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Investigating Issues of Environmental Injustice in Neighborhoods Surrounding Parks

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Abstract

Parks are important resources for facilitating community health. Using an environmental justice framework, this study in Kansas City, Missouri examined disparities by income and race/ethnicity for bordering land uses, densities of incivilities (e.g., vandalism, litter), unhealthy retail establishments in neighborhoods surrounding parks. Low and medium income and high minority park neighborhoods were more likely to be surrounded by higher densities of incivilities and to have a moderate density of FF restaurants. Low-income park neighborhoods were five times more likely to have a moderate density of other unhealthy establishments compared to parks in high-income areas. Future research and environmental justice efforts should explore policies that reduce unhealthy characteristics of park neighborhoods to encourage increased usage of these important community settings.

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Introduction

Obesity is an expanding public health issue in the United States as associated morbidity and mortality rates continue to rise (Dietz, 1998; Olshansky et al., 2005; Reilly et al., 2003; Trasande, 2010). The 2008 *Physical Activity Guidelines for Americans* recommend 150 minutes of physical activity for adults and one hour daily for children (USDHHS, 2008), but adherence to these recommendations is poor (Centers for Disease Control and Prevention [CDC], 2009; CDC, 2011). Likewise, although awareness of nutrition guidelines, such as consuming five servings of fruits and vegetables per day, has increased from 8% to 40% since 1991, consumption trends have remained the same, with fewer than 1 in 10 Americans consuming the recommended amount of fruit and vegetables (CDC, 2011). Further, levels of obesity, poor eating habits, and inactivity are more problematic among low income and racial and ethnic minority groups (CDC, 2011).

Ecological models suggest that health is a shaped and constrained by the environments in which we live (Bronfenbrenner, 1979; Lee & Cubbin, 2009; Sallis, Owen, & Fisher, 2008; Spence & Lee, 2003). Obesogenic environments have been defined as the "sum of influences that the surroundings, opportunities, or conditions of life have on promoting obesity in individuals or populations" (Swinburn, Egger, & Raza, 1999, p. 564). Evidence has shown that the obesogenicity of an environment is an impacting factor on escalating obesity rates (Sallis, Nader, & Atkins, 1986; Hill & Peters, 1998; Koplan & Dietz, 1999; Swinburn, Egger, & Raza, 1999; Reidpath et al., 2002). One element of obesogenic environments is the built environment, which includes a community's physical design, land use patterns, and transportation systems (Handy et al., 2002).

Improving elements of the built environment may be key to addressing obesity disparities, especially in communities of color (Floyd, Taylor, & Whitt-Glover, 2009; Sallis, Floyd, Rodriguez, & Saelens, 2012). As one solution, researchers and public health professionals have argued for increased access to places that encourage physical activity, such as parks and playgrounds (Bedimo-Rung, Mowen, & Cohen, 2005; Blanck et al., 2012; Cohen et al., 2007; Godbey, Caldwell, Floyd, & Payne, 2005; Kaczynski & Henderson, 2007; Moody et al., 2004). Indeed, a growing body of evidence supports that both proximity to parks and open spaces as well as the design and quality of such resources are important for facilitating park use and a wide variety of physical and mental health benefits (Floyd et al., 2011; Maas et al., 2009; Kaczynski, Potwarka, & Saelens, 2008; Kaczynski, Potwarka, Smale, & Havitz, 2009; Lee and Mahweswaran, 2011; Payne et al., 2005; Sugiyama, Middleton, Owen, & Giles-Corti, 2010;).

Although parks are widely regarded as important community resources for health promotion, much research has reported that parks are often less prevalent and/or contain fewer features or poorer quality spaces in lower income and higher minority areas (Crawford et al., 2008; Estabrooks, Lee, & Gyurcsik, 2003; Gordon-Larsen, Nelson, Page, & Popkin, 2006; Joassart-Marcelli, 2010; Macintyre, 2000; Moore, Diez Roux, Evenson, McGinn, & Brines, 2008; Timperio, Ball, Salmon, Roberts, & Crawford, 2007; Vaughan et al., 2013; Wolch et al., 2005). This differential access to public facilities increases the burden on one population group while providing benefits to another; as such, this is an environmental justice issue that warrants attention for its implications for health and health disparities (Cutts, Darby, Boone, & Brewis, 2009; Sister, Wolch, & Wilson, 2010). Environmental justice is a theoretical framework as well as an action-oriented social movement that seeks to understand how environmental amenities and disamenities are distributed based on sociodemographic characteristics and to ameliorate these disparities for the benefit of all (Agyeman, 2005; Pellow, 2000; Taylor, Poston, Jones, & Kraft, 2006).

