INVESTIGATING SMART NEIGHBORHOOD DESIGN FOR PHYSICAL ACTIVITIES; A CASE STUDY OF SOUTH ATLANTA NEIGHBORHOOD, GEORGIA

OKENWA, BENJAMIN
Clemson University, bokenwa@g.clemson.edu

NASSAR, HALA
Clemson University, hnassar@clemson.edu

1. ABSTRACT

Despite an increased awareness of the importance of physical activity (PA) and its associated health benefits, minority neighborhoods of color fare poorly in access to outdoor spaces conducive to a healthy lifestyle. Literature shows that residents in such neighborhoods are amongst the most predisposed to most chronic diseases (Wang et al., 2008). Few research studies pointed out correlations between smart growth principles and health benefits, economic development, and sustainable living (Daniels, 2001).This research investigates the condition of South Atlanta neighborhood and its impact on residents' level of PA. Specifically, the research examines habits and patterns of PA of the residents, as well as their preference of designed outdoor spaces that align with smart growth principles (SGP). Neighborhood observation and behavioral mapping were conducted in February 2020. Using quantitative and qualitative questions, an online survey was posted to the neighborhood Facebook page requesting residents' responses. The survey was sent several times for one week in April 2020 to elicit more participation. According to 21 respondents who participated in the study, more people are willing to lead physically active lives if their neighborhood design encourages it. Additionally, safety and social destinations were identified as primary factors determining how residents engage in PA in the outdoor space. In summary, the study shows clear possible physical and mental health benefits for South Atlanta neighborhood residents by being more physically active and that SGP offers possible benefits for improved quality of life.

1.1 Keywords:

Smart, neighborhood, design, physical activity

2 INTRODUCTION

Lack of physical activity accounts for as much as 23% of all US deaths from major chronic diseases (Warburton, Darren, Nicol & Bredin, 2006). In 2008, a study by Dr. Youfa Wang and his team at Johns Hopkins school of public health concluded that “most adults in the United States will be overweight or obese by 2030, with related health care spending projected to be as much as $956.9 billion" (Wang, Beydoun, Liang, Caballero & Kumanyika, 2008). Consequently, a lack of PA will place an enormous burden on healthcare costs for people and the government. This issue highlights the relevance of an active lifestyle as low levels of PA threaten health both directly and indirectly while active living prolongs life expectancy (Lee & Paffenbarger, 2000). Studies have identified the built environment as having a great deal of impact on our attitudes towards PA (Lawrence, Peter & Thomas, 2003), with the built environment demonstrating a capacity to influence patterns of behaviors that promote health outcomes in the long term. The vast majority of low and middle-income neighborhoods lack basic amenities including sidewalk, bike lane, and open space that stimulate PA such as walking, biking, and running (Day, 2006). Factors such as safety concerns (Boslaugh, Luke, Brownson, Naleid & Kreuter, 2004; Bennett et. al., 2007) and lack of social destinations (McCormack, Giles-Corti & Bulsara, 2008) discourage residents' engagements in PA. This is evident as most US cities are challenged with a crux of diminishing health exacerbated by their immediate environment especially for minority neighborhoods of color, (Wang et. al., 2008). The primary cause of physical inactivity that relates to the built environment design can be attributed to the consequences of urban sprawl since the twentieth century. Nonetheless, the World Health Organization attributes some other factors: violence, air pollution, high-density traffic, and lack of streetscape facilities such as parks, sidewalks, and recreational facilities as causes of physical inactivity (World Health Organization [WHO], n.d.).

Several studies have identified walking as the most common form of PA. Other cultural and physical factors influence people's decisions to select walking as their mode of movement (Rapoport, 1987; Desyllas, Duxbury, Ward & Smith, 2003). Frank et al., 2006 and Leslie et al., 2007 examined the association between walking and built environment features such as mixed land uses, street connectivity, net residential density (dwelling density), and retail floor-area ratio. Their study concludes that single land-use, low-density land development, and disconnected streets are positively associated with auto dependence and negatively associated with walking which is the most common form of PA. Healthy living and total well-being require a physically active lifestyle that is naturally incorporated in multifaceted daily activities including traveling to work, shopping, recreation, etc. Modern advancements in technology have contributed to a rather sedentary way of life (Ng & Popkin, 2012); urban sprawl causes long commute time and extended periods of inactivity (Ewing, Schmid, Killingsworth, Zlot & Raudenbush, 2003). Transit services including trains, buses, and subways could be a suitable means of PA if incorporated into daily commute. Fragmentation of urban streetscapes hardly creates a walking experience, affecting street walkability and engagement in PA (Frank & Engelke, 2005). Previous studies from other low-income urban neighborhoods located within major cities like Los Angeles (Cohen et al., 2007; Han et al., 2018) and Newark (Echeverria et al., 2014) found that crime and concern for safety pose as an impediment to residents’ PA within the neighborhood. Other studies found that, generally, low-income communities lack the basic amenities for improved PA, which calls for changes in their design and planning (Gustat et al., 2012). A more recent study conducted in low-income communities of New York concludes that children and younger adults tend to be active in neighborhoods with park facilities, bike paths, and mixed land use (Huang et al., 2020). Environmental design experts now argue that planning and design for an active living must primarily address low-income communities, where obesity and related health risks are greatest, and resources are least available (Day, 2006; Wang et al., 2008). This research identifies problems in neighborhood design and investigates ways the built environment can contribute to a more healthy, efficient, and active neighborhood design that promotes various forms of PA. The study employs six principles of smart growth as parameters that promote PA in a neighborhood context by studying the connection between various design components and how they adversely affect PA levels of residents. These smart growth principles were selected as they identify relationships between neighborhood design, aesthetic qualities and social environment. Moreover, they take into account the preservation of existing neighborhood characteristics while accommodating changes that can contribute to improved levels of PA (Dill, 2004).

