ASSOCIATIONS BETWEEN PARK-USE, PREFERENCES OF PARK FEATURES, AND PHYSICAL ACTIVITY AMONG CITY RESIDENTS VARYING IN SOCIOECONOMIC STATUS

by

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Public parks can play a substantial role in increasing physical activity (PA) because they offer a wide range of either free or low-cost activities. For many Americans, there are limitations on the environment and resources where they can be physically active. Parks are important resources for promoting PA, yet few studies have examined how preferences of park features relate to physical activity levels and socioeconomic status (SES). This study investigated associations between city park use and PA levels across low and higher SES groups. A secondary purpose of the study was to assess the association between preferences of park features used for PA and PA levels across low and higher SES groups. Data were collected via questionnaire from 318 city residents. Descriptive analysis provided means, standard deviations and frequencies. Independent t-tests were run to examine the differences among low and higher SES residents' survey responses. A chi-square test was used to determine the association between a being physical activity at a park (Yes/No) and IPAQ categories. An additional chi-square test was used to determine the association between a having a neighborhood park present (Yes/No) and IPAQ categories, income category and IPAQ categories. A Pearson's correlation was used to assess the relationship of minutes of self-reported park usage and self-reported minutes per week of physical activity from the IPAQ. Finally, binary logistic regression models

were used to assess (a) park-based physical activity was related to physical activity from the IPAQ; and (b) the a relationship between specific park features and meeting physical activity guidelines from the IPAQ. Binary logistic regression models were calculated individually for low SES, high SES, and total sample. All the logistics regression analyses were adjusted for age and gender. The significance level was set at alpha $\leq$ .05. Responses for open-ended survey questions were qualitatively examined. The researcher first read through all comments several times to become familiar with the content. Then meaning units were created and coded based on words or statements that communicate the same central meaning through their content. The results of this study indicated a positive relationship between park-based PA and PA measured by the IPAQ. The most visited parks' main features were open space, trails, and sidewalks. Participants reported using open space, trails, and sidewalks the most. There were no differences in either park use or park features used for physical activity by SES group. Specific park features were not related with PA levels ($p>.05$). Adults who reported being physically active at a park were more likely to meet PA recommendations compared to those not active at a park (OR= 2.01, 95% CI= 1.20-3.36). A similar finding was observed for the high SES group (OR=1.90, 95% CI=1.05-3.50), but not the low SES group (OR=2.35, 95% CI=0.8-6.90). Better measuring and understanding how the park preferences of city residents are associated with physical activity and health may improve the understanding of how parks facilitate active living.

ASSOCIATION OF PARK-USE, PREFERENCES OF PARK FEATURES, AND PHYSICAL

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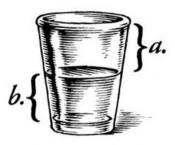The Masters of Science in Exercise and Sport Science

Physical Activity Promotion

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You helped me see the glass half full.

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Chapter I: Introduction

A person's position in society and conditions in which they may live strongly influence their health. Socioeconomic status (SES) is used to define an individual or groups' position in society (Adler, Boyce, Chesney, Cohen, Folkman, Kahn, and Syme, 1994). Nearly 15% of people in the United States are living below the United States federal poverty line; that amounts to 46.2 million Americans living in poverty (United States Census Bureau, 2012). Most of these low SES Americans have poor health when compared to higher SES adults.

In the United States, health is seen on a socioeconomic-health gradient. This means that on a population level, as SES decreases, negative health outcomes increase (Adler et al., 1994; Freeman, 2004; House, Kessler, and Herzog, 1990; Winkleby, Jatulis, Frank, and Fortmann, 1992). Low-income populations and those from ethnic and racial minority groups have shorter life spans, higher rates of chronic diseases, and lower quality of life than affluent and non-Hispanic white populations (Centers for Disease Control and Prevention, 2004). This relationship has created a distinct health disparity in the United States; a health disparity is a result of health difference closely linked with social, economic, and environmental disadvantaged (Centers for Disease Control and Prevention, 2004).

The largest health disparity is between those in the lowest and highest SES levels. Health disparities in the United States provide insight into the components of health. It could be that lower SES individuals, who have poor health, consequently have poor health behaviors or higher SES individuals have better health outcome due do positive health behaviors (Frierson, Howard, Defina, Powell-Wiley, & Willis, 2013; Freeman, 2004). However, research is still limited on the direction of the relationship of health behaviors and socioeconomic. Previous research has

shown that health behaviors, such as tobacco use, poor diet, and lack of physical activity, are critical predictors of a healthy life. Like health outcomes, these predictive health behaviors, such as smoking and physical inactivity, are inversely related to SES (House et al., 1990). There are many factors that help an individual achieve optimal health; physical activity is one factor. Like health, there is a large disparity between physical activity levels among low SES individuals compared to high SES individuals.

Low-income and racial/ethnic minority populations have been observed to have lower levels of leisure- time physical activity compared to the national averages. Adults with a college degree are almost 3 times more likely to meet the 2008 Physical Activity Guidelines than adults with a less than a high school degree (Centers for Disease Control and Prevention, 2004). In addition, adults whose family income is above the poverty level are more likely to meet the 2008 Physical Activity Guideline than adults whose family income is either at or near the poverty level (Centers for Disease Control and Prevention, 2003). Approximately 54.1% (95% C.I.: 52.2 - 56.0) of adults with less than a ninth grade education do not regularly participate in leisure-time physical activity compared 18.3% (95% C.I.: 16.9 - 19.6) of college graduates (Centers for Disease Control and Prevention, 2011). When family income is less than 100% of the federal poverty line, 34.2% (95% C.I.: 32.5-36.0) adults engage in regular moderate physical activity for 150+ minutes/week or vigorous for 75+ minutes/week. This is compared to 65% (95% C.I.: 63.1- 66.9) for adults who family income was greater than 600% of the federal poverty line. In addition, lower levels of neighborhood unemployed and median household income were positively related to leisure-time physical activity (Ford, Merritt, Heath, Powell, Washburn, Kriska, & Haile, 1991). This suggests that neighborhood factors play a role in adults' physical activity levels.

SES is a powerful predictor of health and health behaviors, like physical activity. Low levels of physical activity are more prevalent among lower income, less educated, and unemployed populations compared to higher income individuals. The exact social determinates of this health disparity are still unclear, but current research has demonstrated that the physical (built) and social environments have a relationship with physical activity, especially for low income communities (Freeman, 2004; Sallis, Cervero, Ascher, Henderson, Kraft, and Kerr, 2006). As a nation, physical activity is at unhealthy levels and has resulted in a multitude of health related concerns. However, low SES communities when compared to national averages are at even lower levels of physical activity.

Low SES individuals are typically surrounded by individuals at the same educational or economic attainment level; therefore low SES individuals are surrounded by those who exhibit poor health behaviors and where residents are inculcated into unhealthy lifestyles (Winkleby et al., 1992). Research has linked higher education with greater exposure to positive health messages resulting in either better health understanding or literacy level and social support for physical activity participation (Winkleby et al., 1992). Physical activity is driven by the complex interaction of social, economic, cultural and access to physical activity resources (Freeman, 2004; Ford, 1991). These factors are extremely powerful in determining how individuals and communities thrive. Low SES status is associated with a lack of resources, information, and knowledge; substandard living condition and risk promoting lifestyles (Freeman, 2004). The social norms and culture of the low SES environment is a strong dynamic in the lives of many Americans. Low SES communities' low activity levels are not solely a result of personal choices. Optimal health is a result of the choices that people are able to make in response to the options that they have. These choices are presented in both the social and physical environments

and determine the range of options that are available. It is clear that low SES creates a conditional social environment for physical activity and health; meaning that physical activity is a result of the choices and condition made available. The social and community environment are intertwined and research investigating the interplay of both is needed.

Low-income individuals are often confronted with more difficult social and environmental barriers to physical activity than higher income groups. Some of the most common barriers include long distances to important daily destinations, lack of meaningful transportation choice, unsafe neighborhood and traffic conditions, poor access to parks and recreational facilities, air pollution, lack of time, poor health and lack of social support for exercise (Sallis, Johnson, Calfas, Caparosa, and Nicholas, 1997). While many of these barriers also exist for other income groups, they often exist to a greater degree in low-income communities. Low-income people have less financial flexibility to choose more activity-friendly alternatives such as living closer to work or in a safer and cleaner neighborhood, purchasing a health club membership, paying a fee to visit the community pool or recreation center, or purchasing services that afford time for physical activity such as housecleaning or childcare (Cromer, Brownson, and Donanelle, 1998). National physical activity recommendations encourage individuals to engage in more physical activity, but for many American there are limitations on the environment and resources where they can increase physical activity. Financial barriers are common for low income communities and parks provide a space that is free to the public. Public parks provide a space that is ideal for residents of low income communities to engage in physical activity.

Public parks can play a substantial role in increasing leisure-time physical activity because they offer a wide range of free or low-cost activities close to where people live (Godbey

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Caldwell, Floyd, and Payne, 2005). There is sufficient evidence to conclude that parks have a positive relationship with physical activity (Leslie, Cerin, and Kremer, 2010; Godbey et al., 2005; Brownson, Baker, Housemann, Brenna, and Bacak, 2001). Therefore, public parks and recreational facilities have the potential to combat decreasing levels of physical activity specifically in lower SES communities. Yet, it is important to keep in mind the idea that parks must be attractive and safe, and have a diversity of amenities and features to meet the needs of a diverse population (Jacobs, 1961). Park usage and park based physical activity is dependent of the qualities/features of the park; not just the presence of parks. Understanding the additional factors within the park itself that facilitate more physical activity when present is needed.

Attributes such as park size (Giles-Corti, Broomhall, and Knuiman, 2005) the presence of sports fields (Floyd, Spengler, Maddock, Gobster, and Suau, 2008a); wooded areas, trails, paths, and sidewalks (Kaczynski, Potwarka, and Saelens, 2008; Reed, McKenzie, Hagen, and Harring, 2008; Shores and West, 2008) and the total number of features and amenities (Giles-Corti et al., 2005; Kaczynski et al., 2008) may promote park use and physical activity more specifically to low SES communities, while the presence of litter, vandalism, and unclean washrooms may deter use (Gobster, 2002). Sugiyama, Francis, Middleton, Owen, and Giles-Corti (2010) and Giles-Corti et al. (2005) found that park attractiveness, a greater number of features and larger parks were associated with increased park usage and leisure time physical activity. The two studies highlighted that park attributes could play a role in increasing physical activity at parks Rung, Mowen, Broyles, and Gustat (2011) noted that basketball courts had the highest energy expenditure and playgrounds with the second highest energy expenditure. In addition, support features, like drinking fountains, can increase physical activity. There is a better understanding of why some parks are used more than others. Supporting features, larger parks, attractiveness,

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and increased variety of features offered can increase physical activity. Sports facilities, playground and trails have all been to be related to increased physical activity (Giles-Corti, 2005). Park attributes including safety, aesthetics, amenities, maintenance, and proximity are important for encouraging park use (McCormack, Rock, Toohey, and Hignell, 2010; Rung et al., 2011; Giles-Corti et al., 2005).   Yet, there has been limited research on the low income communities' preference of park features that support physical activities. The needs of the community members should drive the design, but often factors like available funding and high SES preferences dictate the specifics of park design.

Wilbur, Chandler, Dancy, Choi, and Plonczynski (2002) found that there was a cultural difference to physical activity. These cultural differences were related to the women to associate with either engaging in daily physical activity or sedentary behavior and not leisure time exercise. In addition, they felt a lack of safety caused the environment was not conducive to physical activity. The women repeated that they did not feel comfortable to engage in activity outside their immediate community. Lastly, the women felt that the dominant culture does not provide adequate policy support for their communities. The Wilbur et al. (2002) study has many implications for research in parks and physical activity. If parks are to be used for promoting physical activity among the low SES communities, community leaders and park designers must address the cultural differences and perceptions of the parks. The study suggested that there was a relationship between the perceptions of the social environment and perceptions of the physical environment. The Bai, Stanis, Kaczynski, and Besenyi (2013) study provided evidence on the link between residents' perceptions of neighborhood park quality and PA and health outcomes. Perceiving parks as a health benefit to the community was positively related to overall MVPA and park-based PA and negatively related to BMI.   Bai et al. (2013) study sample was majority

middle to high SES. In comparison to the wealth of knowledge on park usage and park access, park perception literature is very small. There is a clear gap in the literature and a need to focus on park perceptions for promoting physical activity in low SES communities. More information and research about park perceptions related to physical activity among low SES communities would provide insight into the social and behavioral mechanism that drives health disparities in the United States communities. There is a need to understand the perceptions of low SES communities in order to increase park usage and physical activity in parks. A better understanding is needed in order to increase the overall health of the community and decrease the expanding health disparity in the United States.

Purpose Questions

The aim of the study is to elucidate the relationship between specific park feature and park-based physical activity among adults with varying SES. The study addressed two core questions (a) Does the presence of specific park features used for physical activity have a relationship with self-reported physical activity and park-based physical activity; (b) Is there a relationship with park-based physical activity and self-reported physical activity?

Research Hypotheses

(a) The presence of specific park features will have a positive relationship with self-reported physical activity and park-based physical activity regardless of SES status; (b) There will be a positive relationship with specific park features and self-reported physical activity and park-based physical activity; and (c) There will be moderate positive relationship between time spent in self-reported park based-physical activity and self-reported physical activity. In addition, we predicted low SES group would engage in less physical activity than higher SES groups.

Definitions of Terms

Athletic fields: A space with designated boundaries or borders used for specific sports.

Built environment: Modified places such as homes, schools, workplaces, parks, industrial areas, farms, roads and highways that create developed spaces.

Carrying capacity: Carry capacity refers to the maximum number of people a park can tolerate before it deteriorates, and functional density is a term measuring the optimal number of people in a park to maximize enjoyment (neither too crowded nor too vacant) (Klenosky and LeBlanc, 2007).

Culture: Integrated patterns of human behavior that include the language, thoughts, communications, actions, customs, beliefs, values, and institutions of racial, ethnic, religious, or social groups. The unique shared values, beliefs, and practices that are directly associated with a health-related behavior, indirectly associated with a behavior, or influence acceptance and adoption of the health education message (US Department of Health and Human Services, 2000).

GIS: Geographic Information Systems is a system of hardware and software used for storage, retrieval, mapping, and analysis of geographic data.

Health disparity: Health disparities are the differences in the incidence, prevalence, mortality, and burden of diseases and other adverse conditions that exist among specific population groups in the United States (American Council of Learned Societies, 1958)

Health equity: Health equity is the attainment of the highest level of health for all people. Achieving health equity requires valuing everyone equally with focused and ongoing societal efforts to address avoidable inequalities, historical and contemporary injustices, and the elimination of health and health care disparities (US Department of Health and Human Services, 2000).

Moderate physical activity (MPA): On an absolute scale, physical activity that is done at 3.0 to 5.9 times the intensity of rest. On a scale relative to an individual's personal capacity, moderate-intensity physical activity is usually a 5 or 6 on a scale of 0 to 10.

Park: Parks are designated public spaces where individuals have the option of engaging in physical activity, along with other leisure activities. Examples of such benefits include opportunities for social interaction (Bedimo-Rung, Mowen, and Cohen, 2005), reductions in

stress (Hansmann, Hug, and Seeland, 2007) and improvements in feeling well-balanced (Hansmann et al., 2007).

Path: A path is a distinct and designated route with the primary function of linking elements within the park, may be paved or unpaved.

Physical activity (PA): Physical activity is any body movement that works your muscles and requires more energy than resting.

Socioeconomic status (SES): Socioeconomic status is used to define an individual or groups' position in society (Adler et al., 1994). SES can be measured by household income, educational attainment, or occupation (Winkelby et al., 1992) and typically refers to the combined measure of economic, social, and work status (Adler et al., 1994).

Trail: A route used for walking, biking, rollerblading, running, ect. A trail is distinct from a path by its intent and predominant use. A trail is primary intended for active recreation, whereas a path is intended to link difference areas/functions of a park. Although a trail can link areas, this is not the primary intention or use of a trail.

Vigorous physical activity (VPA): Vigorous-intensity physical activity may be intense enough to represent a substantial challenge to an individual and refers to a level of effort in which a person should experience.

Delimitations

1. All participants must reside in Greenville, NC and be at or above the age of 18 years.
2. All parks must be maintained and serviced by the City of Greenville Recreation and Parks.

3. A validated measure of physical activity was used, International Physical Activity Questionnaire.

4. A reliable and valid measurement of park features and amenities was used, Environmental Assessment of Public Recreation Spaces.