While several studies have explored inequities in access to park space and features, examining disparities in the characteristics of neighborhoods *around* parks is also an important

environmental justice issue, and one which been considered less often to date. Research into the neighborhood context around parks may be important for encouraging or discouraging visitation and use of parks (Kaczynski, Koohsari, Stanis, Bergstrom, & Sugiyama, 2014; Moody et al., 2004). For example, one study found that parks surrounded by greater mixed land use were less likely to be used for physical activity (Kaczynski et al., 2010), but differences in the areas around the parks were not examined by neighborhood income or racial composition. Likewise, an observational study of 28 parks in six Montreal neighborhoods found that in areas where residents had poorer health status, parks were more likely to be located adjacent to industrial sites and multi-lane roads (Coen & Ross, 2006). Baran et al. (2013) examined several measures of the neighborhood built and social environment (e.g., land uses, sidewalks, crime, racial heterogeneity) and found that park size and setting as well as sidewalk availability were positively associate with park usage while crime, poverty and racial diversity of the park neighborhood were negatively associated with park use. In one analysis in New York City that actually explored racial disparities in the neighborhood contexts around parks, it was reported that people of color had access to parks that were disproportionately adjacent to disamenities, including crime, lack of traffic safety, and noxious land uses in comparison to the parks that were accessible to Whites (Weiss et al., 2011).

Other studies have found that *incivilities*, a term used to describe the quality and social order of a neighborhood (Lee et al., 2005), can influence people to avoid being active outdoors (Brownson, Baker, Houseman, Brennan, & Bacak, 2001; Hoehner, Brennan Ramirez, Elliott, Handy, & Brownson, 2005; Miles, 2008). Further, loitering and public drunkenness, which is associated with higher densities of alcohol and/or tobacco shops and bars (Wechsler, Lee, Hall, Wagenaar, & Lee, 2002) have been shown to impact physical activity levels in adolescents and children (Burdette, Wadden, & Whitaker, 2006; Molnar, Gortmaker, Bull, & Buka, 2004). Research also suggests that higher densities of fast food restaurants can impact eating habits, overweight, and obesity (Davis & Carpenter, 2009), which, if located near parks, could decrease the positive health impacts of a community's open space resources.

Taken together, these issues represent a relatively comprehensive focus on the obesogenic nature of environments around parks. Obesogenic environments comprise conditions and circumstances encouraging of unhealthy weight gain and can include factors that limit active use of those environments, such as land uses and incivilities, or issues that contribute to poor nutrition, such as fast food restaurants and other unhealthy retail outlets (Lee, McAlexander, & Banda, 2011). Although parks represent one positive element of neighborhood environments that can promote physical, social, and psychological health, the possibility that they may be situated within obesogenic environments potentially limits their salutogenic potential. The exact properties and impacts of obesogenic environments are becoming better understood through a growing body of research, including how these elements operate in different contexts (Kirk, Penney, & McHugh, 2010; Lake & Townshend, 2006). While research has explored the obesogenic nature of neighborhoods around places such as homes, schools, and worksites (Day & Pearce, 2011; Hoehner et al., 2013; Moore et al., 2013), to our knowledge, little similar attention has been focused on the areas around parks.

Purpose

Given the importance of elements beyond the boundaries of a park, the purpose of this study was to investigate disparities in neighborhood attributes surrounding parks between areas of varying income and racial/ethnic composition. Specifically, this study examined whether

parks located in low-, medium-, and high-income neighborhoods and low, medium, and high racial/ethnic minority areas differed with respect to

- the types of land uses adjacent to the park (e.g., commercial, industrial, institutional, natural, residential);
- the density of types of incivilities in the area bordering the park (e.g., litter, graffiti, vandalism);
- the density of fast food restaurants within a ½ mile buffer around the park; and
- the density of unhealthy retail establishments (e.g., alcohol and/or tobacco shops, bars) within a ½ mile buffer around the park.

This study does not directly examine how types of land uses and densities of incivilities, fast food restaurants, and other unhealthy retail establishments in areas surrounding parks are associated with park use and/or physical activity. However, better understanding the spatial distribution of these factors that have been shown to contribute to the obesogenic environment can illuminate where environmental and policy interventions to rectify disparities in park neighborhoods are needed most.