What is smart growth (SG)? Smart growth is an approach to development that encourages a mix of building types and uses, diverse housing and transportation options, development within existing

neighborhoods, and community engagement (Smart Growth America [SGA], 2017). The model of Smart Growth Principles (SGP) was introduced to improve environmental sustainability and economic growth (Grant, 2009). More studies claim that applying SGP to new developments or redevelopments will address most built environment issues (Daniels, 2001). Previous studies culminate that SGP positively impacts increased PA levels, this study aims to further investigate a diametrical connection between SGP and PA by exploring six of the SGP comprehensively to understand how its application can impact levels of PA for neighborhoods. The six SGP examined in this study are; multimodal transport system, integrated land use, increased street walkability, public open spaces, community identity and safety, efficient pedestrian circulation, and connectivity. Applied to South Atlanta neighborhood, this study explores the relationship between SGP and improved PA at a neighborhood scale. This research sought to investigate the urban condition of South Atlanta neighborhood and its impact on residents' level of PA. Specifically, the research examines the habits and patterns of PA of the residents, as well as their preference for designed outdoor spaces that align with SGP.

2.1 Study Area

South Atlanta neighborhood (previously known as Brownsville) is located about two miles south of downtown Atlanta along two important railroads which contributed to the growth of the area during the reconstruction period (1863-1877). Historic South Atlanta has a rich history of higher education, performing arts, and community development stemming from the creation of Clark University in 1869, with the aim to educate freed slaves. The college attracted development through common interests and kindred relationships of some of the most influential families in the city of Atlanta for a period of more than half a century. During the segregation period, South Atlanta blossomed into an elite middle-class African American community with over 700 privately owned homes. The community experienced rapid development until 1941 when the university relocated causing a decline in the neighborhood population and development. During this period, Browns Avenue, which ran west to east of the site, served as a historical diving line between the city of Atlanta and Fulton county. The dividing line caused a separation in areas where public development was proposed consequently causing a decline in community development of the southern parts of the neighborhood. Additionally, the neighborhood became notorious as a result of the activities of its African American residents during the Atlanta riot which caused more residents to flee the neighborhood resulting in a steady decline until the early 1940s (see figure 1).

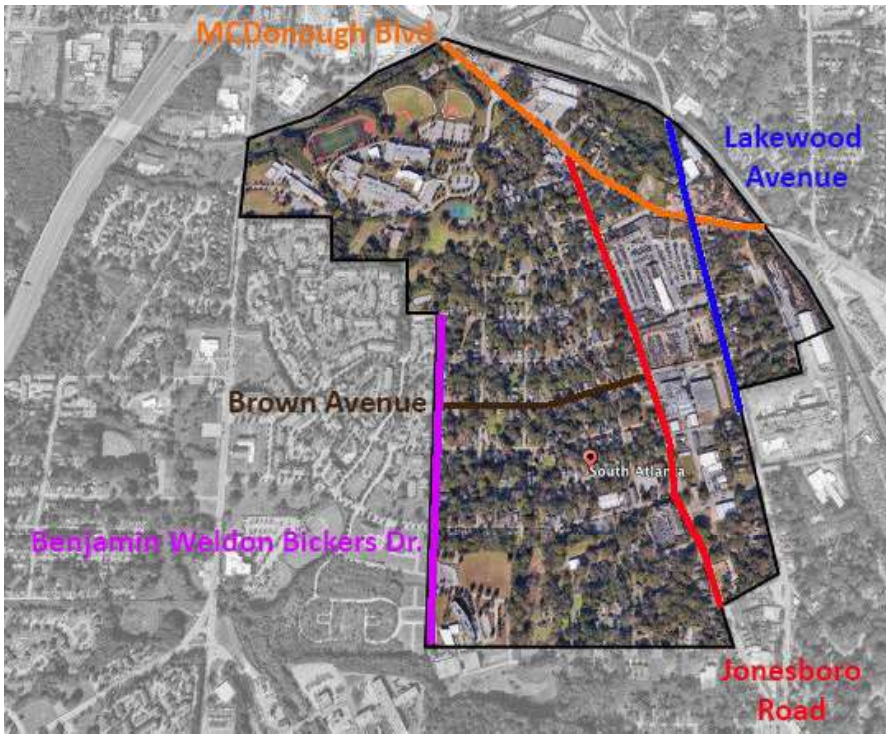

Figure 1. South Atlanta Source- Google Earth Pro image (2020). Image by the authors

South Atlanta neighborhood was selected for the purpose of this study for several reasons. Primarily, its geographic location within Atlanta metropolitan area, and its proximity to downtown Atlanta, and Hartsfield Jackson Atlanta International Airport; the busiest airport in the world makes it a suitable site for a study that focuses on the effect of the built environment on residents' engagement in PA. The neighborhood consists of 520 residential parcels and a population of approximately 1200 residents. It is a low to middle income neighborhood comprised mainly of minority African American population making up 91% of the population. The average household income in South Atlanta neighborhood is $23,166, and 35% of the residents make less than $15,000 annually. A combination of these factors which correlates with literature concerning low to middle socioeconomic status and residents' associated levels of PA (Wang et. al., 2008), presented South Atlanta neighborhood as a suitable site for this research investigation.

3 METHODS

3.1 Data Collection

The study derived data from two primary methods: the first method consists of behavioral mapping using correlational research methods which involve mapping and natural observation, and the second method used survey questions to collect data from South Atlanta neighborhood residents.

3.2 Behavioral Mapping

This part of the research sought to understand place-based behavior and activities of South Atlanta neighborhood residents. As per literature review, factors including land use, transit amenities, active nodes, accident rate, neighborhood connectivity, and crime rate were of prime importance to the study. To understand how these factors affected residents' PA in South Atlanta neighborhood, the research employed the use of interactive mapping tools to independently analyze the various factors. Applications used in this step of behavioral mapping included ArcGIS, Google Earth Pro, Lexis Nexis Community Crime Map, and Georgia Department of Transportation (GDOT) crash data map.

