The relationship of walkability, social capital and the built environment in a Blue Zones® demonstration site community

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University of Northern Iowa

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THE RELATIONSHIP OF WALKABILITY, SOCIAL CAPITAL AND
THE BUILT ENVIRONMENT IN A BLUE ZONES®
DEMONSTRATION SITE COMMUNITY

An Abstract of a Dissertation

Submitted

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Education

Approved:

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Dr. Christopher R. Edginton, Committee Chair

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December, 2019
ABSTRACT

Today, communities throughout the world seek to design, develop, and organize their natural and manmade features to promote a higher quality of life and community livability. The term “built environment” includes both natural and manmade areas, facilities, and structures but also social and cultural factors which are unique to a given community; this term is used to frame a dialog around this topic (Flack et al., 2013). Increasingly, greater attention has focused on crafting the built environment to promote more walkable streetscapes, and opportunities for community engagement and social capital have become more prominent in the minds of citizens, community developers, and public policy planners.

The purpose of the study was to explore the relationship of the built environment, social capital, and walkability. In particular, the study was undertaken in a certified Blue Zones® project demonstration community. As such, the study seeks to explore how one’s perception of walkability and social capital influences one’s life’s activities.

There were 119 respondents in this study, 48 drawn from urban neighborhoods and 71 from suburban neighborhoods. Of the respondents, 75 (63.0%) were female and 41 (34.5%) were male. The majority of participants were 65 years and older (52.9%). The majority of respondents resided in a household of two (46.2%) individuals. The most frequently reported income level was $50,000-$74,999, indicated by 31 (26.1%) respondents. The educational attainment of respondents found that 76 (63.8%) held bachelor’s, graduate, or professional degrees. Respondents reported the actual number of
locations to which they walked. The highest number reported was two locations by 36
(30.3%) individuals.

Several null hypothesis statements were formulated from eight research questions. The majority of statistical calculations demonstrated no statistically significant differences among the hypothesis statements and therefore they were retained. A single hypothesis statement was rejected for $H_0:1$, which investigated neighborhood type when viewing walkability and social capital. Thus, it is somewhat evident that when viewing walkability and social capital by neighborhood, that urban neighborhoods reported stronger perception of walkability, while suburban neighborhoods reported a higher level of social capital.
THE RELATIONSHIP OF WALKABILITY, SOCIAL CAPITAL AND THE BUILT ENVIRONMENT IN A BLUE ZONES® DEMONSTRATION SITE COMMUNITY

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Approved:

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Thomas Manford Flack
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December, 2019
DEDICATION

This dissertation is dedicated to my father, Manford “Manny” Wesley Flack. My father was a quiet and reserved man of few words who never sought attention. That is, until the later years of his life when he discovered that by wearing his “WWII Veteran” hat, strangers would give him praise and thanks. But then, my dad, and the other veterans of his generation, truly deserve our praise, and our thanks for what they endured, and were able to accomplish. My father did not live to see this day. I took too long and, I’m sorry dad.

This dissertation is also dedicated to my mother Leota Beryl Flack. My mother is the opposite in demeanor from my father. She has always been talkative and outgoing. Maybe for these reasons they complimented each other, and that made their relationship possible. She resides in the Iowa Veterans Home thanks to my father’s veteran’s benefits. The top official at the facility is known as the commandant. He and his wife, have taken notice of my mother, visiting her occasionally and by having her join them at their table during special occasions. My mother wonders why the commandant and his wife have taken notice of her, but I feel that it is apparent why.

Last, this dissertation is also dedicated to my daughter Hanna Michelle Flack. She is finding her way in this world, and her story is just being written. Thank you, Hanna, for your love and support.
ACKNOWLEDGEMENTS

The author would like to thank those individuals that provided support, guidance, and assistance for this endeavor. You are many, and your support is greatly appreciated.

Secondly, this author would like to thank the dissertation committee chair, Dr. Christopher Edginton for his support of this project. Dr. Edginton’s guidance, and assistance were invaluable to the completion of this venture. While the author had no intention of being his last student to finish the dissertation process, it however may be fitting for a number of reasons.

Third, the author would like to thank the committee members. I would like to thank Dr. Oksana Grybovych for her insightful comments and sticking with me over the years that it has taken to get to this point. I would like to also thank Dr. Radhi Al-Mabuk, and Dr. Christopher Kowalski for agreeing to serve and provide support on my committee. A special thank you to Dr. Sam Lankford for his technical expertise, knowledge, and guidance, as well as his reassurance to the author that the work I had performed was “fine”, and I should not be worried. It turns out, Dr. Lankford was right.

Fourth, I would like to thank the Edginton’s. I did not get to this point alone, and I may have never gotten here at all without them. I would also like to thank Julee Jacobson, Karen Petersen and Melanie Billington for helping the author navigate the graduate process and their patience regarding the multitude of requests for help from me over the years. Thank you.

And last, a special thanks to my cohort, officemate, colleague and friend, Dr. Kristine Fleming. In many, if not all, of our communications of late, Dr. Fleming would invariably ask how the “D” was coming along. Well, it’s finally “D” for done.
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CHAPTER 1

INTRODUCTION

In 2011, Iowa Governor Terry Branstad, announced his endorsement of the Healthiest State Initiative (“Blue Zones Project,” n.d.; Office of the Governor of Iowa, 2011). This initiative provided a platform for communities to identify with the Blue Zones® Project. A series of elements aimed at improving quality of life and community livability Blue Zones® demonstrate site communities often included elements such as enhancing walkability and improving social capital. More to the point, this investigation will concentrate on the relationships between social capital and walkability (as both a psychological construct and the physical configuration of the built environment) in Midwestern community.

The initiative, a partnership among Healthways®, Blue Cross Blue Shield®, and the Blue Zones® program, intended to transform the health and well-being of the state of Iowa and its residents for the better. The governor set an ambitious goal to reach the number one spot, up from 16th place, by the year 2016. The Blue Zones® concept stems from a pilot study on longevity conducted in Albert Lea Minnesota in 2009 (“Blue Zones Project,” n.d.). It was from this pilot study that the “Power 9®” principles of the Blue Zones® program were developed and refined.

It has been well established in the literature that eating a healthy diet and engaging in regular physical activity are key components in a holistic regimen intended to bolster the efforts to prevent overweight and obesity and in turn the resulting non-communicable diseases associated with predominately sedentary lifestyles (Ekelund et
Further, one cannot ignore the staggering health care costs related to the conditions resulting from inactivity, obesity, and overweight (Heath et al., 2006). The Centers for Disease Control and Prevention (CDC) has established guidelines for the weekly inclusion of physical activity, stating that adults should engage in 150 minutes of moderate or 75 minutes of vigorous intensity physical activity per week. Moreover, it is recommended that the activity should incorporate some form of strength training on at least two of those days per week (CDC, 2008).

The study of the concept the “built environment” has begun to garner increased attention over the last decade. The focus has included factors such as planning, zoning, design, safety, and accessibility. In her book, Good Urbanism Nan Ellin (2012) suggests that of late, humans have begun to endeavor to transform or construct places that “…sustain us, not strain us” (p. 1). Ellin goes on to assert that the outdoor spaces we create should provide opportunity for recreation, active transport, and social gathering while being aesthetically pleasing and multipurpose, among other things (Ellin, 2012).

The built environment can be thought of in a broad context to be the physical qualities of one’s surroundings, including man-made and natural features such as parks, trails, streets, sidewalks and structures such as buildings and recreation facilities etc. Additionally, the built environment encompasses social and cultural environments as well (Flack, Edginton, Coles, & Jalloh, 2013). According to Booth, Pinkston, and Poston (2005) the built environment, as a result of its configuration and features, can hamper or support physical activity (Booth et al., 2005). Specifically, factors such as intersection design, street connectivity, and personal safety play important roles in promoting and
enhancing opportunities for physical activity. As Handy, Cao, and Mokhtarian (2006) report, the trend towards suburbanization has led to communities that encourage driving over walking for transport and leisure, thus limiting opportunities for physical activity (Handy et al., 2006).

As an example, personal experience shaped this author’s interest in the built environment and its effect on one’s motivation for physical activity. While attending a conference in Durban, South Africa, a group of attendees, which included this author, undertook a short journey from the hotel to the sea-front promenade known as the “Golden Mile”. This attraction extends from the uShaka Marine World in the south, 5 km up the coast and culminates at the Suncoast Casino and Entertainment World (Chin, Edginton, Fleming, Flack, & Ruan, 2013). The promenade stands between shops, bars and restaurants, and the beachfront, beyond which lies the southern Indian Ocean. There were a multitude of individuals walking, rollerblading, biking, and jogging along its length. The promenade provided an even, well-maintained surface that was aesthetically pleasing and accessible to all individuals visiting or residing in the region.