Methods

Setting and Sample

This study occurred in 2010 in Kansas City, Missouri (KCMO) which covers 313 square miles, including 12,000 acres of parkland, and has approximately one-half million residents (City of Kansas City, Missouri Parks and Recreation Department [KCMO], 2009). The population of KCMO is diverse, with the largest racial group being non-Hispanic Whites (59%), then non-Hispanic Blacks (30%), and Hispanics (10%) (United States Census Bureau [USCB], 2010). KCMO has a median household income of $44,113, with 18.1% of residents at or below the poverty line.

KCMO has a history of residential segregation dating back to the early 1900s. From 1900 to 1930, the Black population increased from 17,567 to 38,574 (Gotham, 2000). With the development of segregationalist real estate practices, a new ideology emerged about the relationship of place, race, and culture creating "racialized urban space" (e.g., "places where specific racial groups lived with culturally specific behavior") (Gotham, 2000, p. 621). Between 1940 and 1970, the level of segregation fluctuated only slightly from 88.0 at the lowest to 91.3 at the highest in that 88.0% to 91.3% of residents were living in a racially homogeneous neighborhood (Sorensen, Taeuber, & Hollingsworth, 1975). Indeed, evidence has suggested that KCMO is one of the most segregated cities in the U.S. (Denton, 1994). Such segregation has negative implications for health. For example, one study examining the relationships between segregation, concentrated poverty, and racial and ethnic health inequalities found that neighborhoods with high concentrations of Blacks or Hispanics had failing infrastructure due to a lack of investment and therefore increased health disparities (LaVeist, Gaskin, & Trujillo, 2011).

The park neighborhood was the unit of analysis for examining disparities in the neighborhoods surrounding parks. A Geographic Information System (GIS) file of all KCMO parks was obtained from the municipality and all parks were visited and audited to determine if they were accessible and useable. Using the edited shape file, within ArcGIS 10, a ½ mile buffer was created around each park polygon (n=165). The ½ mile buffer was chosen given that this distance is consistent with other studies of park neighborhood attributes (Kaczynski et al., 2010) and with the radius from which park usage usually originates. For instance, an unpublished study of ap-

proximately 10 parks in DeKalb County, GA found that more than 80% of park users traveled less than 0.6 miles to get there (D. Merriam, personal communication, April 25, 2014). Further, this buffer size around parks is also employed by the National Center for Environmental Health, Environmental Health Tracking Branch (CDC, 2012). Finally, the ½ mile buffer is consistent with recommendations from the National Recreation and Park Association related to standard park neighborhood service areas (Mertes & Hall, 1996).

Measures

Park neighborhood income and racial composition. After all KCMO census tracts were mapped in ArcGIS, for each park, we determined the area of each intersecting tract falling within the park's buffer. Subsequently, each park was assigned a weighted income and percent minority value based on the area of the park's buffer comprised by intersecting tracts (i.e., if a park's area was divided 60% and 40% between two tracts, the park would be assigned a weighted income or percent minority value based on these proportions and the respective income or percent minority values for the two tracts). Five-year (2005–2009) estimates for median household income and percent minority residents (defined as all non-White and Hispanic White residents) for all tracts were downloaded from the American Community Survey (ACS) website (American Community Survey [ACS], 2010). Once the weighted income and percent minority values were created for each park, these values were used to categorize each park neighborhood as low, medium, or high income and low, medium, or high percent minority by dividing the full set of parks into three even tertiles (Abercrombie et al., 2008; Estabrooks et al., 2003; Powell, Slater, Chaloupka, & Harper, 2006).

Park neighborhood characteristics. Within the neighborhoods around parks, we examined disparities in adjacent land uses, incivilities, and multiple types of unhealthy retail establishments. Data on land uses and incivilities in the area around the park were collected through audits of all parks conducted by two trained research assistants using the Community Park Audit Tool (CPAT) (Kaczynski, Wilhelm-Stanis, & Besenyi, 2012). The CPAT assesses elements of park environments thought to be related to physical activity and contains four primary sections: park information, access and surrounding neighborhood, park activity areas, and park quality and safety. Inter-rater reliability of the CPAT was previously assessed through Kappa and percent agreement statistics, with all but eight items demonstrating at least moderate to perfect agreement and only three items with percent agreement less than 70% (Kaczynski et al., 2012). In this study, land uses were noted as present (yes/no) if they were visible in the surrounding neighborhood from within the park and included five categories: residential, commercial, industrial, institutional, and natural.