Limitations

1. Physical activity questionnaires provided limited information on the intensity of the physical activity.

2. Physical activity questionnaires are not the most accurate measure of the physical activity and can be skewed by participants' bias.

Significance of the study

Parks are important resources for physical activity, yet few studies have examined the association of the preferences of park characteristics related to physical activity among low SES communities. This comparison will provide further insight into the needs of low SES communities, in terms of park features to increase physical activity in parks and promote overall park usage.

CHAPTER II: Review of the Literature

Socioeconomic Status and Health

A person's position in society and conditions in which they live strongly influence their health. Socioeconomic status (SES) is used to define an individual or groups' position in society (Adler et al., 1994). SES can be measured by household income, educational attainment, or occupation (Winkelby et al., 1992) and typically refers to the combined measure of economic, social, and work status (Adler, 1994). Nearly 15% of the United States' population is living below the poverty line; that amounts to 46.2 million Americans living in poverty (United States Census Bureau, 2012). Most commonly, SES is assessed through single individual-level indicators, but these may not accurately characterize the status of the family or household (Adler et al., 1994; Krieger, Chen, Waterman, Rehkopf, and Subramanian, 2003). Appropriate SES measures are necessary to accurately assessing a group's status and access resources (Krieger et al., 2003). Studies that evaluated SES on multiple levels (education, income, poverty status, employment) provided a more accurate assessment of the association between SES and health outcomes.

However, one of the most common measures of SES is income. The *Federal Register* uses an income standard to create a poverty threshold and poverty guidelines for the United States (United States Census Bureau, 2012). Yet, regardless of the measurement of SES there is a strong inverse relationship between SES and health (Krieger et al., 2003). The ratio of observed to expected deaths within subgroups among White men aged 25 to 64 years was the lowest for those with a college education or better (.70) and gradually increased as education decreased [(.85 for those with some college), (.91 for high school graduates), (1.03 for those with some high school), (1.07 for those completing eight years of schooling), (1.13 for those with five to

seven years of education), and (1.15 for those with four years or less of education)]. Comparable ratios for White women of this age were for each of the education levels (college education= .78, some college= .82, high school graduates= .87, some high school= .91, eight years of schooling = 1.08, five to seven years of education= 1.18, and four years of less of education= 1.60) (Adler et al., 1994). SES provides clues to the material, social, and psychological mechanisms that impact the health of the nation, communities, and individuals. The quality and level of health varies tremendously for American citizens and SES is one of the strongest predictors of the quality of health an individual will experience in their life.

In the United States, health is seen on a socioeconomic-health gradient. Meaning as SES decreases, negative health outcomes increase (Adler et al., 1994; House et al., 1990; Winkleby et al., 1992; Freeman, 2004). Low SES populations and those from ethnic and racial minority groups have shorter life spans, higher rates of chronic diseases, and lower quality of life than affluent and non-Hispanic white populations (Centers for Disease Control and Prevention, 2004). This relationship has created a distinct health disparity in the United States. A health disparity is a result of health difference closely linked with social, economic, and environmental disadvantaged.

The SES and health gradient is scene in a number of health outcomes; obesity is just one example. Less education attainment and lower income results in higher rates of obesity and overweight. Sobal and Stunkard (1989) reviewed 144 studies focusing on obesity and SES. They found there was an inverse relationship between obesity and SES. The Centers for Disease Control (2004) found that more than 33 % of adults who earn less than $15,000 per year were obese, compared with 24.6 % of those who earned at least $50,000 per year. Those in the highest

socioeconomic class have better health outcomes than the upper-middle class, the upper-middle class has better health outcomes than the middle class, and so on (Adler et al., 1994; Marmot, Shipley, and Rose, 1984; Krieger et al., 2003).

Therefore, the largest health disparity is between those in the lowest and highest SES levels. Health disparities in the United States provide insight into the components of health. It is logical that lower SES individuals, who have poor health, consequently have poor health behaviors (Frierson et al., 2013; Freeman, 2004). Health behaviors, such as smoking, poor diet, and lack of exercise, are critical predictors of a healthy life. Like health outcomes, these predictive health behaviors, such as smoking and physical inactivity, are inversely related to SES (House et al., 1990).

Despite, the pathway and determinants of SES and health behaviors are not well understood. There is a need for research focusing on the determinants and factors of poor health outcomes and poor health behaviors of low SES individuals. This information is important for developing federal, state, or local health policies and interventions aimed to eliminate SES disparities in health. One critical health behavior is physical activity. A better understanding of the mechanisms that drive low SES individuals to be less physical active is critical for eliminating the nation's growing health disparity (American Council of Learned Societies, 1958). *Healthy People 2020* embraced the need to intervene in health disparities and a focus on the "social determinants" of health (United States Department of Health and Human Services, 2000). Emphasizing the need to consider factors such as poverty, education, and aspects of the social structure that influences communities achieve health equity. There are many factors that help an individual achieve optimal health; physical activity is one factor. This literature review

will address the potential factors related to the large disparity between physical activity levels among low SES individuals compared to high SES individuals.

Physical Activity

Nationally, a majority of adults fail to meet sufficient physical activity recommendations to maintain good health. According to *Healthy People 2020*, more than 80% of adults do not meet the guidelines for both aerobic and muscle-strengthening activities (U.S. Department of Health and Human Services, 2000). The positive benefits of health and physical activity are well-documented. Regular physical activity has been shown to reduce morbidity and mortality by decreasing the risk for heart disease, type II diabetes, high blood pressure, colon cancer, feelings of depression and anxiety, and obesity, help in maintaining healthy bones, muscles, and joints (United States Department of Health and Human Services, 1996). Despite the positive benefits of physical activity, only 43.5% of adults engaged in aerobic physical activity of at least moderate intensity for at least 150 minutes/week, or 75 minutes/week of vigorous intensity, or an equivalent combination (Centers for Disease Control and Prevention, 2003). When measuring no leisure-time physical activity, the Behavioral Risk Factor Surveillance System Survey found 31.6% of adults engaged in no leisure time physical activity (Centers for Disease Control and Prevention, 2004). Adults meeting the physical activity guidelines have been reported as low as 5% when measured by accelerometer (Troiano, Berrigan, Dodd, Masse, Tilert, and McDowell, 2008). As a result of the low physical activity levels, increasing physical activity levels in United States has been identified as a top public health priority (United States Department of Health and Human Services, 2000). *Healthy People 2020* set a goal of reducing the percentage of adults who engage in no physical activity by 10% (United States Department of Health and Human Services, 2000). An additional goal was set to increase the proportion of adults who engage in

aerobic physical activity of at least moderate intensity for at least 150 minutes/week, or 75

minutes/week of vigorous intensity, or an equivalent combination to the target goal of 47.9% of

the United States population. It is clear increasing physical activity in the United States is an

important health initiative for all Americans, but especially for those who engage in the least

amount of physical activity. Physical activity is no different than other health behaviors;

disadvantaged individuals engage in less physical activity than those with higher education,

income and employment status.

As a nation, physical activity levels are at unhealthy levels and have resulted in a

multitude of health related concerns. However, low SES communities when compared to

national averages have even lower levels of physical activity. In order to eliminate health

disparities, it is important to address the small behavioral factors that result in health equity.

Health equity is the attainment of the highest level of health for all people (United States

Department of Health and Human Services, 2000). One health behavior contributing to health

disparities in America is physical activity. Disadvantaged populations engage in less physical

activity.

Low Socioeconomic Status and Physical Activity

Low levels of leisure physical activity are more prevalent among lower income, less

educated, and unemployed populations compared to higher income individuals (Centers for

Disease Control and Prevention, 1999; Crespo, Smit, Andersen, Carter-Paokras, and Ainsworth,

2000; United States Department of Health and Human Services, 1996). Physical inactivity

increases as SES decreases; like chronic diseases, positive physical activity levels are dependent

on a social gradient. The factors responsible for these disparities are poorly understood.

According to the Behavioral Risk Surveillance System (BRFSS), adults with higher education are more likely to meet the 2008 Physical Activity Guideline than less educated adults (Centers for Disease Control and Prevention, 2004). Adults whose family income is above the poverty line are more likely to meet the 2008 Physical Activity Guidelines than adults whose family income is either at or near the poverty level (Centers for Disease Control and Prevention, 2004). As expected, lower SES groups engaged in less leisure-time physical activity (Centers for Disease Control and Prevention, 2000). Approximately 54.1% (95% C.I.: 52.2 - 56.0) of adults with less than a ninth grade education do not regularly participate in leisure-time physical activity compared 18.3% (95% C.I.: 16.9 - 19.6) of college graduates (Centers for Disease Control and Prevention, 2000). When family income is less than 100% of the federal poverty line, 34.2% (95% C.I.: 32.5-36.0) adults engage in regular moderate physical activity for 150+ minutes/week or vigorous for 75+ minutes/week. This is compared to 65% (95% C.I.: 63.1-66.9) for adults who family income was greater than 600% of the federal poverty line. In addition, lower levels of neighborhood unemployed and median household income were positively related to leisure-time physical activity (Ford et al., 1991). This suggests that neighborhood factors play a role in adults' physical activity levels.

Bennett, Wolin, Puleo, and Emmons (2006) examined physical activity, measured via pedometer, in a predominately low SES neighborhood. SES status was determined by three primary predictors— self-reported income level, education, and employment. Neither education ($F = 0.77$, $p = 0.47$) nor income ($F = 1.90$, $p = 0.13$) were significantly associated with daily steps. Employment status, however, was significantly associated with steps per day ($F = 13.45$, $p < 0.0001$), those who were employed full-time recorded 2,876 more daily steps ($p < .0001$) than those who reported not working. Those with full time employment (N=76) had on

average 7,864 steps/day (SD= 4,240.7), part time employment status (N=56) had on average 6,432 steps/day (SD= 4,614.8), disabled status (*N*= 92) had on average 4,396 steps/day (SD= 3,336.4), and not working (*N*= 182) had on average 4,526 steps/day (SD= 3435). The researchers found the lowest SES level for work status were sedentary for every SES predictor (Bennett et al., 2006).

The Ball, Bauman, Leslie, and Owen (2001) study examined walking and leisure time activity in relation to socioeconomic status using data from the Behavioral Risk Surveillance System. The study found as educational attainment increases consequently walking for leisure increased. Those with a university education had the largest odds ratio of walking for exercise in the past two weeks of 1.77 (95% C.I.: 1.46- 2.14) compared to individuals with only 10 years of education. Bennett et al. (2006) and Ball et al. (2001) findings present evidence of a positive relationship between SES and physical activity, however, it is still unknown the direction of the relationship and what promotes low physical activity levels to fester in low SES communities.

In summary, significant portions of Americans are living in poverty and many low SES individuals are inactive. Therefore, there is a need to address the underlying issues that inhibit higher levels of physical activity for the low SES population. The difference in physical activity levels between low and high SES is increasing in the United States. Government agencies have prioritized reducing health disparities and increasing physical activity as a top public health issues for the United States. Past research findings have provided a strong foundation of physical activity disparity and guided future research to a new focus on the cultural social determinates that contribute to the physical activity levels of low income communities (Bauman, Reis, Sallis, Wells, Loos, and Martin, 2012; Lynch, Kaplan, and Salonen, 1997). Low SES

communities and individuals have different needs and lower level of security for the basic needs of life than higher SES. These differences create a unique perspective on needs, wants, and values of low SES communities. The culture and social aspect of low income communities provides insight into the prevalence of low physical activity levels.

Low SES Community and Culture

Research has shown that low income individuals suffer from poor health and exhibit poor health decision and health behaviors (Lynch et al., 1997) and low SES individuals are typically surrounded by individuals who are either at similar economic level or education attainment. This creates a sub culture in these communities, where individuals are surrounded by people who engage in poor health behaviors. Research has found higher education is associated with greater exposure to positive health messages resulting in either better health understanding or literacy level and social support for physical activity participation (Winkleby et al., 1992). SES has a powerful influence over a person's life experiences. As a result, physical activity is driven by the complex interaction of social, economic, cultural and access to physical activity resources (Freeman, 2004; Ford et al., 1991). These factors are extremely powerful in determining how individuals and communities thrive. Freeman (2004) explains that low SES status is associated with a lack of resources, information, and knowledge; substandard living condition and risk promoting lifestyles. The social norms and culture of the low SES environment is a strong dynamic in the lives of many Americans.

Over 50% of the 46.2 million Americans in poverty are either a racial or ethnic minority. African Americans accounts for 27.6 % of those living in poverty, 25.3% were Hispanic/Latino and 12.3% Asians compared with 12.8% of Whites (Centers for Disease Control and Prevention, 2004). When addressing the culture of low income communities it is important to realize culture is not synonymous with the race. Many cultures exist in the same racial and ethnic group (Freeman, 2004). Culture refers to a shared communication system; similarities in physical and social environments, common beliefs, values, and traditions; and similarities in lifestyles, attitudes, and behavior (Freeman, 2004). The culture of low SES individuals is a powerful determinate of an individual's activity level and how they will react to the negative impact of no or insufficient amount of physical activity (Wilbur et al., 2002). The Secretary's Advisory Committee on National Health Promotion and Disease Prevention Objectives for 2020 observed that health is a result of the choices that people are able to make in response to the options that they have. These choices are presented in both the social and physical environments and determine the range of options that are available (United States Department of Health and Human Services, 2000). In addition, many of the same factors are at play and, over time, can result in physiologic changes that exacerbate chronic disease (United States Department of Health and Human Services, 2000). Understanding societal and culture factors at play for exacerbating low SES inactivity can be an overwhelming task. Yet, focusing on the physical environment, as known as the built environment, could provide insight into the needs and wants of low SES individuals.

SES is a powerful predictor of health and health behaviors, like physical activity. Low levels of physical activity are more prevalent among lower income, less educated, and unemployed populations compared to higher income individuals. The exact social determinates

of this health disparity are still unclear, but current research on the physical and social

environment provide hope for bringing health equality for the United States. It is clear that low

SES creates a conditional social environment for physical activity and health; meaning that

physical activity is a result of the choices and condition made available. The social and

community environment are intertwined and research investigating the interplay of both is

needed.

The Built Environment

Understanding the specific determinates of why individuals are either physically active or

inactive is critical to eliminating the United States physical activity disparities. Individual

behaviors, like physical activity, do not solely rely on personal choice. Physiological, genetic,

social, and built environment are just a few factors that impact physical activity behaviors (Sallis,

Prochaska, and Taylor, 2000; Bauman et al., 2012). The built environment consists of all man-

made structures, including transportation infrastructure, schools, office buildings, housing, and

parks. The environments that can affect behavior may be physical (e.g., weather or climate,

community resources, the built environment, the information environment) or social (e.g., social

support, norms, beliefs, and attitudes) as well as objective (actual) or subjective (perceived)

(Sallis, et al., 2006). *Healthy People 2020* set a developmental goal to increase legislative

policies for the built environment that enhance access to and availability of physical activity

opportunities (United States Department of Health and Human Services, 2000). This section of

the literature review will focus on the built environment.

Physical activity and many health behaviors are dependent on specific places or environments. Some places are physical activity–friendly by nature or design, such as playgrounds, health clubs, open spaces, stairs, sidewalks, and trails. Other places are designed for sedentary behaviors, such as movie theaters, classrooms, offices, and elevators. Places also can be designed in such a way that physical activity is unsafe or unattractive, such as interstate highways, streets without sidewalks or protected pedestrian crossings, crime-infested parks, and locked stairwells (Sallis, 2009). Brownson et al. (2001), found that neighborhood characteristic, including the presence of sidewalks, enjoyable scenery, heavy traffic, and hills, were positively associated with physical activity. There was a high level of support for health policy–related measures. Up to one third of individuals who had used environmental supports reported an increase in physical activity. Later studies have found similar results (Humpel, Owens, Leslie, 2002; Giles-Corti et al., 2002; Sallis et al., 2006; Cutts, Darby, Boone, and Brewis, 2009). Humpel et al. (2002) reviewed studies relating to environmental factors and physical activity found that physical environment factors have consistent positive associations with physical activity behavior. Accessibility, opportunities, and aesthetic attributes were significant associations with increased physical activity. Weather and safety showed less-strong relationships. Humpel et al. (2002) emphasized the need for further research to identify possible causal relationships between the environmental factors and physical activity.

The built environment can be broken down into several sub groups. The neighborhood level, involves characteristics that are particularly important for understanding health disparities. In the United States there is substantial spatial segregation by income and race/ethnicity; meaning similar income levels cluster together throughout the nation. The socioeconomic hierarchy has created unique needs and determinants of physical activity for low SES groups.