ArcGIS

ArcGIS is a cloud-based mapping tool used in generating and analyzing maps for planning or design purposes. To explore the land use and zoning plan of South Atlanta neighborhood, the study used ArcGIS to generate several map layers describing the neighborhood's current land uses including housing typologies, open space, commercial and industrial spaces, churches, and public schools. Additional layers were created to identify property boundaries and determine public and private land ownerships. ArcGIS maps aided in the analytical understanding of the neighborhood land use make up which was predominantly residential with few public land uses including schools and churches.

3.2.1 Google Earth Pro

The Google Earth Pro application is commonly used for wayfinding and location purposes by the general public. It is easily accessible on smartphone devices which made it ideal to use in this research. The researchers used Google Earth Pro to examine the existing physical conditions of roads and their accessibility to the different modes of transportations including private vehicles, public transit, bicycles, and motorcycles. Additionally, the application was used to generate 3D street views which provided a clearer understanding of the physical context of road conditions and places in the neighborhood. Street view pictures generated using Google Earth Pro further aided in classifying the road condition into three categories: standard, sub-standard, and poor. The categories are shown in table 1.

3.2.2 LexisNexis Community Crime Map

LexisNexis Community Crime Map is an online interactive mapping system with basic dashboards and analytics used by law enforcement to share specific crime data with the public. It is easily accessible by the public and contains information and geolocation of recent crime activity. The study used LexisNexis Community Crime application to find the current crime rate in South Atlanta neighborhood, and understand the level of safety in the neighborhood through reported crime frequency and location of occurrence.

3.2.3 GDOT Crash Data Dashboard

Georgia Department of Transportation (GDOT) Crash Data Dashboard is an online platform that offers data on crash reports for Atlanta metropolitan Area. For this study, this report was a part of the analysis that focused on investigating the accident rate in the neighborhood to understand how safe the neighborhood is for improved PA.

3.2.4 Natural Observation

Ground truthing of the multiple mapping layers was achieved through natural observation of South Atlanta neighborhood. This was deemed relevant to ensure that current physical conditions matched data collected from the different online mapping tools and websites. The researchers observed the site closely during two site visits, spending two and a half hours in the first visit conducted in early February 2020 and two hours in the second visit later the same month. The first site observation visit took place on a Saturday morning between 9:00 am and 12:00 pm, and the second observation took place on a late Wednesday afternoon between 4:25 pm and 6:00 pm. During these visits, the researchers used Google map Global Positioning System (GPS) to correlate mapped data with physical neighborhood conditions. The investigation was more specific at some locations where intent observations and study of natural occurrences were needed. Some of those locations included Jonesboro Road (see Fig 4), Benjamin Weldon's Bickers Drive, Lakewood Avenue (figure 3), and McDonough Boulevard. The researchers took photographs and hand sketches at various places to augment the mapping information gathered.

3.3 Survey

The study used a survey tool to gather data on residents' behavioral habits, opinions, and attitudes aimed to understand variable patterns that affect PA in the neighborhood. Utilizing quantitative and qualitative questions, an online survey was posted to the neighborhood Facebook page requesting residents' responses. The survey was posted several times for one week in April 2020 to elicit more participation and asking residents questions about their PA levels and how the design and condition of their neighborhood has encouraged or discouraged engagement in PA. (figure 5B). The survey consisted of four sections; the first section focused on soliciting data from neighborhood residents regarding their daily activities, and types and frequency of engagement in PA. Residents were asked to identify their most common daily destinations and their associated modes of commuting. Furthermore, this section asked residents if their neighborhood conditions encourage, discourage, or have no effect on their type and frequency of PA. The second section aimed to collect data about the residents' perception of South Atlanta neighborhood. Specifically, in open-ended questions, residents were asked to identify three or more factors that encourage more engagement in PA levels and three or more factors that are currently prohibiting their willingness to be physically active. The third section focused primarily on Smart Growth Principles and solicited residents' preference of incorporating them in their neighborhood design. The final survey section collected residents' demographic data including age, gender, marital status, income, education, and employment.

4 RESULTS

4.1 Behavioral Mapping

This study comprises results from the two data collection methods employed, first behavioral mapping and second survey. The researchers used interactive mapping tools and natural observation to classify neighborhood streets into three conditions based on the existing street features. Table one shows the categories of the street conditions.

Table 1. Categories of street condition

	Standard Street Condition	**Sub-Standard Street Condition**	**Poor Street Condition**
Features	- Good street connectivity - Presence of paved sidewalks - Presence of bike lane - Presence of trees - Sidewalk stepped up from the street plane - Visible private and public boundary - Accessible sidewalks	- Sidewalk present on one side of the street - Unpaved sidewalk - Unmaintained sidewalk - Disconnected sidewalk - Sidewalk separated from street with marking. - Available space for sidewalk but no sidewalk. - No bike lane	- Sidewalk completely absent - Deteriorated sidewalk - Narrow street - No clarity between private and public boundary - No space for sidewalk - No bike lane - Cars parked on the street for extended time.

Based on the information derived from the behavioral mapping, the study further classified the street connectivity according to their physical and visual connectivity level. These classifications are based on natural observation and mapping of the neighborhood. For physical connectivity, streets were rated from low to high, considering the presence and adequacy of sidewalks, bike paths, street connections, links, and pedestrian shed. For visual connectivity, neighborhood streets were rated from low to high, considering the presence and adequacy of landmarks, destinations, experience, accessibility, and safety. Google Earth Pro maps aided in the analytical understanding of the neighborhood street connectivity identifying three major streets (Benjamin Weldon's Bickers Drive, Jonesboro Road, and Lakewood Avenue) as very well physically and visually connected, having high physical connectivity and medium visual connectivity. Other streets such as McDonough boulevard, Thirkield Avenue, Margaret Street, and Dorothy Street were rated medium in physical connectivity and high visual connectivity. Out of the twenty-one (21) street segments investigated, eleven (11) were classified as low physically and visually, which means they lacked the basic amenities that encourage PA. Seven streets were classified medium and high physically and visually, while three neighborhood streets had low to medium connectivity (see figure 2). The study found the most connected streets with high physical connectivity and medium visual connectivity, followed by the streets with medium physical connectivity and high visual connectivity. Researchers could further study to examine which of these connectivity types has a positive relationship with increased PA levels.