The CPAT audits also provided data regarding incivilities visible in the surrounding neighborhood as rated from the perimeter of the park. Each type of incivility was recorded as either present or not using an index of 10 issues (inadequate lighting, litter, vandalism, graffiti, heavy traffic, excessive noise, vacant or unfavorable buildings, poorly maintained properties, lack of eyes on the street, evidence of threatening persons or behavior). Then, the total number of unique types of neighborhood incivilities was divided by the park size to adjust for park/neighborhood frontage (hereafter referred to as a neighborhood incivility density value). While not capturing the full context of the broader surrounding community, this method of using park-based audits to assess types of incivilities in the neighborhood was thought to reasonably reflect the level of disorder visible from or experienced by the park user while also providing a metric that took into account the size of the park and that could be consistently applied across all

parks. The neighborhood incivility density values were then separated into three groups—low, moderate, and high—such that each group contained an approximately equal number of parks (with values of 0/mile^2, 0.01-100/mile^2, and 100/mile^2 of park area, respectively).

For unhealthy retail establishments, a database of North American Industry Classification System codes for all limited service (fast food) restaurants, liquor stores, bars, cocktail lounges, nightclubs, and tobacco stores within KCMO was obtained from the regional planning organization. ArcGIS10 was used to determine the number of each type of unhealthy establishment that fell within each park's half-mile buffer. Fast food restaurants were examined individually, but all other unhealthy establishments were aggregated due to lower totals in each category. The total number of fast food and other unhealthy establishments were divided by the area of the park buffer to create a density measure (establishments/mile^2) for each of the two categories of businesses. Fast food restaurants were then divided into three even categories: low (0/mile^2), moderate (0.01-5.00/mile^2), and high (more than 5/mile^2). Other unhealthy establishments were also categorized into three even groups: low (0/mile^2), moderate (0.01-1.00/mile^2), and high (more than 1/mile^2).

Analyses

Binary or multinomial logistic regression, as appropriate, was used to examine the likelihood of a park being surrounded by each type of land use (yes/no) and by a greater density of neighborhood incivilities (low, moderate, or high), fast food restaurants (low, moderate, or high), and other unhealthy establishments (low, moderate, or high). Separate analyses were conducted for income and percent minority tertiles (the reference groups were high income and low minority). In a few cases, this resulted in categories with a small number of parks where results should be interpreted with more caution, but research suggests that marginal effects (i.e., effects of changes from one category of a predictor to another) in logistic regression are relatively robust to sample size (Bergtold, Yeager, & Featherstone, 2011). All analyses controlled for neighborhood crime incidence, population density, and the proportion of the population < 18 years around each park.

Results

Characteristics of Park Neighborhoods

The mean household income of all the neighborhoods surrounding the 165 parks included in this study was $42,731 (SD=$20,440). The parks were split evenly into three categories labeled low, medium and high income, with 55 parks in each tertile. The low-income category ranged from $14,876 to $28,509 (M=$23,960, SD=$2,996), the medium-income category from $28,930 to $48,177 (M=$37,351, SD=$6,109), and the high-income category from $48,873 to $116,776 (M=$66,881, SD=$15,498). Likewise, the park neighborhoods were split into three tertiles (55 parks each) according to the percentage of minority population. The mean-percent minority for all of the park neighborhoods was 42.5% (SD=29.9%). The high-percent minority neighborhoods ranged from 98.2% to 55.8% (M=79.2%, SD=13.9%), the medium-percent minority category from 55.6% to 19.8% (M=37.0%, SD=10.3%), and the low-percent minority category from 19.6% to 2.8% (M=11.2%, SD=4.1%).

Table 1 shows characteristics across all park neighborhoods in the sample for frequencies of adjacent land uses and densities of incivilities, fast food restaurants, and other unhealthy retail establishments.

Table 1

Neighborhood Characteristics for All Parks

Frequency of Land Uses	N[a]	%
Residential	146	88.5
Institutional	43	26.1
Commercial	41	24.8
Natural	30	18.2
Industrial	9	5.5
Densities	Mean	SD
Neighborhood Incivilities[b]	241.44	580.01
Fast Food Restaurants[c]	7.91	13.8
Other Unhealthy Retail Establishments[c]	1.48	2.42

[a]Number of parks bordered by each type of land use out of 165 total parks in the sample
[b]Mean density of incivilities visible in the surrounding neighborhood per square mile of park area
[c]Mean density of establishments per square mile of park buffer area

Disparities in Neighborhood Attributes Surrounding Parks

Land uses. The first neighborhood variable analyzed was the types of land uses bordering the parks in low, medium, and high income and percent minority areas. As shown in Table 2, there were no significant differences in adjacent land uses by income or percent minority, except that the odds of having adjacent residential land was lower for parks in medium income areas compared to those parks in high income areas (OR=0.28, 95% CI=0.08-0.99).