Open public space, because of both fiscal limitation and culture norms may be used in different ways for low SES individuals and communities. This idea holds true for physical activity (Santos, Page, Cooper, Riberiro, and Monta, 2009).

Low SES individuals are often confronted with difficult social and environmental barriers to physical activity unlike higher SES groups. Some of the most common barriers include: long distances to important daily destinations, lack of meaningful transportation choice, unsafe neighborhood and traffic conditions, poor access to parks and recreational facilities, air pollution, lack of time, poor health and lack of social support for exercise (Sallis et al., 1997). While many of these barriers also exist for other SES groups, they often exist to a greater degree in low SES communities. Low SES people have less financial flexibility to choose more activity-friendly alternatives such as: living closer to work or in a safer and cleaner neighborhood, purchasing a health club membership, paying a fee to visit the community pool or recreation center, or purchasing services that afford time for physical activity such as housecleaning or childcare (Cromer et al., 1998). National recommendations are encouraging individuals to engage in more physical activity, but for many American there are limitations on the environment and resources where they can increase physical activity. Financial barriers are common for low income communities; parks provide a space that is free to the public. Public parks provide a space that is ideal for low income communities to engage in physical activity.

The topic of the built environment and physical activity provides a breath of research. The topic's coverage by many disciplines, like urban planning, geography, health science or recreation and leisure, emphasizes its importance and current interest. Although the literature is expansive there is limited information on the built environment relationship to low SES

communities' engagement in physical activity. There is a clear gap in the literature. For this reason there is a need to address aspects of the built environments that are available and pertain specifically to areas where low income communities engage in physical activity. One option available for most low SES is public parks. Parks exist throughout the United States and free of charge for virtually all Americans.

Parks

Public parks offer a unique setting within the urban landscape, providing opportunities for physical activity, enjoyment of nature, social interaction, and escape (Hayward and Weitzer, 1984). The overarching goal and reach of public parks make them an ideal opportunity for promoting physical activity across various sub-populations. Moreover, park users are more likely to achieve recommended physical activity levels compared with non-users (Giles-Corti et al., 2005; Deshpande, Baker, Lovegreen, and Brownson, 2005). There is also evidence that distance from parks and open space is inversely associated with use and physical activity behavior (Kaczynski and Henderson, 2007), which might suggest that creating more neighborhood parks within walking distance to most residents could encourage physical activity participation in the population.

Although, parks are only one component of the built environment, they exist in majority of American communities. Approximately 70% of United States residents live within walking distance of a public park (Godbey et al., 1992). Parks are designated public spaces where individuals have the option of engaging in physical activity, along with other leisure activities. Examples of such benefits include opportunities for social interaction (Bedimo-Rung et al., 2005), reductions in stress (Hansmann et al., 2007) and improvements in feeling well-balanced

(Hansmann et al., 2007). Parks are an essential part of a community's characteristics. According to the national survey on Recreation and the Environment, at least nine out of ten Americans participate at least once in some form of outdoor recreation annually, but the majority of these individuals participated in ten or fewer each year (Cordell, 2004). The role of parks for promoting physical activity through parks is promising; parks have the potential to increase the quality of life for many.

Although the research in physical activity and built environment is relatively new; parks have a historical place in American society and are free for almost all individuals to use (Bedimo-Rung et al., 2005). The original park movement was initiated in the mid 1800's to provide a refuge from the overcrowding and pollution due to industrial urbanism (Jacobs, 1961). In addition, parks and green spaces provided a space for social contact between social groups (Jacobs, 1961). The first United States' public park-makers – Frederick Law Olmstead and Calvert Vaux– hoped free access would increase contact between the social classes and thoughtful park design would foster democratic inclusiveness. Parks were intended to for people of all classes and a space to escape the pollution and stress of the Industrial Revolution (Olmstead, 1870). Despite the lofty goal of park-makers, parks have a history of limited access for the disadvantaged and low social classes. Many socio-economic factors such as education, income levels, disability, and home ownership impact park usage.

Parks and Park Access

Parks are not equally distributed across the socioeconomic hierarchy. Inequitable distribution of resources may explain some of the observed health disparities in physical activity. Studies have highlighted residents of low SES areas and ethnic minorities lower access to

physical activity facilities than residents of higher SES neighborhoods (Cohen, McKenzie,

Sehgal, Williamson, Golinelli, and Lurie, 2007; Gordan- Larson, Nelson, Page, and Popkins,

2006).

Boone, Buckley, Grove, and Sister (2009) examined the distribution of parks as an

environmental justice issue. They found a significantly higher proportion of blacks (38 %) have

access to parks than any other racial or ethnic group in metro Baltimore, Maryland. The

researchers went a step further examine the highest need for parks and recreation facilities.

According to Boone et al. (2009), children, older adults, the carless and low-income

neighborhoods are at the greatest need for parks within walking distance. Boone et al. (2009),

created a park needs index (high, medium, and low). The scale provided a different look at the

distribution of the park land. For those with the lowest need of a park had a mean distance was

864 meters, medium need was 505 meters, and highest need was 239 meters. Accessible acres

per 1,000 populations, for individuals with the lowest need of a park accessibility was 13.48

acres, medium need was 10.36 acres, and high need was 7.46 acres. Lower SES areas have

better access to parks when looking at a 400 meter buffer. African Americans and high-need

populations had better walking access to parks, but access to less park acreage per capita than

Whites and low-need populations. The authors emphasized that for African Americans and low

SES communities, the current benefit of living close to parks could be a result of a long standing

history of segregation. The close proximity to parks follows race lines from segregation times.

The authors explain the parks were placed close to African American communities to separate

the communities from high SES white communities. The Boone et al. (2009) highlighted the

need to address how the parks are being used and whether acreage or walkability is desired more.

Dai (2011) accessed accessibility to green spaces using Geographic Information Systems (GIS) and evaluated the racial/ethnic and socioeconomic disparities in green space access. Urban green spaces ($n = 890$) in metropolitan Atlanta, Georgia were collected from the Atlanta Regional Commission. The GIS models demonstrated neighborhoods with a higher concentration of African Americans had significantly poorer access to green spaces ($p < 0.05$) and poor access was present in socioeconomically disadvantaged areas as well. The study used new technology to highlights areas where disparities visually existed.

Disparities in distribution and park access exist across all communities, but are pronounced in low SES and in some racial/ethnic minorities (Estabrooks, Lee, and Gyurcsik, 2003). Eastabrooks et al. (2003) addressed resources for physical activity participation in relation to SES. There was no significant different in the number of pay-per-use recreational facilities for low, medium and high SES communities. However, there were fewer publically-provided resources in low and medium SES communities compared to high SES communities.

While disparities exist with park access and distribution for some ethnic minorities and low SES groups in the United States, the studies above examined self-reported physical activity levels and other demographic factors. There is still debate on whether it is the presence of the park or if it is the qualities/features of the park that increase physical activity and park usage. Understanding the additional factors within the park itself that facilitate higher when parks are present physical activity is higher. Even with disparities in park distribution and park access, public parks can play a substantial role in increasing physical activity.

Parks and Physical Activity

Multiple benefits of parks to health and well-being have since been recognized (Godbey et al., 2005; Bedimo-Rung et al., 2005). As recognized by the Centers for Disease Control and Prevention parks are important built environment supports for physical activity (Centers for Disease Control and Prevention, 2004). They provide access for individuals to engage in regular physical activity. Most parks have a variety of activity settings (e.g., tennis courts, trails, playgrounds, playing fields, etc.) designated to provide a multitude of opportunities to participate in physical activity (Reed, Arant, Wells, Stevens, Hagen and Harring, 2008).

Parks offer a wide range of either free or low-cost activities close to where people live (Godbey et al., 2005). Access to parks and recreation areas has been identified as an important predictor of physical activity (Sallis et al., 1997; Giles-Gorti et al., 2005; Cohen et al., 2007). People who live close to parks are three times more likely to get the recommended amount of daily exercise when compared to those who live beyond walking distance (Giles-Corti et al., 2005). There is the potential for parks to combat decreasing level of physical activity specifically in lower SES communities. People with greater access to recreation facilities engage in more physical activity; researchers have found individuals are twice as likely to achieve high levels of walking when they have parks access (OR=1.50; 95% C.I.= 1.06-2.13) (Ball et al., 2001; Brownson et al., 2001; De Bourdeauhujij, Sallis and Saelens, 2003; Giles-Corti et al., 2005).

Leslie et al., (2010) accessed whether neighborhood environment and park use may influence relationships between neighborhood SES and walking. Self-report data on perceived park features, neighborhood environment, park use, neighborhood walking and socio

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demographics were obtained. The sample was Australian adults living in high/low SES areas. Surveys were mailed to 250 randomly selected households within 500 meter of 12 matched parks. The mean frequency of visiting a local park use was higher for high SES residents (4.36 vs 3.16 times/wk., $p < .01$). Higher SES residents reported higher levels of park safety, maintenance, attractiveness, opportunities for socialization, neighborhood crime safety, and traffic safety. Safety and opportunity for socialization were independently positively related to monthly frequency of visits to a local park. Consequently, monthly visits were positively associated with walking for recreation and total walking. Residents of higher SES areas reported an average 22% (95% CI: 5%, 37%) more weekly minutes of recreational walking than their low SES counterparts. Residents of high-SES areas lived in environments that promote park use, which positively contributes to their weekly amounts of overall and recreational walking.

There is sufficient evidence to conclude that parks have a positive relationship with physical activity (Leslie et al., 2010; Godbey et al., 2005; Brownson et al., 2001). Yet, much of the research has used self-reported physical activity or equated park usage to physical activity. The following section, park usage, takes a closer look at the individuals who visit parks and the amount of measured physical activity achieved at the parks.

Park Use

Despite the increase in research in parks, it cannot be assumed that individuals are active if they visit the park. Park usage varies among various demographics. Understanding who visits parks and what individuals do at the parks is important to promoting physical activity at parks. The presence of a nearby park does not mean that people will perceive it as an amenity or use it

for physical activity recreation. This section of the literature review presents a study that focused on who visits parks and what activities they are engaging in at the parks.

Reed, Price, Grost, and Mantinan (2012) examined park usage in sixteen parks in Detroit, Michigan was examined from 2008 to 2010 using the System for Observing Play and Recreation in Communities (SOPARC). Park user demographics were collected and physical activity was measured using SOPARC. Demographic characteristics gathered included gender, ethnicity (white, other), and age [including children (12 years or less), teens (13–20 years), adults (21–59 years), and older adults (60 years or over)]. The physical activity of park users using the parks was coded as sedentary (i.e., lying down, sitting, or standing), walking (i.e., individuals are walking at a casual pace) or engaging in vigorous activity (i.e., individuals are engaged in activity more vigorous, such as jogging). The sample was majority white park users and more children were observed than any other age groups. Park users were most often observed engaging in walking or vigorous activity rather than sedentary activities.

The ethnicity demographics of the park users 54.7% were Whites and 42.8% others. There was a significant difference ($p < .0001$) with a greater proportion of Whites and smaller proportion of persons of other ethnicities expected to be observed using the parks. Ethnicity was associated with physical activity intensity as well ($p < .0001$). More Whites (64.9%) engaged in observed vigorous activity compared to other ethnicities (35.1%). Whereas those from other ethnicities were most often observed walking compared to Whites (44.1% white, 55.9% other ethnicities). These findings are supported by previous research, showing a discrepancy in physical activity intensity with Whites preferring more vigorous activity (64.9%) compared to other ethnic groups (35.1%) (Shores and West, 2008). For gender, more females engaged in

sedentary behaviors (54.6%) compared to males (45.4%). There was a significant difference between males (62.7%) and females (37.3%) who engaged in vigorous physical activity. It may be that females are sedentary in parks as they watch their children play or engage in sports. Additional research is needed to examine females' sedentary activity in parks and to identify opportunities to transition these women to less sedentary activities. For example, walking trails around the field perimeters or playgrounds where their kids play or practice sports. In addition, almost half of all observed adults were engaged in sedentary behavior (49.7%) activity compared to teens (21.4%) and children (26.2%). Adults engaged in less vigorous physical activity (55.4% children, 32% teens, 11.8% adults) and walking (42.1% children, 21.7% teens, 3% adults). In the parks, there were significant associations between physical activity intensities gender, age, and ethnicity.

The Reed et al. (2012) study highlighted the fact that adults engage in less walking and vigorous activity at parks than teens and children. In addition, ethnic minorities engaged in less physical activity. Female ethnic minorities were most likely to be sedentary and engage in the least amount of physical activity. These results mirror the health behaviors of females and ethnic minorities in the Unites States as minorities are less likely to engage in physical activity than Whites (Centers for Disease Control and Prevention, 2004).

Floyd, Spengler, Maddock, Gobster, and Suau (2008b) focused on physical activity at parks in relation to racial/ethnic and income level of neighborhoods. The purpose was to examine whether physical activity levels were associated with specific activity areas in the park and if the energy expenditure and park usage varied by the racial/ethnic and income groups of the neighborhoods in Tampa, Florida and Chicago, Illinois (Floyd et al., 2008b). Physical

activity was measured using a version of the System for Observing Play and Leisure Activity in Youth (SOPLAY) and then SOPLAY codes were transformed to energy expenditure per person (kcal/kg/min). Energy expenditure was compared for different racial/ethnic and income composition. Parks were selected in order to have a representative sample from both low and high SES groups. The study sample was a total of 7,043 park users in ten Tampa parks and a total of 2,413 park users in the 18 Chicago parks. Overall, 11% of park users were observed in vigorous activity, 23% were observed walking, and 65% were observed as sedentary. Seventy percent of Tampa and 51% of Chicago park users were observed engaged in sedentary behavior. In both cities, children were more likely than adults to be observed in walking or vigorous activity. In Tampa, parks located in neighborhoods with the highest concentration of Hispanic residents were associated with greatest levels of energy expenditure. In Chicago, parks in neighborhoods with the highest concentration of African Americans showed the highest energy expenditure per person. Gender was associated with physical activity only in Tampa parks. Energy expenditure also varied by activity areas. More than one half of park users in both cities engaged in sedentary behavior. While differences in park-based physical activity by neighborhood income and racial/ethnic composition were observed, these differences can more likely be attributed to the types of designated activity areas that support physical activity. The Floyd et al. (2008b) study provided value information on the level of activity of park users and found a large percentage of park users in the Floyd et al. (2008b) were sedentary; like in the Reed et al. (2012) study. In addition, differences in physical activity expenditure were observed among different races and income levels. There is a need to further investigate what type designated of activity areas support physical activity.

Cohen et al. (2007) measured the intensity of physical activity at eight parks. The parks had a high percentage of minorities (Latino [range, 11%–95%], African American [range, 0%–88%]), and 6 had high household poverty (range, 16–55%) compared with the national percentage. The SOPARC was used to gather data on the physical activity levels of park users; data was then converted to METs for an estimation of energy expenditure. A total of 165 areas were observed (approximately 20 areas per park), including grassy areas, multipurpose fields, playgrounds, gymnasiums, tennis courts, basketball courts, handball courts, tracks, baseball diamonds, horseshoe pits, spectator stands, gymnastics-equipped areas, picnic areas, and swimming pools. Cohen et al. (2007) observed on average 1,849 people per week using each parks. More males (62%) were seen in parks than females (38%), and they outnumbered females in all park areas except playgrounds and the track, where the numbers were about equal. Fewer than 5% of park users appeared to be over 60 years of age; 33% were children, 19% were adolescents, and 43% were adults. The most common activities coded were sitting or picnicking (22%), followed by playing basketball (15%), being a spectator of organized sports (13%), playing soccer (9%), and using the playground (8%). Of all park users, 66% were sedentary (range by park, 49%–77%), 19% were walking (range, 12%–30), and 16% were engaged in vigorous activity (range, 11%–23%). People were more likely to be engaged in walking and vigorous activity in the multipurpose fields (34%), volleyball courts (33%), tennis courts (32%), and basketball courts (31%) and playgrounds (26%). In general, males were nearly twice as likely to engage in vigorous activity as females (19% vs 10%).

In addition to observation of the park users, Cohen et al. (2007) conducted interviews with park users and residents living within a 2 mile buffer of the parks. More park users than neighborhood residents reported visiting the park at least a few times per week (71% vs 34%; $p <$

.001). Both groups named the park as the most common place for exercise, and only 6% of residents and 3% of park users reported using a health club for exercise. The most common park activity reported among both residents and park users was sitting (72%), followed by walking (59% of park users vs 65% of residents; $p = .07$), using the playground (40%), having a party or celebrating (26%), and meeting friends (20%). The most common sport people played in the park was basketball (25%), followed by soccer (9%) and baseball (6%).

