway segments need to be perceived as traversable, not as barriers. Unlike parks, the design of greenways as corridors and paths inherently encourages movement along their route, but the extent of this movement does not appear to be hindered by the racial disparity between users and those living around the greenway. In both Lansing and Battle Creek, the multi-use paths of interest traverse and connect neighborhoods with different racial compositions, but neither the descriptive nor inferential results reveal an association between the racial composition of trail segment users and the racial composition of the neighborhoods with access to the segment. This is promising in that greenways appear to be acting as "green magnets" (Gobster, 1998) or links between neighborhoods and potentially between neighborhoods and services where people of different races might coexist.

Limitations

The major limitation of this study lies in the inability to identify the users' neighborhoods of origin. It is certainly a possibility that the small percentage of African-Americans living in a white neighborhood are the ones using their local greenway segment, thereby giving the appearance of persons of one race using the greenway in an area dominated by another. The converse could also be true

with local whites using a section of the greenway in their predominantly African-American neighborhood. Data on a user's residence and location for entering the greenway system would be needed to investigate this possibility. These data would need to be collected through a survey. What a survey might also help clarify are differences in race/ethnicity not readily distinguishable through the nonobtrusive methods employed here. For example, data collected on Hispanic ethnicity could prove valuable to understanding the unique use patterns and behaviors of this population (Cronon et al., 2008).

Finally, the generalizability of these findings should be tempered by the fact that this census of greenway segments was performed on two greenways in two relatively small cities (<150,000 persons). The dynamic in a major metropolitan area may be different.

Recommendations for Future Research

An example of a research methodology that would complement the nonobtrusive method employed here is a survey of users which queries their locations for entering, traversing, and exiting the system and their stated reasons for doing so. These data could be coupled with GIS to analyze spatial patterns. These patterns are important for determining the types of neighborhoods that users live in and the length of trips they take using the greenway. These survey data could also include information on the trip type and the socioeconomic status (SES) of the user. Indeed, SES may prove more informative than race in characterizing users and the neighborhoods they will and will not enter.

Carrying out such a survey would require a sensitivity to access points and geographic clustering of uses. Surveyors would need to be stationed at spatially stratified access points to ensure an adequate representation for each segment of persons from racially and ethnically diverse neighborhoods surrounding the greenway.

Another possible avenue of future research is testing the possible phenomenon of use by African-Americans being inhibited by typical greenway users being overwhelmingly white. This would be consistent with the findings of other studies that reveal that persons use parks if others like them are also using the space (Ho et al., 2005). Further research is certainly needed that probes reasons for potential non-use of greenways by residents living near access points.

Yet another vein might be the testing of Floyd and Shinew's (1999) theory on the convergence of leisure activity preferences. Follow-up studies might explore whether the ability of the greenway to connect and create contact between persons leads to a convergence of leisure activity preferences. There may very well be a convergence of activities (such as bike riding) due to not only the design and facilities of the greenway but also because of the contact and observed behavior of other users.

In conclusion, this exploratory study is certainly not the definitive piece supporting the potential for greenways to lead to harmony between diverse urban populations. It may even raise more questions than it answers. For example: Does the origin of the greenway user matter in whether they are willing to traverse different neighborhoods? What is it about the greenway that allows users to enter

neighborhoods they otherwise would not? Are persons using the greenway to traverse diverse neighborhoods out of choice for leisure activity or due to lack of choice, for utilitarian purposes such as to travel to work or to purchase goods? Urban greenways are ripe for research examining their potential to connect people to places and to one another.

References

- Abildso, C., Zizzi, S., Abildso, L., Steele, J., & Gordon, P. (2007). Built environment and psychosocial factors associated with trail proximity and use. *American Journal of Health Behavior, 31*, 374-383.
- Antonakos, C. (1994). Environmental and travel preferences of cyclists. *Transportation Research Record, 1438*, 25-33.
- Brownson, R. C., Housemann, R. A., Brown, D. R., Jackson-Thompson, J., & King, A. C. (2000). Promoting physical activity in rural communities: Walking trail access, use, and effects. *American Journal of Preventive Medicine, 18*(3), 235-241.
- Brownson, R. C., Baker, E. A., Housemann, R. A., Brennan, L. K., & Bacak., S. J. (2001). Environmental and policy determinants of physical activity in the United States. *American Journal of Public Health, 91*, 1995-2003.
- Centers for Disease Control and Prevention. (2007, April). Prevalence of fruit and vegetable consumption and physical activity by race/ethnicity-United States, 2005. *Morbidity and Mortality Weekly Report, 56*(13), 301-304.
- Centers for Disease Control and Prevention. (2010). How should one choose a data classification method? Retrieved on October 13, 2010 from <http://www.cdc.gov/brfss/maps/faqs.htm>.
- Cordell, H., Betz, C., & Green, G. (2002). Recreation and the environment as cultural dimensions in contemporary American society. *Leisure Sciences, 24*, 13-41.
- Coutts, C. (2008). Greenway accessibility and physical activity behavior. *Environment and Planning B: Planning and Design, 35*(3), 552-563.
- Coutts, C. (2009). Locational influence of land use type on the distribution of uses along urban river greenways. *Urban Planning and Development, 135*(1), 31-38.
- Cronan, M., Shinew, K., & Stodolska, M. (2008). Trail use among Latinos: Recognizing diverse uses among a specific population. *Journal of Park and Recreation Administration, 26*(1), 62-86.
- Fabos, J., & Ahern, J. (Eds.). (1995). *Greenways: The beginning of an international movement*. New York: Elsevier.
- Floyd, M. (1998). Getting beyond marginality and ethnicity: The challenge for race and ethnic studies in leisure research. *Journal of Leisure Research, 30*(1), 3-22.
- Floyd, M., & Shinew, K. (1999). Convergence and divergence in leisure style among whites and African Americans: Toward an interracial contact hypothesis. *Journal of Leisure Research, 31*(4), 359-384.

