ENVIRONMENTAL JUSTICE AND PHYSICAL ACTIVITY: EXAMINING DISPARITIES IN ACCESS TO PARKS IN KANSAS CITY, MISSOURI

by

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Abstract

Background: Parks are key community assets for promoting physical activity, especially in low income areas where other accessible, low cost resources may not be available. However, some evidence suggests these integral resources are not equitably distributed. The primary purpose of this study was to examine disparities in park availability, features, and quality across socioeconomically and racially diverse census tracts (CTs) in Kansas City, Missouri (KCMO).

Methods: All parks in KCMO were mapped using GIS shape files provided by the City of KCMO. Park features and quality were determined via on-site audits using the Community Park Audit Tool. Data from the American Community Survey were used to designate all 174 CTs within KCMO as either low, medium, or high income and percent minority. MANCOVA was used to analyze differences in park availability, features, and quality across income and race/ethnicity tertiles.

Results: Low income CTs contained significantly more parks (M=1.46) than medium (M=1.25) or high (M=1.00) income CTs, but also had more quality concerns (e.g., vandalism) per park. High income CTs contained more playgrounds per park (M=.69) than low (M=.62) and medium (M=.52) income tracts. There were more basketball courts per park in high minority CTs (M=.59) than low (M=.13) or medium (M=.30) minority CTs, and more trails per park in low (M=.60) and medium (M=.55) minority CTs than high (M=.39) minority CTs. Finally, there were more sidewalks around parks in low (M=.87) and high (M=.74) income CTs than medium (M=.61) income CTs.

Conclusions: This study adds to an important body of literature examining income and racial disparities in access to active living environments. Park availability was greater in low income areas, but several key park characteristics were less common in low income or high minority areas. Future research should consider the quality of park facilities and amenities and the composition of neighborhoods around parks, as well as how disparities in access to park environments are associated with physical activity and health outcomes. Public health and parks and recreation researchers and practitioners should work together to examine policies that contribute to and that might rectify disparities in access to safe and attractive parks and open spaces.

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Chapter 1 - Introduction

Background and Significance

Obesity has reached epidemic proportions in the United States. The vast majority of adults (>65%) are overweight or obese (Flegal, Carroll, Ogden, & Curtin, 2010). Overweight is classified as a body mass index (BMI) of 25-29.9, while obesity is classified as a BMI of 30 or more (Centers for Disease Control and Prevention [CDC], 2009a). Carrying excess body weight is not only detrimental to the individual; the annual economic cost of obesity and obesity-related diseases in the United States is approximately $147 billion, half of which is directly financed by Medicare and Medicaid (Finkelstein, Trogdon, Cohen, & Dietz, 2009). Obesity is significantly associated with an increased risk for numerous health concerns, such as high blood pressure, diabetes, high cholesterol, heart disease, depression, compromised health status, and premature morbidity and mortality (CDC, 2009b; National Center for Chronic Disease Prevention and Health Promotion, 2010).

Engaging in regular physical activity can greatly reduce the risk of obesity and obesity-related chronic diseases (CDC, 2011a; United States Department of Health and Human Services [USDHHS], 2008; USDHHS, 1996). Some of the most predominant benefits of meeting physical activity guidelines include controlling weight; reducing risk for cardiovascular disease, type two diabetes, metabolic syndrome, and some cancers; strengthening bones and muscle tissues; improving mental health and mood; improving one's ability to accomplish activities of daily living; avoiding falls (in older adults); and increasing life longevity (CDC, 2011b). The USDHHS provides physical activity guidelines in three categories, including those for children and adolescents (age 6-17), adults (age 18-64), and older adults (age 65+). Children and

adolescents should engage in 60 or more minutes daily, incorporating muscle and bone strengthening exercises. For health benefits, it is prescribed that adults engage in at least 150 minutes per week of moderate intensity physical activity or 75 minutes per week of vigorous intensity physical activity. However, for adults to achieve increased health benefits, they should engage in 300 minutes per week of moderate intensity physical activity or 150 minutes of vigorous intensity physical activity. Guidelines for older adults (over age 65) are the same as for adults, with the exception of those who have a disabling chronic disease, at which point the individual should be as physically active as their ability and condition allows (USDHHS, 2008). Or, individuals can engage in a combination of the moderate and vigorous exercise recommendations to gain health benefits. Despite these recommendations, only 43% of adults engage in at least the minimum amount of leisure-time physical activity recommended, and 36.2% of adults do not engage in any leisure-time physical activity (CDC, 2011c). Additionally, only about one-third of youth meet recommended levels of physical activity (Eaton, Kann, Kinchen, Shanklin, Ross, & Hawkins, et al., 2008)..

A Social Ecological Approach

The obesity epidemic did not occur due to any single reason and therefore it will not be solved in one simple way. A social ecological perspective and a holistic point of view are needed to address obesity and cure related issues. The social ecological model is comprised of five levels, accounting for internal and external underpinnings of behavior. They include intrapersonal, interpersonal, institutional, community, and societal factors (Hayden, 2009). Ecological models aim to promote behavior change via changes in the physical as well as social environments (McLeroy, Bibeau, Steckler, & Glanz, 1988). The built environment is a key component of the social ecological model, and changes therein can be influenced on the

institutional, community, and societal levels. Significant factors in the built environment that influence physical activity include neighborhood walkability, street connectedness, proximity to public and private recreational facilities, and the presence of sidewalks (Bauman & Bull, 2007; Gebel, Bauman, & Petticrew, 2007; Saelens & Handy 2008). Public parks are a major component of public recreational facilities and their proximity, accessibility, design and quality are all important elements that determine their usage and their influence on population-level physical activity. Carnoske and colleagues (2010) found that activity-friendly traditional neighborhood designs are increasing in demand, but creating such communities requires considerable thought and planning. Indeed, the attributes of the community are important determinants of physical activity (Sallis et al., 2010). Overall, activity-friendly neighborhoods are desirable places to live and play, although such behaviors are dependent upon the features' available and the users' preferences.

Parks and Physical Activity

Public parks offer several physical activity opportunities and are present in most communities at low or no cost (Godbey, Caldwell, Floyd, & Payne, 2005). In general, parks are important in facilitating recreational and leisure time physical activities (Henderson, 2007; Loukaitou-Sideris & Sideris, 2010). Research on parks and physical activity promotion reinforces that parks are viewed as potential settings for engagement in physical activity, so much so that parks have a broad public health impact (Bedimo-Rung, Mowen, & Cohen, 2005). This is due partially to their low cost and ability to reach a large portion of the population (Moody et al., 2004). Studies have been conducted interviewing park users who indicated engaging in physical activity (70%), and who identified parks as the most common place where they exercised (60%) (Wilhelm Stanis, Schneider, & Anderson, 2009; Wilhelm Stanis,

Schneider, Shinew, Chavez, & Vogel, 2009). Also, observational studies have found that approximately 40% of park use is observed as physically active (Cohen et al., 2007; Floyd, Spengler, Maddock, Gobster, & Suau, 2008). Access to green spaces in urban areas has been shown to increase the likelihood that the residents who live in close proximity thereto will meet physical activity recommendations (Coombes, Jones, & Hillsdon, 2010). Parks not only provide physical benefits, but also mental benefits for users, such as decreased stress levels, decreased depression and sadness, and increased confidence and self-efficacy, thereby contributing to overall better health status (Dustin, Bricker, & Schwab, 2010; Payne, 2002).

Researchers have found a positive correlation between an individual's proximity to parkland and physical activity engagement (Cohen et al., 2007; Roemmich, Epstein, Raja, Yin, & Robinson, 2006). Increasing availability and accessibility to parks may also reduce sedentary activity time (Carson, Kuhle, Spence, & Veugelers, 2010). As well, particularly among youth, access to parks and the perception of relative proximity and safety are key determinants of engaging in physical activity, regardless of spatial proximity to the park (Nichol, Janssen, & Pickett, 2010; Tilt, 2010).

The features (i.e. facilities and amenities) of a park may be just as important in promoting physical activity as the existence of the park itself, or its proximity to users to provide venues to engage in recreational activities (Kaczynski, Potwarka, & Saelens, 2008). For example, public parks provide access to such facilities as walking trails, playgrounds, various sports fields, swimming pools, and splash pads, among other features that may facilitate physical activity for children and adults. Research shows that a variety of park features promote moderate to vigorous physical activity for all ages (Kaczynski & Havitz, 2009; Loukaitou-Sideris & Sideris, 2010; Shores & West, 2008). Survey data has shown that the two most important site attributes

for physical activity engagement are the presence of a path and site beauty (Wilhelm Stanis, et al., 2009). The characteristics of parks should reflect users' preferences in order to promote the greatest use and increased physical activity levels (Hino, Reis, Ribeiro, Parra, Brownson, & Fermino, 2010). Overall, not only does the presence and proximity to residents of a park determine usage, but also the features present therein.

Programs, amenities, and quality can also influence a park's utilization (Leslie, Cerin, & Kremer, 2010; Perry, Saelens, & Thompson, 2011). The quality in terms of condition of a park's facilities and amenities are influential on park use (Perry et al., 2011). However, there has been minimal research conducted on the relationship between park condition and park usage for physical activity and health.

Disparities in Park Availability

The fair distribution of community resources, or environmental justice, is an increasing societal concern, including as it relates to physical activity (Cutts, Darby, Boone, Brewis, 2009). Research suggests that in certain demographic areas, monies spent per capita on public recreational resources are significantly lower in neighborhoods with a greater ethnic or minority population (Joassart-Marcelli, 2010; Wolch, Wilson, & Fehrenbach, 2005).

Access to environmental resources that stimulate physical activity also varies according to the demographic characteristics of the neighborhood. For example, there is mounting evidence of unequal distribution of parks and recreation spaces in areas of higher minority population and/or lower socioeconomic status residents (Estabrooks, Lee, & Gyurcsik, 2003; Moore, Diez-Roux, Evenson, McGinn, & Brines, 2008; Powell, Slater, Chaloupka, & Harper, 2006). Further research has shown that the condition of parks measured through material disadvantages were worse in neighborhoods of poor health status (Coen & Ross, 2006).

Correspondingly, living in socially disadvantaged census tracts is associated with child obesity (Grow et al., 2010). Additionally, teens living in more highly-concentrated neighborhoods and those with a higher proportion of poverty are less likely to engage in physical activity and have decreased access to parks (Babey, Hastert, & Brown, 2007). This unequal distribution of parks across socioeconomically and racially diverse areas is likely negatively impacting physical activity behaviors. At the same time, however, other research has found that there are in fact no such disparities in certain cities, with high minority status or low income level of block group populations not linked to a decreased number of parks and private recreational facilities in those neighborhoods (Abercrombie et al., 2008; Lee, Booth, Reese-Smith, Regan, & Howard, 2005). Thus, there are some discrepancies in these findings and research is needed in local areas to examine the equity of resource distribution and subsequently how this may be related to the contexts, priorities, policies, and demographics in different areas.

Statement of the Problem

In summary, parks and recreational facilities are key components of the built environment which stimulate and influence individual physical activity behaviors. However, there is a mounting body of evidence suggesting that these integral community resources are not equitably distributed in cities by race and/or and socioeconomic status. Nevertheless, given some discrepant findings, more research is needed to fully assess access to quality park environments in low socioeconomic status and high minority areas; this has been identified as an important research endeavor for public health (Taylor, Floyd, Whitt-Glover, & Brooks, 2007). It is necessary to investigate any such disparities so that they can be identified and steps taken to eliminate them.

Purpose of the Study

The primary purpose of this study is to examine disparities in park availability, features, and quality across racially and socioeconomically diverse census tracts. Specifically, this paper will explore the following six research questions:

1. Does park availability (number of parks and total park acres) differ according to census tract socioeconomic status?
2. Does park availability (number of parks and total park acres) differ according to census tract racial composition?
3. Do the number of total and the presence of individual park features differ according to census tract socioeconomic status?
4. Do the number of total and the presence of individual park features differ according to census tract racial composition?
5. Do the number of park quality concerns and aesthetic features differ according to census tract socioeconomic status?
6. Do the number of park quality concerns and aesthetic features differ according to census tract racial composition?

It was hypothesized that park availability (number of parks and total acres of parkland) did not differ by census tract racial composition or socioeconomic status. Additionally, it was expected that there would be fewer park features, more quality concerns, and fewer aesthetic features for census tracts of more diverse racial composition and lower socioeconomic status.

In order to investigate disparities and contribute to research knowledge in this important area of environmental justice, this study involved spatial analysis and extensive audits of parks in diverse census tracts of Kansas City, Missouri. Better understanding disparities between census

tracts helped to inform public policy aimed at improving the distribution of public open spaces and subsequently increasing physical activity participation among all residents.

Chapter 2 - Literature Review

Background

The increase in obesity rates and the host of medical problems associated with obesity impact all areas of individual and societal life. Indeed, the obesity trend is becoming an epidemic in the United States. Data from the National Health and Nutrition Examination Survey (NHANES) found that the prevalence of obesity in men for 2007-2008 is 32.2%, and in women is 35.5%; combined data for both overweight and obesity for both genders showed a prevalence of approximately 68% (CDC, 2009a; Flegal, Carroll, Ogden, & Curtain, 2010). The obesity epidemic disproportionately affects low income populations (Babey et al., 2007; Brennan, Henry, Nicholson, Kotowicz, & Pasco, 2010; Coogan et al., 2010; Zhang & Wang, 2004) and persons from minority backgrounds (American Heart Association (AHA), 2003; AHA, 2004a,b,c; Kumanyika, 1994; World Health Organization (WHO), 2000; Zhang & Wang, 2004). Adherence to the USDHHS physical activity guidelines has been shown to reduce obesity (Jakicic & Otto, 2006; Saris et al., 2003).