When asked how to improve their local park residents and park users suggested provide more park events and fairs (48%), improve landscaping (42%), more adult sports (39%), more and improved walking paths (38%), and more youth sports (37%). Cohen et al. (2007) developed a logistical regression as models for predicting neighborhood park use. Cohen et al. (2007) found that age (being younger), gender (being male), and distance (living within 1 mile of a park) were positively associated with park use and the frequency of leisure exercise. People who lived within 1 mile of the park were four times as likely to visit the park once a week or more and had an average of 38% more exercise sessions per week than those living further away. Concern about park safety was not associated with either park use or frequency of exercise.

Cohen et al. (2007) results showed that parks play a critical role in facilitating physical activity in minority communities. Minorities reported using the park for physical activity, but were observed in sedentary behavior. Although the parks ideally would be used for physical activity, the park where beneficial in providing destinations to which people can walk—even though they may be sedentary after arriving there. Most people who exercised did so in their local park, so the frequency of exercise and frequency of park use are both associated with park proximity. Although not all people living close to parks used them, many more living farther

away from a park did not inhibit resident from using the parks. The studied provide much need insight into the park usage according to actual park users and local residents.

In 2010, Cohen, Golinelli, Williamson, Sehgal, Marsh, and McKenzie expanded a previous study and compiled data from park directors in addition to direct observation of the park users, interviews with park users and residents living within a 2 mile buffer of the parks. The purpose of the study was to isolate the direct factors that increase or promote physical activity at parks. The study used the data from park features, observed park users residents from the 2007 study and added a surveyed park directors living near the parks in a Southern California metropolitan area. The total survey sample was a total of 51 park directors, 4,257 park users and local residents, and 30 parks were observed. The parks were observed over two years. In 2008, parks were selected to be a representative sample of diverse communities across the city. While in 2006-2007, the parks observed were more representative of low SES, minority communities. The park system studied served approximately 4 million in temperate year-round weather conditions and had more than 100 recreation centers located within parks with fulltime staff. Each recreation center had either a gymnasium or rooms activities and classes and a kitchen. The typical park had an outdoor playground area, basketball court, field(s) for baseball and/or soccer, picnic tables, and handball or tennis courts. Each park was required to establish a volunteer park advisory board as a source of community involvement in park management. Park directors were asked to complete a questionnaire describing the number of programs their facility offered in the previous year, the number and age group of participants, the extent of community involvement in park advisory board, the frequency of meetings, and the number of current members.

Cohen et al. (2010) found that park usage was associated with park size and the number of organized activities observed. The mean park size was 7.31acres (SD ± 4.30). Park size (acreage) was positively associated with park use ($r=.37, p < .04$), Cohen et al. (2010) observed an additional 95 persons with every 1 acre increase in size. Having events at the park, including sports competitions and other attractions, appears to be the strongest correlate of park use and community-level physical activity. There were no statistically significant correlation between the number of users and population density of the surrounding neighborhood, existence of a park advisory board, the percentage of households in poverty, and park users' and residents' perceptions of park safety. In neighborhoods with a higher percentage of Hispanic households, there was a trend for more park users ($r= .32, p= .09$), while fewer users were observed in neighborhoods with a higher percentage of African American households ($r= -.36, p= .05$). While some parks in neighborhoods with high poverty levels were used infrequently, the five parks most frequently used also had high levels of poverty (average 26%) and high population density (average 44,066 people in a 1-mile radius). Park residents' and users' perceptions of safety were not significantly different among parks most used and those used less often. Perceptions of safety were lowest in communities with higher population density ($r= -.39, p< .04$), higher percentage of households in poverty ($r= -.77, p< .0001$), and higher percentage of Hispanics ($r= -.78, p< .0001$). Ironically, poor perceptions of park safety were highest among those who report they usually exercise in health clubs. However, perceptions of safety were not associated with the number of people counted in the parks, the number of programs offered by the park, the existence of a park advisory board, park acreage, or the number of organized activities observed. Safety, park acreage, reported programming, and neighborhood racial and ethnic characteristics were not associated with self-reported frequency of exercise among the

individuals surveyed. There was a trend for more individuals to be observed in moderate to vigorous activity where people reported more frequent exercise.

Cohen et al. (2010) study provided further insight into the specifics of parks size and features from their previous studies. They identified size or carry capacity as an important factor. Carry capacity refers to the maximum number of people a park can tolerate before it deteriorates, and functional density is a term measuring the optimal number of people in a park to maximize enjoyment (neither too crowded nor too vacant) (Klenosky et al., 2007). Cohen et al. (2010) suggested from their findings that a public park should be able to accommodate at least half of all residents within a mile radius to engage in physical activity at least 5 days per week for 15 minutes. Based on their park sample, an average park of 7.4 acres serving the average population of 38,000, parks should serve 1 person per 428 square feet. This number would be 8.7 times higher than what was actually observed, suggesting that most parks are underutilized compared to the physical activity needs of the population and park capacity as measured by acreage.

In summary, park usage tends to be higher for males compared to females. For many of the studies, low SES individuals and ethnic minorities engaged in less physical activity and park usage than high SES Whites; however, this was not the case for all the studies. The studies above found that a majority of adult users were engaging in sedentary behavior (Reed et al., 2012; Floyd et al., 2008a or b). Basketball courts and playgrounds were typically used for more vigorous physical activity (Cohen et al., 2007; Cohen et al., 2010). With inconsistencies in the literature there is a need to understand what parks features facilitate physical activity; especially for low SES communities and ethnic minorities.

Park Attractiveness

In 1961, Jane Jacobs explained parks must be attractive and safe, and have a sufficient diversity of amenities and features to meet the needs of people with multiple different interests (Jacobs, 1961). Decades later, this logical idea is still at the center of park development. Yet, the answer to what features and amenities are need to meet the needs of varies demographics is still unknown.

Giles-Corti et al. (2005) observed parks user along with a park assessment. Parks were assessed and scored for the presence or absence of 10 attributes; including shade trees, shaded walking paths, a water feature, birdlife, and irrigated lawns. Of the 772 park users observed, the majority were using the high scoring parks (70%). High scoring parks were parks that had higher number of the ten attributes. In addition, users of high scoring parks engaged in a wider range of both active (e.g., walking, jogging) and passive (e.g., picnics, sitting) activities. Poorer scoring parks tended to be sports fields used principally for organized sport. A positive association was also found between access to attractive and large parks and physical activity. A majority of walkers (70%) and cyclists (75%) used attractive and large parks. When an individual had very good access to the use of a park that was attractive, larger and proximal parks, the odds ratio for physical activity was 2.05 (95% C.I. = 1.52-2.75) compared to very poor access. Very good access to a park that was just attractive had an odd ratio of 1.62 (95% C.I. = 1.20-2.19) compared to very poor access. This study provides preliminary evidence that improving the quality of public open space might encourage more people to use them, and to use them frequently enough to benefit their health. Secondly, attributes of parks, attractiveness of parks and the size of park could improve the use of the park for active pursuits.

An observational study by Sugiyama et al., (2010) assessed attractiveness, size, and proximity of multiple neighborhood open spaces with recreational walking. Public open space is an umbrella term for recreational areas and designated plazas. Over 2,000 parks (two acres or larger) in suburban areas of Australia were audited using the Public Open Space Tool, which is an audit tool used for public open spaces such as parks, with particular emphasis on the physical attributes that may either encourage or discourage their use for physical activity. It includes qualitative aspects of open spaces, such as aesthetics, safety, as well as the presence of amenities. Participants living in the same suburban areas ($N = 1366$, 40% men, mean age 42) reported time spent in leisure-time walking within their neighborhoods. Using GIS, the most attractive, largest and closet parks within a 1.6 km buffer from participant's home were identified, then attractiveness, size, and network distance from home were determined for each park. Attractiveness was calculated using scores from various aspects of parks such as walking paths, shade, water features, irrigated lawn, lighting, sporting facilities, and park location.

The study found that a shorter distance to the most attractive park (OR = 1.33, 95%CI: 1.01–1.76), compared to longer distance and higher attractiveness of the closest park (OR = 1.34, 95% CI: 1.01–1.78), compared to lower attractiveness were significantly associated with higher amounts of walking. Larger size of the most attractive park (OR = 1.38, 95%CI: 1.12–1.69), compared to a smaller size was significantly associated with increased walking. Attractive parks nearby (not necessarily large) are more conducive for leisure-time walking, and having a large attractive park in neighborhoods (not necessarily close) may help residents achieve the sufficient amount of physical activity through leisure-time walking. The park's attractiveness and distance to a neighborhood is more important for leisure-time walking, while attractiveness and size of parks may be relevant to residents' sufficient level of physical activity. This study demonstrates

how public open spaces can increase walking through thoughtful design. The potential for parks could function as a population-wide treatment for insufficient physical activity is hopeful.

Sugiyama et al. (2010) and Giles-Corti et al. (2005) found that attractiveness, higher number of features and larger parks were associated with increased park usage and leisure time physical activity. The two studies highlighted that park attributes could play a role in increasing physical activity at parks

Park Features

Parks contain a wide variety of features that lend themselves to different types of usage. Many studies have investigated the general relationship between physical activity and parks (Bedimo-Rung et al., 2005). However, they do not address what specific attributes contribute to physical activity during recreation experiences. Research is now emerging on what park features facilitates increased park visitation and physical activity. Despite the potential for parks to increase physical activity, studies have reported up to 70% of all park users were actually engaged in sedentary behavior on-site (Floyd et al., 2008; Reed et al., 2012). If parks are to be used to promote physical activity, a better understanding of what specific features are associated with increased or decreased park-based physical activity is needed.

Rung et al. (2011) examined the effect of park condition and presence of supporting features on park usage. The park usage and park-based physical activity were measured using the SOPARC in 37 parks and 154 park activity areas within parks New Orleans. Park features and conditions were assessed using the Direct Observation component of the Bedimo-Rung Assessment Tools (BRAT-DO), a paper-and-pencil audit is designed for field observers to identify and evaluate park characteristics that may be associated with physical activity. The

study focused on assessing the type and condition of activity areas, as well as the availability of supporting features. Type of activity area included basketball courts, sports fields, green spaces, and playgrounds. Supporting features were measured as either the presence or absence of the following amenities in the park: shelters, restrooms, drinking fountains, bike racks, benches, and picnic tables; in addition size of activity area was measured through GIS.

Rung et al. (2011) found that type of activity area was associated with number of park users, mean and total energy expenditure. The mean energy expenditure was 2.70 ± 1.12 METs, and total energy expenditure in the activity areas during a 3-hour time period was $1,411 \pm 2761$ MET- minutes. Type of activity area was significantly associated with the number of park users, mean energy expenditure, and total energy expenditure. Basketball courts had the highest mean number of park users (11.8 people), followed by sports fields (8.4 people), playgrounds (5.1 people), and green space (3.8 people) (overall $F < .0004$). Playgrounds had the highest mean energy expenditure (3.19 METs), followed by basketball courts (3.16 METs), green space (2.58 METs), and sports fields (2.09 METs) (overall $F < .0001$). Basketball courts had the highest total energy expenditure (881.8 MET minutes per 3 hours), followed by playground (431.9 MET minutes per 3 hours), sports fields (415.1 MET minutes per 3 hours), and green space (244.7 MET minutes per 3 hours). The condition of an activity area was not associated with the presence of any park users, but it was associated with number of park users and total energy exipenditure. When Rung et al. (2011) controlled for type of activity area, park users were more likely to be present in those that contained shelters ($p = .0025$), drinking fountains ($p = .0218$), and benches ($p = .0200$). Furthermore, on average, more park users were observed in activity areas that contained drinking fountains ($p = .0136$). Mean energy expenditure was lower in activity areas that contained benches ($p = .0305$) and picnic tables ($p = .0470$), while total energy

expenditure was higher in areas containing drinking fountains ($p = .0264$). The Rung et al. (2011) study, like the Reed et al. (2012) and Floyd et al. (2008a) studies, provided evidence regarding characteristics of parks that can contribute to achieving physical activity goals within recreational spaces. Rung et al. (2011) was unable to access the demographics of the park users, but did find there was a relationship between supporting features of the parks and physical activity. Features other than size may influence park use; including accessibility, availability, and quality of amenities play a role in physical activity level at parks. The use of the parks is likely to reflect the preference of the individual; as well as age, income, exercise culture, and race/ethnicity (Cohen et al., 2007).

Parks can contain a wide variety of features that lend themselves to different types of usage. Rung et al. (2011) found basketball courts had the highest energy expenditure for, only second to playgrounds. In addition, support features, like drinking fountains, can increase physical activity. There is a better understanding of why some parks are used more than others. Supporting features, larger parks, attractiveness, and increased variety of features offered can increase physical activity. Sports facilities, playgrounds and trails have all been to be related to increased physical activity (Giles-Corti et al., 2005). Yet, there has been little of the research on parks and physical preference of activities in low SES communities. Researchers and urban planners' perspective of how the park should be used could be completely different the perspective than the low SES community members. Much of the research has assessed park features in higher SES groups. This is a critical disconnect. The needs of the community members should drive the design, but often factors like funding and high SES preferences dictate the specifics of the parks design.

Park Preferences

A handful of studies have examined preference based on race, gender, and age. Payne, Mowen, and Orsega-Smith (2002) examined the relationship between age, race, and residential location to the preferences of recreation and park use. The study assessed the perceived need for (a) an additional park; (b) preferences for the desired function of that park; (c) preferences for the style of recreation; and (d) level of existing visitation to local parks. The sample was drawn from a general population within a seven-mile radius of Cleveland Metro. Computer assisted telephone interviewing was used to collect data from respondents during an 8- to 10-minute interview. The telephone interview first, gauged the level of public support for Cleveland Metro parks among the different groups. Respondents were first asked if they thought there was enough park land in their community. Responses included: (a) there is enough park land in my community; (b) more park land is needed in my community; or (c) unsure (Payne et al., 2011).

Second, respondents were asked about the preferred function of additional park land (i.e., for conservation or recreation). "If there was more park land in this area, should more of that land be set aside for conservation or should more of that land be developed for recreation?" This item was designed to elicit public preferences for the function or role of park land in their community. Respondents were required to make a choice (or trade-off) between conservation and recreation purposes. Third, citizens were asked about their preferences for the types of recreation opportunities provided at local parks. Respondents were asked, "If more land in this area was developed for recreation, which would you prefer to have: more areas for organized activities such as ball fields, tennis courts, and jogging tracks or more areas for nature-based activities such as hiking trails, picnic areas, and fishing?" Essentially, this question was included in an attempt to determine preferred recreation activities based on the physical and site

characteristics needed to facilitate them. Response included organized activities and nature-based activities. Finally, to assess outdoor recreation behavior, respondents were asked to indicate whether they had visited a local park in the last 12 months (visitation/nonvisitation). Eight hundred telephone interviews were completed, representing an overall response rate of 77%. Results of the study suggested that while all three variables (race, age, and residential location) contributed significantly to the models, age was the strongest predictor of support/nonsupport for additional park land. Examination of park preferences revealed that older adults and blacks were more likely to prefer recreation to conservation than younger adults and Whites. Race was the strongest of these characteristics in terms of predictive power. Race had the strongest influence on the preference for type of recreation activity. When examining park visitation, older adults and blacks were more likely to be nonvisitors (Payne et al., 2002). The Payne et al. (2002) study did not address low SES communities' perceptions, but the study does demonstrate there are significant differences in park preferences. By understanding citizen diversity and the implications of this diversity for agency missions and policies, recreation and park professionals can continue to adapt their roles to the changing needs of their communities. This study provided a starting point for determining preference and further understanding perspective of park users and non users.

Wilbur et al. (2002) reported information from six focus groups of Chicago low-income, urban African American women aged 20 to 50 years. The purpose of the study was to identify cultural, environmental and policy determinants of physical activity that could inform the development of exercise interventions for preventing CVD in low-income, urban African American women aged 20 to 50 years. This study was part of a multi-site project carried out with seven universities throughout the United States. There was 5 to 11 in each group and 40% had

less than a high school education, and 33% were neither employed nor attending school. Findings reflected the influence of a culture of poverty and the importance of environmental safety and community support. Wilbur et al. (2002) found that across all age groups there was a common theme. In their society, there were three types of women: the physically active, the physically inactive, and the exerciser. The physically active woman's entire day was filled with activities. This woman was involved with her world and the lives of others, particularly her children and grandchildren. The physically active woman was "always on the go" and "meeting goals for a lot of people" (Wilbur et al., 2002). In contrast, the inactive woman had difficulty getting out of bed in the morning and was not engaged with the world. She and her family had a habit of sleeping late and doing nothing all day.