Incivilities. Table 3 displays the odds of observing a moderate or high density of incivilities in the neighborhood around the park according to the income level and percent minority population in the area. Compared to parks in high income areas, the odds of having a moderate density of incivilities was significantly higher for parks in low and medium income areas (OR_{low}=3.33, 95% CI=1.04-10.68; OR_{medium}=2.91, 95% CI= 1.16-7.28). As well, the risk of experiencing a high amount of incivilities increased by almost ten for park neighborhoods in low income areas in comparison with parks in high income neighborhoods (OR_{low}=9.52, 95% CI= 2.76-32.92). Finally, the risk of experiencing a high amount of incivilities increased by eight in neighborhoods around parks in high minority areas compared to those in low minority areas (OR=7.97, 95% CI= 2.23-28.50).

Fast food restaurants. Table 4 shows the prevalence of fast food restaurants within the park buffer area according to the neighborhood income level and percent minority population. Parks in both low (OR=3.71, 95% CI=1.20-11.46) and medium (OR=4.01, 95% CI=1.45-11.11) income were at a higher risk of being surrounded by a moderate level of fast food restaurants than parks in high income areas. The same was true for parks in high minority areas (OR=4.90, 95% CI=1.48-16.18) compared to low minority areas.

Other unhealthy establishments. Finally, Table 5 depicts the odds of greater densities of other unhealthy retail establishments within the park buffer area according to the income level and percent minority population of the neighborhood around the park. Parks in low income areas were at five times greater risk of being surrounded by a moderate density of other unhealthy establishments compared to parks in high income areas (OR=5.25, 95% CI = 1.68-16.94).

Table 2

Bordering Land Uses by Park Neighborhood Income and Percent Minority

Park Neighborhood Characteristics	Commercial			Institutional			Industrial			Natural			Residential		
	n[a]	OR	95% CI	n[a]	OR	95% CI	n[a]	OR[b]	95% CI	n[a]	OR	95% CI	n[a]	OR	95% CI
Income[c]															
Low	55	14	1.14	0.44-2.97	18	1.39	0.56-3.42	3	0.55	0.12-2.46	9	1.93	0.62-6.04	51	0.68	0.15-3.14
Medium	55	15	1.17	0.47-2.89	12	0.83	0.34-2.07	6	1	n/a	10	1.34	0.49-3.72	44	0.28*	0.08-0.99
High	55	12	1	n/a	13	1	n/a	0	n/a	n/a	11	1	n/a	51	1	n/a
Percent Minority[d]															
High	55	14	1.7	0.61-4.72	17	1.59	0.60-4.22	4	1.2	0.22-6.63	9	1.57	0.47-5.22	51	0.55	0.12-2.63
Medium	55	14	0.81	0.32-2.08	14	1.1	0.45-2.71	5	1	n/a	9	1.01	0.36-2.79	45	0.45	0.14-1.52
Low	55	13	1	n/a	12	1	n/a	0	n/a	n/a	12	1	n/a	50	1	n/a

[a]Number of parks in each income or percent minority group (low, medium, or high) bordered each type of land use

[b]For the industrial land use analyses, the reference groups were medium income and medium percent minority because no parks in the high income or low minority categories were bordered by industrial land (and thus, these groups could not be used in the analyses due to a lack of variability).

[c]The low income category ranged from $14,876 to $28,509 (M=$23,960, SD=$2,996), the medium income category from $28,930 to $48,177 (M=$37,351, SD=$6,109), and the high income category from $48,873 to $116,776 (M=$66,881, SD=$15,498).

[d]The high percent minority neighborhoods ranged from 98.2% to 55.8% (M=79.2%, SD=13.9%), the medium percent minority category from 55.6% to 19.8% (M=37.0%, SD=10.3%), and the low percent minority category from 19.6% to 2.8% (M=11.2%, SD=4.1%).