The concept of aesthetics has been examined by Rissel and McCue (2015) and Ball, Bauman, Leslie, and Owen (2001) in relation to the built environment and motivating factors for physical activity. These authors suggest that a greater understanding of the relationship between the built environment and its influence on physical activity will aid in shaping interventions designed to increase individuals’ levels of participation. In their study Ball et al. (2001), asked participants to respond to specific statements and questions such as “your neighborhood is friendly,” “your local area is
attractive,” and “you find it pleasant walking near your home” regarding the aesthetics of their neighborhoods and of the places they were most likely to walk to (p. 436). These researchers found significant correlations between perceived aesthetics of the environment and how the perceptions served to positively or negatively influence walking for leisure as well as for exercise and transport (Ball et al., 2001).

Author Dan Buettner (2012) studied geographical sites across the globe where an unusually high percentage of the inhabitants lived to 100 years of age or more. He titled these locations “Blue Zones” (Buettner, 2012, p. xv). Communities across the United States have begun embracing the practices outlined in his investigations. Through careful scrutiny of these unusual communities, a series of nine principles, common to the original Blue Zones® sites have been identified. The nine principles of the Blue Zones® project make up what is identified as the Power 9® and include: (1) Move Naturally; (2) Know Your Purpose; (3) Down Shift; (4) 80% Rule; (5) Plant Slant; (6) Wine @ 5; (7) Belong; (8) Loved Ones First; and (9) Right Tribe (Buettner, 2014). These principles will be further detailed and explained in Chapter 2 which presents the review of the literature. It should be noted, the purpose of the Blue Zones® program is to motivate individuals to make a series of small, easily attainable changes in their life habits. From a psychological context, the motivation for participation may appear to be external in nature. However, once the principles are internalized, they may become intrinsic to the individual (“Blue Zones® Project,” n.d.).

One of the factors identified in Buettner’s (2014) investigation focuses on the environments in which people live and the physical activities they engage in. This aspect
of the program endeavors to motivate individuals to “Move Naturally.” The “Move Naturally” pillar is intended to encourage individuals to become more physically active and is of particular interest to the walkability scale (“Blue Zones® Project,” n.d.). The goal of this aspect of the Blue Zones® is to encourage individuals to increase active leisure, exercise, walking, and active transport. Additionally, for a community to attain certification as a Blue Zones® site it must meet certain criteria for physical structures such as sidewalks and street crossings that promote foot and bicycle traffic.

To make it to age 100, you have to have won the genetic lottery. But most of us have the capacity to make it well into our early 90s, and largely without chronic disease. As the evidence suggests, the average person’s life expectancy could increase by 10-12 years by adopting a Blue Zones® lifestyle.

Another key concept in this investigation is that of “social capital.” Over the past several decades, interest in the concept of social capital has increased in-part due to the work of Robert Putnam (2000). Author of the book *Bowling Alone: The Collapse and Revival of American Community*, Putnam (2000) brought the concept of the loss of social capital in America to greater public awareness through the research and publications conducted at Harvard’s John F. Kennedy School of Government (2002) as part of the Saguaro Seminar. Beginning in 1995, the seminar brought together individuals from academia, government, religion, and other sectors with the goal of formulating ways to support and grow social capital and promote civic engagement (Putnam, 1995). Putnam notes that social capital has both “individual and collective aspects” (Putnam, 2000, p.
20). As part of the Blue Zones® program there are several principles focused on social interaction and as such, social capital.

One can think of social capital as the connections that individuals make with other individuals and the community. Putnam (2000) suggests that social capital takes several forms. The first is *bonding capital*. Bonding capital refers to the close ties that individuals form. Family members and close friendships can be thought of in this way. The second is *bridging capital*. This form of capital consists of more loosely formed bonds like those between coworkers and business acquaintances or through associations such clubs and church groups (Putnam, 2000).

Another key component of this investigation is that of “walkability”. It has been suggested that community residents may be affected by the physical environment (Rogers, Gardner, & Carlson, 2013; Wilkerson, Carlson, Yen, & Michael, 2012). The effect of the built environment is that it may provide individuals physical and psychological benefits and therefore can contribute positively towards overall well-being. Therefore, physical activity levels can serve as one measure of well-being (Wilkerson et al., 2012). Walking for transport, physical activity or leisure has been identified as one of the most commonly utilized forms of physical activity and significant attention has been directed towards examining aspects of the environment that promote walking for exercise, leisure and transport (Joh, Nguyen, & Boarnet, 2012). Physical and other leisure activities and their selection have been strongly tied to one's freedom to choose. Intrinsic motivation, as explained by Kleiber, Walker, and Mannell (2011), occurs when “… an
activity is interesting, enjoyable and rewarding in and of itself” (p. 157). Therefore, such decision-making factors may contribute to one’s well-being (Kleiber et al., 2011).

Walking for transport or leisure has been identified as one of the most commonly utilized forms of physical activity due to its low impact, cardiovascular requirements, accessibility, and lack of specialized equipment (Ball et al., 2001; Dunton & Schneider, 2006). As a result, significant attention has been directed towards examining aspects of the environment that promote walking for leisure and transport (Joh et al. 2012). This is especially the case in the design of the physical environment so as to include trails, walkways, bicycle paths, intersection design, and other factors that encourage and promote walking for transport or leisure as physical activity (Joh et al., 2012).

Recently, the concept of walkability has gained national and international attention. A study conducted by Ekelund et al. (2015) has reported that physical inactivity caused higher levels of all-cause mortality than obesity. Reporting on this European study which tracked 330,000 European men and women over a twelve-year span, NBC News’ chief medical editor, Dr. Nancy Snyderman reported that “…a 20-minute daily walk reduced a person’s risk of early death by 30%” (Snyderman, 2015). According to Snyderman, walking is easier than other fitness activities such as running or jogging. It was also reported that “urban planners are changing how they think about the modern city.” These commentators suggested that development is being focused on crafting better walkways and bike paths to promote walking behaviors and activity (Snyderman, 2015).

Thus, the study of the built environment is garnering much attention and the focus has ranged from planning, design, safety, and accessibility. The built environment can be
thought to be the physical and aesthetic qualities, including man-made and natural features such as parks, trails, streets, sidewalks, and structures such as buildings and recreation facilities. Additionally, the built environment encompasses the social and cultural environments (Flack et al., 2013).

Theoretical Framework

The studies by Rogers et al. (2013), Leyden (2003) and Saelens, Sallis, Black, and Chen (2003) collectively served as the impetus for the present investigation. The earlier investigation by Saelens et al. (2003) developed a survey that was used to identify and measure the walkability of a given community. They theorized there were important variables within the environment that influenced physical activity. The authors looked specifically at neighborhoods that were determined to exhibit high and low walkability, by density and type of family dwellings. High walkability neighborhoods were identified by the concentration of multi-family and single-family houses, shorter blocks, and mixed land use; low walkability neighborhoods had primarily single-family houses, longer blocks, and little to no mixed land use (Saelens et al., 2003).

Leyden (2003) used a similar approach but added two additional dimensions to the investigation. The influence of neighborhood design was separated into three categories. The first category was called city-center and near city-center neighborhoods, the second category was labeled older mixed-use suburbs, and the third category was labeled modern automobile-dependent suburbs. In addition to asking participants to report on their perception of walkability, Leyden (2003) inquired of participants to choose from a list of the number of places or locations they could walk to. This is an
important distinction. A component of social capital was found to have significant effects on the walkability of neighborhoods. This was thought to be a result of familiarity and knowing one's neighbors and was considered to be an important factor in identifying existing walkable neighborhoods as well as an aspect important in the development of new walkable communities (Leyden, 2003).

Combining elements from the works of Leyden (2003) and Saelens et al. (2003), Rogers et al. (2013) added yet one more element; like Leyden, they asked respondents to indicate which locations or destinations they could walk to from a list. These researchers added an additional question that asked the respondents to indicate which locations or destinations they do walk to. These researchers investigated social capital and walkability in sustainable communities. It should be noted that, when referencing sustainable communities one can think of aspects of sustainability that are not merely limited to conservation of resources and recycling. Indeed, sustainability encompasses all aspects of thriving healthy communities such as the previously mentioned aspects and social sustainability (Rogers et al., 2013).

The work of Lefebvre (1991) serves as the over-arching theoretical framework that anchors the constructs of walkability, social capital, and the built environment together in this study. More to the point, in his book *The Production of Space* he presents what has become to be known as the spatial triad theory (Lefebvre, 1991). This theory asserts that space in its abstract form can be associated with the power held and implemented by certain groups and individuals such as bureaucrats and city planners (Stewart, 1995). Further, humans have the ability to produce space in addition to
conceiving it. By producing space individuals can regain some measure of control of their daily lives (Stewart, 1995).