- Folsom, A., Cook, T., Sprafka, J., Burke, G., Norsted, S., & Jacobs Jr., D. (1991). Differences in leisure-time physical activity levels between blacks and whites in population-based samples: The Minnesota heart survey. *Journal of Behavioral Medicine*, 14(1), 1-9.
- Furusest, O., & Altman, R. (1994). Who's on the greenway? Socioeconomic, demographic and locational characteristics of greenway users. *Environmental Management*, 15(3), 329-336.
- Gobster, P. (1995). Perception and use of a metropolitan greenway system for recreation. *Landscape and Urban Planning*, 33, 401-413.
- Gobster, P. (1998). Urban parks as green walls or green magnets? Interracial relations in neighborhood boundary parks. *Landscape and Urban Planning*, 41, 43-55.
- Gobster, P. (2002). Managing urban parks for a racially and ethnically diverse clientele. *Leisure Sciences*, 24(2), 143-159.
- Ho, C., Sasidharan, V., Elmendorf, W., Willits, F., Graefe, A., & Godbey, G. (2005). Gender and ethnic variations in urban park preferences, visitation, and perceived benefits. *Journal of Leisure Research*, 37(3), 281-306.
- Humpel, N., Owen, N., Leslie, E., Marshall, A., Bauman, A., & Sallis, J. (2004). Associations of location and perceived environmental attributes with walking in neighborhoods. *American Journal of Health Promotion*, 18(3), 239-242.
- Lindsey, G. (1999). Use of urban greenways: Insights from Indianapolis. *Landscape and Urban Planning*, 45, 145-157.
- Lindsey, G., Drew, J., Hurst, S., & Galloway, S. (2001). Summary report: Indiana trails study. Retrieved on October 22, 2009 from Indiana Department of Transportation Web site at <http://www.in.gov/indot/div/projects/indianatrails/pubs/b-Acknowledgements.pdf>
- Lindsey, G., Maraj, M., & Kuan, S. (2001). Access, equity, and urban greenways: An exploratory investigation. *The Professional Geographer*, 53(3), 332-346.
- Lindsey, G., & Nguyen, D. (2004). Use of greenway trails in Indiana. *Journal of Urban Planning and Development*, 130(4), 213-217.
- Lindsey, G., Han, Y., Wilson, J., & Yang, J. (2006). Neighborhood correlates of urban trail use. *Journal of Physical Activity and Health*, 3(S1), S139-S157.
- Little, C. E. (1990). *Greenways for America*. Baltimore, MD: Johns Hopkins University Press.
- Loukaitou-Sideris, A. (1995). Urban form and social context: Cultural differentiation in the uses of urban parks. *Journal of Planning Education and Research*, 14, 89-102.
- Philipp, S. (1999). Are we welcome? African American racial acceptance in leisure activities and the importance given to children's leisure. *Journal of Leisure Research*, 31(4), 385-403.
- Reed, J. A., Ainsworth, B. E., Wilson, D. K., Mixon, G., & Cooke, A. (2004). Awareness and use of community walking trails. *Preventive Medicine*, 39, 903-908.
- Reynolds, K., Wolch, J., Byrne, J., Chou, C. P., Feng, G., Weaver, S., & Jerrett, M. (2007). Trail characteristics as correlates of urban trail use. *Journal of Health Promotion*, 21, 1-12.

- Rodriguez, D., & Joo, J. (2004). The relationship between non-motorized mode choice and the local physical environment. *Transportation Research D*, 9, 151-173.
- Sharpe, P., Granner, M., Hutto, B., & Ainsworth, B. (2004). Association of environmental factors to meet physical activity recommendations in two South Carolina counties. *American Journal of Health Promotion*, 18(3), 251-257.
- Shinew, K., Glover, T., & Parry, D. (2004). Leisure spaces as potential sites for interracial interaction: Community gardens in urban areas. *Journal of Leisure Research*, 36(3), 336-355.
- Shinew, K. J., Stodolska, M., Floyd, M., Hibbler, D., Allison, M., Johnson, C., et al. (2006). Race and ethnicity in leisure behavior: Where have we been and where do we need to go? *Leisure Sciences*, 28(4), 403-408.
- Solecki, W., & Welch, J. (1995). Urban parks: Green spaces or green walls? *Landscape and Urban Planning*, 32(2), 93-106.
- Talen, E. (1998). Visualizing fairness: Equity maps for planners. *Journal of the American Planning Association*, 64, 22-38.
- Troped, P., Saunders, R., Pate, R., Reiningger, B., Ureda, J., & Thompson, S. (2001). Associations between self-reported and objective physical environmental factors and use of a community rail-trail. *Preventive Medicine*, 32, 191-200.
- Virden, R. J., & Walker, G. J. (1999). Ethnic/racial and gender variations among meanings given to, and preferences for, the natural environment. *Leisure Sciences*, 21, 219-239.
- Wolch, J., Tatalovich, Z., Spruijt-Metz, D., Byrne, J., Jerrett, M., Chou, C., et al. (2010). Proximity and perceived safety as determinants of urban trail use: Findings from a three-city study. *Environment and Planning A*, 42, 57-79.