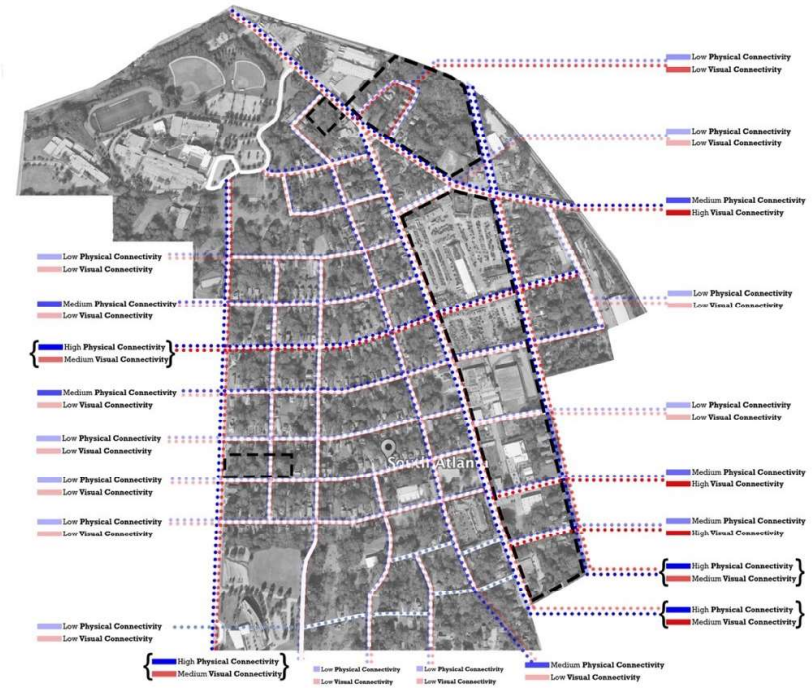

Figure 2. Google Earth map of street connectivity analysis (2020). Diagram by the authors.

Studies explored in the literature show that crime and safety concerns discourage residents of low-income communities from engaging in PA within their neighborhood environment (Cohen et al., 2007; Han et al., 2018; Echeverria et al., 2014). To explore this further in the context of South Atlanta neighborhood, the study accessed LexisNexis Community Crime Map in late April 2020 to search reported crimes for the previous six months (November 2019-April 2020). Maps generated from the search showed that the most commonly reported crimes in the area are burglary from motor vehicles, theft, and aggravated assault. It further highlighted that majority of the theft cases were reported on Jonesboro Road (figure 4), while a majority of burglaries from motor vehicle cases were reported within the single-family residential zone. Generally, the frequently reported crime cases in the neighborhood were non-violent crimes. Other violent crimes, such as aggravated assault, robbery, rape, and homicide, were less common in the area. The study highlights that most of the inner neighborhood streets had low to medium connectivity and poor-substandard streets that may be related to the increased crime rate. The study further concludes that

residents can freely engage in PA within their neighborhood with very low reports of violent crimes without fear for their safety.

Safety-related factors are further explored using the GDOT crash data dashboard, accessed from the GDOT website in March 2020. The study found that the neighborhood of South Atlanta had 15 car crashes in the last year, with 53.3% of the crashes occurring on Jonesboro Road (figure 4). After adjusting the dates to show crash reports over the previous five years (March 2015-2020). The results showed 141 car crashes in five years, with 31% (44) occurring on Jonesboro Road. With the information derived from the GDOT crash report, the study deduced that the accident rate within the neighborhood is relatively low, with most occurrences happening on significant arterials like Jonesboro Road, Lakewood Avenue (figure 3), and Lansing Street, respectively. During the natural observation, the study identified inconsistencies in sidewalks and bike lanes, with the only complete street being Benjamin Weldon Bickers Avenue on the western boundary of the site. Other significant arterials such as McDonough Avenue, Lakewood Avenue, and Jonesboro Road (figure 1) had inconsistent bike lanes and sidewalks. The inner neighborhood streets were narrow, with trucks parked on both sides of the street, causing pedestrian and vehicular obstruction. Also, the inner neighborhood streets had numerous clutters. Most street lanes were shared as vehicles parked on the road for extended periods causing other moving vehicles to share one lane. There was no clear boundary between public and private properties, especially in the inner neighborhood. About 30% of the streets had bike lanes, and about 45% had a functioning sidewalk. In both visits, the researchers observed few pedestrians using the streets, most of whom walked on the vehicular right of way due to lack of sidewalks or obstructions. Inner neighborhood houses were also in obsolete conditions, while some looked relatively new. The site observation affirmed that South Atlanta neighborhood lacks basic safety amenities, including sidewalks and bike lanes that connect the neighborhood to local destinations such as schools, churches, and grocery stores vital to the community's daily activities.

Figure 3. View of Lakewood Avenue (2020). Figure 4. View of Jonesboro Road (2020). Photo by authors.

4.2 Survey

A total of 21 respondents participated in the survey. Results show that 95.2% of the respondents engage in different forms of PA (figure 5A), while 76.2% agree that the current conditions of their neighborhood discourage PA (figure 5B). The most common PA reported include walking, running, and biking. 42.8% of the respondents indicated that they engage in such activities at least three times a week. Primary destinations within South Atlanta Neighborhood were identified by residents as workplaces, schools, churches, and grocery stores. 57% of the respondents reported that their primary destinations are more than three miles walking distance from their home which has contributed to 47.6% of the respondents driving for commute (figure 5C and 5D). 66.7% of respondents indicated their willingness to walk or bike to their primary destination contingent on the presence of safe sidewalks and bike lanes and within walking and biking distance. 10% of the respondents indicated a lack of interest in walking or biking despite having their primary locations within walkable distance due to safety concerns (figure 5E). 23.8% of the respondents identified as non-drivers who primarily commute by transit and a mix of other forms of commute (walking and biking), another 28.5% drive and use other means of commute (figure 5).