Lefebvre’s (1991) theory suggests that there are three types of space which can be produced. They are: (1) spatial practices; (2) representations of space; and (3) spaces of representation or representational space. One can think of spatial practice as ways in which people perceive of and use space. Representations of space are envisioned spaces, and are commonly utilized by engineers, city planners, and architects, among others. These are the spaces that have yet to be produced in reality. Spaces of representation are actual lived spaces or inhabited. These spaces may hold symbolic importance, meaning, and are produced and used over an extended time span (Lefebvre, 1991; Stewart, 1995).

An overview of the theoretical model of the concepts taken from the three aforementioned studies (Rogers et al., 2013; Leyden, 2003; Saelens et al., 2003) and the work of Lefebvre (1991) can be found in Figures 1 and 2. In Figure 1 there are three components of the model that contribute to the production of one’s social space. These are: (1) spatial practices; (2) representations of space; and (3) spaces of representation. These portions all contribute to one’s social capital as well. Figure 2 provides a representation of the linkages of this study combining walkability, social capital and the built environment with the spatial triad.
Multiple aspects of the built environment will be examined in this study. In particular, the intersection of the built environment, social capital, and walkability will be explored. The study will examine the aesthetics of the environment, the affordance that an environment or a particular feature provides, self-selection of walking. Several aspects including the Blue Zones® “Move Naturally” pillar will be explored in relationship to the built environment, social capital, and the concept of walkability. However, there are no
studies that specifically link these elements together and therefore there is a need to investigate the relationship among the built environment, social capital, and walkability.

**Purpose of the Study**

The purpose of the present study is to explore the relationship of the built environment, social capital, and walkability. In particular, the study was undertaken in a certified Blue Zones® project demonstration community. As such, the study seeks to explore how one’s perception of walkability and social capital influences one’s life’s activities. This research study seeks to explore how participation in the Blue Zones® project may affect the perception of walkability.

**Statement of the Problem**

What is the relationship among perceptions of social capital, walkability, and the built environment? In addition, the study will examine the relationship between suburban and urban neighborhoods on one’s perception of social capital and walkability. Suburban and urban neighborhoods present different types of built environments with which to be explored in the study. These relationships were examined in a select Blue Zones® project demonstration community.

**Research Questions**

The following research questions have been formulated to guide the investigation:

1. What are the perceptions of walkability in a select Blue Zones® project demonstration community?

2. Are there differences on the way participants view walkability and social capital based on demographic characteristics such as gender, age, race, number of
household members, estimated household income, level of education, and neighborhood type?

3. What are the differences when comparing demographic variables such as gender, age, race, number of household members, estimated household income, and level of education when viewing walkability?

4. What is the perception of subjects’ level of social capital in a select Blue Zones® project demonstration community?

5. What are the differences when comparing demographic variables such as gender, age, race, number of household members, estimated household income, and level of education when viewing social capital?

6. What are the differences when comparing demographic variables such as gender, age, race, number of household members, estimated household income, and level of education when viewing walkability and social capital?

7. What are the perceptions of respondents residing in urban or suburban neighborhoods when viewing walkability and social capital separately and when combined?

8. What is the relationship of Blue Zones® program awareness and participation, walkability, and social capital in urban and suburban neighborhoods?

**Hypothesis Statements**

The eight research questions yielded seven null hypotheses subject to statistical analysis. The following hypothesis statements have been established in null form.
1. There is no statistically significant difference between the perceptions of respondents residing in urban or suburban neighborhoods when viewing social capital and walkability.

2. There is no statistically significant difference when comparing demographic variables such as gender, age, race, number of household members, household income, and education when viewing perceptions of social capital.

3. There is no statistically significant difference when comparing demographic variables such as gender, age, race, number of household members, estimated household income, and level of education when viewing perceptions of walkability.

4. There is no statistically significant difference when comparing demographic variables such as gender, age, race, number of household members, estimated household income, and level of education when viewing the perceptions of the individuals residing in urban and suburban neighborhoods.

5. There are no statistically significant differences when viewing demographic variables such as gender, age, race, number of household members, estimated household income, and level of education when comparing urban or suburban neighborhoods when viewing social capital and walkability.

6. There is no statistically significant difference when viewing Blue Zones® program awareness and participation when comparing urban and suburban neighborhoods.

7. There are no statistically significant differences when viewing demographic variables such as gender, age, race, number of household members, estimated household
income, and level of education when comparing Blue Zones® program awareness and participation.

**Delimitations**

The following delimitations have been established for the study as follows:

1. Adults living in urban and suburban neighborhoods in a medium-sized Midwestern community;
2. Self-administrated questionnaire to determine the relationship between levels of social capital and walkability when viewed by type of spatial typology - urban or suburban.

**Limitations**

1. Ability to generalize the findings of the study to other communities due to the type of sampling employed (convenience sample).
2. Self-reported questionnaires may induce response bias and may not accurately reflect the participants’ accurate views.
3. Selected indicators of social capital were used which did not necessarily or broadly embrace all definitions and measures.
4. Selected indicators of walkability were used which did not necessarily or broadly embrace all definitions or measures.
5. Reliability and validity were not established for all items in the survey instrument.
6. Aggregate measures of social capital may be influenced by individual characteristics (Kawachi, Kim, Coutts, & Subramanian 2004).
7. There is some ambiguity in how social capital, walkability, and the built environment are defined.
8. Measurements of social capital and walkability are not well established in the literature.

Assumptions

The following assumptions have been established for this study:

1. Participants who will complete the survey instrument will be at least 18 years of age.
2. Study participants will be residents of a small Midwestern community.
3. Study participants will respond to the survey instrument in an honest and forthright manner.
4. Validity and reliability measurements will be established for the survey instrument.

Definition of Terms

The terms defined in this section of the introductory chapter will be employed throughout the duration of the research project and are associated with topic of the study focused on social capital, walkability, and the built environment in a select Blue Zones® project demonstration community. They are as follows:

1. Aesthetics: This term can be thought of as the visual appeal or beauty of a place or object (Aesthetic, n.d.).
2. Blue Zones®: This refers to geographical locations where unusually high numbers of inhabitants live to 100 years or more at a rate three times greater than in the U.S. (Buettner, 2008).
3. Blue Zones® Demonstration Site Communities: These are selected cities and towns that have been chosen to receive support from Healthiest State Initiative
partners to become showcases for the Blue Zones Project® ("Blue Zones® Demonstration,” n.d.).

4. Blue Zones® Principles: Blue Zones® Principles refer to a collection of nine shared traits collectively named the Power 9® from the original Blue Zones® sites ("Blue Zones® Project,” n.d.).

5. Built Environment: The built environment includes both natural and manmade areas, facilities, and structures. The built environment is not just the physical or natural environment (to include streets, trails, buildings, and green spaces), but also includes social and cultural factors unique to a given community (Flack et al., 2013).

6. Census Block: A Census block consists of one city block and is to be considered the smallest geographic grouping of residences (U.S. Census Bureau, 2010).

7. Census Block Group: A Census Block Group consists of two or more Census Blocks. Each Census tract contains a minimum of one Census block group (U.S. Census Bureau, 2010).

8. Iowa Healthiest State Initiative: This program is based on the Gallup-Healthways Well-Being Index® that ranks U.S. states on a number of factors. The goal set by Governor Branstad was to climb to the highest rank by 2016.

9. Leisure: Leisure can be defined primarily in three ways-free time, activities that individuals find enjoyable, and as state of mind that incorporates elements of motivation, personal choice, competence and enjoyment (Edginton, DeGraaf, Dieser, & Edginton, 2006).
10. Move Naturally principle: This element of the Blue Zones Project® refers to one of nine Blue Zones® principle traits and emphasizes the notion that individuals should forgo motorized transport in favor of walking and cycling whenever possible (www.bluezones.com).

11. Physical Activity: The conception-physical activity can be defined as “…any bodily movement produced by skeletal muscles that result from energy expenditure.” (Caspersen, Powell & Christenson, 1985, p. 126).

12. Social Capital: The notion of social capital can be broadly defined as the “…connections among individuals in social networks and norms of reciprocity and trustworthiness that arise from them” (Putnam, 2000, p. 19).

13. Suburban: A built-up area, located a distance greater than 800-meters removed from the city center, whose hallmark consists of mostly single-family dwellings, and neighborhoods that are a mix of grid-type and non-conforming streets and cul-de-sacs.

14. Urban: Densely populated neighborhoods within an 800-meter radius of a city center whose streets are arranged in a grid pattern made-up of a combination of single and multi-family dwellings.