*p<.05

Table 3

Density of Neighborhood Incivilities by Park Neighborhood Income and Percent Minority

Park Neighborhood Characteristics		Density of Incivilities					
		Moderate			High		
	N	n[a]	OR	95% CI	n[a]	OR	95% CI
Income[b]							
Low	55	11	3.33*	1.04-10.68	36	9.52***	2.76-32.92
Medium	55	18	2.91*	1.16-7.28	21	2.87*	1.01-8.17
High	55	18	1.00	n/a	8	1.00	n/a
Percent Minority[c]							
High	55	14	2.97	0.93-9.47	34	7.97**	2.23-28.50
Medium	55	14	0.69	0.27-1.78	20	1.49	0.53-4.21
Low	55	19	1.00	n/a	1	1.00	n/a

[a]Number of parks in each income or percent minority group (low, medium, or high) within the density category
[b]The low income category ranged from $14,876 to $28,509 (M=$23,960, SD=$2,996), the medium income category from $28,930 to $48,177 (M=$37,351, SD=$6,109), and the high income category from $48,873 to $116,776 (M=$66,881, SD=$15,498).
[c]The high percent minority neighborhoods ranged from 98.2% to 55.8% (M=79.2%, SD=13.9%), the medium percent minority category from 55.6% to 19.8% (M=37.0%, SD=10.3%), and the low percent minority category from 19.6% to 2.8% (M=11.2%, SD=4.1%).
*p<.05
**p<.01
***p<.001

Table 4

Density of Fast Food Restaurants by Park Neighborhood Income and Percent Minority

Park Neighborhood Characteristics		Density of Fast Food Restaurants					
		Moderate			High		
	N	n[a]	OR	95%	n[a]	OR	95%
Income[b]							
Low	55	27	3.71*	1.20-11.46	21	1.79	0.52-6.22
Medium	55	23	4.01**	1.45-11.11	25	2.46	0.79-7.70
High	55	18	1.00	n/a	16	1.00	n/a
Percent Minority[c]							
High	55	36	4.90*	1.48-16.18	13	1.09	0.28-4.16
Medium	55	14	0.84	0.31-2.30	28	0.63	0.21-1.88
Low	55	18	1.00	n/a	21	1.00	n/a

[a]Number of parks in each income or percent minority group (low, medium, or high) within the density category
[b]The low income category ranged from $14,876 to $28,509 (M=$23,960, SD=$2,996), the medium income category from $28,930 to $48,177 (M=$37,351, SD=$6,109), and the high income category from $48,873 to $116,776 (M=$66,881, SD=$15,498).
[c]The high percent minority neighborhoods ranged from 98.2% to 55.8% (M=79.2%, SD=13.9%), the medium percent minority category from 55.6% to 19.8% (M=37.0%, SD=10.3%), and the low percent minority category from 19.6% to 2.8% (M=11.2%, SD=4.1%).
*p<.05
**p<.01

Table 5

Density of Other Unhealthy Retail Establishments by Park Neighborhood Income and Percent Minority

Park Neighborhood Characteristics		Density of Other Unhealthy Establishments					
		Moderate			High		
	N	n[a]	OR	95% CI	n[a]	OR	95% CI
Income[b]							
Low	55	20	5.25**	1.68-16.94	25	2.72	0.93-7.98
Medium	55	13	2.45	0.85-7.08	25	2.08	0.81-5.36
High	55	14	1.00	n/a	9	1.00	n/a
Percent Minority[c]							
High	55	21	2.78	0.88-8.74	17	2.16	0.74-6.38
Medium	55	13	2.07	0.70-6.12	30	2.65	0.99-7.09
Low	55	13	1.00	n/a	12	1.00	n/a

[a]Number of parks in each income or percent minority group (low, medium, or high) within the density category
[b]The low income category ranged from $14,876 to $28,509 (M=$23,960, SD=$2,996), the medium income category from $28,930 to $48,177 (M=$37,351, SD=$6,109), and the high income category from $48,873 to $116,776 (M=$66,881, SD=$15,498).
[c]The high percent minority neighborhoods ranged from 98.2% to 55.8% (M=79.2%, SD=13.9%), the medium percent minority category from 55.6% to 19.8% (M=37.0%, SD=10.3%), and the low percent minority category from 19.6% to 2.8% (M=11.2%, SD=4.1%).
*p<.05
**p<.01
***p<.001

Discussion

Although past literature has explored disparities in park space and features by income or race/ethnicity, only a limited number of studies (e.g., Lovasi et al., 2009; Weiss et al., 2001) have examined sociodemographic disparities in the characteristics of neighborhoods surrounding parks. This oversight potentially obfuscates the health-promoting potential of parks if the environments around them are not similarly conducive to safe and healthful activity and to facilitating obesity prevention.