Lower levels of physical activity are also an issue among low income and/or minority populations of all ages. Low income populations are less likely to meet physical activity recommendations than high income populations (Parks, Housemannn & Brownson, 2003). For example, a survey of high school students in San Diego, CA found that students of higher socioeconomic status generally were more physically active due to more time spent in physical education classes and engaging in higher levels of activity in those classes (Sallis, Zakarian, Hovell & Hofstetter, 1996). Lee and colleagues (2011) found that older adults with higher income (greater than $30,000) were more likely to engage in leisure time physical activity but

spent less time in household physical activity, whereas older adults with lower incomes (less than $30,000 per year) were more likely to engage in household physical activity and spent less time in leisure time physical activity. Further, people from minority backgrounds are less likely to engage in physical activity (August & Sorkin, 2011). Significant associations have also been drawn between BMI and ethnicity. For example, Wright (2011) concluded that Hispanic ethnicity children had an almost 6 times greater chance of being overweight. Additionally, normal-weight Hispanic children had higher levels of physical activity than overweight or obese Hispanic children. A study on leisure time physical activity of urban White, African-American, and Mexican-American women found that women of color, women over 40, and women without a college degree had the lowest levels of leisure time physical activity (Ransdell & Wells, 1998). Conversely, another study found that African American and Hispanic adolescent males were more physically active than their white male counterparts (Richmond, Hayward, Gahagan, Field, & Heisler, 2011). Generally, across the lifespan, persons from lower income and minority backgrounds tend to have lower physical activity levels than their higher income, White counterparts.

Parks and Physical Activity

Parks are an important venue to facilitate physical activity (Kaczynski & Henderson, 2007; Moody et al., 2004). Research has found associations between increased physical activity and availability and accessibility of urban parks (Henderson, 2007). Engagement in physical activity in a public recreational facility such as a park or walking trail is described as that amenity facilitating physical activity by choice, meaning that the individual or group is not influenced monetarily to use or not use the facility, as joining a gym might influence use of that physical activity modality (Henderson & Bialeschki, 2005). Parks have been identified as key

components of the built environment with the potential to facilitate large amounts of physical activity across the population that can subsequently have a positive impact on public health (Bedimo-Rung, Mowen, & Cohen, 2005). However, for physical activity to occur by choice and for individuals to feel empowered to use these public facilities, accessible opportunities and environmental supports are needed (Sallis et al., 2006).

Park Proximity and Physical Activity

Close proximity of park space is a predictor of physical activity in all age groups. Especially in children, being able to walk to a park is associated with park use while having to drive in order to access a park deters park use (McCormack, Rock, Toohey, & Hignell, 2010). Cohen and colleagues (2006) found that among adolescent girls, those that live near parks with active features (e.g., recreational facilities, play structures) engage in more moderate to vigorous physical activity outside of school than girls with fewer parks in close proximity. Further, the perception of decreased walking distance to parks is related to increased physical activity due to increased frequency and duration of park use (Mowen, Orsega-Smith, Payne, Ainsworth & Godbey, 2007). Similarly, Giles-Corti et al. (2005) found that close proximity to open spaces was also associated with increased engagement in time spent walking for physical activity. Among younger (18 to 34) and older (55+) adults, the number and total area of parkland within a 1km radius of participants' homes were significantly related to achieving 150 minutes of moderate-to-vigorous physical activity per week (Kaczynski, Potwarka, Smale, & Havitz, 2009). Likewise, a study in Georgia found that convenience and being able to walk to a place to engage in physical activity in 10 minutes or less was predictive of meeting physical activity recommendations (Powell, Martin, & Chowdhury, 2003). Wolch and colleagues (2011) conducted a longitudinal cohort study in children and found that there was an inverse

relationship between parks acres within 500 meters of a child's home and the child's BMI at age 18. Overall, proximity of parks is indicative of park use and subsequent increased physical activity levels.

Park Characteristics and Physical Activity

Park characteristics include two aspects: features (i.e., facilities and amenities) and quality (i.e., quality concerns and aesthetic features). The features of a park or public open space may be just as important as availability and accessibility in facilitating physical activity and encouraging use among residents. Several studies have looked at features and quality and their relationship with park use amongst adults. The presence of certain facilities (unpaved trail, meadow, water area, basketball court, and soccer field) and amenities (restroom, historical/educational feature, landscaping, bike rack, parking lot, and a roadway through the park) in nearby parks was shown to be related to increased likelihood of use of parks for physical activity (Kaczynski & Havitz, 2009). In other studies, walking trails were found to be key facilities that encouraged park use and physical activity (Kaczynski, Potwarka, & Saelens, 2008; Paxton, Sharpe, Granner, & Hutto, 2005).

One correlate of increased walking behaviors is that the walking trails must be aesthetically pleasing and display scenic beauty (Gobster, 1995; Wilcox, Castro, King, Houseman, & Brownson, 2000). Wilhelm Stanis and colleagues (2009) found that paths and site beauty were the two most important site attributes for facilitating physical activity. Further, a non-physical feature that has been shown to increase park space and trail usage, especially in walkers, is the perception that the facility or trail is safe in terms of lighting, park monitoring (by law enforcement), and adequate signage (Andereck, Vogt, Larkin, & Freye, 2001; Leslie, Cerin, & Kremer, 2010).

Likewise, studies have examined the relationship between features and quality and park use by children and teens. Potwarka and colleagues (2008) conducted a study in Canada assessing park proximity and facility availability in relation to obesity among children. They found that park facilities such as playgrounds are more important predictors of healthy weight status among children than availability of park space in general. Age appropriate play structures and equipment are also features determining park use for children (McCormack et al., 2010). In addition, children's preferences in terms of equipment and park design vary by neighborhood location, gender, and race/ethnicity (Loukaitou-Sideris et al., 2010). Timperio et al. (2008) conducted a study to determine which park features are most indicative of children engaging in physical activity. The researchers had mixed findings and determined that overall the features of parks are not as important as the quality (i.e., condition and safety) of the features and facilities available in parks. Specifically, they only found significance among a few of the features present in parks; for example, younger boys engaged in more physical activity if there was a playground present in the park, but this trend decreased with age and there was no significance among playgrounds with girls. Instead, girls' physical activity was positively associated with the presence of trees and signage regarding dogs. Furthermore, a study of children and park use found differences between genders, races/ethnicities, and urban versus suburban neighborhoods with respect to use of park and recreation spaces (Loukaitou-Sideris & Sideris, 2010). The authors also reported that there is no generalization of one type of park that every child will go to play in; however, the most significant characteristics that were found to contribute to park use and physical activity were active recreation facilities, sports programs, presence of natural features, and proper maintenance and cleanliness. Additionally, Veitch and colleagues (2011) conducted a study of public open spaces to determine park usage, physical activity levels, and

screen time (i.e., television and computer use) and their correlation to both features and quality. When assessed cross-sectionally, the researchers found that water features and greater public open space area were inversely associated with children's screen time. Additionally, park quality had the same inverse association with sedentary behaviors.

Environmental Justice

Environmental justice is defined as the fair treatment and meaningful involvement of all people in the development, implementation and enforcement of environmental law, regulations and policies (National Research Council, 1999). There have been two waves of the environmental justice movement; the second one is presently ongoing. Taylor and colleagues (2007) summarizes the first wave as the presence of environmental injustices such as locally unwanted land uses and lead in homes, as well as other pollutants. The second wave of the environmental justice movement takes on a different focus and is centered on urban design, public health, and access to and quality of outdoor recreation and facilities (Taylor et al., 2007).

The environmental justice movement and subsequent framework are useful in researching reasons for disparities in physical activity. Following the social ecological framework, public facilities like parks and playgrounds are integral determinants of physical activity. The availability of public parks can affect health through multiple levels of the social ecological model through availability to the community, affecting public policy, and fostering interpersonal and organizational relationships. Access to and availability of public facilities and open spaces are compromised by structural disadvantages associated with race/ethnicity and socioeconomic status; this concern is recognized by environmental justice framework (Floyd & Johnson, 2002). Similar to the concept of environmental justice is the notion of deprivation amplification. This concept describes the concern about individuals who already have disadvantaged personal

resources being compounded with fewer local facilities, resources, and environmental supports enabling them to lead healthy lives, as compared to areas where residents are not personally poor in resources and impoverished or socially deprived (Macintyre, 2000). The environmental justice and deprivation amplification frameworks are both integral in measurement of the built environment to evaluate discrepancies in low income and racial and ethnic minority communities (Floyd, Taylor, & Whitt-Glover, 2009).

Racial and ethnic effects in leisure activity participation are often explained through a pair of theoretical frameworks: the marginality hypothesis and the ethnicity (or subcultural) hypothesis (Floyd, 1998). The marginality hypothesis explains that there are lower rates of physical activity participation in individuals of lower socioeconomic status due to limited resources resulting from a historical pattern of discrimination related to policies, past funding, priorities, and other factors. (Washburne, 1978). The ethnicity framework hypothesizes that disparities in physical activity participation in racial and ethnic groups are due to differences in the value systems, norms, and/or socialization patterns (Floyd, Shinew, McGuire, & Noe, 1994).

Park Availability in Low Income and High Minority Areas

It has generally been concluded that neighborhoods of a lower socioeconomic status and higher minority population contain significantly fewer parks and recreational resources than their higher socioeconomic status and low minority counterparts (Moore et al., 2008; Talen, 1997; Wolch et al., 2005). Using data from the National Longitudinal Study of Adolescent Health, Gordon-Larsen et al. (2006) reported that there are significant inequalities in the availability of public parks and open spaces, in that low socioeconomic status and high minority block groups were less likely to have recreational facilities than high socioeconomic status and low minority block groups. Additionally, they found that the presence of one, as opposed to no, public

recreational facility per block group was associated with increased odds of participation in physical activity as well as decreased odds of overweight and obesity.

Disparities in access do not only occur in public parks and playgrounds, but also in access to trails. Wilson and colleagues (2004) found that low socioeconomic status residents had less access to walking trails, and that access and usage of trails were major predictors of accumulating adequate minutes of physical activity. Other research found that in Phoenix, AZ, the areas with the largest number of youth from minority backgrounds were also the least walkable and had the lowest park access; these are strong predictors of childhood obesity that can be attributed to environmental deprivation (Cutts, Darby, Boone, & Brewis, 2009). Estabrooks and colleagues (2003) conducted a study assessing park accessibility in neighborhoods of various socioeconomic statuses. They found that in lower socioeconomic status neighborhoods, there were fewer parks and lower recreational facility utilization than in high socioeconomic areas; low and medium socioeconomic areas had fewer numbers of free-for-use facilities and resources. Consequently, the researchers concluded that low and medium socioeconomic status areas had less ability to control their engagement in physical activity due to their environment. Moore and colleagues (2008) conducted a study which also found lower availability of parks and recreational resources in low socioeconomic status and high minority areas. Their findings suggest that increasing resource availability could favorably impact physical activity and help reduce disparities in poor and ethnically diverse/minority neighborhoods. Finally, Powell and colleagues (2006) had similar findings in that physical activity related facilities were less likely to be present in neighborhoods composed of higher proportions of residents from minority racial backgrounds. Not only were outdoor public

facilities inequitable in availability across neighborhoods, but commercial facilities were unevenly distributed as well.

At the same time, other research has produced conclusions that are inconsistent with the aforementioned findings. Again, this may be due to variation in policies, urban development, priorities, and/or funding within communities rather than inconsistencies in a generalizable trend. An Australian study found mixed results in that populations of lower socioeconomic status had better access to some recreational resources, but worse access to others (Giles-Corti & Donovan, 2002). In Glasgow, Scotland, researchers found that there were differences in the types of resources found in neighborhoods of lower socioeconomic status versus higher socioeconomic status (Macintyre, Macdonald, & Ellaway, 2008). Low socioeconomic status neighborhoods were more likely to have public nurseries, public primary schools, police stations, pharmacies, credit unions, post offices, bus stops, bingo halls, public swimming pools, public sports centers, outdoor play areas, and vacant and derelict land/buildings. Neighborhoods of higher socioeconomic status were more likely to have public secondary schools, private schools, banks, building societies, museums/art galleries, railway stations, subway stations, tennis courts, bowling greens, private health clubs, private swimming pools, colleges, hospitals, parks, waste disposal sites, and tourist attractions. Thus, the researchers found inconsistent distributions of neighborhood resources, in areas of various socioeconomic statuses. Abercrombie and colleagues (2008) found that the number and size of public parks across their Maryland study area did not reveal significant disparities according to income or racial groups. In a study of neighborhoods in London, Canada, researchers found that there was no relationship between the number of recreational opportunities and the socioeconomic status of the neighborhood (Gilliland, Holmes, Irwin, & Tucker, 2006). Additionally, in California, researchers found that

the number of gyms and parks was actually greater in areas of lower socioeconomic status (Lee, Cubbin, & Winkleby, 2007). Finally, Lee et al (2005) found that neighborhoods of lower socioeconomic status and high minority had an equal number of physical activity facilities and amenities as high socioeconomic status and low minority neighborhoods, but the quality of those features and amenities was far lower and greater incivilities were present (Lee et al., 2005). The contradictions of these studies in diverse locations indicate that more research is needed in this area. Again, such contradictions in diverse locations may be expected. Future research should examine other factors that make these locations different (policies, funding, etc.). Presently, it is of utmost importance to continue to gather such information across diverse locations to build an evidence base as well as provide an understanding of the situation in these particular locations and to be able to address and later be able to examine trends associated with these differences across communities.