The focus groups described an inactive woman was being unemployed, lacking in energy, and having low self-esteem. The exerciser was described as an organized woman who engaged in leisure time activity such as jogging, biking, or aerobics or who used exercise equipment regularly. The exerciser was portrayed as consuming very small quantities of food or eating only healthy food, like lettuce and carrots. Most of the women said that African American women were either "active" or "inactive." The focus groups suggested that lack of community support and shortage of role models were cultural influences that discouraged them and other African American women from being exercisers. They were not encouraged by women in their own socioeconomic group to engage in exercise, and they did not see women in their neighborhood walking or jogging. They feared being teased if they exercised in public because they were not physically fit; the teasing would be devastating to their self-esteem. Some women found it easy to compare and contrast the physical activity of women from different cultures, but others saw it as stereotyping. As expected, they were knowledgeable about women from the dominant culture

(Caucasian), with whom they had the most contact, as well as women of Mexican descent. Their description of the exerciser was consistent with their view of Caucasian women, whom they saw as "jogging all the time," "really getting into it . . . Skating and everything" and "riding them bikes." They suggested the dominant culture could financially afford to free themselves from chores, such as cooking and cleaning, and thus have time for exercise. Although Mexican women were not seen as exercisers, they were perceived as having the benefit of female group cohesiveness.

The focus groups described a clear cultural difference for physical activity. The African American women in the focus group did not associate with leisure-time physical activity. They felt it was a skill set they did not possess. This cultural difference is a barrier to increasing physical activity in African American communities. If women feel they lack the skills to exercise and to not cultural relate to exercise; programs and facilities that promote leisure-time physical activity could be disregarded for low SES African American women. Wilbur et al. (2002) also found the environment of the focus group was characterized by its extreme poverty and saturation with drugs and crime. Many women were reluctant to venture far from their own front porch, and some feared for the safety of their families even within their homes. Although they lived close to opportunities for exercising along a lakefront with walking and running trails, they perceived these areas to be beyond their community boundaries. Most of their communities had parks, but although some felt safe in these parks and many did not. The women felt that the dominant culture was not providing adequate facilities, policy, or sufficient protection of women and families in their community.

Wilbur et al. (2002) studied provided support that there was a cultural difference to physical activity. These cultural differences caused women to associate with engaging in daily physical activity or sedentary behavior and not leisure time exercise. In addition, they felt a lack of safety caused the environment was not conducive to physical activity. They did not feel comfortable to engage in activity outside their immediate community. Lastly, the women felt that the dominant culture does not provide adequate policy support for their communities. Wilbur et al. (2002) study has many implications for research in parks and physical activity. If parks are to be used for promoting physical activity among the low SES communities, they must address the cultural differences and perceptions of the parks.

Ozunger (2011) explored the public's attitudes towards urban parks in two popular urban parks of Isparta, Turkey using a questionnaire survey ($n = 300$). Although the study is not directly related to the American culture, the study provided insight into the methods and approach to surveying park users' attitudes towards parks. A questionnaire was designed and carried out in the two parks to investigate people's use of, and attitudes towards, urban parks. The questionnaire used open-ended questions and addressed a broad range of issues including respondents' use, perceptions and preferences of urban parks in general. Specifically the questionnaire was designed to provide the answers to the following basic questions. What are the general features of the park users? How do people feel about, perceive and use urban parks? What is the people's image about urban parks? What types of green spaces do people prefer? The results revealed some similarities to American culture, as well as some distinct difference attitudes towards urban parks (Cronan, Shinew, Schneider, Stanis, and Chavez, 2008). People in Turkey use urban parks generally for passive recreational activities such as picnicking, resting and relaxing. Appreciation of natural features, experienced benefits, the need for recreational

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facilities and concerns for general cleanliness and maintenance were found as universally similar attitudes in urban parks.

McCormack et al. (2010) reviewed twenty–one qualitative studies on urban park use and physical activity. These studies relied mainly on semi-structured interviews with individuals or in focus groups. The study finding were similar to previous studies, park attributes including safety, aesthetics, amenities, maintenance, and proximity are important for encouraging park use (Rung et al., 2011; Reed et al., 2010, Giles-Corti et al., 2005). The authors suggested from the synthesized data that the perceptions of the social environment were entwined with perceptions of the physical environment. McCormack et al. (2010) suggested perceptions of the physical attributes of parks may influence physical activity patterns.

Park Perceptions

There has been limited data on perceptions of park and park features for low SES communities. The studies above provided information regarding race more than SES status. The studies in this section are in relation to measured perception of parks.

Bai et al. (2013) investigated the associations between perceptions of neighborhood park quality and overall moderate to vigorous physical activity (MVPA), park-based physical activity, and body mass index (BMI). Data was collected using a mailed questionnaire in households in Kansas City, Missouri. The initial mailing also included a small incentive (recreation center pass) and all respondents were eligible to be entered into a drawing for one of ten $50 gift cards. Of the 3,906 questionnaires mailed out, 649 were returned by the postal service as undeliverable and 893 were returned completed. This resulted in a response rate of 27.4 %.

The questionnaire included questions on perceived neighborhood park quality; self-reported physical activity, past park use, and demographics, among other variables. Perceptions of neighborhood park quality were measured on a 5-point scale (10 strongly disagree and 50 strongly agree) using seven items adapted from previous qualitative and quantitative research. Respondents indicated their agreement with statements about "parks in their neighborhood" that related to cleanliness, availability of facilities of interest, how well used the parks are, attractiveness, safety, maintenance, and the extent to which parks are a benefit to the neighborhood. Each participant was given a definition of neighborhood (area within a 10- to 15-min walk from your home and parks) and parks (a public park or outdoor recreation area in the community that is designed for active or passive use).

A majority of the respondents were female (60.7 %) and non-Hispanic White (67.0 %), followed by non-Hispanic Black (24.5 %) and Hispanic/Latino of any race (4.7 %). More than half of the respondents had an annual household income of less than $50,000 (55.6 %). Within the past month, 58.4 % had not visited a park, 19.9 % visited 3 days or less, and 21.7 % had visited 4 days or more. Residents reported positive perceptions of their neighborhood parks (M=3.55). Respondents most strongly agreed that parks are a benefit to people living nearby (M=3.85), followed by parks are clean (M=3.70), well used (M=3.58), and well maintained (M=3.53). The availability of facilities of interest was rated the lowest (M=3.21). Internal consistency coefficients for the seven items ranged from 0.49 to 0.76. The set of seven items has a high internal reliability (α= 0.91). Bai et al. (2013) found that greater perceptions of neighborhood parks as a benefit to people in the neighborhood was associated with higher levels of overall moderate-to-vigorous physical activity (OR=1.46, 95 % C.I.:1.12–1.90), higher levels

of park-based weekly physical activity (OR=1.40, 95 % C.I.:1.05–1.88), and lower BMI (OR= 0.69, 95 % C.I.:0.54–0.88).

The study provided a new neighborhood park quality scale that demonstrated good test–retest and internal reliability. Residents' perceptions of neighborhood park quality were related to PA and health outcomes. Perceiving parks as a benefit was positively related to overall MVPA and park-based PA and negatively related to BMI. Better measuring and understanding how perceptions of local parks are associated with PA and health can improve appreciation of how parks facilitate active living. Bai et al. (2013) provided information on the perceptions of park. The study refined measurements of park attitude and perceptions from previous research. However, the sample was majority middle to high SES. In comparison to the wealth of knowledge on park usage and park access, park perception literature is very small. There is a clear gap in the literature and a need to focus on park perceptions for low SES communities. More information and research in park perceptions among low SES communities provides insight into social and behavioral mechanism that drives health disparities in the United States communities.

Summary

In summary, previous research has shown that often low SES communities have higher barriers to physical activity (Bauman et al., 2012) and history of lacking resources for physical activity (Cohen et al., 2007). When resource like parks are present in low SES communities, low SES and minorities are the least likely to use the parks and those that do use the park engage in the highest amount of sedentary behavior (Reed et al., 2012). Studies have found that in high SES communities, park features, park size and attractiveness all play a role in increasing physical

activity (Giles-Corti et al., 2005). Features like basketball courts and playgrounds are used for physical activity the most (Rung et al., 2011). When preferences are analyzed, cultural norms play an important role and the perception of the parks' health benefit for the individuals (McCormack et al., 2010; Bai et al., 2013). There is a need to understand the perceptions of low SES communities in order to increase park usage and physical activity in parks. A better understanding could result in order to increase the overall health of the community and decrease the expanding health disparity in the United States.

CHAPTER III: Methods

Data collection included two domains: a community park survey and 25 park audits. A random sample of 4,786 was mailed a park survey. The sample included participants who were older than 18 years and current Greenville residents. The park audits were completed on 25 public parks in Greenville, North Carolina.

Sample

The random sample was taken from the Greenville, NC population of 87,242 people where 31.4% of people are below poverty level according to the 2011 Census data (United States Census Bureau, 2012). Like many communities in Eastern North Carolina, Greenville's poverty rate is twice the national (14.3%) and state averages (16.0%) (United States Census Bureau, 2012). The random sample was generated from a list provided by municipal officials (Figure 1). The sample's income status was based on the American Community Survey (ACS). The ACS estimates poverty rate using household living under the poverty level and the Federal poverty level (Table 1). A local GIS technician assisted in using GIS technology to identify all census tracts that had at least 40% of the residents with an income below the poverty line based on the 2006-2010 ACS 5 year estimates. The census tracks used were the following: 1, 2.01, 3.02, 4, 5.02, 6.02, 7.01, 7.01, and 10.01. For those census tracts the percent of the population in poverty ranged from 43% to 81%. Neighborhood boundaries were used to exclude businesses and college/university housing. Using GIS technology, the sample generated was an oversampling of low income individuals. A higher percentage of low income individuals was selected because evidence suggests that low income residences have a lower response rate than higher income individuals (Boone et al., 2009).

Figure 1

Table 1

2012 Poverty Guidelines for the
48 Contiguous States and the District of Columbia

Persons in family/household	Poverty guideline
1	$11,170
2	$15,130
3	$19,090
4	$23,050
5	$27,010
6	$30,970
7	$34,930
8	$38,890

Note. For families/households with more than 8 persons, add $3,960 for each additional person.

Procedures & Measurements

Mailed Survey. The random sample of 4,786 was mailed a survey. All surveys included a self-addressed return envelope and a survey printed in the form of a booklet on quality paper with no more than 8 pages measuring 8.5"x11". Survey cover letters explained why the study was being conducted and instructions for mailing the survey back to the researchers. A copy of the cover letter and survey are found in Appendix B. The survey envelopes were stamped with Greenville Recreation and Parks return address. Surveys that were sent out followed a modified Dillman technique (Dillman, 1997).

Preferences. The survey included questions pertaining to perceptions of neighborhood park quality, physical activity, and demographics. An example of the questions include, "How often do you visit a park?" And "What type of physical activity do you engage in at a park?" In addition, the respondent could choose from a list of neighborhood park features used for physical activity.

Park Usage. A series of questions was used to assess the individual's parks usage, such as, "Do you ever use Greenville parks for physical activity?" A list of Greenville parks were provided for the participant to identify if they had heard of the park, used the park before, and used the park for physical activity. A question about self-reported time spent at the park was also asked.

Physical activity. Physical activity was assessed with The International Physical Activity Questionnaire (IPAQ) short self-administered version. The IPAQ provides common instruments that can be used to obtain internationally comparable data on health–related physical activity. Typical IPAQ correlations are about .80 for reliability and .30 for validity (Craig, Brownson, Cragg, Dunn, 2003). In addition, the IPAQ asks participants to report activities performed for at least 10 minutes during the last 7 days. Respondents are asked to report time spent in physical activity performed across leisure time, work, domestic activities, and transport in 3 conditions: walking, moderate, and vigorous. Examples of activities that represent the intensity are provided; for example, participants are asked about vigorous activities such as "heavy lifting, digging, aerobics, or fast bicycling." Using the instrument's scoring protocol, total weekly physical activity was estimated by weighting time spent in each activity intensity with its estimated metabolic equivalent (MET) energy expenditure (IPAQ, 2005).

Scoring IPAQ. Using procedures outlined in the IPAQ scoring manual, total MET-minutes per week were calculated based on MET values of 3.3, 4.0, and 8.0 for walking, moderate, and vigorous activities, respectively (IPAQ, 2005). These total MET-minutes values were scored in to three categories—low, moderate, and high. High activity was a score of vigorous-intensity activity on at least 3 days and accumulating at least 1500 MET-minutes/week or 7 or more days of any combination of walking, moderate- or vigorous-intensity

activities accumulating at least 3000 MET-minutes/week. Moderate is one of three criteria—3

or more days of vigorous activity of at least 20 minutes per day, 5 or more days of moderate-

intensity activity and/or walking of at least 30 minutes per day or 5 or more days of

any combination of walking, moderate-intensity or vigorous-intensity activities achieving a

minimum of at least 600 MET-minutes/week. Low category was no activity reported or

some activity was reported but not enough to meet high or moderate categories. Physical activity

from the IPAQ was dichotomized into two variables—meeting Federal physical activity

guideline or not meeting physical activity guidelines. The Federal 2008 Physical Activity

Guidelines require adults to get at least 2 hours and 30 minutes (150 minutes) of moderate-

intensity aerobic activity (i.e., brisk walking) every week, or 1 hour and 15 minutes (75 minutes)

of vigorous-intensity aerobic activity (i.e., jogging or running) every week or an equivalent mix

of moderate- and vigorous-intensity aerobic activity (United States Department of Health and

Human Services, 2008).

Demographics. Demographics were the final section of the survey. Questions on age,

number of children, home ownership or renting, years at current address, race, income,

education, and occupation were included. Using the demographics, the sample was categorized

into two socioeconomic statuses—low and high. Income was used as the primary predictor for

SES. When income was not reported, education was used as the second predictor for SES. Low

SES was an income equal to or less than $19,999 or an education equal to or less than a high

school degree. High SES was an income greater than $19,999 or education level greater than a

high school degree.

Qualitative data. Three open-ended questions were included in the survey. "What type

of physical activity do you typically do outside at the park (be specific)?" This question was the

second question on the survey. The second qualitative question was "Why do you use this park the most?". Lastly, survey participants were asked if there were any additional questions, comments, or concerns related to parks in the city.

Parks. All parks maintained by the City of Greenville Recreation and Parks department were included in the study (*N*=25). The study excluded all cemeteries, swimming pools, pay only spaces, parks under construction, greenways, and recreation centers (Table 2). The parks were audited by two trained researchers. The researchers completed the park audits at the same time but independently. In order to provide interrater reliability the researchers did not confer on any of the park audits.

A park audit provides a reliable and valid assessment of feature and amenities in a park that lend in facilitating physical activity. Type, condition, and cleanliness of the features and amenities located within the twenty five study parks were assessed using the Environmental Assessment of Public Recreation Spaces (EAPRS) tool (Saelens, Frank, Auffrey, Whitaker, Burdette, and Colabianchi, 2006). EAPRS protocol uses a series of detailed guidelines, definitions, and visual examples to consult upon when conducting type, condition, and cleanliness observations. An observational audit assessment of the parks' accessibility, usability, equipped, supervised and provided organized activities. The paper and pencil audit is designed to be used by field observers who identify and evaluate characteristics of parks that may be associated with physical activity. Types of activity areas include basketball courts, sports field, green spaces, trials and playgrounds. EAPRS items are assessed on a multiple scales, but this study will focus on park features that support physical activity. The EAPRS has a high reliability for the presence/number and specific qualities items across the various park areas and features, with 87.1% and 75.1% of these items on the instruments respectively having good-

excellent reliability or high percent agreement (Saelens et al., 2006). Approximately 69.6% of the 800 items tested had reliability values in the good-excellent range or high percent agreements (Saelens et al., 2006).

The type of park features and amenities (i.e, target areas) were categorized according to neighborhood park feature and amenity types commonly found within the study, and informed through previous park literature and study findings (Kaczynski et al., 2008; Reed et al., 2005; Shores and West, 2008). The presence of a feature is identified with a yes or no answer on the audit tool. Condition and cleanliness is one category on the EARPS audit tool and the section below illustrates the procedure followed by the EARPS protocol.