In this study, there were few significant differences in adjacent land uses across park neighborhood tertiles for income or percent minority population. The environmental justice movement was born out of concerns about the increased burden on underserved populations resulting from disproportionate exposure to potentially harmful land uses (Barnett 2001; Boone et al. 2009; Bullard et al. 2007; Lineberry & Welch, 1974; McLafferty, 1982; Tarrant & Cordell, 1999). These exposures to such things as pollution and hazardous waste have been shown to lead to negative health outcomes, increased stress within the community, a reduction in quality of life, and decreased neighborhood sustainability (Gee & Payne-Sturges, 2004; Wilson, 2009). In the context of parks specifically, previous research has reported that lower health status neighborhoods (e.g., lower life expectancy, higher disease rates) were more likely to have parks bordered by industrial land and higher traffic roads, the latter a potential marker of commercial or retail space (Coen & Ross, 2006). In another study, parks surrounded by a greater variety of land uses

(e.g., residential, commercial, industrial, institutional) were *less* likely to be used for physical activity (Kaczynski et al., 2010). In this analysis, we observed that the land uses adjacent to parks were relatively equally distributed across KCMO. This may be due to municipal planning and exaction regulations that disperse these public goods throughout the community regardless of neighborhood context (Crompton, 1999). Indeed, policymakers and planners should explore mechanisms (e.g., zoning laws, park master planning guidelines) that better mandate that park environments are bordered by similarly inviting and healthful types of land uses. Having said that, this study did not fully examine what *combinations* of land uses specifically surrounded each park or how this impacted access and park usage. Future research should explore the potential effects of proximal zoning decisions on residents' perceptions of and enjoyment of parks and their levels of usage and physical activity therein.

In the current study, there was a higher density of unique types of incivilities in the neighborhoods around parks in lower income and high minority areas. Some research has found that neighborhood disorder and low perceptions of safety have a negative effect on levels of walking and cycling as well as overall physical activity levels (Carver et al., 2005; Molnar et al., 2004) and that increased disorder and deprivation are associated with higher rates of overweight and obesity (Cubbin, Hadden, & Winkleby, 2001; Ellaway, Anderson, & Macintyre, 1997; Kinra, Nelder, & Lewendon, 2000; van Lenthe & Mackenbach, 2002). Residents in lower income and higher minority neighborhoods may perceive parks as unsafe due to incivilities surrounding the park, thus causing them to avoid using the park for physical activity and other social and mental health purposes. Simply increasing the number of parks is likely insufficient to address these issues (Weiss et al., 2001). Given that the quality of the neighborhood surrounding a park is a predictor of engaging in more outdoor activity, this, instead, should be a focus of researchers interested in addressing health disparities and of lawmakers, planning, parks and recreation, and public health officials interested in improving the health of the populations they serve (Miles, 2008; Molnar et al., 2004). Our findings suggest that there is a role for both parties to play in working with underempowered communities to evaluate park and surrounding neighborhood environments and to develop solutions for addressing incivilities and other identified concerns (DeBate et al., 2011).

Parks in low and medium income areas and high minority areas were more likely to be surrounded by a moderate level of fast food outlets. This is consistent with past research reporting that predominantly low income and African American neighborhoods are more likely to contain a greater concentration of fast food restaurants (Block, Scribner, & DeSalvo, 2004; Pearce, Blakely, Witten, & Bartie, 2007; Reidpath, Burns, Garrard, Mahoney, & Townsend, 2002). Other research shows that adults and children living in or attending schools in areas with a greater density of fast food outlets are more likely to be overweight or obese (Davis & Carpenter, 2009; Saelens et al., 2012; Schneider & Gruber, 2005). Given that several studies have reported fewer parks in low income and racial minority neighborhoods (Estabrooks et al., 2003; Moore et al., 2008; Timperio et al., 2007) and, according to the current study, these parks are more likely to be surrounded by unhealthy fast food outlets, this additively contributes to an obesogenic environment and provides another explanation for higher rates of obesity in disadvantaged communities.

Some efforts have targeted restrictions on fast food advertising in more disadvantaged areas and around schools (Schwartz & Ustjanauskas, 2012; Walton, Pearce, & Day, 2009). Community leaders and policy makers should consider similar policies and laws for other community destinations frequented by youth and lower income groups, such as parks. Additionally, parks may be

destinations for active trips within neighborhoods that may include other daily functions as well, such as food purchasing. Therefore, future research should explore how access to *healthful* food options (e.g., supermarkets and corner store initiatives to stock healthy products; Gittelsohn et al., 2010) near parks is associated with adult and youth food buying and consumption behaviors. For example, increasing the availability of fruits and vegetables in a store across the street from a neighborhood park may contribute to a multiplicatively positive effect on neighborhood obesity levels. Conversely, however, greater densities of fast food restaurants within close proximity to parks may attenuate the health benefits associated with park usage, and this ironic injustice merits research and policy attention, especially in low-income and minority communities.

