



Research Paper

Using an environmental justice approach to examine the relationships between park availability and quality indicators, neighborhood disadvantage, and racial/ethnic composition



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HIGHLIGHTS

- Detailed audits for 103 public parks in a southeastern U.S. county were completed.
- Park availability was equitably distributed across diverse block groups.
- High disadvantaged block groups were more likely to have park incivilities.
- Associations between park quality and disadvantage varied by minority composition.
- Quality indicators are important when measuring equitable recreation spaces.

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ABSTRACT

Public parks are key community resources that can promote health. Some research has examined whether parks are equitably dispersed across neighborhoods of varying socioeconomic status and racial/ethnic composition, but few studies have examined the interaction of these characteristics. Additionally, the quality of park environments has received limited attention, but is considered integral to utilization of parks. This study examined the relationship between neighborhood disadvantage and park availability and quality and whether neighborhood racial/ethnic composition moderated these associations. A neighborhood disadvantage index was created for all block groups ($n = 255$) in a southeastern U.S. county using Census Bureau data. Detailed audits of all public parks were conducted in 2013 ($n = 103$). Park availability was determined using ArcGIS and four park quality indicators were examined: facilities, amenities, incivilities, and aesthetics. No significant differences were detected between neighborhood disadvantage and number of parks. However, high-disadvantaged neighborhoods had increased park incivilities compared to low-disadvantaged neighborhoods (IRR = 1.93, 95% CI = 1.24, 3.00). Further, neighborhood racial/ethnic composition moderated the associations between park incivilities and amenities and neighborhood disadvantage. Among low-disadvantaged neighborhoods, park incivilities increased as neighborhood minority concentration increased but remained constant in high-disadvantaged neighborhoods. Additionally, among low-disadvantaged neighborhoods, the number of park amenities decreased as neighborhood minority concentration increased but among high-disadvantaged neighborhoods, park amenities increased as neighborhood minority concentration increased. Identifying and rectifying disparities in park quality may be integral to creating equitable park environments across diverse neighborhoods.

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1. Introduction

For several decades, environmental justice research and policy has focused primarily on inequitable exposure to hazardous natural environment elements, such as air pollution, water safety, and

waste sites, among low socioeconomic and racial and ethnic minority groups (Frumkin, 2005). In recent years, environmental health has broadened conceptually to include the built environment, or human-made structures where people live, work, and spend leisure time (Sallis et al., 2006). Elements of the built environment, such as housing, transportation, and parks and green spaces, have increasingly been linked to disparities in health behaviors and outcomes, and thus have also been recognized as integral components of creating healthier communities by promoting healthy behaviors, reducing neighborhood stressors, fostering social resources, and preventing chronic disease (Jackson, Dannenberg, & Frumkin, 2013; Sallis, Floyd, Rodríguez, & Saelens, 2012; Schulz & Northridge, 2004). Given that elements of the built environment have the ability to hinder or facilitate both physical and mental well-being, scholars from a variety of disciplines have expanded the scope of environmental justice research to include exploration of the inequitable distribution of health-promoting features of the built environment (e.g., parks and open green space) among low socioeconomic and racial and ethnic minority groups (Floyd & Johnson, 2002; Taylor, Poston, Jones, & Kraft, 2006). This is in part because disparities in community resources have been hypothesized as one mechanism that contributes to persisting racial and income-related health inequities observed in the United States (Do et al., 2008; Schulz & Northridge, 2004). As researchers have noted a widening health inequality between social classes and racial/ethnic minority groups (Singh & Siahpush, 2006; Williams, Mohammed, Leavell, & Collins, 2010), exploring environmental justice issues may be a needed next step to explain such inequities. Therefore, the purpose of this paper is to explore whether park availability and quality of those resources are equitably distributed according to neighborhood socioeconomic status and racial/ethnic composition.

Public parks and recreational resources are key components of community and neighborhood infrastructure that may promote active living, physical and mental health, and overall well-being across diverse communities (Babey, Hastert, Yu, & Brown, 2008; Bedimo-Rung, Mowen, & Cohen, 2005; Besenyi et al., 2014; Cohen et al., 2007; Coombes, Jones, & Hillsdon, 2010; Kaczynski & Henderson, 2007; Kaczynski, Potwarka, & Saelens, 2008; Wolch et al., 2011). Specifically, public parks offer spaces (e.g., open green space) and facilities (e.g. trails, baseball fields) for individuals to participate in physical activity (Floyd, Spengler, Maddock, Gobster, & Suau, 2008; Kaczynski et al., 2008; Shores & West, 2008). Also, these facilities have demonstrated psychological and social benefits to individuals by reducing stress and mental fatigue (Ward Thompson et al., 2012), creating a sense of wellness (Broyles, Mowen, Theall, Gustat, & Rung, 2011; Stigsdotter et al., 2010), and increasing social interaction and social cohesion among neighbors (Peters, Elands, & Buijs, 2010). Overall, parks are low to no-cost resources for residents that offer both structured and unstructured opportunities for leisure and physical activity.