Park Characteristics in Low Income and High Minority Areas

Park characteristics, including features/design and quality, are important predictors of usage, with previous studies finding a positive relationship. Crawford et al (2008) found that in higher socioeconomic status neighborhoods, public open spaces were more abundant and possessed more features likely to support children's physical activity, while lower socioeconomic status neighborhoods were less likely to have park features conducive to children's physical activity. One argument the authors made for this was that lower socioeconomic status neighborhoods are more likely to be found in the inner city where there is less room and park space for features like ponds, picnic tables, and playgrounds. Moore et al. (2008) found that even though there were a greater number of total recreational resources in lower socioeconomic status areas, the concentration of facilities requiring a fee was much lower

in those same areas, as opposed to the areas of higher socioeconomic status and lower minority population where fee for use facilities were more prevalent.

The quality of a park's features is also a significant predictor of a park's health-promoting potential. A Canadian study found that park quality (measured by physical incivilities, safety, recreation facility provision, recreation facility quality, play structure provision, play structure quality, locational setting, and amenities) varied by neighborhood health status (based on life expectancy and disease incidence rates in the neighborhood) in that the quality of parks was lower within poor health neighborhoods than the highest health status neighborhoods, including the availability of facilities for physical activity, playgrounds, and the concentration of park incivilities (Coen & Ross, 2006). Ultimately, they concluded that the quality of parks likely determines use and subsequent health outcomes among residents in the neighborhoods. In a study conducted in Edmonton, Canada, researchers concluded that while neighborhoods of lower socioeconomic status and higher minority population had equitable access to playgrounds, the playgrounds were often below city standards for quality (Smoyer-Tomic, Hewko, & Hodgson, 2004). Further, Leslie and colleagues (2010) found that in areas of higher socioeconomic status, the perception of neighborhood safety was higher in terms of crime and traffic safety, and residents in those areas engaged in more minutes of walking for physical activity than their low socioeconomic resident counterparts. The equal availability of parks may not matter to populations of high minority and/or low socioeconomic background if they are of poor quality and located in unsafe neighborhoods, so improving neighborhood supports for disadvantaged populations may prove to be a beneficial target area (Greenberg & Renne, 2005).

Summary

Overall, the literature has shown that there is a large yet inconsistent body of evidence surrounding environmental justice issues as they relate to parks and other public recreation facilities. Consequently, more research is needed to examine disparities in access to parks between neighborhoods of diverse socioeconomic status and racial minority backgrounds. However, simply addressing the presence or absence of parks throughout neighborhoods will not suffice; park features and quality should also be taken into consideration. If a park is designed to target specific users (e.g., a specific neighborhood, youth versus adults, or individuals from a particular racial background), individual and neighborhood characteristics can have an important influence on park use and engagement in physical activity.

Research of this nature is important because park use is an important contributor to physical activity and lower socioeconomic status persons and racial minorities have been shown to have lower rates of participation in physical activity and a subsequently higher overweight and obesity prevalence. Using detailed measurement methods to assess the availability of parks, park facilities and amenities, and park quality are all important in order to better understand potential disparities in exposure to physical activity-promoting environments.

This is an important research endeavor in Kansas City, Missouri because approximately 64% of adults in the city are either overweight or obese, on par with the national average (Health Care Foundation of Greater Kansas City, 2010). Further, Missouri county-level studies show that 25% of adult residents engage in no leisure-time physical activity and approximately 50% of adult residents do not meet physical activity recommendations (Health Care Foundation of Greater Kansas City, 2010). This study builds understanding for both addressing potential environmental justice issues locally, while also contributing to a broader body of evidence measuring resource disparities.

Chapter 3 - Methods

This cross-sectional study included two integrated components. The first component involved obtaining demographic information for all census tracts in Kansas City, Missouri using data from the American Community Survey. The second component involved obtaining objective availability and characteristics measures of all parks across Kansas City, Missouri. The following sections describe the park study area, sample, specific measures, and analysis of the data.

Study Area

The Kansas City metropolitan area spans both Kansas and Missouri, and includes 176 cities and 15 counties with nearly 2 million inhabitants. The present study only focused on Kansas City, Missouri (KCMO), which included four counties (Jackson, Platte, Clay and Cass), covered 313 square miles, and was home to just under one-half million (441,545) residents.

The city had a diverse demographic profile and land use composition. There was racial/ethnic diversity among the population, with the largest racial group being White (61%), then Black (31%), and Hispanic (7%) (United States Census, 2000a). However, when the census data were stratified by age, children were shown to be more diverse ethnically/racially than adults as 49% were White, 40% were Black, and 9% were Hispanic. The median household income in Kansas City was $39,230. According to 2000 census data, 14% of residents were at or below the poverty line, with higher rates of poverty for Blacks (25%) and Hispanics (21%). There were differences in household income between land use areas of the city. The urban core area of the city had the highest concentration of poverty, as 50% of households earned less than $25,000.

There were 219 parks in KCMO and approximately 12,000 acres of parkland, with the parks ranging in size from .09 acres to 1,805 acres (KCMO Reference Book, 2009). The parks were spread over three park management districts in the city: North (91 parks, 5,266 acres), Central (80 parks, 1,415 acres), and South (48 parks, 3,125 acres). There was a diversity of features available for use in the various parks, including, but not limited to, aquatic facilities, ball diamonds, lakes, playgrounds, picnic shelters, trails, and tennis courts. The diversity of the city's population in terms of race, ethnicity, socioeconomic status, and land use areas made it an ideal setting to conduct research related to equity of physical resources among census tracts.

Parks were identified for enumeration and location in the present study by using GIS shape files provided by the Kansas City, Missouri Parks and Recreation Department. An edited GIS file of parks was cross-referenced with tracts to allocate parks (and their area and characteristics) to tracts. Ultimately, parks were included in the edited GIS file after an in-person audit using the Community Park Audit Tool if they were deemed parkland usable for physical activity and/or recreation, and were publicly accessible. Although school playgrounds and facilities provide opportunities for physical activity and/or recreation, they were not included in the present study. The final number of parks included in the edited GIS file for analysis was 165.

Study Sample

The sampling units for this study were census tracts in the City of Kansas City, Missouri. A census tract was a small, generally permanent, subdivision of a county (and entirely within county lines) used to delineate large metropolitan and densely populated areas; they were outlined by local census area committees using standards set forth by the Census Bureau (US Census Bureau, 2000b). Census tracts usually contain from 2,500 to 8,000 people and were

designed as homogenous groups in terms of population characteristics, economic status, and living conditions. Census tracts were not always contained within city boundaries because city boundaries change over time due to political boundary changes. For comparison purposes year to year, it was easier for the Census Bureau to maintain census tract boundaries based on population (US Census Bureau, 2005). In the present study, the specific census tracts that were included were determined by overlaying two GIS maps, one of the boundary of the city and the other a map of the census tracts in the four counties that encompassed the city. This helped to determine which county tracts were either partially or fully within the Kansas City, Missouri boundary. In total, 186 tracts intersected the boundary of Kansas City, Missouri, but 12 of them were 50% or more outside the city boundary. These 12 tracts were excluded because the present study only focused on KCMO residents and parks. A final sample of 174 tracts was analyzed.

Measures

Census Tract Characteristics

The American Community Survey (ACS) was used to gather information on race/ethnicity and income for each census tract. The ACS was operated through the US Census Bureau and involved an ongoing survey with data outputs every year to give communities the information they need to plan investments and services. The survey asked about age, sex, race, family and relationships, income and benefits, health insurance, education, veteran status, disabilities, where individuals worked and how they got there, and where individuals lived and how much they paid for some essentials. This information was used to compile statistics that were used in communities to decide everything from school lunch programs to new hospitals (American Community Survey, 2011a).

Data from the ACS website, 5-year estimates were downloaded for two key variables related to race and income. The ACS 5-year estimates used 60 months of data collected for all areas and included a large, reliable sample size, as compared to the 1-year and 3-year estimates (ACS, 2011b). The ACS 5-year estimates were used for this study as opposed to the 1-year or 3-year estimates because the collected data lent itself well to analyze small populations and 5-year estimates were the only estimates available for the small geographical census tract areas.

The first independent variable in this study was median household income. The American Community Survey calculated income by adding wages, salary, commissions, bonuses, or tips from all jobs, self-employment income from own nonfarm businesses or farm businesses, including proprietorships and partnerships, interest, dividends, net rental income, royalty income, or income from estates and trusts, social security or railroad retirement, supplemental security income, any public assistance or welfare payments from the state or local welfare office, retirement, survivor, or disability pensions, any other sources of income received regularly such as Veterans' payments, unemployment compensation, and child support or alimony, from the last 12 months, this time period being from today's date one year ago to up through today (ACS, 2011). Household was defined in the survey as anyone living or staying at the address for 2 months or more. The measure of median household income was available as a dollar figure for each census tract and was used in this study to categorize census tracts into tertiles by allocating an even number of tracts into the low, medium, and high income groups (Estabrooks et al., 2003; Powell et al., 2006).

Race/ethnicity was the other independent variable used to describe census tracts in this study. For each census tract, we identified the percentage of minority residents, defined as the

percentage of non-White and Hispanic White residents. Similar to income, census tracts were categorized by percent minority into even tertiles (low, middle, high percent minority).

Park Availability

The first dependent variable related to availability in this study was the number of parks that intersected the chosen census tracts. Parks were counted as "in the census tract" if any portion of the park intersected any portion of the census tract (Abercrombie et al., 2008). In a study conducted in Canada, researchers summed the total number of amenities within a specified radius around neighborhood residents to determine accessibility and availability (Smoyer-Tomic et al., 2004). The current study used the same theory using parks instead of amenities and census tracts rather than personal neighborhoods. As a second measure of park availability, the area of parkland in each census tract was calculated. This was determined by summing the total land area of all parks that intersect the tract, similar to the method that other studies employed, except using census tracts instead of neighborhood environments (Roemmich et al., 2006).

Park Characteristics

Park characteristics, including features and quality, were assessed using the Community Park Audit Tool (CPAT). The CPAT was recently developed as part of an Active Living Research project funded through the Robert Wood Johnson Foundation (Kaczynski & Wilhelm Stanis, 2009). This comprehensive audit tool was six pages long and contained four sections to assess park information, access and surrounding neighborhood, park activity areas, and park quality and safety. There were 30 questions and 140 total items on the tool (Appendix A). Two trained auditors including the author conducted the audits and each audit took approximately 30 minutes to complete. The parks were visited for audit on multiple weekends (Friday-Sunday) during September-November, 2010 and March-June, 2011. Approximately one-third of the

audits were previously completed as part of the ALR audit tool development project, while the rest were audited by the two trained research assistants. Inter-rater reliability was previously assessed for each item of the tool as long as at least three pairs of ratings were available (Saelens et al., 2006). Two statistics were used to assess inter-rater reliability, Kappa and percent agreement. The vast majority of the items had acceptable Kappas and/or percent agreement (i.e., better than .60 or 70%, respectively). The reliability of 10 items (out of 142 items) on the tool could not be assessed because there were less than three pairs of ratings; all but 3 of the remaining 130 items on the tool had 70% or higher agreement.

Information on park features taken from the CPAT consisted of both park facilities and amenities. Park facilities encompassed park activity areas, which were assessed using section 3 of the CPAT (Appendix A). Those 14 park facilities included playgrounds, sports fields, baseball fields, swimming pools, splash pads, basketball courts, tennis courts, volleyball courts, trails, fitness stations, skate parks, dog parks, green spaces, and lakes. However, only 8 of the 14 facilities were included in the analysis because those facilities were too prevalent (i.e., green spaces) or too scarce (i.e., swimming pools). Park features also included amenities in the park, and were assessed using sections 2 and 4 of the CPAT (Appendix A). There were 25 park amenities assessed, including transit stops, car parking, bike racks, sidewalks, external trails, bike lanes, traffic signals, restrooms, drinking fountains, benches, picnic tables, picnic shelters, grills, trash cans, vending machines, shade, rules posted about animals, animal waste bags, lights, park monitored, emergency devices, threatening behaviors, neighborhood visibility, roads through the park, and dangerous spots (note: a few of the park characteristics included in the list of amenities may not have fit the traditional definition of a positive park attribute that contributed to park visitors' physical activity – e.g., threatening behavior, dangerous spots – but

they were included amongst the other non-facility park features while recognizing this limitation). The average number of park facilities, amenities, and total features per park in the census tract was calculated for comparison across areas. The overall features total included 38 of the 40 features, excluding the two negative features related to the presence of threatening behaviors and dangerous spots. Furthermore, the proportion of parks in each tract with each individual feature was calculated (but this portion of the analysis did include the two negative features). The individual amenities analyses included 21 of the 25 amenities as some amenities were too scarce and would have skewed the results, including bike parking, bike lanes, vending machines, and emergency devices.

As a final portion of the park characteristics assessment, park quality concerns and the presence of aesthetic features in the parks were audited. Question 28 of the CPAT (Appendix A) provided a checklist of park quality concerns present, while question 29 was a checklist of aesthetic features that were present in the park. The total number of quality concerns and aesthetic features identified in each park from the lists were summed. The average number of quality concerns and aesthetic features per park in the census tract was calculated. Overall, sections 2, 3, and 4 of the CPAT contained valuable data for assessing park characteristics in the present study.