15. Walkability: The concept of walkability can be thought of as the “overall quality and ability of an environment to promote and support pedestrian travel for a range of purposes” (Litman, 2014, p. 6993-6995).

16. Walking for active transport and leisure: The act of walking for active transport can be thought of as walking to a specific destination such as one’s place of
employment rather than utilizing motorized transport. The act of walking for leisure can be thought of as walking for enjoyment or physical activity that may or may not include a specific destination.

**Significance of the Study**

The value and significance of this study is that it links together several dimensions impacting on individual and community quality of life and well-being. Further, the study investigates the relationship among several salient topics including walkability, social capital and the built environment. The study of walkability is important in that it provides a means to gain insight regarding active transportation, walking for leisure and also leisure time physical activity (LTPA) (Duncan, Cash, Horn & Turkheimer, 2015; Hosler, Gallant, Riley-Jacome, & Rajulu, 2014; Oluyomi et al., 2014; Saelens et al., 2003; Geddes & Vaughan, 2014; Villanueva et al., 2014). Social capital, which is concerned with community building, can provide opportunities for individuals to engage in significant social bonding and social bridging. Two elements according to Putnam (2000) that are critical in revitalizing the life of any community (Putnam, 2000). Last, the concept of the built environment is one in which the design features of a community can influence one’s sense of place and in turn enhance one’s quality of life and well-being (Flack et al., 2013).

The significance of this study lies at the intersection of the investigation of the aforementioned three basic topics explored in this study—walkability, social capital, and the built environment. Each of the variables may influence the others. Walkability is thought to influence social capital thereby promoting a greater sense of community
connectedness. People walking are often talking and engaging in interaction with one another. Various forms of the built environment such as walking and bicycle trails and pathways, as well as neighborhood designs such as mixed land use, urban and suburban play a role in promoting quality of life, well-being, and community livability. Designing and building places and spaces on a human scale that promote greater opportunities to interact with others and nature is prized. These are values sought by all individuals residing in neighborhoods, communities, and nations throughout the world.

The setting for this study is a Blue Zones® demonstration community. As such, the study will add valuable information in support of the Blue Zones® program. The Blue Zones® program aims to introduce a number of small incremental steps individuals and communities can take to improve quality of life and well-being. As a community-wide project the Blue Zones® program has incorporated a variety of agencies, organizations, businesses, and community groups in a unified effort aimed at as mentioned above, quality of life and well-being and perhaps even community livability.
CHAPTER 2
REVIEW OF THE LITERATURE

Introduction

The purpose of the present study is to explore the relationship of the built environment, social capital, and walkability. In particular, the study was undertaken in a select Blue Zones® project demonstration community. As such, the study seeks to explore how one’s perception of walkability and social capital influences one’s life’s activities. This research study seeks to explore how participation in the Blue Zones® project may affect the perception of walkability and safety, thus increasing physical activity. Further, the study will explore the linkages, factors, and influences that the built environment imparts to individuals’ physical activity behaviors.

The constructs of walkability, social capital and the built environment are interrelated. Therefore, a great deal of overlap exists within the literature. For the present investigation, and the purposes of this review of the pertinent literature, every effort will be undertaken to examine each with some degree of separation from the other constructs. Chapter 2 presents a comprehensive review of the literature and is divided into four major sections. The first section addresses the topic of walkability. This is followed by examination of concepts related to social capital. The third section of the literature review is focused on the conception of the built environment. The last section of the literature review is dedicated to the topic of Blue Zones®.

Table 1 provides information regarding each of the aforementioned topics and the citations contained within each area of the review. As one can see the y axis in the table
presents the major headings found in the literature review. The x axis of the table presents the authors cited within each of the major headings appearing in the literature review.

The table presents a listing of each of the references in each of the major sections. The section dealing with walkability includes 15 citations. The next section, which is focused on the topic of social capital, finds 11 citations listed on the table. The third section dealing with the topic of the built environment includes 14 citations. Last, the section devoted to Blue Zones® presents eight citations. In each of these sections the references are listed in date order with the most recent citation presented first.

Table 1

Literature Review Sources

<table>
<thead>
<tr>
<th>Study Areas</th>
<th>Sources</th>
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</thead>
<tbody>
<tr>
<td>Walkability</td>
<td>Cerin, Saelens, Sallis, and Frank (2006); Duncan, Cash, Horn, and Turkheimer (2015); Geddes and Vaughn (2014); Giles-Corti et al. (2015); Grant, Edwards, Sweitstrup, Andrew and Egan (2010); Hosler, Gallant, Riley-Jacome, and Rajulu (2014); Leslie et al. (2005); Leyden (2003); Litman (2014); Rogers, Gardner, and Carlson (2013); Saelens and Handy (2008); Saelens, Sallis, Black, and Chen (2003); Sallis (2009); Tully et al., (2013); Wood et al. (2008);</td>
</tr>
<tr>
<td>Social Capital</td>
<td>Bourdieu (1986); Coleman (1988); Folland (2007); Hanibuchi and Nakaya (2013); Hanifan (1916); Kamruzzaman et al., (2014); Leyden (2003); Lindstrom, Hansen, and Ostergren (2001); Portes (1998); Putnam (2000, 1995, 1993); Rogers, Gardner, and Carlson (2013); Schlicht (1984);</td>
</tr>
<tr>
<td>Built Environment</td>
<td>Badland et al. (2009); Bartram (2015); Baxter (2011); Bracy et al. (2014); Craig, Brownson, Cragg, and Dunn (2002); Cerin et al. (2006); Durand et al. (2011); Flack et al., (2013); Foster and Giles-Corti (2008); Handy, Boarnet, Ewing, and Killingsworth (2002); Joh, Nguyen, and Boarnet (2012); Rissel and McCue (2015); Sallis (2009); United Nations (2012); Wood et al. (2008);</td>
</tr>
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</table>
Walkability

The construct of walkability can be thought of as the “overall quality and ability of an environment to promote and support pedestrian travel for a range of purposes” (Litman, 2014, p. 6993). Studies focused on the topic of walkability can be broken into two basic categories. The first of these categories focuses on the relationship of walkability and the built environment (for example, Geddes & Vaughan, 2014; Leslie et al., 2005; Tully et al., 2013). The second are studies that have investigated walkability as a physical activity (Duncan et al., 2015; Hosler et al., 2014; and others.). Such studies are often intertwined with the perceptions of individuals regarding their environment. Some of the factors that influence the individual perceptions are aesthetics, safety, street connectivity, ease of performing daily living tasks and accessibility to walking paths and trails.

There have been numerous research studies that have focused on the topic of walkability. These are referenced in Table 1. One of the pivotal studies directly related to this research project sought to measure the concept of walkability. Leyden (2003) examined the impact on social capital and community involvement that resulted from pedestrian-oriented, mixed-use neighborhoods. Such neighborhoods, walkable neighborhoods, facilitate activities of daily living such as grocery shopping, going to the park, transporting children to-and-from school, and dining out, without having to resort to automotive transport. In short, the study sought to explore whether mixed-use pedestrian-oriented neighborhoods are more likely to encourage social capital than auto-dependent single-use neighborhoods (Leyden, 2003). Unique to this study, Leyden (2003) classified
a given neighborhood’s walkability based on a survey question in which a list of possible destinations was identified. The response to the question was assigned a walkability score that ranged from 0 (no destinations on the list) to 9 (can walk to every destination).

This researcher found that there was a relationship between walkability and social capital within mixed-use pedestrian-oriented neighborhoods when compared with auto-dependent single-use neighborhoods. For this study the research design involved identifying self-reported amounts of social capital. Data were acquired from household surveys that measured the social capital of individuals living in neighborhoods that ranged from conventional, mixed-use, pedestrian-oriented designs to modern, car-dependent suburban American-like subdivisions in Galway, Ireland (Leyden, 2003).

The results suggest that persons living in walkable, mixed-use neighborhoods exhibit higher amounts of social capital compared with those residing in car-oriented suburbs. Respondents living in walkable neighborhoods tended to know their neighbors, be politically engaged, trust others, etc. The results of this study suggest that the way we plan and build our communities and neighborhoods can directly affect physical and mental health (Leyden, 2003).

In a comparative case study by Grant, Edwards, Sveitstrup, Andrew, and Egan (2010) the interrelationship between urban forms (inner-urban to suburban) and neighborhood socioeconomic status (SES) were examined relative to walking behaviors. More specifically, the researchers focused on a comparison of qualitative and quantitative data collected from a group of older (65+ years) individuals of high and low socioeconomic status who reside in four separate urban and suburban settings and
routinely walk in their respective neighborhoods. It should be noted that all combinations of socioeconomic status (high to low) and neighborhood forms were included in the comparison (Grant et al., 2010). A multi-phased approach to qualitative data collection that utilized older participants' perceptions of their walking experience combined with perceptions of the walking environment (walkability). During the third phase of data collection quantitative measures of factors such as amenities and neighborhood-specific traffic levels were collected.