A growing body of research has examined the distribution of public parks and recreational resources by neighborhood socioeconomic status (SES) or racial/ethnic composition. Findings from these studies have been largely mixed on the direction and magnitude of these associations. Some studies have reported that parks and recreational spaces are less available in low SES and high minority communities (Estabrooks, Lee, & Gyurcsik, 2003; Harris, Paul, Young, Zhang, & Fulton, 2015; Powell, Slater, & Chaloupka, 2004; Taylor et al., 2006). For example, a nationally representative study found that low SES as well as high racial/ethnic minority Census block groups were less likely to have physical activity facilities like parks and recreation spaces compared to high SES and low racial and ethnic minority block groups (Gordon-Larsen, Nelson, Page, & Popkin, 2006). Conversely, other studies have found no differences in park availability across low, medium, and high income neighborhoods or neighborhoods of varying racial composition

(Gilliland, Holmes, Irwin, & Tucker, 2006; Nicholls, 2001) or have found a higher availability of park, recreational, or green space in low-income and high minority areas compared to higher-income and low minority areas (Boone, Buckley, Grove, & Sister, 2009; Sister, Wolch, & Wilson, 2010; Vaughan et al., 2013). Although these studies have made valuable contributions to understanding whether the total availability of park resources is equitably distributed across neighborhoods, at least three areas of inquiry merit greater attention: (1) the quality of park and recreational resources; (2) advancements in the indicators used to investigate environmental justice issues; and (3) analyses that examine the interaction between neighborhood SES and racial/ethnic minority composition. These issues are described further below.

First, in a widely-acknowledged conceptual framework that details how parks can positively influence health behavior, quality is recognized as an under-studied yet critical component of public parks and recreational spaces (Bedimo-Rung et al., 2005). Examining park quality is important because research has indicated that the quality, including facilities and amenities of park environments contribute to whether residents visit and are active in those settings (Giles-Corti et al., 2005; Stanis, Schneider, Shinew, Chavez, & Vogel, 2009). Indeed, a recent study found that park quality indicators such as cleanliness and perceived benefits of parks were related to physical activity and body mass index (Bai, Stanis, Kaczynski, & Besenyi, 2013). As well, a review of studies that examined relationships between park use and park characteristics noted that specific park facilities, like play structures and walking trails, as well as positive aesthetic features were critical for drawing park visitors and facilitating physical activity (McCormack, Rock, Toohey, & Hignell, 2010). Despite such findings, little research has examined whether there are disparities in the quality of park resources, in addition to park availability, across neighborhood SES and racial/ethnic minority composition. For example, one study in Kansas City found that lower income census tracts had higher availability of parks but that the parks in those areas were more likely to contain incivilities (e.g., vandalism, excessive litter) and fewer aesthetic features (e.g., artistic features, water feature) than those in medium and high income census tracts (Vaughan et al., 2013). Similarly, a study examining racial and income-related disparities in neighborhood recreational resources found that although high poverty areas had more accessibility to such spaces, parks and playgrounds were perceived as less safe and comfortable for participation in outdoor physical activity, which could detract from actual park visitation (Franzini et al., 2010). Since the primary focus of most previous research has been on the presence or availability of park facilities, increased attention is needed to determine if the quality of parks and recreational facilities, including characteristics such as facilities and amenities, are equitably distributed across communities by SES and race/ethnicity (Floyd, Taylor, & Whitt-Glover, 2009; Taylor et al., 2006).

Another issue when examining the distribution of built environment resources across neighborhood environments is the inconsistency in how neighborhood socioeconomic characteristics are measured. The most common approach is to use single economic indicators such as median household income or education to assess if a neighborhood is “advantaged” or “disadvantaged” (Gordon-Larsen et al., 2006; Powell, Slater, Chaloupka, & Harper, 2006; Vaughan et al., 2013). Only a few studies have used indices that combine multiple socioeconomic indicators, even though they may be more appropriate (Crawford et al., 2008; Estabrooks et al., 2003). Socioeconomic indices include several variables that represent different aspects of advantage or disadvantage for a given area. For neighborhood disadvantage, indices usually include a number of measures related to poverty, including income, education levels, and employment. Combining multiple socioeconomic measures better represents the concentration of neighborhood disadvantage; persistent and concentrated disadvantaged neighborhoods

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