Table 2

Public City parks in Greenville, North Carolina

Matthew Lewis Park	Andrew A. Best Freedom Park
Beatrice Maye Garden Park	Westhaven Park
Bradford Creek	Town Common
Disc Golf Course	Dream Park
Drew Steele Center	Eastside Park
Elm Street Park	Evans Park
Extreme Park	Greenfield Terrace Park
Thomas Foreman Park	Guy Smith Park
H. Boyd Lee Park	Hillsdale Park
Jaycee Park	Peppermint Park
Paramore Park	Perkins Baseball Complex
River Park North	Woodlawn Park

Condition and cleanliness of each of the 143 features and amenities were carefully ranked according to the EARPS ranking descriptions, visuals, and published protocol. As defined by the EARPS tool cleanliness refers to, "the general aesthetics of the element. Things that make elements less clean include graffiti, dirt, broken glass, lack of maintenance cleaning (eg., painting) and/or debris/litter" (Saelens et al., 2006). Cleanliness is not affected by twigs, leaves, or muck; thus, poor weather conditions (i.e., wind or rain) would not affect rankings. Cleanliness was coded as a discrete variable ranging from: 1=not at all, 2=somewhat, 3=mostly to extremely. Conditions were defined as "the general state of an element. Most condition assessments are element specific, but include, missing or broken pieces, age of the element, rust, and/or evidence of vandalism (not graffiti)" (Saelens et al., 2006). In short, condition refers to anything that may compromise the operation of the element. For each target area, condition was ranked as a discrete variable categorized as: 1=poor, 2=fair, and 3=excellent. All parks were audited between the months of September through December 2013.

Statistical analyses

Descriptive Analysis. Questionnaire data and EAPRS data were entered and analyzed using SPSS (Version 20.0. Armonk, NY). Descriptive analysis provided means, standard deviations, and frequencies to describe the sample and variables of interest. To explore the data further, survey data was divided into groups based on socioeconomic status. An independent t-test was run to examine the differences among low and high SES residents' survey responses for park-based physical activity and self-reported physical activity.

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Bivariate Correlations. A Pearson's correlation was used to assess the relationship between minutes of self-reported park usage and self-reported minutes/week of physical activity from the IPAQ.

Chi-Square. A chi-square test was used to determine the association between being physically active at a park (Yes/No) and IPAQ categories. An additional chi-square test was used to determine the association between IPAQ categories and (b) a having a neighborhood park present (Yes/No); (b) income category; and (c) race.

Binary Logistic Regression. Finally, binary logistic regression models were used to assess if park-based physical activity was related to physical activity assessed by the IPAQ and whether specific park features were related to meeting physical activity recommendations from the IPAQ. Binary logistic regression models were calculated individually for lower SES, all other SES, and total sample. All analyses were adjusted for age and gender. The significance level was set at alpha $\leq .05$.

Qualitative Analysis. Responses for open-ended survey questions were qualitatively examined. Qualitative questions were placed into the survey to provide an opportunity to respondents to expound on close-ended questions. The first open-ended question was "What type of physical activity do you the most often (be specific)?". Follow-up questions focused the respondents' top choice of park, "Why do you use this park the most?" The final question was asking the respondent if there were any other comments about parks in Greenville. In the qualitative content analysis described by Graneheim and Lundman (2004), the question answers were read through a number of times and interpreted step by step. The researcher first read through several times to become familiar with the content. The analysis began by finding the meaning units, that is, the constellation of words or statements that communicate the same

central meaning through their content. Meaning units contained aspects related to the respondent's park experience. These meaning units were condensed, abstracted, and labeled with a code while still preserving the central meaning. The codes constitute the basis of finding categories by comparing them to each other to note similarities and differences related to the content of the text. A category was defined as a line of an underlying meaning in the text through condensed meaning units and codes. Subcategories illuminate nuances of the essential sense of each category. The analysis was carried out by the main author (E.P) and the analyses were evaluated by means of discussions between all authors during the analysis process. The final step in the analysis was to find the theme, which describes the entire result and connects all of the categories (Graneheim and Lundman, 2004).

CHAPTER IV: Results

A total of 4,786 surveys were mailed to the random sample. Ninety-two surveys were returned to the research office because of invalid address and 372 surveys were returned by participants. The return rate for the survey was 7.89%. After excluding participants' who's work status was student, the total sample was 318 adults. Table 3 shows the demographics of the participants.

Survey Participants' Demographics Participants in this study were aged 48.36 ± 19.05 years. More women (64.2%) returned the survey compared to men (33.6%) ($p \leq .0001$). A majority of the respondents reported Caucasian for their race (61.9%), African American was the second highest reported race (28.9%), Hispanics, American Indian, and Asians were collectively 4.2% of the sample and 3.8% declined to report their race. Over half of the participants had some college or a college degree (53.5%), 18.2% of the survey participants had a high school education or less, and 28.3% reported 4 years or more of college. Over half of the participants were employed for wages (56%), 24.5% were retired, and 16.7% were out of work. For family income, 21.7% earned less than $19,999, 33.0% earned between $20,000 and $59,999, 24.8% earned more than $60,000, and 19.5% declined to answer the question.

The sample was broken down into the two groups—the lowest SES and all other SES (Table 3). The mean age was similar between high and low SES. For employment status, 31.0% of the low SES group respondents were employed, while 65.3% of high SES respondents were employed.

Table 3

Sociodemographic Characteristics of the Participants

Characteristics	Total Sample $N= 318$ No. (%)	Low SES $n=87$ No. (%)	High SES $n=231$ No. (%)
Gender			
Men	204 (64.2)	58 (66.7)	146 (63.2)
Women	107 (33.6)	26 (29.9)	81 (35.1)
Age (years)			
18-34	88 (27.7)	20 (23.0)	68 (29.4)
35-54	82 (25.8)	25 (28.7)	57 (24.7)
≥55	130 (40.9)	34 (39.1)	96 (41.6)
Employment Status			
Employed	178 (56.0)	27 (31.0)	151 (65.3) *
Unemployed	53 (16.7)	34 (39.0)	19 (8.2)*
Retired	78 (24.5)	23 (26.4)	55 (23.8)
Race			
Caucasian	197 (61.9)	30 (34.5)	167 (72.3)*
African American	92 (28.9)	52 (59.8)	40 (17.3) *
Other	14 (4.3)	2 (2.2)	12 (5.2)

Note. SES=socioeconomic status; * $p \leq .05$, Low SES versus high SES

Over half of the respondents were African American (59.8%) for the low SES and 34.5% were Caucasian. The high SES group was mostly Caucasian (72.3%) and African American (17.3%) was the second highest race reported. Female respondents were more likely to return the survey for both low SES (66.7%) and high SES (63.2%). Low SES group was more likely to report to be living in rental housing (66.7%) compared to the high SES group (36.4%). There was a significant difference in race, education, work status, income, and house ownership between low SES and high SES groups ($p \leq .0001$). In summary, the low SES group was more likely to be African American, unemployed, and have a lower education level compared to high SES respondents.

Survey Participants' Park Use. The results for the park usage related to physical activity are found in Table 4. Over half of the respondents reported engaging in physical activity at a

park in Greenville (59.1%). Of the participants who were active at the park, 18.6% visited the

park two or more times a week, 11.6% visited once a week, and 15.4% visited one to three times

a year.

Table 4

Physical Activity Responses to Survey Questions

	Total Sample *N*= 318 No. (%)	Low SES *n*=87 No. (%)	High SES *n*=231 No. (%)
Characteristic			
Active at a park			
Yes	188 (59.1)	45 (51.7)	143 (61.9)
No	107 (33.6)	32 (36.8)	75 (32.5)
Frequency of park visitation			
Never visited a park	124 (39.0)	43 (49.4)	81 (35.1)
2+/week	59 (18.6)	18 (20.7)	41 (17.7)
1/week	37 (11.6)	4 (4.6)	33 (14.3)
1/month	18 (5.7)	5 (5.7)	13 (5.6)
2-3/month	31 (9.7)	7 (8.0)	24 (10.4)
1-3/year	49 (15.4)	10 (11.5)	39 (16.9)

Note. SES= socioeconomic status

   Preferences of Greenville Parks among City Residents. A majority of respondent

reported using Town Common Park (27%) and 79.62% had heard of Town Commons Park.

Town Commons Park's key features for physical activity are paved trails, sidewalks, open space,

and water area. These features were assessed using the EAPRS tool. The second highest park

reported being used was Elm Street Park and 40.6% of respondents reported being physically

active at Elm Street Park (Table 5). Elm Street Park's key features for physical activity are paved

trails, paths, sidewalks, and athletics fields (baseball fields, horseshoe pits, shuffleboard, and

tennis courts). River Park North was the third highest park reported for the total sample, low

SES, and high SES. River Park North's key features for physical activity are unpaved trails, paths, open space, wooded area, water area, and volleyball court.

Table 5

Park Visitation

Characteristics	Total Sample N= 318 No. (%)	Low SES n=87 No. (%)	High SES n=231 No. (%)
Heard of the park			
Town Commons	253 (79.6)	61 (70.1)	192 (83.1)
Elm Street	239 (75.2)	61 (70.1)	178 (77.1)
River Park North	215 (67.5)	52 (59.8)	163 (70.6)
Visited the park			
Town Commons	164 (51.6)	51 (58.6)	175 (75.8)
Elm Street	204 (64.2)	47 (54.0)	157 (68.0)
River Park North	171 (53.8)	36 (41.4)	135 (58.4)
Active at the park			
Town Commons	164 (51.6)	36 (41.4)	128 (55.4)
Elm Street	129 (40.6)	22 (25.3)	107 (46.3)
River Park North	119 (37.4)	22 (25.3)	97 (42.0)
What park do you use most often? (Open-ended question)			
Town Common	86 (27.0)	18 (20.7)	68 (24.4)
Elm Street	49 (15.4)	10 (11.5)	39 (16.9)
River Park North	31 (9.7)	9 (10.3)	22 (9.5)
Never Visited	36 (11.3)	9 (10.3)	27(11.7)

Note. SES= socioeconomic status

Participants' Preferences for Park Features Used for Physical Activity. The final park-based physical activity question was about park features for physical activity. The survey included two questions on park features—what features present at the park does the individual

use for physical activity and what features would the individual like to use for physical activity.

The complete results for park features promoting physical activity are found in Table 6.

Table 6

Park Feature Preferences Among Low and All Other SES Groups

Characteristics	Total Sample N= 318 No. (%)		Low SES n=87 No. (%)		High SES n=231 No. (%)	
What features do you use for physical activity?	Rank		Rank		Rank	
Sidewalks	(1)	205 (64.5)	(4)	31 (35.6)	(3)	93 (40.3)
Trails	(2)	179 (56.3)	(3)	33 (37.9)	(2)	127 (55.0)
Open Space	(3)	145 (45.6)	(1)	55 (63.2)	(1)	133 (57.6)
Athletic Fields	(3)	145 (45.6)	(2)	44 (50.6)	(4)	87 (37.7)
Athletic Track		48 (15.1)		5 (5.7)		15 (6.5)
Baseball/Softball		48 (15.1)		22 (25.3)		48 (20.8)
Basketball		45 (14.2)		14 (17.3)		16 (6.9)
Tennis		41 (12.9)		12 (13.8)		31 (13.4)
What features would you use for physical activity?	Rank		Rank		Rank	
Sidewalks	(4)	112 (35.2)	(4)	27 (31.0)	(4)	85 (36.8)
Trails	(1)	179 (56.3)	(3)	38 (43.7)	(1)	141 (61.0)
Open Space	(2)	145 (45.6)	(2)	40 (46.0)	(2)	105 (45.5)
Athletic Fields	(2)	145 (45.6)	(1)	46 (52.9)	(3)	99 (42.9)
Athletic Track		48 (15.1)		18 (20.7)		30 (13.0)
Baseball/Softball		48 (15.1)		19 (21.8)		29 (12.6)
Basketball		45 (14.2)		16 (18.4)		29 (12.6)
Tennis		41 (12.9)		14 (16.21)		27 (11.7)

Note. SES= socioeconomic status

As a total sample, the top features that were present and used for physical activity were sidewalks (64.5%), trails (56.3%), athletics fields (45.6%), and open space (45.6%). For the low SES group, ranking of the features used for physical activity were slightly different—open space (63.2%), athletic fields (50.6%), trails (37.9), and sidewalks (35.6%). For the high SES group, open space (57.6%), trails (55.0%), sidewalks (40.3%), and athletic fields (37.7) were the top features.

Respondents were asked to select what type athletic field they used the most for physical activity. The top four fields or courts were an athletic track, baseball field, tennis court, or basketball court for the total sample and high and low SES groups. The athletic track (15.1%) and baseball fields (15.1%) were the two features selected by the most participants. Baseball fields (21.8%) and basketball courts (17.3%) were the two top features for low SES respondents. Tennis courts (20.8%) and baseball fields (13.4%) were the top two features for high SES respondents.

The top feature responses for what the respondents would like to use for physical activity were trails (56.3%), athletic fields (45.6%), open space (45.6%), and sidewalks (35.2%) (Table 6). The low SES groups reported athletic fields (52.9%), open space (46.0%), trails (43.7%), and sidewalks (31.0%) as the top features. The low SES respondents reported baseball fields (21.8%) and athletic tracks (20.7%) as the top two choices from the athletic features; with basketball courts as a close third choice (18.4%). For high SES, trails (61.0%), open space (45.5%), athletic fields (42.9%), and sidewalks (36.8%) were the top ranking for features used for physical activity. The top three choices for high SES athletic features were athletic tracks (13.0%), baseball fields (12.6%), and basketball courts (12.6%) (Table 6).

Park Awareness, Park Access, and Park Time. Greenville city park awareness was measured by providing a list of all known city parks, and asking if the participant had heard of each park (yes/no) and whether the participant visited the park (yes/no). An awareness score was calculated by summing the number of positive responses to each item related to whether the participant had heard of the park (yes/no) and visited the park for each of 23 listed parks (yes/no) (maximum score of 46). In addition, respondents were asked the typical amount of time (minutes) they spent being physically active at a park for one session (Table 7). High SES and low SES individuals had a similar awareness of Greenville parks; however, low SES individuals reported spending more time engaged in physical activity at parks. The difference for minutes being active at the park between low SES group and high SES group approached statistical significance (p=.058).

Table 7

Park Awareness Score and Minutes Spent at a Park

Characteristics	Total Sample N= 318 Mean (Std. Dev)	Low SES n=87 Mean (Std. Dev)	High SES n=231 Mean (Std. Dev)
Park Awareness Score	12.22 (8.35)	11.70 (9.08)	12.42 (8.07)
Total Minutes at the Park (minutes/session)	78.37 (65.99)	92.34 (81.72)*	73.24 (58.57)

Note. SES= socioeconomic status; *p=.058

When asked if their neighborhood park had the feature(s) needed to be physically active, most reported their neighborhood park did not have the features needed or enjoyed for physical activity. When asked if their neighborhood has a community park they enjoyed, 39.9% participants reported yes, 13.8% reported not having a park with the features they enjoyed, and 30.8% reported not having a park in their community. Fewer low SES respondents (51.7%)

reported being physically active at a park compared to high SES respondents (61.9%), but this difference was not statistically significant (*p*=.089). Results are presented in Table 8.

Table 8

Response for Neighborhood Park

Characteristics	Total Sample *N*= 318 No. (%)	Low SES *n*=87 No. (%)	High SES *n*=231 No. (%)
Yes, my neighborhood park has the feature(s) that my community enjoys for physical activity	44 (13.8)	15 (17.5)	16 (18.4)
No, my neighborhood park does not have enjoyable features to be physically active	127 (39.9)	32 (40.2)	35 (40.2)
My community does not have a neighborhood park	98 (30.8)	20 (23.0)	21 (24.1)

Note. SES= socioeconomic status

IPAQ Survey—Participants' Physical Activity. Table 9 shows the average minutes/day and MET-minutes/week of physical activity from the IPAQ for the total sample, low SES, and high SES. For the IPAQ, participants reported engaging in walking, moderate, and vigorous activities for 52.16 ± 52.02, 44.51 ± 52.77, 44.72 ± 50.31 minutes/day, respectively, during the previous 7-day period. The total MET-minutes/week for walking, moderate, and vigorous activities was 896.36 ± 1125.91, 549.95 ± 957.96, 1052.25 ± 1541.89 MET-minutes/week, respectively. The low SES group reported a total of 2283.80 ± 2975.46 MET-minutes/weeks of all activity, 831.43 ± 1531.31 MET-minutes/week of vigorous and 503.14 ± 1062.02 MET-minutes/week of all moderate activity. As a whole, the high SES respondents reported a higher amount of activity. The high SES group reported a total of 2548.05 ± 2805.36 MET-minutes per week of all activity, 1135.80 ± 1541.05 MET-minutes/week of vigorous, and 567.55 ± 917.46

MET-minutes/ week of all moderate activity. There was a not a significant difference for

moderate, vigorous, and total activity between low and high SES. The difference between low

and high SES (with high SES respondents reporting more vigorous PA minutes) approached

statistical significance with a *p =*.052.