These researchers report that the relationship between socioeconomic status and urban forms among older people suggests that high SES neighborhoods experienced positive support for neighborhood walking conditions. However, results were inequitable regarding comparisons between urban forms. Disparities were revealed among comparisons of SES rather than urban form comparisons signaling that differences in walkability among higher and lower SES neighborhoods are unequal. Additionally, these researchers reported that future investigations of walkability must consider the interrelationship between urban-forms and SES. Moreover, it was suggested in this study that municipal governments monitor and seek to eliminate inequities in the walking conditions (walkability) among advantaged and disadvantaged neighborhoods (Grant et al., 2010).

The perception of walkability has been linked to the aesthetic quality of a neighborhood and its surrounding areas. Recently, Tully et al., (2013) conducted an investigation focusing on the impact of urban regeneration and health-related behaviors. The study looked at a specific urban renewal project in the Connswater Community
Greenbelt in Belfast, Northern Ireland that included the creation of new bicycle and walking paths. Additionally, a number of programs associated with the Greenbelt regeneration project have been implemented in an effort to promote increased physical activity and outdoor recreation engagement along the 9 km long park. The investigators focus is on four main elements of the renewal and programs and their effects on physical activity levels. These included a before-and-after survey of the population, a Global Information Systems (GIS) assessment of walkability and the built environment, and interviews with residents and community stakeholders before and after the project in an analysis of its cost-effectiveness. The researchers designed a multidisciplinary framework called RE-AIM which stands for Reach, Effectiveness, Adoption, Implementation, and Maintenance through which the above elements were measured in an ongoing effort to assess the impact and effectiveness of the regeneration and physical activity programs (Tully et al., 2013).

Saelens et al. (2003) examined aesthetics as one component of neighborhood design in their work to develop a research scale. These researchers developed an instrument that could be used to determine neighborhood environmental factors and their impact on residents’ physical activity choices. Using the Neighborhood Environment Walkability Scale (NEWS) they included specific items (questions) directed towards measuring individuals’ perceptions of the aesthetic quality of their surroundings. These items incorporate questions regarding the attractiveness of built and natural features in their neighborhood. Landscaping, views, and the visual appeal of homes within one’s neighborhood were also included in the construction of the survey instrument. The
researchers found that in high-walkability neighborhoods, residents reported higher aesthetic appeal (Saelens et al., 2003).

In a follow-up study to further validate the NEWS instrument and develop an abbreviated version Cerin, Saelens, Sallis, and Frank (2006) found that there existed a positive relationship between the aesthetic qualities of a neighborhood and walking for active transport. They report that residents indicated high levels of perceived aesthetic appeal as an important consideration when walking for leisure and recreation (Cerin et al., 2006).

The literature covers a multitude of facets associated with the built environment, walkability and social capital. Associated with each of these facets many sub-dimensions have been identified in the literature. For example, one underlying theme that has become apparent is the notion that safety is one of the major concerns. Specifically, with regard to walkability, safety of individuals not only speaks to an absence of crime, but also is a product of the features and design of the built environment. These features and designs can include crosswalk design, lighting, traffic levels, and street connectedness. Furthermore, when one thinks of walkability, many of the issues of safety concerning the built environment overlap. Moreover, this overlap continues to influence the sphere of social capital as well. Social capital can be thought of as having components of trust and reciprocity. Freedom from physical assault or crime can be thought of as measures of trust and reciprocity within social communities (Wood et al., 2008).

An exploratory study by Wood et al. (2008) focused on three separate suburbs located in Perth, Washington and sought to examine the safety aspects of walkability
using objective measures. This study also explored the relationships and perceptions of safety within the built environment and its impact on social capital. The authors hypothesized that features of the built environment may promote walkability and in turn positively correlate to perceptions of safety by the inhabitants (Wood et al., 2008). The study was carried out in four phases. Phase I involved the crafting of focus groups that were conducted in each of the three suburbs. Phase II utilized a telephone survey of adults selected at random from each of the four suburbs. Phase III utilized built environment characteristics that were gathered as part of a Study of Environmental and Individual Determinants of Physical Activity (SEID II) and Phase IV employed the use of GIS data sets. Wood et al. (2008) found that opportunities exist for new suburban areas to incorporate aspects of social capital, and for the built environment in existing suburbs to be retrofitted to enhance and promote walkability and a greater sense of safety. The authors suggest more specifically that the incorporation of a mixed-use design that introduces an optimal number of destinations of high quality is required to foster perceptions of safety. Further, the aesthetic appeal and upkeep of neighborhood features were suggested to increase feelings of safety and levels of social capital (Wood et al., 2008).

A study by Rogers et al. (2013) sought to measure walkability as a component of the overall sustainability of a given community. These researchers suggest that factors of environmental sustainability can be impacted by how individuals move around and navigate within their communities. Aspects such as… “air pollution, energy use, and greenhouse gas emissions” (p. 3477) can be decreased based on transportation modes. It
is further suggested that neighborhood design features and destinations that promote walking is one means to improve environmental sustainability and may also provide opportunities for community members to interact on a social level.

The researchers sought to measure the concept of walkability from the answers to survey questions regarding locations to which one could walk. The measurement of walkability was split into two distinct variables: how many locations can an individual walk to; and how many locations do individuals walk to. The respondents were asked to select from a list of destinations sourced from the work of Leyden (2003) which included “shopping center, post office, church, school, restaurant, coffee shop/cafè, library/bookstore, community/rec center, convenience store, home of friend, grocery stores, natural area/open space/park, bar/pub.” (Rogers et al., 2013, p. 3477). From the responses, neighborhoods were designated as “more walkable” and “less walkable”. More walkable neighborhoods were those that respondents indicated to contain seven or more destinations that individuals can walk to, and three or more locations that individuals report to which they walk (Rogers et al., 2013). Unique to the study of walkability is the added dimension that reporting locations that one walks to provide.

These researchers found that with regard to neighborhood walkability, respondents report many more locations that they can walk to when compared with ones to which they actually walked. Possible reasons for the differences may include commonly cited built environment features such as sidewalks, safety, time commitment, lighting, and weather (Rogers et al., 2013; Saelens & Handy, 2008; Sallis, 2009).
Social Capital

Another major element of this study is focused on the construct of social capital. According to Putnam (2000), social capital can be thought of in its broadest sense as the connections people make with one another. Beginning in the mid-1990s Putnam began to move social capital out of the shadows of public consciousness into greater awareness through his work at Harvard University. Specifically, through the Saguaro Seminar Series (John F. Kennedy School of Government, 2002) that gathered notable scholars and professionals together to discuss and shed light on what was then perceived as a declining climate of social interaction in America (Putnam, 1995). Putnam (2000) refers to the idea of two concepts, social bonding and social bridging. Social bonding can be thought of as building relationships and enhancing one’s communication with their closest family members, friends and colleagues. Social bridging reflects the opportunities that individuals make in reaching out to extend and expand their social capital by interacting with new partners. In this section of the literature review, discussion will include studies which assist in further defining the concept as well as further linking walkability and the built environment to social capital.

Putman (2000) reports that one of the first uses of the term social capital can be traced back to the article entitled “The Rural Community Center” by Hanifan (1916). In the article, the author was careful to differentiate the term capital from the traditionally accepted notion of currency. Instead, social capital was intended to describe positive interactions among individuals linked within a given community. Hanifan (1916) goes on to suggest that the notion of social capital can be applied to what is termed a social
This notion of a social corporation can then be referred to synonymously as a community (Hanifan, 1916, p. 130).

Bourdieu (1986) suggests that capital can be thought of in three distinct ways: (1) economic capital which can be converted to money for the acquisition of goods and services; (2) cultural capital which may exhibit characteristics of economic capital in certain situations such as education; and (3) social capital. In this context social capital may be referred to as one’s “social obligations” by Bourdieu (1986, p. 16). Social capital, like cultural capital, can also be converted to economic capital under the right circumstances. Bourdieu (1986) states that an individual’s social capital or social clout, is the sum of all of the capital the individual possesses, combined with all of the individual’s social connections, including the economic, cultural, and social capital of these individuals.