Analyses

This section describes the data analysis strategies used to examine differences in park availability and characteristics according to socioeconomic status and race/ethnicity within census tracts. Descriptive statistics (means, frequencies) were used to describe the income and racial characteristics of Kansas City, Missouri census tracts and the availability, features, and quality of parks within them. To answer and discuss each of the six posed research questions,

multivariate analysis of covariance (MANCOVA) was used to compare low, medium, and high income census tracts (for income or percent minority) with respect to the number of parks and the total amount of park space, the total number and the presence of individual facilities and amenities per park, and the total number of park quality concerns as well as aesthetic features per park. These analyses controlled for the size of the tract, total tract population, percentage of the tract population under 18 years old, and the tract's income or percent minority (when those variables were not used to stratify the sample of tracts to begin with). All findings were considered significant at $p<.05$.

Chapter 4 - Results

This chapter will report on the findings of the present study covering the availability, features, and quality of parks by census tract in Kansas City, Missouri. First, descriptive statistics of the study area will be described, and then the results of analyses for each research question will be presented.

Characteristics of the Study Area

Table 1 shows the descriptive characteristics of the 174 tracts included in the study sample. Four of the tracts were missing income data and two of the tracts were missing race/ethnicity data and thus were not included in the respective analyses. The mean household income of all the tracts was $42,747 (SD=$23,951). To determine the three income tertiles, the tracts were evenly split into three categories and labeled low, medium, and high, containing 57, 56, and 57 tracts, respectively. The low income category included a range from $9,219 to $28,762 (M=$22,694, SD=$4,393), the medium income category ranged from $29,167 to $46,276 (M=$36,728, SD=$5,250), and the high income category ranged from $46,471 to $173,750 (M=$68,714, SD=$23,518).

The 174 tracts were evenly split into tertiles by percent minority as well: low (M=13.5% minority, SD=6.1%), medium (M=45.8% minority, SD=14.6%), and high (M=90.0% minority, SD=9.4%), each containing 57, 57, and 58 tracts, respectively. The percent of minority residents for tracts in the high minority category ranged from 100% to 70.4% non-white, the medium minority group ranged from 70.3% to 23.4% non-white, and the low minority group ranged from 23.3% to 0% non-white. The mean percent minority for all of the tracts was approximately 50% (SD=33.2%).

Table 4.1 Tract Characteristics

	N	Median Household Income		Percent Minority	
		Mean	SD	Mean	SD
All Tracts	174	$42,747	$23,951	50.4%	33.2%
Income					
Low	57	$22,694	$4,393	19.6%	21.9%
Medium	56	$36,728	$5,250	49.8%	27.5%
High	57	$68,714	$23,518	81.3%	14.0%
Percent Minority					
High	57	$24,987	$6,906	90.0%	9.4%
Medium	57	$39,310	$12,311	45.8%	14.6%
Low	58	$63,461	$27,332	13.5%	6.1%

Note: 4 tracts missing income data and 2 tracts missing race/ethnicity data

Table 2 shows characteristics of the parks across all census tracts. The mean number of parks per census tract was 1.22 (SD=1.14), but census tracts ranged from having zero parks to six parks per tract, with 53 of the 174 census tracts having zero parks. The average number of park acres was 152.16 per census tract (SD=410.89), with a range from 0-1853 acres across all census tracts. The mean number of facilities per park in the tract was 3.87 (SD=2.07), with a range from 0 to 11 facilities (out of 15 possible facilities per park). The average number of amenities per park was 8.75 out of 23 (SD=3.13), and the parks ranged from 2 to 17 amenities. (Note there were 25 total amenities assessed in the CPAT but only 23 were included in the total amenities analysis because 2 were arguably not desirable amenities.) The average total features present was 12.62 out of 38 (SD=4.71), and ranged from 3 to 27 total features. Similar to the amenities included, there were 40 features assessed using the CPAT but only 38 were included in

the total features analysis, as 2 were not positive features. The mean number of quality concerns per park in the tract was 0.57 (SD=0.71), with a range from zero to 4 (out of seven possible concerns for each park). The mean number of aesthetic features per park was 2.47 (SD=1.45), with a range from zero to 6 (out of 8 possible aesthetic features per park).

Table 4.2 Characteristics of Parks Across All Census Tracts

	Mean	SD
Number of Parks	1.22	1.14
Park Acres	152.16	410.89
Average Facilities Per Park	3.87	2.07
Average Amenities Per Park	8.75	3.13
Average Total Features Per Park	12.62	4.71
Average Quality Concerns Per Park	0.57	0.71
Average Aesthetic Features Per Park	2.47	1.45

Park Availability

The first two research questions in this study concerned park availability by census tract socioeconomic status and racial composition and any disparities or differences therein. To examine this, Table 3 shows the relationship between the number of parks and total acres and the median household income and percent minority for each tract. To begin, the overall MANCOVA comparing both the number of parks and total park acres across income tertiles simultaneously was significant ($F=4.76$, $df=4,324$, $p<.01$). When examined individually, the number of parks was significantly different across low, medium, and high income tracts ($F=6.28$, $df=2,163$, $p<.01$). Specifically, Sidak post-hoc tests showed that low income tracts ($M=1.46$, $SD=1.25$) had significantly more parks than medium ($M=1.25$, $SD=1.00$) or high ($M=1.00$, $SD=1.10$) income tracts. As well, the post-hoc test comparing medium and high income tracts was marginally significant ($p=.06$). For total park acres across income tertiles, the univariate

ANOVA test approached statistical significance (F=3.09, df=2,163, p=.05), but Sidak post-hoc tests revealed no differences between the three groups. However, the medium income group had somewhat more acres of parkland per census tract (M=246.82, SD=544.54) than tracts in the high income (M=66.93, SD=188.41) group (p=0.08). Finally, as shown in the bottom half of Table 3 when examining the low, medium, and high percent minority groups, no differences were found for the number of parks (F=0.08, df=2,163, p=0.92) or the total park acres per census tract (F=1.52, df=2,163, p=0.22).

Table 4.3 Number of Parks and Total Park Acres by Income and Percent Minority

Tract Characteristic	N	Number of Parks		Total Park Acres	
		Mean	SD	Mean	SD
Income					
Low	57	1.46[a]	1.25	154.30	420.75
Medium	56	1.25[b]	1.00	246.82	544.54
High	57	1.00[b]	1.10	66.93	188.41
F		6.28		3.09	
df		2, 163		2, 163	
p		<.01		0.05	
Percent Minority					
High	57	1.28	1.05	194.48	506.82
Medium	55	1.27	1.13	200.72	475.10
Low	58	1.16	1.23	74.27	185.88
F		0.08		1.52	
df		2, 163		2, 163	
p		0.92		0.22	

[a,b] Means with different superscript letters are significantly different at p<.05

Park Features

Research questions three and four inquired whether park features (facilities and amenities) differed according to census tract socioeconomic status or racial composition. The overall MANCOVA comparing the average number of facilities, amenities, and total features per park across income tertiles, was not significant (F=0.56, df=4,224, p=0.70). There were also no significant differences among race/ethnicity groups for the average number of facilities, amenities, or features (F=0.37, df=4,226, p=0.83). In general, there was little difference in means between the low, medium, and high tertiles for both income and percent minority for the number of facilities, amenities, and total features (Table 4).

Table 4.4 Average Number of Facilities, Amenities, and Features per Park by Income and Percent Minority

Tract	Facilities		Amenities		Features	
Characteristic	Mean	SD	Mean	SD	Mean	SD
Income						
Low	4.02	1.98	8.74	2.40	12.76	3.81
Medium	3.94	2.42	8.54	3.41	12.48	5.43
High	3.58	1.70	8.95	3.68	12.53	5.00
F	.20		0.19		0.01	
df	2, 113		2, 113		2, 113	
p	0.82		0.83		0.99	
Percent Minority						
High	4.23	2.13	8.69	2.64	12.92	4.31
Medium	3.82	2.36	8.33	3.42	12.15	5.29
Low	3.52	1.61	9.24	3.35	12.76	4.62
F	0.03		0.46		0.23	
df	2, 114		2, 114		2, 114	
p	0.97		0.63		0.79	

Tables 5-8 detail the proportion of parks in each tract with specific facilities and amenities. Table 5 illustrates the proportion of parks with individual park facilities. Eight of the 15 facilities were included in the analysis. Not all of the park facilities assessed in the CPAT were included in this analysis because they were either too prevalent (i.e., green spaces) or too scarce (i.e., splash pads) per census tract that there would be no differences across race or income tertiles (the specific inclusion criteria was a skewness for the facility variable between -3 to 3). The overall MANCOVA comparing the proportion of parks with individual facilities per census tract by income approached statistical significance ($F=1.66$, $df=16,212$, $p=0.06$). However, as shown in Table 5, the proportion of parks with playgrounds across income tracts differed significantly ($F=4.88$, $df=2,113$, $p<.01$). Post-hoc tests showed that low ($M=0.62$, $SD=0.40$) and medium ($M=0.52$, $SD=0.41$) income tracts had a significantly lower proportion of parks with playgrounds than high ($M=0.69$, $SD=0.38$) income tracts.

Additionally, the overall MANCOVA comparing the proportion of parks with individual facilities per census tract by percent minority was also significant ($F=2.60$, $df=16,212$, $p<.01$). Specifically, the proportion of parks with basketball courts was significantly greater in high minority ($M=0.59$, $SD=0.43$) census tracts than in medium ($M=0.30$, $SD=0.40$) or low ($M=0.13$, $SD=0.29$) minority census tracts ($F=5.18$, $df=2,113$, $p<.01$). The proportion of parks with trails was significantly greater in low ($M=0.60$, $SD=0.41$) and medium ($M=0.55$, $SD=0.41$) minority than high minority ($M=0.39$, $SD=0.41$) census tracts ($F=5.61$, $df=2,113$, $p<.01$). As well, for the proportion of parks with playgrounds across percent minority census tract tertiles, the univariate ANOVA test approached statistical significance ($F=2.98$, $df=2,113$, $p=0.06$), but post-hoc tests revealed no differences between the three groups.

Table 4.5 Proportion of Parks with Individual Facilities Per Census Tract by Income and Percent Minority

Tract Characteristic	Playground Mean (SD)	Sports Field Mean (SD)	Baseball Field Mean (SD)	Swimming Pool Mean (SD)	Basketball Court Mean (SD)	Tennis Court Mean (SD)	Trail Mean (SD)	Lake Mean (SD)
Income								
Low	0.62[a]	0.18	0.47	0.12	0.51	0.28	0.49	0.15
	(0.40)	(0.34)	(0.43)	(0.27)	(0.44)	(0.39)	(0.41)	(0.29)
Medium	0.52[a]	0.19	0.42	0.12	0.33	0.27	0.50	0.22
	(0.41)	(0.32)	(0.42)	(0.29)	(0.42)	(0.39)	(0.43)	(0.36)
High	0.69[b]	0.19	0.36	0.06	0.15	0.23	0.54	0.11
	(0.38)	(0.36)	(0.40)	(0.15)	(0.32)	(0.33)	(0.41)	(0.25)
F	4.88	0.95	0.36	0.57	0.08	0.76	0.38	1.52
df	2, 113	2, 113	2, 113	2, 113	2, 113	2, 113	2,113	2,113
p	0.01	0.39	0.70	0.57	0.93	0.47	0.69	0.22
Percent Minority								
High	0.67	0.15	0.49	0.12	0.59[a]	0.33	0.39[a]	0.18
	(0.39)	(0.31)	(0.42)	(0.27)	(0.43)	(0.41)	(0.41)	(0.32)
Medium	0.57	0.24	0.34	0.11	0.30[b]	0.27	0.55[b]	0.21
	(0.39)	(0.33)	(0.38)	(0.27)	(0.40)	(0.38)	(0.41)	(0.33)
Low	0.55	0.18	0.43	0.08	0.13[b]	0.17	0.60[b]	0.10
	(0.42)	(0.36)	(0.43)	(0.21)	(0.29)	(0.32)	(0.41)	(0.27)
F	2.98	0.77	1.36	0.04	5.18	1.59	5.61	0.56
df	2, 113	2, 113	2, 113	2, 113	2, 113	2, 113	2,113	2,113
p	0.06	0.47	0.26	0.96	0.01	0.21	0.01	0.58

[a,b] Means with different superscript letters are significantly different at $p<.05$

Tables 6-8 show the proportion of parks in each tract with several neighborhood amenities. Similar to the park facilities analyses, not all of the neighborhood amenities were analyzed (the inclusion criteria remained the same and amenities were excluded if their skewness was outside the range of -3 to 3). Of the 25 amenities, 21 were included in the present analysis and these individual analyses included the two negative amenities; the excluded amenities were bike parking, bike lanes, vending machines, and emergency devices. For the MANCOVA analyses, the 21 amenities were split into three logical groups based on the conceptual relationships among the variables: neighborhood amenities (Table 6), park quality amenities (Table 7), and park safety amenities (Table 8).

The overall MANCOVA comparing the proportion of parks with various neighborhood amenities by income tertiles approached statistical significance ($F=0.85$, $df=10,218$, $p=0.056$). When examined individually, the proportion of parks with sidewalks was significantly different across high, medium, and low income census tracts ($F=5.13$, $df=2,113$, $p=.01$). Specifically, post-hoc tests showed that there was a significantly higher proportion of parks with sidewalks in low income ($M=0.87$, $SD=0.28$) or high income ($M=0.74$, $SD=0.38$) than medium income ($M=0.61$, $SD=0.43$) census tracts (Table 6). Finally, the overall MANCOVA comparing the proportions of parks with neighborhood amenities by percent minority was not significant ($F=1.10$, $df=10,218$, $p=0.36$).