In answering the open-ended questions, respondents provided detailed descriptions of factors and amenities they believe are missing in their neighborhood. 85.7% of respondents highlighted the need for a

safe neighborhood. 19% specifically mentioned the immediate need to lessen the crime rate within the neighborhood and increase police patrols. Of neighborhood respondents concerned about safety, 28.6% pointed out high-speed vehicles and lack of signs to slow traffic in residential streets. Social public spaces including parks and children's play areas were indicated by 23.8% of respondents as essential to promoting more PA. 14.2% mentioned streetlights as lacking. Additionally, 48% of the respondents identified the absence of “good sidewalks” or “paved sidewalks” as their prime concern. The study noted that except for safety concerns, less than 50% listed the same amenities either directly or using different words. Other issues that respondents more sparsely identified as impeding physical activities included “street obstructions”, “trash” and “overall cleanliness”.

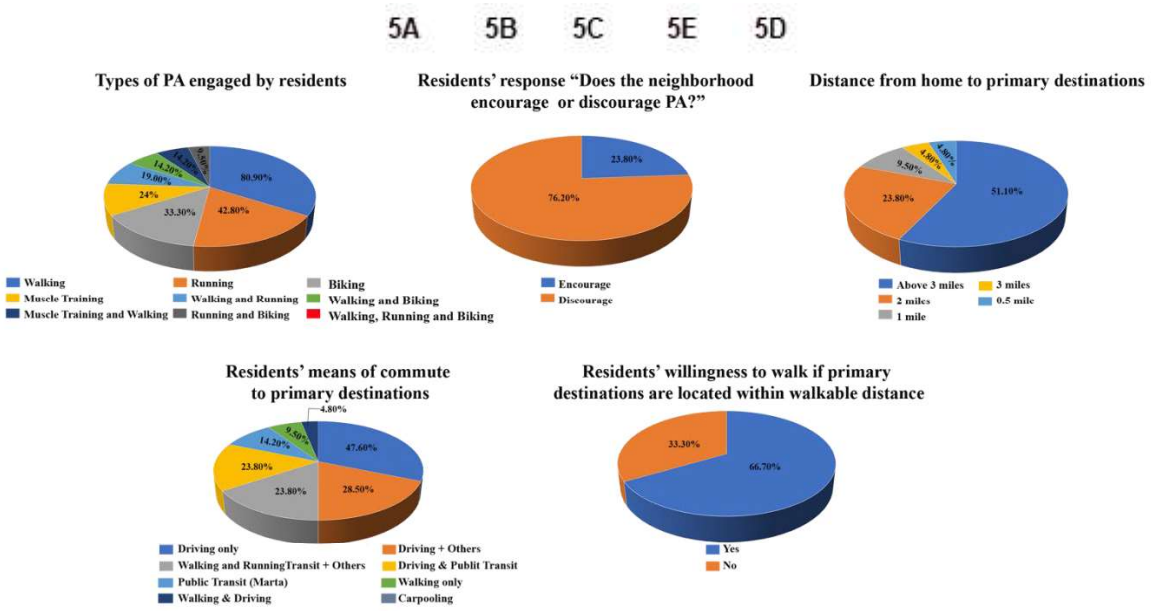

Figure 5 Survey Results (2021). Diagram by the authors

4.3 Using Smart Growth Principles as a framework for data analysis

Data collected from behavioral mapping, natural observation, and a survey questionnaire, allowed the researchers to use Smart Growth Principles as a framework to further investigate its diametrical relationship to residents’ physical activity in South Atlanta neighborhood. As such, multi-modal transit system, integrated land use, increased street walkability, public open spaces, neighborhood identity and safety, and efficient pedestrian connectivity were the six SGP utilized in data analysis.

4.3.1 Multi modal transit system

Using ArcGIS mapping to investigate the current transit system of the site, the study found two main bus transit routes serving South Atlanta neighborhood: Route 55 operating North to South from Five Points Station (downtown Atlanta) to Forest Parkway in Clayton. This bus service runs through McDonough Boulevard and Jonesboro Road with ten stops in South Atlanta for each trip. On both weekdays and weekends days, the bus starts its service as early as 4;00 am until past midnight every fifteen-minute. The second route serving the western end of the neighborhood is Route 42 operating North to South between Lakewood Avenue and Five Points Station. This route is accessible to South Atlanta neighborhood from Benjamin Weldon Bickers Drive and Moury Avenue. Similar to Route 55, this bus route provides service all week. South Atlanta neighborhood is well connected by bus transit to downtown Atlanta and other popular parts of the metropolitan areas such as Decatur, Roswell, Johns Creek, and Hartsfield-Jackson Atlanta International airport. While public transit seems to be readily available, 47.6% of the respondents indicate that they prefer driving to work and other destinations. Only 14.2% of the respondents indicated that they use transit exclusively as their primary means of transportation. However, 23.8% of those who responded reported that they alternate between driving and taking transit depending on the location and distance of their destination.

When asked to offer reasons for choosing driving as opposed to other modes of transportation, respondents indicated problems and challenges with bus transit in the neighborhood. 5% of the respondents preferred to see “more bus stops” that are “closer to home”. 9.7% of the respondents mentioned that the bus schedule “does not fit their work hours”, and 4.8% said their commute requires “taking multiple transit lines” and consequently takes longer to reach their destinations. Although South Atlanta neighborhood seems to offer adequate options for public transit, more residents use private vehicles for commute compared to those who choose public transit. However, options of increasing number of transit routes, destinations, route connectivity, and the number of bus stops, would certainly increase the number of residents opting to use public transit on daily basis.