The conceptions of capital purported by Coleman (1988) are grounded in the study of economics but are applicable across disciplines including the social sciences. Coleman (1988) brings a new dimension to what is considered capital. He offers the idea of “human capital” (p. S100) as another form of this concept. Human capital is more tangible than social capital but less so than what Coleman (1988) refers to as “physical capital” (p. S100). Physical capital refers to the tools, machinery, and raw materials, that can be manipulated, changed, or reconfigured to accomplish a desired goal or production level. Human capital can be controlled in much the same way. The specific skills and capabilities that an individual brings to an endeavor can be directed in varying ways to increase efficiency and effectiveness, hence one’s output.
Social capital is much less palpable than physical and human capital, as it resides in the relationships between individuals, organizations, and communities (Coleman, 1988). Much like Putnam’s (2000) terminology, classifications of bonding and bridging forms of social capital, Coleman (1988) suggests that the advantage of identifying various forms of capital has a function. The function of social capital is that of “value” (p. S104). He states that the value placed on specific relationships varies, and as such, may serve various purposes (Coleman, 1988).

In a slightly different perspective on the issue of social capital, Woolcock (1998) describes the traditional perception of capital from an economic perspective as land, labor and physical capital. However, beyond this traditional idea of the forms of capital, Woolcock (1998) goes on to suggest that within a given community’s population, individual’s must...“work, vote, pray and recreate as members of various but distinct social groups that shape one's very identity, values and priorities” (p. 154). Coleman offers when individuals enter into an agreement, they reach closure on whatever issues are being addressed. According to Coleman (1988), closure can be thought of as the ability to make transactions in which trustworthiness is assumed, allowing for transactions to easily occur among individuals. In agreement with Coleman's (1988) notion of “closure” Woolcock (1998) suggests that indeed closure occurs when individuals operating within similar social contexts agree that it is in their best interests to cooperate. Woolcock (1998) adds that such alliances may prove to be stable or tenuous based on the nature of the specific form of capital, bonding or bridging.
It is suggested that if some social capital is a good thing, then more social capital is an even better (Woolcock, 1998). However, this may not be the case in all situations and circumstances. When long-standing social groups, ethnic groups, organizations, and institutions become increasingly dependent within the social structures that they exist, then there is the real danger of limiting opportunities for expansion and growth with regard to individuals, organizations, groups and institutions that lie outside the realm of established interactions. Granted, the notion of too much social capital and the detriment that may result, is rooted in the study of economics, but this principle may be applied to communities. To this end Woolcock (1998) upholds that forms of social capital “…are resources to be optimized, not maximized” (p. 158).

In his review of social capital, Portes (1998) speaking to the work of Bourdieu, points out that unlike economic capital, the subtleties of social exchanges are much less apparent and carry a higher degree of improbability. Specifically, social capital exchanges can be ambiguous, occur within a vague timeframe and lack adherence to expected norms of reciprocity. The author describes the importance of understanding and identifying the motivations of recipients and donors of social capital. Particularly, the motivation of those making social capital available to others, as these individuals are expected to do so in the absence of immediate reciprocity (Portes, 1998). Therefore, the treatment of the concept of social capital should differentiate among possessors, sources, and the specific resources to be called upon when examining motivations behind social capital exchanges (Portes, 1998).
Given that Hanifan (1916) made a deliberate point to differentiate social capital from economic or monetary forms of capital, one cannot overlook the similarity in the value of capital. This is true for commerce and interpersonal relationships alike. As Schlicht (1984) suggests, social or moral capital serves to compel individuals to follow rules, which in-turn can bolster the values of a given society or. The value of one’s social capital can in most cases be summarized as the trust, obligations, norms of reciprocity and the expectations that bridging and bonding social ties impart among community members (Bourdieu 1986; Coleman, 1988; Hanifan, 1916; Putnam, 2000).

Around the time that Putnam (1995, 2000) was popularizing the construct of social capital, Lindström, Hansen, and Ostergren (2001) examined social capital, engagement in leisure time physical activity (LTPA) and one’s socioeconomic status in Malmo, Sweden. It is of note that these researchers utilized Putnam’s definition of social capital. The sample population of participants consisted of 11,837 individuals of the age range of 45-65 years old.

The researchers hypothesized that social capital might mediate levels of self-reported LTPA due to enhanced encouragement and support when compared to individuals reporting low levels of social participation and social capital (Lindström et al., 2001). The results of the study suggest that there is an element of mediation provided by social capital on the LTPA of specific groups within the study participants. This social capital effect on LTPA level is thought to be the result of high social participation and the support/pressure that may be present (Lindström et al., 2001).
Social capital has been reported to be a viable measure of social sustainability (Kamruzzaman et al., 2014; Rogers et al., 2013). A study conducted in Brisbane, Australia, Kamruzzaman et al. (2014) sought to reveal information on social capital levels in various and differing neighborhoods. The researchers sought to explore the relationship among the type of neighborhood, trust/reciprocity, and neighborhood cohesion. The major distinction between the neighborhoods was based on the manner and level of sustainable transit options available to the inhabitants. The options include public transit, street connectivity, traffic levels, crosswalk design, street lighting, sidewalk, bike paths, etc.

The researchers identified what were called transit-oriented developments (TOD), transit adjacent developments (TAD), and traditional suburbs. TODs are designed to incorporate non-motorized transport and public transit options. While transit adjacent developments (TAD) are suburban neighborhoods that have sustainable transit options adjacent to but are not within the neighborhood. Specifically, a TAD may have a bus line or train line within a close proximity. Their findings suggest that individuals residing in TODs expressed higher levels of social capital than those in TADs. Notably, they report that residents of traditional suburban neighborhoods also indicate higher levels of social capital than residents of TADs.

Folland (2007) sought to explore the role of social capital in a study of the health of a community. In this investigation several specific facets of social capital were selected based on the perceived importance the facet provides to community health outcomes. These include reduced stress, coaching, providing information, and increasing
responsibility. Using existing data collected by DDB Lifestyle Database spanning a timeframe from 1975-1998, this researcher compared 6 of the 14 variables used by Putnam (1993) in his original index to selected state health means. By extending the timeframe and using a multivariate versus bivariate approach, the social capital and health hypothesis of Putnam can be tested more rigorously (Folland, 2007).

Folland (2007) found that there are merits and failings to the blanket statement that positive social capital can affect community health in a positive way. The incidence of heart disease did not vary with social capital index; however, one’s geographic location may influence social capital levels and thus diminish any effect on various diseases. The very nature of how social capital is measured (instrument) can erode any perceived outcomes on community health (Folland, 2007). Further, Folland (2007) suggests that the social capital hypothesis is affirmed when related to health outcomes, although the social capital effect varies by mortality category. What’s more, birth rates and pregnancy may demonstrate a positive sociability effect while genetically derived causes of mortality such as heart disease and cancer would not (Folland, 2007).

Leyden (2003) examined the impact on social capital and community involvement resulting from pedestrian-oriented, mixed-use neighborhoods. The study sought to explore whether differing neighborhood designs are more or less likely to encourage social capital (Leyden, 2003). This study investigated neighborhood design utilizing self-reported levels of social capital. Data were acquired from household surveys determining the social capital of individuals living in neighborhoods ranging from conventional, mixed-use, pedestrian-oriented designs to modern, car-dependent suburban American-
like subdivisions such as the ones reported by Leyden (2003) in Galway, Ireland. Results suggest that persons living in walkable, mixed-use neighborhoods exhibit higher amounts of social capital compared with those residing in car-oriented suburbs. Respondents living in walkable neighborhoods tended to know their neighbors, be politically engaged, and trust others. The results of this study suggest that the way communities and neighborhoods are planned and built directly affect social capital and in turn physical and mental health (Leyden, 2003).

In a review on the determinants of social capital, Hanibuchi and Nakaya (2013) focused on how the social constructs of urbanization/suburbanization and walkability affects a neighborhood’s social climate. These researchers note that the differences in social capital among communities can be attributed to multiple factors. These factors include education, marital status, age, and employment. Overall, it appears that communities possessing elevated levels of socioeconomic status may provide more sociable environments (Hanibuchi & Nakaya, 2013). Therefore, the contextual determinants of the communities’ overall social capital may be a result of an individual’s level of social capital.

Individuals residing in urban city-center type neighborhoods can function in the absence of close family ties as a result of easily accessible necessities of daily living in comparison to inhabitants of rural communities. It is suggested that social bonding activities (a form of building social capital) are decreased and social bridging activities (another form of social capital) may be increased for individuals who reside in urban city center neighborhoods (Hanibuchi & Nakaya, 2013). These authors suggest there is an
enhanced association between individuals residing in urban neighborhoods and levels of civic participation. This supports Putnam's (2000) assertions that social capital levels among individuals who reside in auto-dependent suburbs report decreased levels of community social interaction when compared to those who reside in more densely populated mixed land-use neighborhoods (Hanibuchi & Nakaya, 2013). Examining the historical origins of social capital in relationship to one’s community/neighborhood appears to have some effect on its development. Hanibuchi and Nakaya (2013) report that long-standing traditional style neighborhoods may contain organizations that support cohesion and positive norms of reciprocity among its inhabitants.