Table 9

Physical Activity Variables from the IPAQ

Characteristics	Total Sample N= 318 Mean (Std. Dev)	Low SES n=87 Mean (Std. Dev)	High SES n=231 Mean (Std. Dev)
Walking (Minutes/day)	52.16 (52.02)	54.63 (60.06)	51.24 (48.83)
Moderate Activity (Minutes /day)	44.51 (52.77)	41.22 (60.06)	45.75 (49.67)
Vigorous Activity (Minutes/ day)	44.72 (50.31)	35.07 (51.79)	48.27 (49.41)
MVPA (Minutes/day)	90.54 (90.20)	75.46 (98.79)	96.20 (86.63)
Walking Activity (MET-minute/week)	896.36 (1125.91)	933.14 (1254.55)	882.55 (1076.39)
Moderate Activity (MET-minutes/week)	549.95 (957.96)	503.14 (1062.02)	567.66 (917.46)
Vigorous Activity (MET-minutes/week)	1052.25 (1541.89)	831.43(1531.31)	1135.80 (1541.05)
Total Activity (MET-minutes/week)	2476.84 (2849.71)	2283.80 (2975.46)	2548.05 (2805.36)

Note: MVPA= moderate-to-vigorous physical activity; SES= socioeconomic status

Approximately thirty-one percent (31.1%) of the participants were in the low activity

category (*n*=99), 29.9% were in the moderate and 36.8% were categorized as high (Table 10).

When IPAQ score were categorized for low SES, 41.4% of the participants were in the low

category, 28.7% were in the moderate and 27.6% were categorized as high. For the high SES

group, approximately, 27.9% of the participants were in the low category, 31.0% were in the moderate and 29.9% were categorized as high. A chi-square test demonstrated a statistically significant difference (p=.032) between SES group and IPAQ category. A larger percentage of low SES respondents were considered participating in a low amount of physical activity, according to the IPAQ categories. In addition, more high SES respondents had high physical activity levels (Table 10).

Table 10

Chi Squared IPAQ Activity Categories by SES groups

IPAQ Category	Low SES n=87 No. (%)	High SES n=231 No. (%)
Low	36 (42.4)*	63 (27.9)
Moderate	25 (29.4)	70 (31.0)
High	24 (28.2)*	93 (29.9)

Note. SES= socioeconomic status; *p*=.032

Correlation of IPAQ and Park-based Physical Activity. A Pearson's correlation demonstrated a significant positive correlation between MVPA (minutes/day) and self-report minutes of physical activity at a park for the total group (r= .24, $p \leq$ .001) and high SES group (r= .28, $p \leq$ .001). The correlation between vigorous (minutes/day) and self-reported minutes of physical activity at a park for the low SES group approached significance (r=.24, p= .056). A Pearson's correlation demonstrated a significant positive correlation between walking activity (minutes/day) and self-report minutes at a park for the total group (r= .29, $p \leq$ .001) and high SES group (r= .35, $p \leq$ .001). No significant correlation existed between MVPA (minutes/day) and self-reported minutes of physical activity at a park for the low SES group (r= .18, p= .129).

Percentages and counts for IPAQ categories and being active at a park are presented in

Table 11. A chi-squared test demonstrated there was a statically significant relationship between

physical activity at a park (Yes/No) and IPAQ categories for the total group ($p \le .001$), low SES

group ($p = .011$), and high SES group ($p \le .001$). Among low and high SES respondents, a

higher percent of respondents who reported being active at a park were classified as being highly

active by the IPAQ.

Table 11

Percentages Of IPAQ Categories and Self-Report Park-Based Physical Activity

Characteristics	Total Sample N= 289 No. (%)		Low SES n=87 No. (%)		High SES n=231 No. (%)	
	Active at a Park		Active at a Park		Active at a Park	
	Yes	No	Yes	No	Yes	No
IPAQ Category						
Low	40 (13.8)	52 (18)	13 (17.3)	20 (26.7)	27 (12.6)	32 (15.0)
Moderate	58 (20.1)	29 (10.0)	16 (21.3)*	6 (8.0)	42 (19.6)	23 (10.7)
High	86 (29.8)*	24 (8.3)	15 (20.0)*	5 (6.7)	71 (33.2)*	19 (8.9)

Note. SES= socioeconomic status; *p ≤ .05 active at the park versus not active at the park

Association of Park-Use and Park Features with Physical Activity

In a binary logistic regression model, adjusted for gender and age, there was a significant

association with respondents who were active at a park and meeting 2008 Federal Physical

Activity Guidelines compared to respondents who were not active at a park (Table 12). There

was not a significant relationship for the low SES group. For high SES group, there was a

significant association between being physically active at a park and meeting physical activity

guidelines.

Among Greenville city survey respondents, a series of binary regression models indicated there were no significant associations with specific park features—open space, trails, sidewalks, or athletic fields and meeting physical activity guidelines ($p > .05$; Table 12). When SES groups (low and high) were analyzed separately there were no associations between specific park features—open space, trails, sidewalks, or athletic fields and meeting physical activity guidelines ($p > .05$).

Table 12

Relationship Between Active at a Park, Park Features, & Meeting 2008 Federal Physical Activity Guidelines Among Total Sample, Lower SES, and All Other SES

Characteristics	Total Sample N= 289 OR (95% CI)	Low SES n=87 OR (95% CI)	High SES n=231 OR (95% CI)
Active at Park			
Yes	2.01 (1.20-3.36)*	2.35 (0.80-6.90)	1.90 (1.05-3.50)*
No	1.0	1.0	1.0
Open Space			
Yes	1.49 (0.92- 2.42)	1.52 (0.55-4.19)	1.55 (0.88-2.69)
No	1.0	1.0	1.0
Trails			
Yes	1.20 (0.92- 1.56)	1.85 (0.71-4.78)	1.10 (0.82 -1.47)
No	1.0	1.0	1.0
Sidewalks			
Yes	1.05 (0.89-1.25)	1.17 (0.84-1.62)	1.00(0.83-1.21)
No	1.0	1.0	1.0
Athletic Fields			
Yes	1.02 (0.90-1.14)	1.18 (0.92-1.50)	0.97 (0.86- 1.14)
No	1.0	1.0	1.0

Note. SES= socioeconomic status; *$p \leq .05$

Qualitative Analysis of Park Survey Response. The quantitative analysis revealed a tendency toward respondents preferring unstructured park features for physical activity. This was demonstrated with higher frequency of the total sample, low SES group, and high SES group using parks with trails, open space, and sidewalks more frequently. In addition, respondents had a preference for the following park features—trails, open space, and sidewalks. However, the

binary logistic regression analyses provided no evidence of associations between specific park features and physical activity.

The responses to the open-ended responses to specific park questions are presented in Table 13. A central theme of the type of physical activity was done at the park was formulated as exercise or fitness. The theme embraced the categories of walking, jogging, yoga, and running. This was the top theme and encompassed responses that demonstrated an intention to be physically active. The second theme was family. Respondents engaged in physical activity that was related to their family. For example, a respondent reported, "Running around after my 17 month old little girl." The last physical activity theme was programming. Respondents engaged in programmatic activities like "slow pitch' or "coaching youth basketball."

The second question was "Why do you use this park the most?" The top theme was proximity. Respondents responded by reporting, "This park is closest to my house" or "I live around the corner." The second theme was favorable to physical activity; meaning there were feature, amenities, or qualities that encouraged physical activity. For example, responses were "tennis courts," "pathways," or "good walking paths." The third theme was programming; responses were "great concerts," "Sunday in the Park," or "spectator at baseball game." Throughout the top three themes there was a subcategory of nature and beauty. For example, "I love walking near the water," "There are beautiful trees," or "I love walking on the paths and seeing the birds."

Table 13

Questions:

What type of physical activity do you usually do outside at the park (be specific)?

Themes	Individual Responses
Exercise	I walk and jog with my dog. I also bike occasionally. Run the perimeter of the park and the run on the concrete path/cross county course. Walking. Walking, yoga, and tennis. Walk and throw Frisbee.
Family	Walk and take my son to the park. Play soccer with my son. Run around after my 17month old little girl. Take my kids out to play on swing jungle gym slide and run around.
Programming	Coaching youth baseball and other baseball activities. Slow pitch and cookouts. Sunday in the Park Baseball.
Nature/Beauty	I like walking on the trails and seeing the new flowers in the Spring. I walk near the water because it is pretty and peaceful.

Why do you use this park the most?

Themes	Individual Responses
Proximity	Close to my house. Proximity to where I live. I live around the corner. It is conveniently located 2 blocks from my house.
Favorable to Physical Activity	Good walking paths. I go to this park because there is a running trail. To play horseshoes. Pathways. Tennis courts.
Programming	Spectator at baseball games Sunday in the Park. Go to events at the park.

	Great concerts and festivals.
Nature/Beauty	It is pretty. I like to walk in the woods. There is nature, birds, and green grass.

Are there any questions, comments, or concerns about parks in Greenville, NC?

Themes	*Individual Responses*
Positive Comments	I love Greenville parks. Parks are a vital part of our community. I think Greenville has many excellent parks. Thank you for the survey. Glad I could participate. Thank you for sending me the survey. I wish I could have been more help. Parks are important. I didn't realize Greenville had so many parks. Thank you for the info.
Requests	Don't develop Town Commons. More walking tracks and lights. Safe dock at Town Commons. Need more trails. Improve safety and lighting. Fitness stations at more parks. Park for older adults and elderly.

CHAPTER V: Discussion

SES has been consistently shown in published review articles (Sallies et al., 2000; Adler et al., 1996) to influence physical activity among adults. However, research with regards to the influence specific park features have on physical activity across various SES levels is limited. Understanding the modifiable factors that influence the SES-physical activity relationship among adults could provide insight into what should be addressed in future interventions related to the built environment. Parks have been shown to be important environments for physical activity (Bedimo-Rung et al., 2005; Kaczynski and Henderson, 2007), but there is limited research on the importance of park features in promoting physical activity PA (Cohen et al., 2010; Hoehner, Brennan, Ramirez, Elliot, Handy, and Brownson, 2005). Therefore, the purpose of this thesis was to identify the associations between physical activity with (a) park usage and (b) specific park features across low and higher SES groups.

Differences in Physical Activity. The study found that the total sample reported engaging in walking, moderate, and vigorous activities for about 40-50 minutes per day, and the amount of physical activity was similar by SES group. In contrast, when physical activity was categorized into low, moderate, and high, more low SES individuals engaged in a lower amount of physical activity compared to higher SES respondents. These results are similar to previous research; low levels of leisure physical activity are more prevalent among lower income, less educated, and unemployed populations compared to higher income individuals (Centers for Disease Control and Prevention, 1999; Crespo et al., 2000; United States Department of Health and Human Services, 1996; Bennett et al, 2006; Ball et al., 2001).

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Difference in Park-Based Physical Activity. Over half of the respondents reported engaging in physical activity at a park in Greenville (59.1%) and the main parks used were similar between low and high SES. Bai et al. (2013) found that 45.0% of survey respondents engaged in weekly park-based physical activity. In the current study, 30.2% used park at least once/week.   Previous research has found low SES individuals visit parks less frequently than high SES individuals (Leslie et al., 2010). Due to the nature of park research relying on direct observation for the measurement of park usage and park-based physical activity there is limited information on the SES relationship with park-based physical activity and park usage. The literature is inconsistent when comparing high and low SES groups for park-based physical activity.

An example of this is inconsistency is shown in the results of Floyd et al. (2008a or b). They found that physical activity, energy expenditure in particular, varied by neighborhood racial/ethnic and income composition. In Tampa, the highest levels of energy expenditure were generated in parks from high-income Hispanic neighborhoods and low-income white neighborhoods (Floyd et al., 2008 a or b). The lowest energy expenditure was associated with high-income white neighborhoods and low-income Hispanic neighborhoods (Floyd et al., 2008 a or b). In Chicago, the greatest energy expenditure was recorded from parks in high-income African-American neighborhoods (Floyd et al., 2008 a or b). In both cities, the association between activity zones and physical activity appears to underlie differences by racial/ethnic and income composition (Floyd et al., 2008 a or b).

However, time spent at the park did not follow this trend. Low SES reported a higher amount of minutes spent at the park compared to high SES group ($p=.058$). This was a unique finding of the study. Tinsley, Tinsley, and Croskeys (2002) found that on average park visits

lasted about two hours and 69% of the time individuals engaged in moderate physical activity. There is limited research on the differences in time spent at a park or time spent engaging in physical activity at a park. However, Cohen et al. (2007) found on average females and ethnic minorities engaged in less activity at the parks.

Differences in Park Preference and Park Feature Preference. Regardless of SES status, out of 25 parks the top three parks were used the most by both low and high SES groups. All three parks had multiple features to promote physical activity and many of which were unstructured recreation areas. The top features that were present and used for physical activity were sidewalks (64.5%), trails (56.3%), athletics fields (45.6%), and open space (45.6%). These findings are consistent with previous literature. A study on public space in Australia found that neighborhood residents identified natural features of parks (i.e. tress, bird life, and water) and open space to encourage physical activity (Giles-Corti et al., 2005). Research has suggested that parks with walking paths and trails were visited more often than parks containing sports-related facilities (Reed et al., 2008). There was a clear preference for parks that had trails, open space, and sidewalks/paths. This same theme was consistent with the residents' preferences for park features. It is important to note that preferences were not different among low and high SES individuals. To the best of our knowledge, the similarity of preferences for park features promoting physical activity between the lowest and all other SES respondents is a novel finding. This may reflect the cutpoints chosen by the author and represents an area for continues research attention.

Association between Park-Based Physical Activity with Physical Activity Levels. One of the study purposes was to examine the association between park-based physical activity and

respondents' self-reported physical activity levels. Given the findings from the correlation and

logistic regression analyses, these results suggest there are low to moderate associations between

being physically active at a park and physical activity levels/meeting physical activity guidelines.

The relationships were stronger for the high SES group than the low SES group. The positive

association between park-based physical activity and self-reported physical activity levels has

been established in the literature (Ball et al., 2001; Brownson et al., 2001; De Bourdeauhujij et

al., 2003). De. Bourdeauhujji et al. (2003) study sample found little differences in SES; but this

could have been attributed to little variability in the sample and a majority of high SES adults.

People with greater access to recreation facilities engage in more physical activity; researchers

have found individuals are 1.5 times more likely to achieve high levels of walking when they

have parks access (OR: 1.50, 95% CI= 1.06-2.13) (Giles-Corti et al., 2005).

   Association between Park Features and Physical Activity Levels. Despite trends in

preferences for park features, there were no significant associations between specific park

features (i.e., open space, trails, sidewalks, or athletic fields) and meeting physical activity

guidelines. When SES groups (low and high) were analyzed separately there were no

associations between open space, trails, sidewalks, or athletic fields and meeting physical

activity guidelines. Kaczynski et al. (2008) studied whether park size, the number of features in

the park, and distances to a park from participants' homes were related to a park being used for

physical activity. They found that parks with more features were more likely to be used for

physical activity; size and distance were not significant predictors. Park facilities have been

shown to be more important than were park amenities (i.e. water fountains or parking)

(Kaczynski et al., 2008). Of the park facilities, trails had the strongest relationship with park use

for physical activity (Kaczynski et al., 2008). Kaczynski et al. (2008) found the presence of a

paved trail was a significant predictor of some physical activity occurring in a park. Parks with a paved trail were almost 26 times as likely to be used for physical activity as were parks without a paved trail (OR=25.93; 95% CI=2.15, 312.51; *p*=.01). In this study the most participants were female, were married or living with a partner, had graduated college, and were employed full-time (Kaczynski et al., 2008). Differences in the current study sample and the sample in Kaczynski et al. (2008) could explain the different results.