4.3.2 Integrated Land use

The study used Google Earth Pro, ArcGIS, and natural observation to investigate the current land use of South Atlanta neighborhood. The study also explored future land use and zoning plans from previous development studies conducted by the local and state government (Lakewood Community Initiative; LCI, Strategic Community Investment Report; SCI). Currently, the site is comprised of 70% single-family use, 20% general residential (including schools), and 15% commercial and industrial. This current plan has no mixed land use which provides social and commercial destinations. Consequently, residents travel for most of their social and commercial needs. Current redevelopment plans for the neighborhood aim to increase integrated land uses by 30% especially along major arterials like Lakewood Avenue, Jonesboro Road, and McDonough Boulevard (figure 1). The study explored the respondents’ perceptions of the current land use and how it affects their PA levels as well as their preference for integrated land uses within the neighborhood. 71.4% indicated the need for more commercial destinations with various types of stores and restaurants within walkable distance. Overall, residents’ response to this factor indicates that more integrated land use development may increase walkability for leisure activities and destinations within the neighborhood. Consequently, likely future plans to integrate land use development would positively impact the levels of PA.

4.3.3 Increased street walkability

The study classified sidewalks in South Atlanta neighborhood into three categories: Standard, sub-standard, and poor. Data showed that 75% of the sidewalks in the neighborhood are either sub-standard or in poor condition. The researchers found most streets to be not safely walkable due to various factors such as incomplete sidewalks, absence of bike lanes, trash on streets, and narrow streets. Based on comprehensive mapping and natural observation of the site, the study deduced that the most streets in the neighborhood lack basic qualities for safe walking and other types of PA.

The study shows that 66.7% of the respondents are willing to walk if their primary destinations could be reached safely, while 33.3% indicated an unwillingness to walk, citing different reasons. 14.2% of the respondents will not walk due to extreme heat in the summer months. 23.8% mentioned reasons related to safety concerns, including lack of sidewalks, aggressive stray dogs, or fear of getting hit by cars due to the absence of sidewalks. In the open-ended component of the survey, respondents provided detailed descriptions of the street conditions in South Atlanta neighborhood. 57.5% indicated the need for more “connected sidewalks.” 31% reported that the absence of sidewalks discourages their PA. 33.3% of the respondents indicated that adding standard sidewalks is of prime importance, expressing concern about children walking to school. Although a majority of South Atlanta residents indicated that they walk either to reach destinations or as a form of PA, the neighborhood condition does not seem to support safe walkability. Plans for improving conditions and connectivity of sidewalks in the neighborhood will likely increase residents' willingness to walk.

4.3.4 Public open spaces

According to the UK Design Council, “Access to good-quality, well-maintained public spaces can help to improve our physical and mental health by encouraging us to walk more and play sport” (Design Council, n.d.). The study investigated public open spaces (POS) in South Atlanta neighborhood using ArcGIS mapping tool. The study identified six different types of POS within the study area. Those include schoolyards, green spaces, playgrounds, public seating areas, vacant lots, and plazas. Lucius D. Simon Memorial Park is considered the largest open green space serving as the schoolyard for Carver High School. Kimpson Park and playground are located on Thirkield Avenue, and a large vacant lot on Bisbee Avenue seems to serve as church parking on weekends and a recreation sports area for youth on

weekdays. The Ron Clark Academy schoolyard on Jonesboro road is publicly accessible and fairly utilized by the neighborhood resident on weekends.

Based on the natural observation conducted in South Atlanta Neighborhood in April 2020, researchers recorded that residents were fairly using POS in the neighborhood. Also, groups of youth were engaged in catch ball at Ron Clark Academy school field, and a few older adults were exercising around the sports field. During the second visit in late April that occurred between 4:25 pm and 6:00 pm, researchers noted a much higher level of PA in all public open spaces. The study identified that five of the six public open spaces serve as adequate space for PA. In addition, most POS in the neighborhood seems to be in fairly good conditions and accessible, except for Lucius D. Simon Park, which residents have reported to be inaccessible. According to the survey, 76% of the respondents used the POS within the neighborhood at various times, while 42.8% use it at least three times a week. Also, 57.1% of the respondents prefer access to additional spaces such as Lucius D. Simon Memorial Park. 9.5% notably reported the need for more open spaces added to the community, and 19% expressed interest in trails that connects the neighborhood with the Atlanta Beltline. Overall, South Atlanta neighborhood offers an adequate number of public open spaces accessible to the community members. Although most of those spaces are in fairly useable conditions, community members indicated that additional spaces, sports fields, and playground equipment would invite more presence and PA outdoors.

4.3.5 Neighborhood identity and safety

Smart Growth Principles (SGP) encourage the creation of high-quality communities with architectural and natural elements that reflect the interests of all residents. Additionally, SGP promotes safety and the importance of creating a vibrant community for those who live there (Smart Growth America [SGA], 2017). This study focused on identity and safety as primary components that create a sense of place and vibrant neighborhood, thereby promoting PA. Exploring the history of South Atlanta neighborhood, it can be stated that the neighborhood's sense of identity and safety was adversely affected during the decline that started in 1940. However, data shows that respondents have a strong sense of community identity frequently expressed through engagement in community events and gatherings. 23.8% of respondents highlighted the need for communal spaces within the neighborhood, which are currently lacking. 14.2% indicated the need for sports facilities such as basketball courts, soccer, and football fields, citing the importance of engaging youths in recreational sports. Another 9.5% mentioned an interest in having open food courts in the neighborhood. Considering the current neighborhoods' lack of such spaces where residents can engage in community events that enhance neighborhood identity, future integration of such desired spaces can contribute to an enhanced sense of community vibrancy and create opportunities for PA.