**Built Environment**

The concept of the built environment has come under increased attention in its role relating to walkability and building social capital. The built environment can be thought of as encompassing social, cultural, and economic aspects as well as natural and manmade features that, taken as a whole, incorporate within a community the physical, natural, and social capital (Flack et al., 2013). Moreover, the role of the built environment has been identified as a key component in the promotion of healthy and sustainable communities (Rissel & McCue, 2015).

The global trend toward urban life will see some 70% of the world’s population become city dwellers by the year 2050 (UN, 2012). As this shift occurs the importance of the way in which living environments are designed will become increasingly important. It has been suggested that the manner in which we design our living environments presents both possibilities to enhance as well as inhibit physical activity, social engagement and
overall well-being. Urban decay and suburban sprawl have proven to inhibit active transport, leisure time physical activity, and physical activity in general (Craig, Brownson, Cragg, & Dunn, 2002; Foster & Giles-Corti, 2008; Handy, Boarnet, Ewing & Killingsworth, 2002). While increasing awareness has sparked a growing trend for city planners to consider measures and design features in the built environment that will facilitate and promote active transport. The use of ecological models offers promise in the identification of the interrelationships of the factors such as street design, zoning mix, and traffic speed to name a few (Bracy et al. 2014). Recently there have been developments in what are called “protected lanes” and “protected paths” to address issues of safety. Safety from traffic is especially relevant in urban centers and along major thoroughfares (Baxter, 2011). Further, in the Netherlands, a high percentage of female cyclists prefer protected lanes. Perception of safety and street and path design have been shown to be important factors when considering whether to engage in active transport (Baxter, 2011).

Since World War II, the emphasis on neighborhood design has focused on the creation of auto-dependent enclaves that have low population density and are isolated from urban centers (Durand, Andalib, Dunton, Wolch, & Pentz, 2011). This has especially been the case in the United States regarding urban design. In response to the trend of suburbanization there has been a push toward new urbanism and revitalization in many U.S. cities. Organizations such as Smart Growth America have been formed to provide advocacy, support, guidance and research design to help make existing
communities more livable. Such designs have included new developments with transportation, shopping and an increased emphasis placed on walkability and LTPA.

Bartram (2015) highlighted the role that the built environment can have on community health outcomes. She reported that during the mid-20th century the fields of architecture and city planning separated. This separation is credited with the trend toward single use designs in the interest of flow and efficiency such as high-rise buildings and highways. Because of this, the human condition and experiences became less of a priority in designing communities. As a result, the U.S. began to see an explosion of suburban development and increased decay of many urban and city centers (Bartram, 2015).

Beginning in the 1980s scholars began to take note of the positive effects of natural lighting and social discourse on individuals (Bartram, 2015). At the same time, health professionals began to investigate the impact of the built environment on community health outcomes. From these investigations, and the discussions that accompanied emerging fields of study, city planners and the architectural community began to once again collaborate. The shift from what was being built to who was going to use the resources of the built environment began to dictate the focus of planning. Key to successful implementation of more human-oriented design themes has been the collaboration of planners, architects, landscape architects, city leaders, and others. While not a new concept, specialization has over time isolated and limited the boundaries that such professionals operate (Bartram, 2015). Multi-use features of the built environment that feature green spaces and facilitate active transport while connecting destinations of interest will benefit healthy community development (Bartram, 2015).
Joh et al. (2012) examined physical activity (walking) behavior among individuals reporting positive and negative attitudes toward this dimension. One of the elements that was explored was that of the built environment and social climate of one’s community. More specifically, whether the built environment plays a part in encouraging or constraining walking activity of individuals possessing differing attitudes toward such behavior (Joh et al., 2012).

Mixed land-use and design of the built environment have been shown to affect walking behavior and social interactions among community members. Wood et al. (2008) report that social encounters among neighborhood inhabitants occurred most often when frequency of walking and positive perception of the environment were high (Wood et al., 2008). When crime and safety are of main concern Joh et al. (2012) report that individuals with neutral or negative attitudes towards walking were most affected. However, when the built environment provides street connectivity and neighborhood businesses, individuals with positive walking attitudes are most likely to engage in walking activity.

Among disciplines there exist varying ways to look at the built environment. City planners, leisure professionals, and those in health care and promotion have viewed and measured the built environment in differing ways. In a study that examined historical trends that have shaped how researchers measure environments for physical activity Sallis (2009) suggests that traditionally, one thinks of locations such as parks, trails, fitness centers, and school playgrounds as sites for physical activity. Further, it is reported that while the built environment has long been linked with physical activity,
until recently there has been a marked absence of studies measuring this relationship. Sallis (2009) notes that three broadly defined fields have served to develop measures of the built environment and its significance to physical activity. Professional areas instrumental in the development of measures of built environment and physical activity include health, city planning, and leisure studies. Public health researchers, in general, have employed two types of approaches for measuring physical activity and built environments. These include: (1) Direct observation of physical activity in selected settings utilizing a coding system such as the Childre n's Activity Rating Scale (CARS) and (2) Checklist for Health Environments at Work (CHEW). City planners have designed conceptualizations incorporating such factors as walkability and destinations of choice and daily routines such as restaurants, grocery stores, places of employment, and doctor’s offices. Further, city planners have utilized self-reported measures of walkability as well as GIS to influence community design for physical activity, while leisure studies has typically focused on parks, aesthetics, and landscaping as influences for physical activity. Through the utilization of all three disciplines in the various measures they employ, the best mix of built environment attributes and qualities can be incorporated in communities designed to promote physical activity (Sallis, 2009).

In a study by Badland et al., (2009) the researchers sought to uncover the features of the built environment and identify the roles these variables may impart to physical engagement and body size among adult and child populations in four New Zealand communities. Using GIS data, neighborhoods were identified according to stratification,
street connectivity, dwelling density, mixed land use, retail floor area, Maori population, and neighborhood selection.

Badland et al. (2009) addressed four key gaps in the information regarding the relationship between the built environment and physical activity levels. First, there has been an undervaluation regarding any connection between urban configuration and health outcomes. Second, the use of accelerometers has greatly heightened the accuracy of self-reported levels of physical activity among the study participants. Third, little substantive research exists concerning how individuals of various ethnicities, ages, genders, and/or family compositions are affected by health outcomes due to neighborhood configuration. Fourth, scarce evidence has been presented identifying which built environment features impact children's physical activity, body size, and on parental choices regarding children's physical activity prospects (Badland et al., 2009). There is great importance in shaping built environments to promote health and physical activity habits that continue into adulthood.

**Blue Zones**

Introduced in a *National Geographic* article, The Blue Zones® concept focused on several geographic clusters around the globe that contained the highest percentage of individuals that live to 100 years or more (Buettner, 2005). Buettner’s investigation of longevity began in 2000 when he was asked to come to Okinawa, Japan. The request resulted from his previous work on “Quests” which were internet-based scientific explorations of... “Earth’s great puzzles.” (Buettner, 2012, p. xiv).
From Buettner’s (2008) continued investigation, demographers identified five locations for closer scrutiny. The sites include: (1) Okinawa, Japan; (2) Nicoya, Costa Rica; (3) Sardinia, Italy; (4) Ikaria, Greece; and (5) Loma Linda, United States (Buettner, 2012). Each of the unique geographies and demographic profiles were found to have a number of commonalities. Shared commonalities include diet, occupation, and physical and social aspects of daily life. Nine principles emerged from the commonalities of the Blue Zones® studied. These became known as the Power 9® (Buettner, 2012).

The Blue Zones® program was first operationalized in Albert Lea, Minnesota beginning on May 14, 2009 (Buettner, 2010). It began with four basic elements: eat better, be more physically active, be more socially connected, and find a greater sense of purpose. The Blue Zones® Project in cooperation with the American Association of Retired People (AARP®) and Healthways® and sponsored by the United Health Foundation® kicked off a six-month experiment to improve the health and increase the longevity of individuals living in the community. Some 786 individuals out of 3,465 total participants completed an online survey called the Vitality Compass at the beginning and end of the program. It was found that the vitality scores of these individuals rose by an average of 2.9 years. Participants reported they felt better, had increased energy, and believed they were more connected with the community (Buettner, 2010).

It was from the Albert Lea pilot project’s four basic elements mentioned above that the Power 9® principles of the Blue Zones® Program were refined. The refined program was designed to introduce easily adopted changes to everyday life through the
incorporation of the Blue Zones® principles through the Power 9® (“Blue Zones®
Project,” n.d.).