Table 4.6 Proportion of Parks with Individual Neighborhood Amenities Per Census Tract by Income and Percent Minority

Tract Characteristic	Transit Mean (SD)	Car Parking Mean (SD)	Sidewalk Mean (SD)	External Trail Mean (SD)	Traffic Signal Mean (SD)
Income					
Low	0.70	0.90	0.87[a]	0.07	0.86
	(0.42)	(0.27)	(0.28)	(0.20)	(0.26)
Medium	0.54	0.91	0.61[b]	0.08	0.74
	(0.46)	(0.22)	(0.43)	(0.22)	(0.39)
High	0.29	0.87	0.74[a]	0.12	0.63
	(0.43)	(0.27)	(0.38)	(0.22)	(0.43)
F	0.68	0.13	5.13	0.65	2.46
df	2, 113	2, 113	2, 113	2, 113	2, 113
p	0.51	0.88	0.01	0.53	0.09
Percent Minority					
High	0.69	0.93	0.82	0.06	0.84
	(0.42)	(0.23)	(0.34)	(0.18)	(0.31)
Medium	0.51	0.83	0.66	0.10	0.67
	(0.46)	(0.31)	(0.40)	(0.24)	(0.39)
Low	0.38	0.92	0.74	0.11	0.75
	(0.45)	(0.20)	(0.40)	(0.22)	(0.38)
F	0.93	1.31	1.63	0.19	1.76
df	2, 113	2, 113	2, 113	2, 113	2, 113
p	0.40	0.27	0.20	0.83	0.18

[a,b] Means with different superscript letters are significantly different at $p<.05$

Table 7 shows the proportion of parks with various quality amenities by census tract. This table includes ten of the 15 quality amenities captured by the CPAT. The overall MANCOVA comparing the park quality amenities by census tract income was not significant ($F=0.51$, $df=20,208$, $p=0.96$). Further, the overall MANCOVA comparing the park quality amenities by census tract percent minority was also not significant ($F=1.59$, $df=20,208$, $p=0.057$). However, the univariate ANOVA test comparing the proportion of parks with restrooms across high, medium, and low percent minority census tracts approached statistical significance ($F=2.45$, $df=2,113$, $p=0.09$), and low ($M=0.34$, $SD=0.40$) and medium ($M=0.27$, $SD=0.33$) percent minority tracts had somewhat more parks with restrooms than high ($M=0.20$, $SD=0.35$) minority census tracts (Table 7).

Table 4.7 Proportion of Parks with Individual Quality Amenities Per Census Tract by Income and Percent Minority

Tract Characteristic	Restrooms Mean (SD)	Drinking Fountains Mean (SD)	Benches Mean (SD)	Picnic Tables Mean (SD)	Picnic Shelters Mean (SD)	Grills Mean (SD)	Trash Cans Mean (SD)	Shade Mean (SD)	Rules About Animals Mean (SD)	Animal Waste Bags Mean (SD)
Income										
Low	0.22	0.39	0.76	0.65	0.30	0.34	0.78	0.42	0.10	0.06
	(0.37)	(0.41)	(0.34)	(0.42)	(0.39)	(0.41)	(0.35)	(0.42)	(0.27)	(0.22)
Medium	0.27	0.43	0.71	0.63	0.24	0.33	0.77	0.49	0.11	0.13
	(0.36)	(0.42)	(0.41)	(0.42)	(0.38)	(0.41)	(0.35)	(0.43)	(0.28)	(0.33)
High	0.32	0.51	0.70	0.66	0.38	0.44	0.75	0.55	0.29	0.26
	(0.37)	(0.44)	(0.37)	(0.39)	(0.42)	(0.43)	(0.35)	(0.43)	(0.38)	(0.38)
F	0.11	0.03	0.24	0.04	1.25	0.59	0.52	0.24	1.55	0.68
df	2, 113	2, 113	2, 113	2, 113	2, 113	2, 113	2, 113	2, 113	2, 113	2, 113
p	0.89	0.97	0.79	0.96	0.29	0.55	0.60	0.79	0.22	0.51
Percent Minority										
High	0.20	0.33	0.76	0.66	0.31	0.36	0.77	0.42	0.10	0.03
	(0.35)	(0.39)	(0.35)	(0.43)	(0.40)	(0.42)	(0.36)	(0.44)	(0.28)	(0.17)
Medium	0.27	0.44	0.70	0.57	0.28	0.34	0.71	0.52	0.11	0.10
	(0.33)	(0.42)	(0.39)	(0.42)	(0.36)	(0.37)	(0.34)	(0.41)	(0.26)	(0.28)
Low	0.34	0.55	0.71	0.71	0.31	0.39	0.81	0.51	0.26	0.29
	(0.40)	(0.42)	(0.39)	(0.38)	(0.42)	(0.45)	(0.33)	(0.43)	(0.38)	(0.41)
F	2.45	1.65	1.04	0.85	0.14	0.24	0.84	0.42	0.36	1.30
df	2, 113	2, 113	2, 113	2, 113	2, 113	2, 113	2, 113	2, 113	2, 113	2, 113
p	0.09	0.20	0.36	0.43	0.87	0.78	0.44	0.66	0.70	0.28

Table 4.8 Proportion of Parks with Individual Park Safety Amenities Per Census Tract by Income and Percent Minority

Tract Characteristics	Lights	Park Monitored	Dangerous Spots	Threatening Behaviors	Neighborhood Visibility	Road Through Park
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Income						
Low	0.48	0.17	0.29	0.13	0.68	0.35
	(0.45)	(0.29)	(0.39)	(0.28)	(0.42)	(0.41)
Medium	0.41	0.07	0.35	0.03	0.72	0.22
	(0.42)	(0.22)	(0.44)	(0.18)	(0.40)	(0.35)
High	0.63	0.18	0.23	0.15	0.53	0.32
	(0.41)	(0.32)	(0.35)	(0.32)	(0.46)	(0.39)
F	1.37	0.24	0.20	0.35	1.59	1.45
df	2, 113	2, 113	2, 113	2, 113	2, 113	2, 113
p	0.26	0.79	0.82	0.70	0.21	0.24
Percent Minority						
High	0.62	0.22	0.25	0.18	0.60	0.36
	(0.41)	(0.36)	(0.36)	(0.35)	(0.45)	(0.42)
Medium	0.46	0.15	0.29	0.09	0.65	0.21
	(0.44)	(0.24)	(0.37)	(0.25)	(0.43)	(0.32)
Low	0.47	0.07	0.31	0.05	0.66	0.34
	(0.44)	(0.20)	(0.43)	(0.19)	(0.44)	(0.41)
F	1.18	1.11	0.06	0.26	0.04	2.36
df	2, 113	2, 113	2, 113	2, 113	2, 113	2, 113
p	0.31	0.33	0.94	0.77	0.96	0.10

The overall MANCOVA comparing the proportion of parks with safety amenities by low, medium, and high income census tracts was not significant (F=0.78, df=12,216, p=0.67). Finally, the overall MANCOVA comparing the proportions of parks with safety amenities by high, medium, and low percent minority census tracts was also not significant (F=0.97, df=12.216, p=0.48). Table 8 shows the univariate ANOVA analyses run for the six park safety amenities, none of which were individually significant.

Park Quality

The final two research questions inquired whether park quality, as measured by park quality concerns and aesthetic features, differed according to census tract socioeconomic status and racial composition. Table 9 shows the average quality concerns per park and average aesthetic features per park by median household income and percent minority tertiles. The overall MANCOVA simultaneously comparing quality concerns and aesthetic features per park across low, medium, and high income census tracts was significant (F=4.84, df=4,222, p<.01). The ANOVA comparing the average number of quality concerns per park by census tract income was significant (F=3.74, df=2,113, p=0.03). Specifically, Sidak post hoc tests showed there were a greater number of quality concerns per park in low income census tracts (M=0.75, SD=0.89) than high (M=0.42, SD=0.57) or medium (M=0.50, SD=0.56) income census tracts (Table 9). Also, the ANOVA comparing the average number of aesthetic features per park by census tract income was significant (F=6.08, df=2,113, p<.01). Specifically, there were more aesthetic features per park in medium income census tracts (M=3.02, SD=1.57) than high income census tracts (M=2.29, SD=1.31), but a statistically similar number in low (M=2.11, SD=1.29) and medium (M=3.02, SD=1.57) income census tracts, and in low (M=2.11, SD=1.29) and high (M=2.29, SD=1.31) income census tracts. The overall MANOVA comparing quality concerns

and aesthetic features per park by census tract percent minority was not significant (F=1.02, df=4,224, p=0.40).

Table 4.9 Quality Concerns and Aesthetic Features Per Park by Income and Percent Minority

Tract Characteristic	N	Average Quality Concerns Per Park		Average Aesthetic Features Per Park	
		Mean	SD	Mean	SD
Income					
Low	45	0.75[a]	0.89	2.11[a,b]	1.29
Medium	43	0.50[b]	0.56	3.02[a]	1.57
High	32	0.42[b]	0.57	2.29[b]	1.31
F		3.74		6.08	
df		2, 113		2, 113	
p		0.03		<.01	
Percent Minority					
High	44	0.62	0.87	2.18	1.52
Medium	38	0.57	0.65	2.65	1.41
Low	38	0.57	0.71	2.68	1.39
F		0.71		1.35	
df		2, 113		2, 113	
p		0.49		0.26	

[a,b] Means with different superscript letters are significantly different at p<.05

Chapter 5 - Discussion

Environmental justice is a recognized and growing concern among parks and recreation and public health researchers and practitioners. The purpose of the present study was to examine disparities in park availability, features, and quality across racially and socioeconomically diverse census tracts in Kansas City, Missouri. This study adds to an important body of literature examining income and racial disparities in access to active living environments.

Park Availability

The first two research questions in this study inquired about park availability across income and race/ethnicity tertiles and several significant findings were revealed. For example, availability in terms of the number of parks per tract differed by census tract socioeconomic status. Specifically, low income census tracts had significantly more parks than medium or high income census tracts. However, there was not a significant difference across percent minority census tracts for either total park acres or the number of parks per census tract. In KCMO, overall park availability was greater in low income areas. The present findings were similar to a study conducted in California which found that there are more places to engage in physical activity in areas of low socioeconomic status (Lee et al., 2007). Other researchers have reported that there were no discrepancies in park availability between areas of differing socioeconomic status (Abercrombie et al., 2008; Gilliland et al., 2006; Nicholls, 2001; Timperio et al., 2008). Overall, this study provides additional evidence that park availability is rarely balanced in communities, and may actually be skewed often in favor of low socioeconomic status tracts in some areas.

Conversely, there is an equally substantial body of evidence that contradicts the present findings on park availability. A number of researchers have found that there are significantly

fewer parks in areas of lower socioeconomic status (Estabrooks et al., 2003; Gordon-Larsen et al., 2006; Moore et al., 2008; Talen, 1997; Wolch et al., 2005). For example, in a recent study conducted in Los Angeles, CA, another large metropolitan city, researchers found that there were fewer parks and park acres in areas of the city of lower socioeconomic status and higher percent minority leading to greater park pressure (park ratio per capita) in those neighborhoods (Sister, Wolch, & Wilson, 2010).

Availability of public parks and recreation resources in neighborhoods is potentially an important predictor of physical activity, especially in neighborhoods of low socioeconomic status or high minority population. In KCMO, the majority of low income census tracts are concentrated in the urban core of the city (see map in Appendix B). Further, as shown in the map in Appendix C, the majority of high minority census tracts are also in the urban core of the city and somewhat mirror the low income census tracts. Because this area is densely populated, city planners may have allocated a certain amount of parkland to be required per census tract or neighborhood when the city was developed, thereby leading to a greater number of parks in the inner city. Future research could assess past city planning and present policies in place for allocation of parkland and/or physical activity resources in the city's plan. Additionally, the present study only looked at the availability of public parks, whereas the availability of recreational resources could have been completely opposite if pay-for-use facilities were also taken into account, given that they may be more common in higher socioeconomic status and lower minority neighborhoods (Estabrooks et al., 2003).

Park Features

While park availability is an important predictor of physical activity, park facilities and amenities also have an impact on physical activity and influence health behaviors (Kaczynski et

al., 2008). The second two research questions inquired about the dispersion of park features across income and race/ethnicity tertiles. Both the number of park features and the presence of individual features per census tract were assessed in the present study via an in-person audit using the CPAT. The average number of facilities, amenities, and overall features per park across income tertiles as well as across percent minority tertiles was not significantly different; indeed, the means were very similar across both income and race tertiles. It appears that the total number of facilities and amenities are equitable across income and minority tracts. A study conducted in Kansas City reported consistent findings in that there were an equal number of total park amenities (what the present study qualified as facilities) in areas of low and high socioeconomic status (Suminski et al., 2011). However, they did find that the types of amenities (facilities) offered in parks were different between neighborhoods of low and high socioeconomic status. For example, they found that in lower income neighborhoods, there were significantly more courts, trails/paths, event spaces, and water amenities, but more recreation classes and ball fields offered in neighborhoods of higher socioeconomic status. However, while there could be the same total number, certain tracts may have an abundance of one type of feature and lack other important features, thus yielding the same overall numbers. Therefore, the overall number does not provide details regarding how specific facilities and amenities are distributed, and thus examining the differences in individual facilities and amenities is important. The following paragraphs in this section examine the availability of *individual* park facilities and amenities by income and percent minority.