Furthermore, the study investigated safety as a factor determining how people use their immediate environment, including crime rate and accidents within the neighborhood. According to LexisNexis Community Crime Map, the most commonly reported crimes in the area are burglary from motor vehicles, theft, and aggravated assault, with most of the theft cases reported on Jonesboro Road. In contrast, a majority of burglaries from motor vehicle cases were reported within the single-family residential zone. Using GDOT crash report, the study found that most crash occurrences happened on major arterials like Jonesboro Road, Lakewood Avenue, and Lansing Street respectively. Therefore, those streets were found to be unsafe due to traffic-related concerns such as high speed and traffic accidents. Evidence from mapping and survey results shows a direct correlation between safety and PA levels. While 76.2% of the respondents report that their neighborhood discourages PA, 85.7% of those respondents highlighted safety concerns as the main reason. Specifically, 28.6% described traffic safety as a significant concern, 30% expressed concern about crime, and 25% mentioned that they feel unsafe outdoors at odd hours. While South Atlanta neighborhood seems to enjoy a strong sense of identity and community vibrancy, it is clear that the majority of residents do not feel safe in the neighborhood, which certainly impedes their levels of PA. Future development of additional social and recreational spaces and the introduction of crime and traffic safety measures could undoubtedly enhance a sense of neighborhood identity and safety, allowing residents to engage in more events and activities freely.

4.3.6 Efficient pedestrian connectivity

Investigating the current street conditions of the neighborhood to understand pedestrian connectivity, the study examined two types of connectivity: visual and physical. The use of Google Earth data shows that only six streets were well connected ranking high and medium for visual and physical

connectivity (see figure 2). None of the existing streets ranked high in both visual and physical connectivity. Although fairly close to downtown Atlanta, the neighborhood lacks elements that enhance pedestrian experience, including visual elements such as landmarks, destinations, experience, accessibility, and safety; and physical elements such as sidewalk, bike path, street connection, links and pedestrian sheds.

Asking residents about visual and physical connectivity criteria, the study found that respondents approached connectivity at a micro-scale, analyzing connectivity from their doorsteps to the sidewalk and maintaining consistency within different neighborhood destinations. Visual connectivity criteria including safety, destinations, and accessibility were reported to be of primary importance for PA and outdoor use. Respondents less identified other criteria of visual connectivity such as landmarks and experience as necessary for PA and outdoor use. In terms of criteria for physical connectivity, respondents mentioned the need for incorporating all five elements of physical connectivity in the neighborhood. According to responses from the open-ended questions, more respondents were interested in seeing both visual and physical connectivity elements within their neighborhood.

5 CONCLUSION

South Atlanta neighborhood is a low to middle-income community of minorities, mostly African Americans, within two miles proximity of downtown Atlanta. The neighborhood has been identified by Focused Community Strategies (FCS) and the city of Atlanta as facing a period of transition through urban redevelopment plans. Initial research plan was impacted due to the events Covid-19 pandemic resulting in less than anticipated number of participants. Based on research findings, residents of South Atlanta neighborhood are fairly physically active and are willing to be more active through engagement in various outdoor activities. Smart Growth Principles offered a valuable framework to investigate the current conditions of the neighborhood and the residents' levels of PA. Data analysis from behavioral mapping, natural observation, and survey questionnaire found that current neighborhood existing conditions are not optimal in supporting a physically active lifestyle. Using the six principles of smart growth; transit system, integrated land use, street walkability, public open spaces, neighborhood identity and safety, and pedestrian connectivity, the study found that they vary in their level of support of PA in the neighborhood. For example, while the neighborhood offers access to adequate lines of bus transit, the study shows that there is a need for more transit routes, destinations, route connectivity, and number of stops. Offering better transit access, the study indicates, will increase the number of residents opting to use public transit on daily basis. Consistent with the literature suggesting that integrated land use encourages compact development and lowers automobile dependency, majority of South Atlanta neighborhood residents indicated the need for a mixed-use development including stores, restaurants, recreational facilities. With the current future redevelopment plans of increasing integrated land use by 30%, walkability for work, leisure activities, and other destinations will likely increase as well.

Considering that walking is the most common form of PA in general and was the highest reported by South Atlanta neighborhood residents, the research shows the existing street conditions to be unsafe and of major concern. Improving the conditions and connectivity of sidewalks in the neighborhood will have a positive impact on the number of residents willing to walk. Access to good quality public open spaces is vital for both physical and mental health of a community as per the literature. South Atlanta neighborhood comprehensively offers an adequate number of public open spaces that are accessible to the community members. However, the neighborhood could certainly benefit from the improved quality of its existing POS and the addition of recreational and sports fields. In addition, sense of safety shows as South Atlanta neighborhood's most prime concern. Traffic-related accidents, burglary, and theft were the most commonly reported in the data, as well as residents' overall unsafe feeling in the outdoors. Prioritizing this factor, the research suggests that introduction of crime and traffic safety measures could certainly enhance a sense of safety allowing residents to freely engage in more events and activities.

Although the research utilized the smart growth principles as separate components in examining data, the study found that each of the six SGP discussed tend to address multiple factors of concern towards improving levels of engagement in PA for South Atlanta neighborhood. Findings illustrate that more people are willing to lead physically active lives if their neighborhood design supports it. Consequently, a smart growth integrated approach of development and improvement of the neighborhood design is important to encourage a more physically active community. In summary, the study shows clear possible physical and mental health benefits for South Atlanta neighborhood residents by being more physically active, and that smart growth principles offer possible benefits for improved quality of life. Future research could focus on

additional neighborhoods in Atlanta as well as other cities and provide valuable perspective on the benefits of SGP and designed outdoor spaces on PA.

6 REFERENCE

Bennett, G. G., McNeill, L. H., Wolin, K. Y., Duncan, D. T., Puleo, E., & Emmons, K. M. (2007). Safe to walk? Neighborhood safety and physical activity among public housing residents. *PLoS medicine*, *4*(10), e306.