Finally, these findings also revealed a greater density of other unhealthy retail establishments (e.g., bars, tobacco stores, liquor stores) around parks in lower income areas. Increased proximity to such businesses may have detrimental effects on the park and its potential users. For example, increased tobacco store density lowers the total cost of purchasing cigarettes and therefore could lead to an increase in consumption (Schneider, Reid, Peterson, Lowe, & Hughey, 2005). Another study reported that bars located in low income, high minority areas provided increased opportunities for crime (Gruenewald, Freisthler, Remer, LaScala, & Treno, 2006). Overall, a greater density of unhealthy retail establishments surrounding parks could contribute to a negative perception of that park. For example, residents are less likely to use a park if they perceive doing so to be unsafe, regardless of its proximity (Nichol, Janssen, & Pickett, 2010; Tilt, 2010), but research should explore which detrimental neighborhood elements specifically contribute to safety or other concerns. Likewise, park administrators should work together with city planners and neighborhood groups to advocate for zoning laws that restrict the location of unhealthy retail outlets that sully the appeal of parks and other destinations that encourage healthful activities such as physical activity.

Limitations

The findings of this study should be interpreted in light of certain limitations. To begin, we measured land uses bordering the park and incivilities in the surrounding neighborhood through visual audits from within the park. Although this captures concerns visitors must traverse in the area immediately adjacent to the park as well as the potential influence of these factors on the experience of users within the park, it does not account for land uses or incivilities that are less proximal but still within the vicinity of the park. Likewise, the density of unhealthy retail establishments was examined within a one half-mile buffer around the park, but other buffer sizes may have yielded different results. Further, incivilities were measured as the presence, or not, of ten types of incivilities as opposed to the total frequency of these incivilities around the park. We also did not examine an exhaustive list of positive and negative neighborhood attributes that may be important for influencing park use and health. For example, a recent study found that traffic speed around parks can influence park usage (Kaczynski et al., 2014) and future researchers may wish to consider other factors related to safety (e.g., crosswalks) and planning (e.g., population density). Likewise, we were interested in the food and retail environment around the park, but the availability of healthy and unhealthy food and other products *within* the park may be important as well.

Additionally, in this study, multiple racial and ethnic groups were aggregated into a single "percent minority" (non-White) category, whereas differences may exist in predominantly Black or predominantly Hispanic neighborhoods, for example, that should be explored more fully. Likewise, this analysis was conducted in a single, large Midwest city with a history of income and racial/ethnic diversity and segregation. Thus, the parks and attributes of their surrounding

neighborhoods in KCMO may not be generalizable to other settings and future research should explore these environmental justice issues in other areas with varying planning policies and population patterns. Moreover, we did not consider historical or legacy effects contributing to park neighborhood disparities, which would be an important next step. Finally, in the present study, the focus was on neighborhoods surrounding parks as opposed to examining characteristics within parks, as others have done (Crawford et al., 2008; Vaughan et al., 2013). Future research in this area may benefit from examining the correlation and interactive relationship between neighborhood issues and within-park concerns and how this varies across income and racial/ethnic strata.

Conclusion

Our study found few major differences in land uses around parks, but that parks in low income and high minority areas were more likely to be surrounded by higher densities of incivilities, fast food restaurants, and other unhealthy retail establishments. Considerable research has shown that these unhealthy neighborhood characteristics can contribute to increased rates of physical inactivity and overweight and obesity while also counteracting the health-promoting characteristics of parks. In the context of parks, future research and regulatory efforts are needed to explore policies reducing harmful influences in the vicinity of these important community resources in order to reduce real and perceived barriers and to encourage increased park usage and health. As researchers and policy makers work to formulate their research and policy agendas, it may be important to engage the community in the development and decision-making processes. By collaborating with community members, researchers and policy makers can work towards developing strategies that serve the needs of the community on many levels, including neighborhood safety, neighborhood disorder, and neighborhood health (Taylor & Lou, 2011). This comprehensive community effort should prove to be an empowering and productive approach to successfully address park neighborhood disparities in a way that is just for all residents (Taylor et al., 2006).

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