Park Facilities

Though not all of the park facilities measured in the CPAT were included in the individual analyses, one facility, playgrounds, showed significant differences across income

tertiles. Specifically, high income tracts had significantly more playgrounds per park than low or medium income census tracts. This is an important finding because research has shown that playgrounds are an essential feature in parks to promote and facilitate children's physical activity behaviors (Potwarka, Kaczynski, & Flack, 2008; Veitch, Bagley, Ball, & Salmon, 2006). Crawford and colleagues (2008) found similar results in that there were fewer playgrounds and other facilities and amenities (i.e., bike paths, picnic tables) conducive to children's physical activity in areas of lower socioeconomic status. This is a problem because playgrounds have been shown to promote increased physical activity intensity (Besenyi, Wilhelm Stanis, & Kaczynski, 2011; Floyd et al., 2008) and children living in close proximity to a playground are more likely to be at a healthier weight status (Potwarka et al., 2008). Areas of low socioeconomic status are perhaps the neighborhoods that need playgrounds the most due to the increased likelihood of those areas having a higher prevalence of overweight and obesity.

The proportion of parks with basketball court facilities was significantly greater in high percent minority census tracts than in medium or low minority census tracts. Conversely, the proportion of parks with trails was lower in census tracts of high percent minority than in low or medium percent minority census tracts. Wilson and colleagues (2004) had consistent findings with the present study, as they found that areas of lower socioeconomic status had fewer trails. The presence of a walking trail encourages engagement in physical activity (Kaczynski et al., 2008; Paxton et al., 2005). Thus, these disparities have implications for health behaviors and outcomes in areas that have significantly fewer walking trails. Likewise, across racial/ethnic groups, basketball courts are among the top activity areas for higher levels of energy expenditure among park users (Floyd et al., 2008). Other studies have found that basketball courts attract the largest number of park users and yield the highest per person energy expenditure of all activity

areas (other than playgrounds) (Rung, Mowen, Broyles, & Gustat, 2011). Rung and colleagues (2011) also found that after meeting minimum quality/condition requirements, basketball court condition was not a deterrent or incitement of use (i.e. the condition of the courts could be less than optimal and the courts would still attract users). This finding is significant to the present study because there were a greater number of basketball courts in areas of high minority population, perhaps because of a greater demand, and though the courts may be in poorer condition, they still can attract users. The higher number of basketball courts could have been a product of increased demand at the time the certain parks (i.e., those in high minority areas) were built. Offering activity areas such as trails and basketball courts shown to promote increased energy expenditure are essential elements of parks to have a public health impact on activity and obesity levels among at-risk population groups. None of the other park facilities in the analysis approached significance. From an environmental justice standpoint, this lack of significance is promising; it means that there is at least a somewhat equal distribution for most facilities among census tracts in Kansas City, MO regardless of income or percent minority.

Park Amenities

The one individual *neighborhood amenity* that was significant was sidewalks, with a higher proportion of parks with sidewalks in low and high income compared to medium income census tracts. The presence of sidewalks is an important predictor of physical activity and the absence of such amenities around parks should not be overlooked (Christensen, Holt, & Wilson, 2010). There could be a higher proportion of parks with sidewalks in the low income areas of the city because those areas are located in the metropolitan core of the city which follows a grid design, while the high income tracts could have a higher proportion of parks with sidewalks because they are in the newer sprawling areas of the city where developments are being built. A

study conducted in St. Louis, MO found that neighborhoods that were predominantly African American were roughly 29 times more likely to have uneven sidewalks and about 15 times more likely to have sidewalk obstructions than predominantly White neighborhoods (Kelly, Schootman, Baker, Barnidge, & Lemes, 2007). Further, these researchers concluded that physical activity supports such as sidewalks are integral in providing environmental access for physical activity, especially in diverse neighborhoods. Therefore, future research should examine not only sidewalk availability, but also the condition of such access-related amenities around parks.

The analyses comparing park amenities related to park quality per census tract was not significant for either socioeconomic status or percent minority tertiles of census tracts (although the proportion of parks with restrooms per census tract by percent minority did approach significance and showed that low percent minority tracts had somewhat more restrooms than high minority census tracts). This is a positive finding because the lack of significance indicates that amenities allowing for park quality (i.e., drinking fountains, shade, animal waste bags) are largely equitably distributed across the city regardless of census tract income or percent minority.

Park *safety amenities* were also included in the present analysis and our results showed that the individual proportions of different park safety amenities per census tract were not significantly different by tract socioeconomic status or percent minority. The lack of differences between census tracts is encouraging because safety amenities present in the park may determine park usage and certainly contribute to users' and residents' perceptions of safety. However, objective measures of safety through audits may still differ from residents' perceptions. There may be aspects of the park and/or surrounding neighborhood that cannot be readily observed using audits. For example, perhaps an individual in the park may not look threatening to an

outsider conducting a park audit, but neighborhood residents know to steer clear when this individual is around. Or, there may be negative events that have happened in the neighborhood making the park less desirable to go to that are not necessarily readily apparent to a park auditor. People who perceive parks as safe, especially in low or medium socioeconomic status neighborhoods, are more likely to use them and/or be active overall (Babey et al., 2008).

In sum, this study examined facilities and amenities that may be key to physical activity. The presence of useable park facilities and amenities in good condition are important aspects of parks to consider because they both lead to perceptions of safety as well as greater use of the park by residents (Leslie et al., 2010). Relatively consistent with the present study's findings, researchers in Los Angeles, CA found that parks in the inner city metropolitan area are more likely to be in neighborhoods of low socioeconomic status and greater percent minority, but have sub-par facilities, thus making the park less usable for physical activity and unsafe to residents and potential users (Sister et al., 2010).

Park Quality

Park quality concerns and aesthetic features were also measured using the CPAT. The last two research questions in this project inquired whether they differ according to census tract socioeconomic status and racial composition. There were a greater number of park quality concerns per park in low income census tracts. Also, there were more aesthetic features in medium income census tracts than in high income census tracts, but a comparable number in low and medium income census tracts, and in low and high income census tracts. Few previous studies have assessed park quality concerns, but these findings are consistent with researchers in Canada who found that neighborhoods of low socioeconomic status and high minority may have equal access to parks, but that those parks are below standard quality overall or have specific

quality concerns present (Smoyer-Tomic et al., 2004). Coen and colleagues (2006) had related findings in that there were more material disadvantages and quality concerns in neighborhoods of poor health status (though they did not examine socioeconomic status or racial composition). With respect to aesthetic features, researchers in Melbourne, Australia found that there were more aesthetic features (i.e., picnic tables, water features, lighting) in areas of higher socioeconomic status (Crawford et al., 2008). In this study, the greater number of aesthetic features in parks in medium income tracts may be a function of those areas having somewhat more established parks and also sufficient resources to support improved design features (as opposed to a lack of funds in low income areas or a lack of maturity in parks in newer, higher income suburban neighborhoods). Improving parks of poor quality or limited aesthetic appeal located in unsafe neighborhoods is a key to alleviating deprivation amplification. Improving neighborhood supports such as safer parks for disadvantaged populations is a beneficial avenue to subsequent use for physical activity (Greenberg et al., 2005). Further, research has shown that enjoyable scenery, for example park amenities such as green space or water features displaying aesthetic beauty, is a predictor of increased engagement in physical activity (Wilcox et al., 2000).

Park quality is a strong predictor of park use and physical activity across all census tracts, regardless of socioeconomic status or racial composition (Coen et al., 2006; Perry et al., 2011). As well, neighborhood safety is a product of the quality of neighborhood resources, which is a predictor of engaging in more outdoor activities (Veitch et al., 2011). Thus, the combination of poor perceptions or the actual reality of park and/or neighborhood quality concerns provides further embodiment of the concept of deprivation amplification, a key issue of the environmental justice movement. Research recognizing this double-edged sword is the first step toward eliminating and alleviating disparities in health-promoting neighborhood resources.

Marginality and Ethnicity in Parks and Physical Activity

The marginality and ethnicity hypotheses can often explain racial and ethnic effects in leisure activity participation (Floyd, 1998). Again, the marginality hypothesis states that lower rates of physical activity participation in individuals of lower socioeconomic status may be due to limited resources because of a historical pattern of discrimination related to policies and funding priorities (Washburne, 1978). The ethnicity framework hypothesizes that there are lower rates of physical activity participation in racial and ethnic groups because of differences in the value systems, norms, and/or socialization patterns (Floyd et al., 1994). Because parks are a popular avenue through which individuals participate in leisure activities, it is worth revisiting this topic, as it may help to explain the findings from the present study.

In KCMO there are significantly more parks in low income census tracts, where presumably there are both lower rates of physical activity participation and a greater percentage of minority population (indeed, tract maps for both income and race show considerable overlap for low income and high minority areas). On the surface, the marginality hypothesis does not seem to apply or explain low levels of physical activity in these areas of KCMO, as there was not a lack of resources found in the low socioeconomic status neighborhoods. However, patterns of discrimination may yet be evident in that the quality of those resources was generally found to be poorer, as was the presence of certain key facilities (e.g., playgrounds, trails) and the condition/quality of those facilities. Future research should also examine the condition/quality of facilities and amenities in parks of low socioeconomic status and/or high minority, as well as any past policies and/or funding priorities of the city that may have contributed to any discrimination in different areas.

The ethnicity hypothesis may also be a relevant theoretical framework to explain any disparities in health behaviors (e.g., physical activity) or outcomes (e.g., obesity). For example,

there may be plenty of parks present in the lower socioeconomic status neighborhoods, but the parks may not be valued by diverse groups perhaps because of the features or quality of the park and/or surrounding neighborhood. Consequently, a lack of physical activity (or at least park-based physical activity) among low income residents may be explained to some extent by divergent norms, value systems, and social organization between majority and minority neighborhoods. Indeed, research has shown that ethnic and racial groups differ in their use of parks and preferences for facilities and amenities therein (Floyd et al., 2008; Gobster, 2002; Hutchison, 1987). Further, there may also be other perceptions not captured by the CPAT audit (e.g., safety, discrimination) that influence park preferences or desired features.

In summary, the marginality and ethnicity frameworks remain useful for subsequent research on environmental justice, parks, and physical activity. They also provide information for urban planners and parks and recreation practitioners to be aware of and to take into account when planning parks and recreation facilities in diverse cities to provide preferable opportunities for physical activity in specific neighborhoods.

Implications for Practice and Future Research

Park availability was greater in low income areas, but several key park characteristics were less common in low income or high minority areas. Although park availability was greater in low socioeconomic status neighborhoods in KCMO, these results contradict the findings of several previous studies; thus, more research of this nature is warranted. Low income and diverse areas of KCMO are generally found within the older, urban core of the city where parks are more established. However, similar to past research showing less spending per capita in at-risk neighborhoods (Wolch et al., 2005), greater investments in certain park facilities and amenities in these neighborhoods may also be necessary. Future research should also consider

the quality of individual park facilities and amenities and the composition of neighborhoods around parks, as well as how disparities in access to park environments are associated with physical activity and health outcomes. Most importantly, public health and parks and recreation researchers and practitioners need to work together to examine policies that contribute to and that might rectify disparities in access to safe and attractive parks and open spaces.

Improving public parks, especially in areas of low income and high minority are a key means to impact public health (Henderson & Fry, 2011). This study contributes to baseline knowledge that parks in these areas are of lower quality and have fewer amenities; law and policy changes are the next step in improving parks and addressing and ameliorating deprivation amplification in the areas which it is most needed. Citizen advocacy may also help in addressing park disparities. The CPAT is a user-friendly tool which could aid in advocacy efforts; if residents can articulate and understand what is wrong and how they want to fix the problem, then changes to their local parks can be addressed more easily. Again, however, environmental justice concerns cannot be generalized and/or be comparable across all areas because of different practices, policies, and priorities regarding the presence, features, and quality of parks.

The findings of this study were consistent with researchers in Melbourne, Australia, who reported that areas of higher socioeconomic status were more likely to have parks with features conductive to children's physical activity, such as playgrounds (Crawford et al., 2008). The implications of this finding are significant because park features are just as important as the presence of a park when considering whether or not the park provides an opportunity for physical activity in the neighborhood in which it is located. To design public parks to promote physical activity, regardless of the neighborhood's socioeconomic status and/or percentage of minority residents, the park's features are an important design element for maximum use and

effectiveness. There is not one park design that will promote the greatest amount of physical activity and park use in every neighborhood; research has shown that racial and ethnic groups differ in their park features preferences (Tinsley, Tinsley, & Croskeys, 2002; Wilhelm Stanis & Kaczynski, 2011). Therefore, neighborhood composition is essential to take into account for urban parks and recreation planners when designing and building parks.

Researchers have been able to generalize that playgrounds are essential facilities to promote physical activity among children, as they facilitate increased energy expenditure (Floyd et al., 2008; Loukaitou-Sideris & Sideris, 2010). Based on this evidence, future policies regarding parks planning should consider inclusion of park features such as playgrounds to be available at an increased prevalence per capita, as they promote increased energy expenditure, especially in revitalization/regeneration of neighborhoods of lower socioeconomic status and/or high minority.