Boslaugh, S. E., Luke, D. A., Brownson, R. C., Naleid, K. S., & Kreuter, M. W. (2004). Perceptions of neighborhood environment for physical activity: Is it "who you are" or "where you live?". *Journal of Urban Health*, *81*(4), 671-681.

Brown, A. L., Khattak, A. J., & Rodriguez, D. A. (2008). Neighbourhood types, travel and body mass: a study of new urbanist and suburban neighbourhoods in the US. *Urban Studies*, *45*(4), 963-988.

Burbidge, S. K., & Goulias, K. G. (2009). Evaluating the impact of neighborhood trail development on active travel behavior and overall physical activity of suburban residents. *Transportation research record*, *2135*(1), 78-86.

Cohen, D. A., McKenzie, T. L., Sehgal, A., Williamson, S., Golinelli, D., & Lurie, N. (2007). Contribution of public parks to physical activity. *American journal of public health*, *97*(3), 509-514.

Craig, C. L., Brownson, R. C., Cragg, S. E., & Dunn, A. L. (2002). Exploring the effect of the environment on physical activity: a study examining walking to work. *American journal of preventive medicine*, *23*(2), 36-43.

Daniels, T. (2001). Smart growth: A new American approach to regional planning. *Planning practice and research*, *16*(3-4), 271-279.

Day, K. (2006). Active living and social justice: planning for physical activity in low-income, black, and Latino communities. *Journal of the American Planning Association*, *72*(1), 88-99.

Desyllas, J., Duxbury, E., Ward, J., & Smith, A. (2003). Pedestrian demand modelling of large cities: an applied example from London.

Dill, J. (2004, January). Measuring network connectivity for bicycling and walking. In *83rd Annual Meeting of the Transportation Research Board, Washington, DC* (pp. 11-15).

Echeverria, S. E., Kang, A. L., Isasi, C. R., Johnson-Dias, J., & Pacquiao, D. (2014). A community survey on neighborhood violence, park use, and physical activity among urban youth. *Journal of physical activity and health*, *11*(1), 186-194.

Ewing, R., Schmid, T., Killingsworth, R., Zlot, A., & Raudenbush, S. (2003). Relationship between urban sprawl and physical activity, obesity, and morbidity. *American journal of health promotion*, *18*(1), 47-57.

Global action plan on physical activity 2018–2030: more active people for a healthier world. Geneva: World Health Organization; 2018. Licence: CC BY-NC-SA 3.0 IGO. Retrieved April 10 2020 from www.who.int/dietphysicalactivity/factsheet_inactivity/en/.

Gustat, J., Rice, J., Parker, K. M., Becker, A. B., & Farley, T. A. (2012). Effect of changes to the neighborhood built environment on physical activity in a low-income African American neighborhood. *Preventing chronic disease*, *9*.

Han, B., Cohen, D. A., Derose, K. P., Li, J., & Williamson, S. (2018). Violent crime and park use in low-income urban neighborhoods. *American journal of preventive medicine*, *54*(3), 352-358.

Howard, E. (2010). *To-morrow: A peaceful path to real reform*. Cambridge University Press.

Huang, J. H., Hipp, J. A., Marquet, O., Alberico, C., Fry, D., Mazak, E., ... & Floyd, M. F. (2020). Neighborhood characteristics associated with park use and park-based physical activity among children in low-income diverse neighborhoods in New York City. *Preventive medicine*, *131*, 105948.

Lawrence, D. F., Peter, O. E., & Thomas, L. S. (2003). The impact of the built environment on physical activity. *Health and Community Design*, 253.

Frank, L. D., & Engelke, P. (2005). Multiple impacts of the built environment on public health: walkable places and the exposure to air pollution. *International regional science review*, *28*(2), 193-216.

Frank, L. D., Sallis, J. F., Conway, T. L., Chapman, J. E., Saelens, B. E., & Bachman, W. (2006). Many pathways from land use to health: associations between neighborhood walkability and active transportation, body mass index, and air quality. *Journal of the American planning Association*, *72*(1), 75-87.

Grant, J. L. (2009). Theory and practice in planning the suburbs: Challenges to implementing new urbanism, smart growth, and sustainability principles. *Planning Theory & Practice*, *10*(1), 11-33.

Lee, I-Min, and Ralph S. Paffenbarger Jr. "Associations of light, moderate, and vigorous intensity physical activity with longevity: the Harvard Alumni Health Study." *American journal of epidemiology* 151.3 (2000): 293-299.

Leslie, E., Coffee, N., Frank, L., Owen, N., Bauman, A., & Hugo, G. (2007). Walkability of local communities: using geographic information systems to objectively assess relevant environmental attributes. *Health & place*, *13*(1), 111-122.

McCormack, G. R., Giles-Corti, B., & Bulsara, M. (2008). The relationship between destination proximity, destination mix and physical activity behaviors. *Preventive medicine*, *46*(1), 33-40.

Ng, S. W., & Popkin, B. M. (2012). Time use and physical activity: a shift away from movement across the globe. *Obesity reviews*, *13*(8), 659-680.

Rapoport, A. (1987). Pedestrian street use: Culture and perception. *Public streets for public use*, 80-94.

Smart growth America website; "What Is Smart Growth?" *Smart Growth America*, 21 Aug. 2017, smartgrowthamerica.org/our-vision/what-is-smart-growth/.

Rodríguez, D. A., Khattak, A. J., & Evenson, K. R. (2006). Can new urbanism encourage physical activity?: Comparing a new Urbanist neighborhood with conventional suburbs. *Journal of the American Planning Association*, *72*(1), 43-54.

Wang, Y., Beydoun, M. A., Liang, L., Caballero, B., & Kumanyika, S. K. (2008). Will all Americans become overweight or obese? Estimating the progression and cost of the US obesity epidemic. *Obesity*, *16*(10), 2323-2330.

Warburton, D. E., Nicol, C. W., & Bredin, S. S. (2006). Health benefits of physical activity: the evidence. *Cmaj*, *174*(6), 801-809.