Qualitative Response to Community Park Surveys. Although there was no significant relationship between physical activity levels and park features, the total sample, the lowest SES group, and all other SES respondents group reported using parks with trails, open space, and sidewalks the most. In addition, respondents had a preference for the following park features— trails, open space, and sidewalks. Qualitative analysis was conducted to better understand the preference for specific park features. The themes that emerged focused on exercise, family, and programming. It is clear there is a complex relationship between the relationship of SES, park use, and physical activity. Feature supports (i.e. trails) were the main reason individuals visited and were active at park, but many of the responses included statements relating to social engagement as well (i.g. "I love Town Commons because I can walk on the paths. I go with my husband in the evenings."). The findings in this study illustrate the importance of the social aspect in promoting physical activity at parks. In addition, there was a clear sub theme and potential mediator of nature/beauty and social engagement. Unfortunately, the community park survey did not ask any questions related to these two constructs. The importance of beauty/nature to increasing park-use and park-based physical activity has been established in the research (Sugiyama et al., 2010; Giles-Corti et al., 2005).

The qualitative questions were pointed and therefore provided information directly related to physical activity. The survey did not ask or address questions relating to sedentary behavior at parks. Cohen et al. (2007) conducted interviews with park users and residents living within a 2 mile buffer of the parks. They found the most common park activity reported among both residents and park users was sitting, followed by walking, using the playground, having a party or celebrating, and meeting friends. These themes are consistent with our study; except for sitting because sedentary behavior was not included in our survey.

Methodology and Evaluation Considerations. This community park survey was mailed to 4,786 residents in Greenville, North Carolina. Oversampling of low income individuals, produced an equally distributed sample of low, moderate, and high SES residents. The response rate for the survey was 7.89% and a total of 318 surveys were used in the analysis after excluding students. This is a low response rate when compared to other community mailed surveys. Leslie et al. (2010) used a mailed survey to assess the perceived neighborhood environment and park use as a mediator for walking behavior. The study response rate was 19.7% (*N*=555). However, the responses were higher for residents in high SES (24.8%) areas than for low SES (14.1%) areas, SES was estimated using Socio-Economic Index for Areas in Australia rather than self-reported income (Leslie et al., 2010). Further, Bai et al. (2013) mailed survey had a response rate of 27.4% (*N*=893) using both a recreation center pass and drawing for one of ten $50 gift cards as an incentive for completion. The study's response for lower SES (less than $25,000) was 24.8%; compared the current response rate of 21.7% for income less than $19,999 and 21.4% response rate for $20,000- $39,999. Clearly, this study's response rate was low compared to other studies; however, many of the studies use door-to-door drop (Kaczynski, 2010), multiple survey mailings (Hoehner et al., 2005), or monetary incentives to

increase the response rate (Hoehner et al., 2005; Kaczynski, 2010). Despite the low response rate the demographics of the survey participants were similar to other research studies using surveys to assess the relationship of park use and physical activity (Hoehner et al., 2005; Troped, Saunders, and Pate, 2001) and provided an even distribution of SES groups. Although the response rate was low; oversampling for low SES individuals produced an opportunity to compare low and high SES groups and provided information on a population among which limited research has been conducted. This oversampling for low socioeconomic individuals could be important method for future research interested in comparing low and high SES groups.

Strengths and Limitations. There were several strengths to the current study. This study assessed park use for an under represented population in park research (Cohen et al., 2007; Cohen et al., 2010). The survey used a valid and reliable measure of physical activity (IPAQ) compared to other research studies which selected portions or abbreviated versions of physical activity questionnaires (Bai et al., 2013). In addition, a valid and reliable measure of environmental features of park (EAPRS) was used as an assessment tool. The survey method provided insight into a population that may not be reached from direct observation, which is prominent in park research (Sallis, 2009). Finally, the study used a mixed method approach to assess the relationship between physical activity and park use. Qualitative methods were rich in narrative and description, and provided insight into the motivation for park usage and physical activity. The qualitative data support the idea that individual-level and environmental factors, like nature and beauty, have an impact of an individual's motivation to be physical activity at a park.

This study had several limitations which provide direction for future research. First, self-reported measures of physical activity are widely used given the advantages of low cost, minimal

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influence on participants' behavior, feasibility to collect data from a large number of people, and demonstrated reasonable reliability and validity (Sallis et al., 2000). However, self-reported physical activity data have limitations such as recall accuracy, over-estimation, and social desirability bias (Baranowski, 1998). In addition, response bias is a limitation with survey data; those who responded to the survey could have been more motivated to be physically active. As such, additional research is recommended to include objective measures of physical activity (e.g., heart rate monitoring, accelerometers, systematic observations) which can provide more precise estimates of energy expenditure. Some of the weaker or nonsignificant associations may be attributed to characteristics of the environmental features studied, measurement error, low statistical power, or a limited direct effect of the environmental characteristic on generating physical activity. For example, the inclusion of both questions about what features "do" you use and what feature "would" you use could have caused respondents to respond similarly to both questions. Finally, like other cross-sectional studies, this study cannot determine causality to explain whether parks promote physical activity or if people interested in physical activity seek out park as a space to be physically active.

Conclusion

The results of this study found that there was a relationship between the park-based physical activity and physical activity measured by the IPAQ. The highest rated park features were open space, trails, and sidewalks. In addition, sidewalks, open space, and trails were the top preferences of city residents, but there was no significant association between physical activity and specific park features. Associations were observed between being physically active at a park and meeting recommendations of physical activity, but only for high SES residents. In contrast,

there was no association between presence of specific recreational features and meeting physical activity recommendations.

From this study it can be concluded that a majority of the respondents used parks for physical activity and there was not a difference in park use for low and high SES residents. We hypothesized that low SES individuals would prefer different features compared to high SES individuals due to various social and environmental barriers. However, low and high SES individuals had similar preferences for parks and park features (unstructured spaces) to engage in physical activity. From the results of the mixed-method study it could be postulated that parks could create a social seam for the gap between low and high SES communities' physical activity levels. Parks, if they are designed to match users' preferences, could facilitate social interaction and increased physical activity among people from different backgrounds. Potentially, parks can act as catalysts for community involvement, but also provide a space physical activity promotion for a diverse population.

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APPENDIX A: IRB Approval Form

EAST CAROLINA UNIVERSITY
University & Medical Center Institutional Review Board Office
4N-70 Brody Medical Sciences Building· Mail Stop 682
600 Moye Boulevard · Greenville, NC 27834
Office **252-744-2914** · Fax **252-744-2284** · www.ecu.edu/irb

Notification of Exempt Certification

From:	Social/Behavioral IRB
To:	Katrina DuBose
CC:	

Date:	9/30/2013
Re:	UMCIRB 13-002013
	Perception of Park Feature that Promote Physical Activity

I am pleased to inform you that your research submission has been certified as exempt on 9/29/2013. This study is eligible for Exempt Certification under category #2.

It is your responsibility to ensure that this research is conducted in the manner reported in your application and/or protocol, as well as being consistent with the ethical principles of the Belmont Report and your profession.

This research study does not require any additional interaction with the UMCIRB unless there are proposed changes to this study. Any change, prior to implementing that change, must be submitted to the UMCIRB for review and approval. The UMCIRB will determine if the change impacts the eligibility of the research for exempt status. If more substantive review is required, you will be notified within five business days.

The UMCIRB office will hold your exemption application for a period of five years from the date of this letter. If you wish to continue this protocol beyond this period, you will need to submit an Exemption Certification request at least 30 days before the end of the five year period.

The Chairperson (or designee) does not have a potential for conflict of interest on this study.

IRB00000705 East Carolina U IRB #1 (Biomedical) IORG0000418
IRB00003781 East Carolina U IRB #2 (Behavioral/SS) IORG0000418

September 2013

Dear Greenville Community Members,

We are interested in your opinion about Greenville, NC parks. The following questionnaire will take approximately 10-15 minutes. There is no compensation for responding nor is there any known risk. In order to ensure that all information will remain confidential, do not include your name. If you choose to, please answer all questions as honestly as possible and return the completed questionnaires to [ ]. Participation is strictly voluntary and you may stop at any time.

The completion of this survey is a part of my master's research at ECU. Your participation is critical to my graduation as a master's student Kinesiology (Physical Activity Promotion). The data collected will provide useful information regarding your usage of Grenville parks. Completion and return of the questionnaire indicates your willingness to participate in this study. If you require additional information or have questions, please contact me at the number listed below. I appreciate your support.

Sincerely,

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APPENDEIX C: Community Survey

You are being invited to participate in a research study conducted by the Department of Kinesiology at East Carolina. We are asking you to take part in a 10-15 minute survey to learn more about what parks you use for physical activity, what park features you use for physical activity, and your general physical activity.

Would you like to participate? [If yes]: Pleas complete the survey below.

Section A: What Park Do You Use for Physical Activity

*The first set of questions will be about what parks you use for **outdoor** physical activity in Greeneville.*

A1. Do you ever use Greenville parks for **physical activity**?

○Yes

○No ➔ **Skip to questions A3.**

○Don't know/Not sure

➔ A1a. If **yes**, how often are you physically active at a park?

○2 or more times per week

○ One time per week

○ Once a month

○2-3 times per month

○A few times per year

A2. What type of physical activity do you typically do outside at the park (be specific)? [List in box below]

A3. Below is a list of parks in Greenville. Please read the instructions for each column.

Park Name	A3_1. Please fill the circle if you have **heard** of each park listed. [Mark all that apply.]	A3_2. Please fill the circle if you have **used** that park. [Mark all that apply.]	A3_3. Please fill the circle if you have **been active** at that park? [Mark all that apply.]
Matthew Lewis Park at West Medowbrook	○	○	○
Andrew Best Freedom Park	○	○	○
Beatrice Maye Garden Park	○	○	○
Westhaven Park	○	○	○
Bradford Creek	○	○	○
Disc Golf Course	○	○	○
Town Common	○	○	○
Dream Park	○	○	○
Eastside Park	○	○	○
Elm Street Park	○	○	○
Evans Park	○	○	○
Extreme Park	○	○	○
Greenfield Terrace Park	○	○	○
Greensprings Park Greenway	○	○	○
Guy Smith Park	○	○	○
H. Boyd Lee Park	○	○	○
Hillsdale Park	○	○	○
Jaycee Park	○	○	○
Peppermint Park	○	○	○
Paramore Park	○	○	○
Perkins Baseball Complex	○	○	○
River Park North	○	○	○
Woodlawn Park	○	○	○
South Greenville Park	○	○	○
Thomas Foreman Park	○	○	○

A4. Which one these parks (from the list above) do you use most often?

1.   _____[*park name*]

2.   Why do you use **this park** the most?

A5. Does your neighborhood park have the feature(s) your community needs and enjoys to be physically active?

○Yes, my neighborhood park has the feature(s) that my community enjoys for physical activity.

○No, my neighborhood park does not have enjoyable features to be physically active.

○My community does not have a neighborhood park.

○Other_____

Section B. What do you use and like at the parks for physical activity?

For this section think of the park that you use the most often (Check all that apply.) [Listed in A4_1].

B1. During a normal park visit, how much time do you typically spend at the park *[listed in A4_1]*?

___ ____ Hours ___ ____ Minutes

For this section think of the park that you use the most often (Check all that apply.)
[Listed in A4_1].

B2. What features **do you** use for physical activity at the park *[listed in A4_1]*?

○Open space

○Trails

○Sidewalks

○ Athletic Fields

➔ Please be specific

○Baseball *or* Softball fields   ○Golf course

○Skate area

○Batting cages   ○Soccer fields

○BMX track   ○Tennis courts

○Basketball courts   ○Athletic track

○Frisbee golf

○Other_____

B3. If you could, what features **would you** use for physical activity at the park?

○Open space

○Trails

○Sidewalks

○ Athletic Fields

➔ Please be specific

○Baseball *or* Softball fields   ○Golf course

○Skate area

○Batting cages   ○Soccer fields

○BMX track   ○Tennis courts

○Basketball courts   ○Athletic track

○Frisbee golf

○Other_____

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Section C. Questions About You

Now there are a few questions about you. These questions help us understand who participated in the survey.

C1. What is your date of birth? [*Month/date/year*]

_____ _____ / _____ _____/ _____ _____ _____ _____

C2. What is your gender?

○Male

○Female

C3. What is your race? [Mark all that apply.]

○American Indian or Alaska Native

○Asian

○Black or African American

○Native Hawaiian or Other Pacific Islander

○White, non-Hispanic

○ Hispanic or Latino

○Other_____

○Don't know/not sure

○ [decline to answer]

C4. How long have you lived at your current address? [Record # of years if one or more. If less than one year, record number of months.]

____years **OR** ____months

➔ **C4a**. Do you rent or own?
○ Rent
○ Own
○ Government Housing

C5. How many children less than 18 years of age live in your household?

_____ [If **no** children live in the household, record 0.]

C5. How many individuals over the age of 18 years of age live in your household?

_____ [If you are the sole occupant, record 1.]

C6. What is the highest grade of school you completed?

○Never attended school or only attended kindergarten

○Grades 1 - 8 (elementary)

○Grades 9 - 11 (some high school)

○Grades 12 or GED (high school graduate)

○College 1 - 3 years (some college or technical school)

○College 4+ years (college graduate, masters, doctorate, professional)

○ [Decline to answer]

C7. What is your current work status? [*Current primary role*]

○Employed for wages

○Self-employed

○Out of work for more than 1 year

○Out of work for less than 1 year

○A homemaker

○A student

○Retired

○Unable to work

○ [Decline to answer]

C8. What is your annual household income?

○$19,999 or less

○$20,000 - $39,999

○$40,000 - $59,999

○$60,000 - $79,999
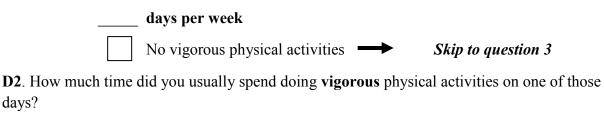
○$80,000 - $99,999

○$100,000 or more

○Don't know/not sure
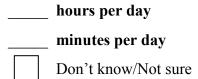
○ [Decline to answer]

Section D. International Physical Activity Questionnaire

We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives. The questions will ask you about the time you spent being physically active in the **last 7 days**. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Think about all the **vigorous** activities that you did in the **last 7 days**. **Vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Think *only* about those physical activities that you did for at least 10 minutes at a time.

D1. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, digging, aerobics, or fast bicycling?
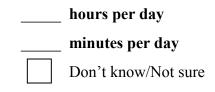
_____ **days per week**

☐ No vigorous physical activities ➡ *Skip to question 3*

D2. How much time did you usually spend doing **vigorous** physical activities on one of those days?

_____ **hours per day**

_____ **minutes per day**

☐ Don't know/Not sure

Think about all the **moderate** activities that you did in the **last 7 days**. **Moderate** activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

D3. During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.
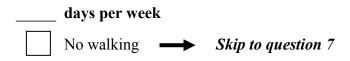
_____ **days per week**

☐ No moderate physical activities ➡ *Skip to question 5*

D4. How much time did you usually spend doing **moderate** physical activities on one of those days?

_____ **hours per day**

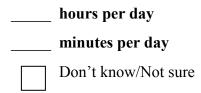_____ **minutes per day**

☐ Don't know/Not sure

Think about the time you spent **walking** in the **last 7 days**. This includes at work and at home, walking to travel from place to place, and any other walking that you might do solely for recreation, sport, exercise, or leisure.

D5. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time?
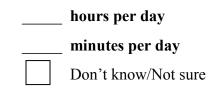
_____ **days per week**

☐ No walking ➡ *Skip to question 7*

D6. How much time did you usually spend **walking** on one of those days?

_____ **hours per day**

_____ **minutes per day**

☐ Don't know/Not sure

The last question is about the time you spent **sitting** on weekdays during the **last 7 days**. Include time spent at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television.

D7. During the **last 7 days**, how much time did you spend **sitting** on a **week day**?

_____ **hours per day**

_____ **minutes per day**

☐ Don't know/Not sure

Additional Comments
Are there any questions, comments, or concerns about parks in Greenville,
Thank you for completing the survey.

You've been selected...

LAST WEEK A QUESTIONNAIRE ASKING YOUR OPINIONS ABOUT THE LOCAL PARKS WAS MAILED TO YOU.

Your address was drawn in a random sample of households in Greenville.

If you have already completed and returned it to us please accept our thanks. If not, please do so today. It was sent out to a select sample of Greenville residents and *we would like your voice to be heard.*

If by some chance you did not get the questionnaire or it was misplaced, please call me today (252-328-1996) and I will get you another one in the mail to you today.

Emily Pineda
Project Director