One final issue to consider with park planning is that when developers build a new development, they are required to give a certain amount of money per house to the city for park space building and maintenance. The city of KCMO is growing and sprawling outward and therefore most of the new developments are on the periphery of the city in the higher socioeconomic status census tracts. City planners must be vigilant and proactive in ensuring park space is set aside in these new subdivisions for recreational physical activity (especially if low levels of *transportation-related* activity exist there due to limited mixed land use). Also, new construction can be assessed development fees that can support both the provision of park facilities and amenities in those neighborhoods (rather than using tax money) as well as the upgrading of existing parks (perhaps in central, lower income areas of the city) that may experience extra pressure due to expanding city-wide population growth (Crompton, 1999).

Future research should also examine whether disparities in neighborhood and park environments translate into different levels of physical activity and health. To date, no research has done this. For example, a study could examine whether tracts of similar income or percent minority population exhibit higher or lower rates of physical activity, obesity, and chronic diseases depending on whether parks and specific park features or quality are present in the tract.

Limitations and Strengths

The present study had several limitations and strengths. One limitation of the present study is that not every census tract in the city of KCMO was included. Twelve of the census tracts were removed because they were more than 50% outside of the city border. It is debatable whether inclusion of these tracts would have made the study sample more complete or altered the results. The KCMO residents in those census tracts would possibly have access to parks in their census tract, even though the parks might be outside of the city limit, but those parks were not mapped in the GIS shape file used in this study and therefore the entire tract was excluded from the analysis.

The unit of analysis for this study was census tracts. Previous studies have also used the census tract method to compare areas of a city (Abercrombie et al., 2008; Estabrooks et al., 2003; Moore et al., 2008). However, a number of other studies have examined other geographic areas such as census block groups, municipal planning districts, postal codes, and zip codes (Cutts et al., 2009; Gilliland et al., 2006; Smoyer-Tomic et al., 2004; Abercrombie et al., 2008; Powell et al., 2006). Census tracts were chosen for the present study because the most up to date information (i.e., 5 year estimates) on socioeconomic status and percent minority were available at this level of city measurement from the American Community Survey.

It is debatable as to the definition of what makes a park "in the census tract." The present study defined parks as in the tract if they were fully, partially, or simply intersecting the tract. This method is similar to what other researchers have done in studies of parks and neighborhood racial composition and socioeconomic status (Estabrooks et al., 2003; Moore et al., 2008). Future research may wish to examine more complex measures of accessibility, rather than just availability, of parks in the census tract.

Similarly, the unit of analysis in this study was a pre-defined geographic area (i.e., census tract), but other research has shown GIS methods using a polygon network approach (i.e., a buffer around homes) to measure green space accessibility to be more practical from an urban planning perspective as it offers a more realistic insight into accessibility (Comber, Brunsdon, & Green, 2008). Using that type of method would have taken the study a step further to assess not only availability of parks, but true accessibility to residents, an important factor determining park usage.

Another limitation is that only parks that were included in the KCMO Parks and Recreation Department GIS shape file were eligible for inclusion in the study. This excluded private parks, school grounds, and any parks maintained under the jurisdiction of the county and not the city, as well as recreational facilities. It is presumable that in higher socioeconomic status and/or lower minority neighborhoods, there are a larger number of private or pay-for-use facilities facilitating physical activity than in low socioeconomic status and/or high percent minority census tracts (Macintyre et al., 2008). For example, in nearby Topeka, KS, Estabrooks and colleagues (2003) found that while there was an equitable number of pay-for-use recreational facilities across income census tracts, there were fewer free-for-use facilities in areas of lower socioeconomic status. Including recreation facilities, in addition to parks, in future

studies may provide a more complete picture of residents' access to neighborhood physical activity resources.

Not all of the facilities and amenities that were accounted for in the CPAT were included in the analyses. This was mostly due to them being either extremely common (i.e., green spaces, trash cans) or there being a lack of certain features in many parks or tracts (i.e., skate parks, family restrooms). Consequently, it was not possible to analyze differences in the availability of these features by levels of census tract income or racial composition. Additionally, the present study only accounted for the quality of the overall park, not the condition of individual facilities and amenities in the park, though the CPAT did capture these. For example, the facilities could have been equitably distributed but the quality or condition of those individual facilities could have been poor. Other CPAT variables were also not examined in the present study, including quality of the neighborhood and types of land uses surrounding the park, both of which influence safety perceptions of residents and subsequent park use. Indeed, researchers have found that parks in areas of lower socioeconomic status have less desirable land uses around the park (i.e., abandoned buildings/vacant lots, presence of graffiti) (Coen et al., 2006). Future analyses using the CPAT should take into account these additional variables.

The primary strengths of this study were related to the fact that all of the parks in the KCMO shape file were visited and audited using a comprehensive and reliable park audit tool. This allowed us to exclude parks that were not accessible or suitable for physical activity, rather than simply rely on the GIS file which contained numerous types of parks and other green spaces (e.g., ravines, cemeteries, etc). Conducting in-person audits was advantageous for the researchers and allowed for the collection of valid and complete information about the existing infrastructure

of park sites. Consequently, this permitted an examination of how a wide range of park facility, amenity, and quality factors differed by income and race across KCMO.

Conclusion

This comprehensive study compared park availability, features, and quality by socioeconomic status and percent minority across all of the census tracts within KCMO. There were no glaring discrepancies in availability, features, or quality among the census tracts. However, there were subtle marked differences that should not go overlooked. This study illustrates that while parks may be equally distributed across the city, differences exist in the availability of certain facilities and amenities and the quality of parks in areas of low socioeconomic status and high minority population. Bringing these up to par with parks in neighborhoods of higher socioeconomic status and lower percent minority will have a public health impact that can help to address the obesity crisis through the provision of equitable environmental supports for physical activity.

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Appendix A - Community Park Audit Tool

COMMUNITY PARK AUDIT TOOL

Instructions

Before you begin, review the brief training guide and audit tool and try to locate a map of the park. This is important to ensure each question and response option is clear when you are making your ratings. Then, go to the park and proceed with filling out this audit tool. The tool (6 pages) is divided into four sections that focus on different aspects of the park environment. Additional instructions are provided within each section.

Tips for Using the Community Park Audit Tool (CPAT)

- Drive, bike, or walk around the park to get a feel for the contents and characteristics of the park and surrounding neighborhood.
- The CPAT is organized such that questions on similar topics are grouped into logical sections and the four sections are arranged in the order that you might encounter them during your audit. However, you may need to switch between sections or pages as you complete the park audit. Therefore, it is important to review and be familiar with all of the tool sections and questions before you begin your audit.
- It is also important that you check back through the full document (6 pages) when you are finished to ensure you have completed all the sections and questions.
- Space is provided at the end of each section (and some individual questions) where you can take notes or record comments as you complete your audit. The margins or back of each page (if copied single-sided) can also be used to take notes, but please be sure that all relevant information is transferred to appropriate places on the tool and that all questions are fully answered using the format provided.
- If you see anything during your audit that requires immediate attention, contact the local parks department.

Section 1: Park Information

Park Name: _____ **Observer Name or ID:** _____

Park Address/Location: _____

Were you able to locate a map for this park? ❑ No ❑ Yes

Was the park easy to find onsite? ❑ No ❑ Somewhat ❑ Yes

Date (m/d/yr): ___ /___ /_____

Approximate Temperature: ___ °F **Weather:** ❑ Clear ❑ Partly Cloudy ❑ Rain/Snow

Start Time: _____ am or pm (circle) **End Time:** _____ am or pm (circle) **Length of visit:** ____ min

Comments on Park Information:

Section 2: Access and Surrounding Neighborhood

This section asks about factors related to accessing the park and about features of the neighborhood surrounding the park. Several questions include follow-up responses if you answered yes. After completing all questions, provide any additional comments in the space at the end of the section. **When thinking about the surrounding neighborhood, consider all areas that are visible from all sides of the park.**

When rating the access and surrounding neighborhood, please use the following definition:

- **Useable**: everything necessary for use is present and nothing prevents use (e.g., sidewalks are passable)

1. Can the park be **accessed for use**? (e.g., not locked/fenced, available for activity, etc.) ❑ No ❑ Yes

2. Are there **signs** that state the following (could be same sign)? *(check all that are present)*
   ❑ Park name ❑ Park hours ❑ Park contact information ❑ Park/facility rental information
   ❑ Park rules ❑ Park map ❑ Rental equipment information ❑ Event/program information

3. How many **points of entry** does the park have? ❑ More than 5 (or park boundary is open) ❑ 2-5 ❑ Only 1

4. Is there a **public transit stop** within sight of the park? ❑ No ❑ Yes

5. What types of **parking** are available for the park? *(check all that are present)*
   ❑ None ❑ Parking Lot ❑ On street parking ❑ Bike rack(s)

6. Are there **sidewalks** on *any* roads adjacent to the park? (could be on opposite side of road) ❑ No ❑ Yes
   If yes … Are they useable? ❑ All or most are useable ❑ About half ❑ None or few useable
   If yes … Are there **curb cuts and/or ramps** on *any* sidewalks bordering or entering the park? ❑ No ❑ Yes

7. Is there an external **trail or path** connected to the park? ❑ No ❑ Yes
   If yes … Is it useable? ❑ No ❑ Yes

8. Are there **bike routes** on *any* roads adjacent to the park? *(check all that are present)*
   ❑ None ❑ Marked lane ❑ Designated route sign ❑ Share the road signs/markers

9. Are there nearby **traffic signals** on *any* roads adjacent to the park? (e.g., crosswalk, stop light/sign) ❑ No ❑ Yes

10. What are the main **land use(s) around the park**? *(check all that apply)*
    ❑ Residential ❑ Commercial ❑ Institutional (e.g., school) ❑ Industrial (e.g., warehouse) ❑ Natural

11. Which of the following **safety or appearance concerns** are present in the **neighborhood surrounding the park**? *(check all that are present <u>in the surrounding neighborhood</u> within sight on any side of the park)*

❑ Inadequate lighting (e.g., absent or limited lighting on surrounding neighborhood streets)
❑ Graffiti (e.g., markings or paintings that reduce the visual quality of the area)
❑ Vandalism (e.g., damaged signs, vehicles, etc.)
❑ Excessive litter (e.g., noticeable amounts of trash, broken glass, etc.)
❑ Heavy traffic (e.g., steady flow of vehicles)
❑ Excessive noise (e.g., noticeable sounds that are unpleasant or annoying)
❑ Vacant or unfavorable buildings (e.g., abandoned houses, liquor store)
❑ Poorly maintained properties (e.g., overgrown grass, broken windows)
❑ Lack of eyes on the street (e.g., absence of people, no houses or store fronts)
❑ Evidence of threatening persons or behaviors (e.g., gangs, alcohol/drug use)
❑ Other _____

Comments on Access or Surrounding Neighborhood Issues:

Section 3: Park Activity Areas

This section asks about the activity areas in the park. For <u>each</u> activity area type:

1. **First, indicate the number (#) that are present in the park** (if none, write "0").
2. Then, respond to several subsequent questions about **up to three** of those particular areas. If there are more than three areas for a specific activity area type, **rate the first three you encounter during the audit**. If there were no activity areas of that type present in the park, move on to the next type.
3. Finally, use the space provided to note any additional comments about each type of activity area.

When rating the activity areas, please use the following definitions:

- **Useable**: everything necessary for use is present (excluding portable equipment - rackets, balls, etc.) and nothing prevents use (e.g., are there nets up for tennis courts, goals for sport fields, are trails passable, etc.)
- **Good condition**: looks clean and maintained (e.g., minimal rust, graffiti, broken parts; even surface; etc.)

12. **Activity Areas**	**# of Areas**	**Area 1**	**Area 2**	**Area 3**
a. **Playground**	(# :_____)			
Useable		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Good condition		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Distinct areas for different age groups		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Colorful equipment (i.e., 3+ colors)		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Shade cover for some (25%+) of the area		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Benches in/surrounding area		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Fence around area (i.e., half or more)		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Separation or distance from road		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Comments:				
b. **Sport Field** (football/soccer)	(# :_____)			
Useable		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Good condition		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Comments:				
c. **Baseball Field**	(# :_____)			
Useable		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Good condition		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Comments:				
d. **Swimming Pool**	(# :_____)			
Useable		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Good condition		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Comments:				
e. **Splash Pad**	(# :_____)			
Useable		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Good condition		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Comments:				
f. **Basketball Court**	(# :_____)			
Useable		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Good condition		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Comments:				
g. **Tennis Court**	(# :_____)			
Useable		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Good condition		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Comments:				

Activity Areas	# of Areas	Area 1	Area 2	Area 3
h. **Volleyball Court**	(# :_____)			
Useable		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Good condition		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Comments:				
i. **Trail**	(# :_____)			
Useable		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Good condition		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Connected to activity areas		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Distance markers/sign		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Benches along trail		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
What is the trail surface? *(check one)*		❑ Paved ❑ Crushed stone ❑ Dirt/mulch	❑ Paved ❑ Crushed stone ❑ Dirt/mulch	❑ Paved ❑ Crushed stone ❑ Dirt/mulch
Comments:				
j. **Fitness Equipment/Stations**	(# :_____)			
Useable		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Good condition		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Comments:				
k. **Skate Park**	(# :_____)			
Useable		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Good condition		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Comments:				
l. **Off-Leash Dog Park**	(# :_____)			
Useable		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Good condition		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Comments:				
m. **Open/Green Space**	(# :_____)			
Useable		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Good condition		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Comments:				
n. **Lake**	(# :_____)			
Useable		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Good condition		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Is there a designated swimming area?		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Comments:				
o. **Other** (*fill in a type description for each*)		_____	_____	_____
Useable		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Good condition		❑ No ❑ Yes	❑ No ❑ Yes	❑ No ❑ Yes
Comments:				

Comments on Park Activity Areas:

Section 4: Park Quality and Safety

This section asks about factors related to comfort and safety when using the park. Several questions include follow-up responses if you answered yes. After completing all questions, provide any additional comments in the space at the end.

When rating the quality and safety features of the park, please use the following definitions:

- **Useable**: everything necessary for use is present and nothing prevents use (e.g., can get into restrooms, drinking fountains work, etc.)
- **Good condition**: looks clean and maintained (e.g., minimal rust, graffiti, broken parts; etc.)

13. Are there public **restroom(s) or portable toilet(s)** at the park? ❑ No ❑ Yes
    If yes …
    Are the restroom(s) useable? ❑ All or most are useable ❑ About half ❑ None or few are useable
    Are they in good condition? ❑ All or most in good condition ❑ About half ❑ None or few in good condition
    Is there a family restroom? ❑ No ❑ Yes
    Is there a baby change station in any restroom? ❑ No ❑ Yes

14. Are there **drinking fountain(s)** at the park? ❑ No ❑ Yes
    If yes …
    How many different fountains are there? (i.e., units, not spouts) _____
    Are the fountains useable? ❑ All or most are useable ❑ About half ❑ None or few are useable
    Are they in good condition? ❑ All or most in good condition ❑ About half ❑ None or few in good condition
    Are they near activity areas? ❑ All or most are near ❑ About half ❑ None or few are near

15. Are there **bench(es)** to sit on in the park? ❑ No ❑ Yes
    If yes …
    Are the benches useable? ❑ All or most are useable ❑ About half ❑ None or few are useable
    Are they in good condition? ❑ All or most in good condition ❑ About half ❑ None or few in good condition

16. Are there **picnic table(s)** in the park? ❑ No ❑ Yes
    If yes …
    Are the tables useable? ❑ All or most are useable ❑ About half ❑ None or few are useable
    Are they in good condition? ❑ All or most in good condition ❑ About half ❑ None or few in good condition
    Is there a picnic shelter in the park? ❑ No ❑ Yes
    Is there a grill or fire pit in the park? ❑ No ❑ Yes

17. Are there **trash cans** in the park? ❑ No ❑ Yes
    If yes …
    Are they overflowing with trash? ❑ All or most overflowing ❑ About half ❑ None or few overflowing
    Are they near activity areas? ❑ All or most are near ❑ About half ❑ None or few are near
    Are recycling containers provided? ❑ No ❑ Yes

18. Is there **food/vending machines** available in the park? ❑ No ❑ Yes

19. If the sun was directly overhead, how much of the park would be **shaded**? ❑ <25% ❑ 25-75% ❑ >75%

20. Are there **rules posted about animals** in the park? (e.g., dogs must be leashed)? ❑ No ❑ Yes

21. Is there a place to get **dog waste pick up bags** in the park? ❑ No ❑ Yes
    If yes … Are bags available at any of the locations? ❑ No ❑ Yes

22. Are there **lights** in the park? (not including neighborhood street lights) ❑ No ❑ Yes
If yes …
How much of the park could be lit? ❑ <25% ❑ 25-75% ❑ >75%
Are the activity areas lit? ❑ All or most are lit ❑ About half ❑ None or few are lit

23. Is the **park monitored**? (e.g., volunteer or paid staff, patrolled by police, cameras, etc.) ❑ Unsure ❑ Yes

24. Are there **any emergency devices** in the park? (e.g., phone, button, emergency directions) ❑ No ❑ Yes

25. Is there evidence of **threatening behavior or persons** in the park? (e.g., gangs, alcohol/drug use) ❑ No ❑ Yes

26. From the center of the park, how **visible is the surrounding neighborhood**? ❑ Fully ❑ Partially ❑ Not at all

27. Are there **road(s)** of any type through the park? ❑ No ❑ Yes
If yes … Are there traffic control mechanisms on the roads within the park? (e.g., crosswalk, stop light or sign, brick road, speed bumps, roundabouts) ❑ No ❑ Yes

28. Which of the following **park quality concerns** are present **in the park**? *(check all that are present)*
❑ Graffiti (e.g., markings or paintings that reduce the visual quality of the area)
❑ Vandalism (e.g., damaged signs, buildings, equipment, etc.)
❑ Excessive litter (e.g., noticeable amounts of trash, broken glass, etc.)
❑ Excessive animal waste (e.g., noticeable amounts of dog waste)
❑ Excessive noise (e.g., noticeable sounds that are unpleasant or annoying)
❑ Poor maintenance (e.g., overgrown grass/weeds/bushes or lack of grass in green areas)
❑ Other _____

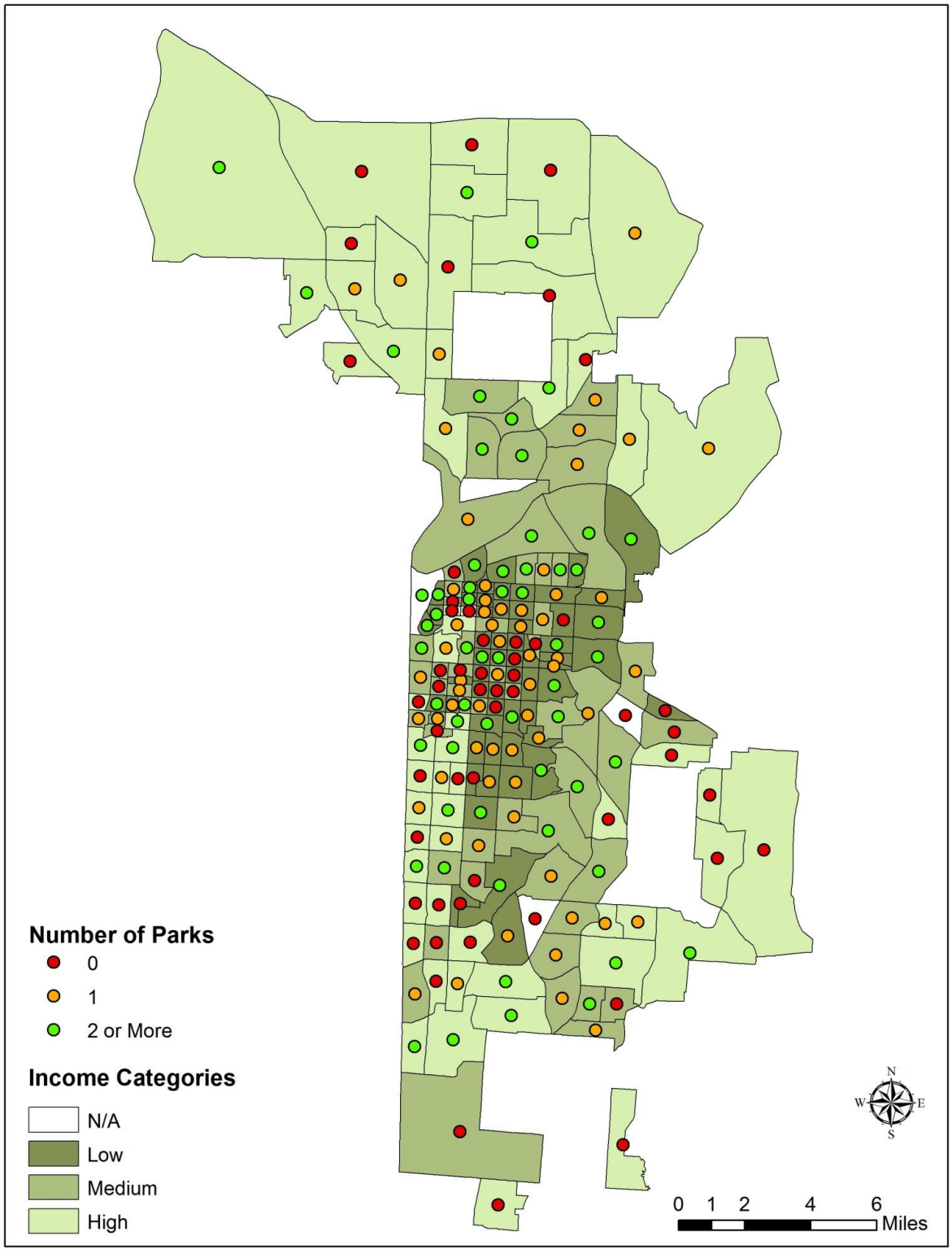
29. What **aesthetic features** are present **in the park**? *(check all that are present)*
❑ Evidence of landscaping (e.g., flower beds, pruned bushes)
❑ Artistic feature (e.g., statue, sculpture, gazebo, fountain)
❑ Historical or educational feature (e.g., monument, nature display, educational signs, etc.)
❑ Wooded area (e.g., thick woods or dense trees)
❑ Trees throughout the park (e.g., scattered trees)
❑ Water feature (e.g., lake, stream, pond)
❑ Meadow (e.g., natural, tall grassy area)
❑ Other _____

30. Are there any **dangerous spots** in the park? (e.g., abandoned building, pit/hole) ❑ No ❑ Yes

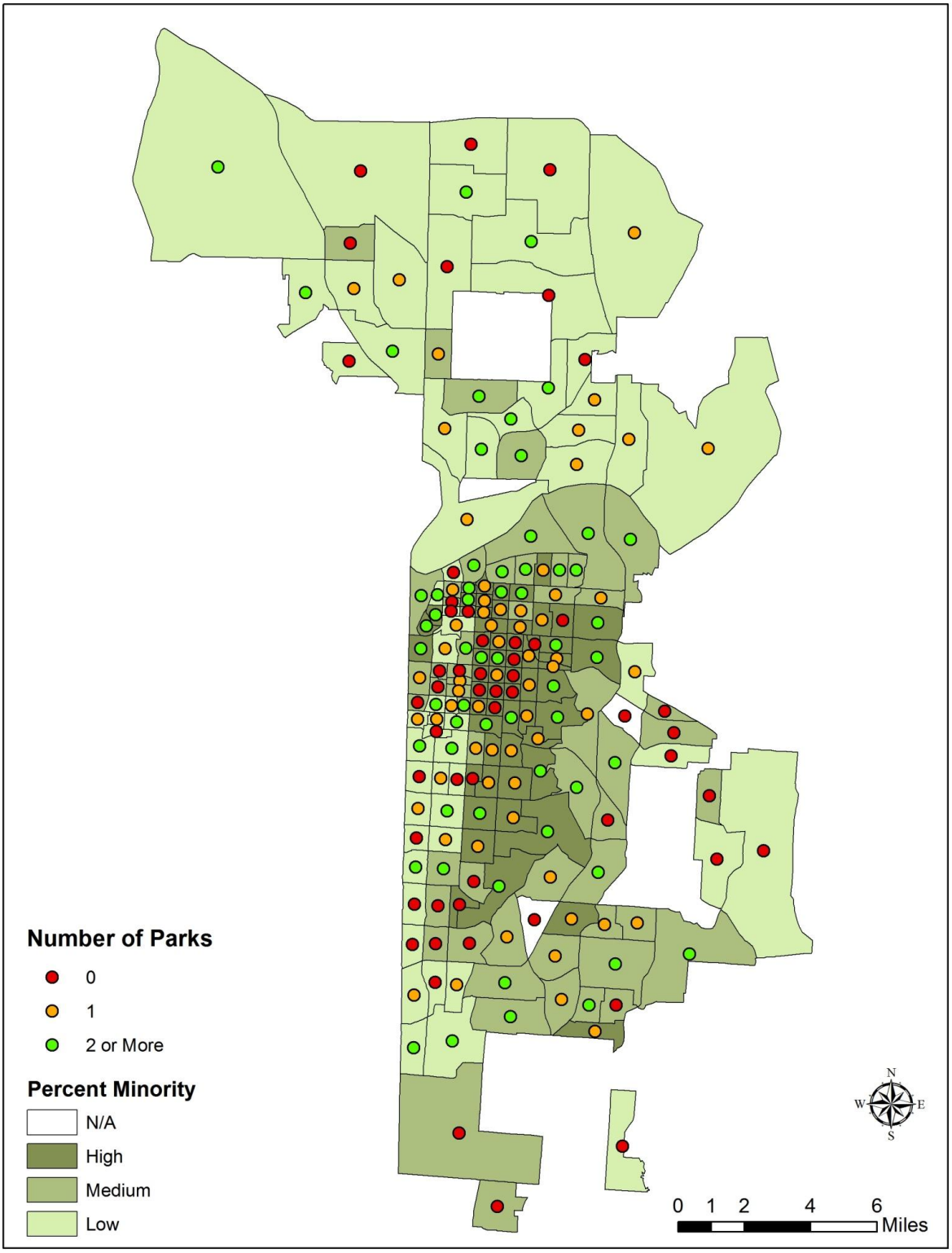
Comments on Park Quality and Safety Issues:

Before finishing, please ensure you have answered all questions in the tool.

Appendix B - Map of Kansas City, MO Census Tracts by Income & Number of Parks


Number of Parks
0
1
2 or More
Income Categories
N/A
Low
Medium
High
N
W
E
S
0 1 2 4 6
Miles

Appendix C - Map of Kansas City, MO Census Tracts by Percent Minority & Number of Parks


Number of Parks
0
1
2 or More
Percent Minority
N/A
High
Medium
Low
N
W
E
S
0 1 2 4 6
Miles