The Power 9® principles stated directly from the Blue Zones® website are as follows:

1. Move Naturally - The world’s longest-lived people don’t pump iron, run
marathons or join gyms. Instead, they live in environments that constantly nudge
them into moving without thinking about it. They grow gardens and don’t have
mechanical conveniences for house and yard work.

2. Purpose - The Okinawans call it “Ikigai” and the Nicoyans call it “plan de
vida;” for both it translates to “why I wake up in the morning.” Knowing your
sense of purpose is worth up to seven years of extra life expectancy.

3. Down Shift - Even people in the Blue Zones experience stress. Stress leads to
chronic inflammation, associated with every major age-related disease. What the
world’s longest-lived people have that we don’t are routines to shed that stress. Okinawans take a few moments each day to remember their ancestors, Adventists
pray, Ikarians take a nap and Sardinians do happy hour.

4. 80% Rule - “Hara hachi bu” – the Okinawan, 2500-year old Confucian mantra
said before meals reminds them to stop eating when their stomachs are 80 percent
full. The 20% gap between not being hungry and feeling full could be the
difference between losing weight or gaining it. People in the Blue Zones eat their
smallest meal in the late afternoon or early evening and then they don’t eat any
more the rest of the day.

5. Plant Slant - Beans, including fava, black, soy and lentils, are the cornerstone
of most centenarian diets. Meat—mostly pork—is eaten on average only five
times per month. Serving sizes are 3-4 oz., about the size of deck or cards.

6. Wine @ 5 - People in all Blue Zones (except Adventists) drink alcohol
moderately and regularly. Moderate drinkers outlive non-drinkers. The trick is to
drink 1-2 glasses per day (preferably Sardinian Cannonau wine), with friends
and/or with food. And no, you can’t save up all weekend and have 14 drinks on
Saturday.

7. Belong - All but five of the 263 centenarians we interviewed belonged to some
faith-based community. Denomination doesn’t seem to matter. Research shows
that attending faith-based services four times per month will add 4-14 years of life
expectancy.
8. Loved Ones First - Successful centenarians in the Blue Zones put their families first. This means keeping aging parents and grandparents nearby or in the home (It lowers disease and mortality rates of children in the home too.). They commit to a life partner (which can add up to 3 years of life expectancy) and invest in their children with time and love (They’ll be more likely to care for you when the time comes).

9. Right Tribe - The world’s longest-lived people chose—or were born into—social circles that supported healthy behaviors, Okinawans created “moais”—groups of five friends that committed to each other for life. Research from the Framingham Studies shows that smoking, obesity, happiness, and even loneliness are contagious. So the social networks of long-lived people have favorably shaped their health behaviors. (“Blue Zones® Project,” n.d.)

Iowa became the first state in the United States to embrace the concept of the Blue Zones®. This reflected a statewide effort to improve the health and well-being of its citizens. Iowa Governor, Terry Branstad, declared his endorsement of the Healthiest State Initiative in August of 2011 (Office of the Governor of Iowa, 2011). The initiative is a partnership between Healthways®, Blue Cross Blue Shield® and the Blue Zones® program. Governor Branstad set an ambitious goal for Iowans encouraging them to gain prominence as a healthy state. His vision called for reaching the number one spot nationally, by the year 2016 (Office of the Governor of Iowa, 2011). At the time of Governor Branstad’s announcement, Iowa ranked 16th in the nation. Communities throughout Iowa were invited to become Blue Zones® Certified Demonstration Sites. Two categories of demonstration sites were established as follows: (1) cities and towns with populations of greater than 10,000 citizens and (2) communities with populations less than 10,000 citizens. The selection criteria required that the community as a whole meet or exceed a specific qualification level regarding commitments from its citizens,
employers, and businesses including restaurants and grocery stores. The certification guidelines stated directly from the Healthways® handout are as follows:

1. Personal — At least 20% of citizens take the Blue Zones® Personal Pledge and complete one action.
2. Schools — At least 25% of public schools become a Blue Zones School™.
3. Worksites — At least 50% of the top 20 community-identified employers become a Blue Zones Worksite™.
4. Restaurants — At least 25% of independently or locally owned restaurants become a Blue Zones Restaurant™.
5. Grocery Stores — At least 25% of grocery stores become a Blue Zones Grocery Store™.

To date there is little if any research literature available regarding the practical application of the Blue Zones® and health outcomes. However, in an article by Carter (2015), the author questions the motivations of the program and associations with private business and public governance. That being said, the author suggests that the program is reported to be holistic in nature and takes into account the importance that … “culture, social norms and environment have on individual health” (Carter, 2015, p. 7).

Carter (2015) points out that the Blue Zones® program doesn’t address some of the determinants of health outcomes. Specifically, the relationship of socio-demographics such as educational attainment, income, employment status, and race with the health of various sectors of a given population. Carter suggests that these factors may play a significant role in U.S. health outcomes when compared to other more developed nations (Carter, 2015). The author goes on to say that the program does offer attractive reasons for participation such as the potential for reduced healthcare costs and elimination of
government mandates through the public-private partnership structure of its implementation (Carter, 2015).

In a study that preceded Buettner’s work, examining the longevity of China’s most elder citizens, Yi, Vaupel, & Zhenyu (2001) sought to uncover factors that contributed to active, long-life. These researchers stress that the issue is of great importance, as the population of China is aging at an accelerated pace when compared to other more developed countries. It is estimated that the population of individuals 65 and older could be as high as 400 million by the middle of this century and as many as 160 million over the age of 80 (Yi et al., 2001). The researcher’s initial findings suggest that 87% of males living in rural areas of China will still be active beyond 80 years of age. For urban males in the same age group 80% were reported to be active. The finding for females over 80 followed a similar pattern at 82% active for rural inhabitants and 75% for urban dwellers.

These researchers further sought to uncover what is different between urban and rural inhabitants and male and females in activity levels of the oldest of the old. They suggest that the hearty nature of the rural lifestyle weeds out the weak. In other words, it comes down to survival of the fittest. The less frail elderly are more likely to be active. It is also thought that due to a lack of services to assist the oldest inhabitants in rural communities require that the elderly perform activities of daily living for themselves, thus providing a form of exercise (Yi et al., 2001). These findings are aligned with the Blue Zones® program, specifically the Move Naturally principle, which urges individuals
to be physically active, thus decreasing or postponing frailty in the elderly (Buettner, 2008).

**Summary**

The constructs of social capital, the built environment and walkability are interrelated and significant overlap exists within the literature. Chapter 2 presented a comprehensive review of the literature divided into four major sections. The first section addressed the topic of walkability. This was followed by examination of concepts related to social capital. The third section of the literature review focused on the conception of the built environment. The last section of the literature review was dedicated to the topic of Blue Zones®.

Walkability can be thought of as the “overall quality and ability of an environment to promote and support pedestrian travel for a range of purposes” (Litman, 2014, p. 6993-6995). Studies focused on the topic of walkability can be broken into two basic categories. The first of these categories focused on the relationship of walkability and the built environment (for example, Geddes & Vaughan, 2014; Leslie et al., 2005; Tully et al., 2013). The second are those studies that have investigated walkability as a physical activity (Duncan et al., 2015; Hosler et al., 2014). Such studies are often intertwined with the perceptions of individuals regarding their environment. Factors that influence the individual perceptions are aesthetics, safety, street connectivity, ease of performing daily living tasks, and accessibility to walking paths and trails.

Putnam (2000) submits that, social capital, in its broadest sense, can be thought of as the connections people make with one another. He refers to two concepts, social
bonding and social bridging. Social bonding can be thought of as the building of relationships and enhancing one’s communication with their closest family members, friends, and colleagues. Social bridging reflects the opportunities that individuals make in reaching out to extend and expand their social capital by interacting with new partners. In this section of the literature review, discussion included studies which assisted in further defining the concept as well as linking walkability and the built environment to social capital.

Bourdieu (1986) suggests that capital can be thought of in three distinct ways: (1) economic capital which can be converted to money for the acquisition of goods and services; (2) cultural capital which may exhibit characteristics of economic capital in certain situations such as education; and (3) social capital. In this context social capital may be referred to as one's “social obligations” by Bourdieu (1986, p. 16). While Coleman (1988) brings a new dimension to what is considered capital. He offers the idea of “human capital” (p. S100) as another form of this concept. Human capital is more tangible than social capital but less so than what Coleman refers to as “physical capital” (p. S100). Physical capital refers to the tools and machinery, raw materials and equipment that can be manipulated, changed or reconfigured to accomplish a desired goal or production level. Human capital can be controlled in much the same way. It is suggested that if some social capital is a good thing, then more social capital is an even better (Woolcock, 1998). However, this may not be the case in all situations and circumstances.

The built environment may be thought of as encompassing social, cultural, and economic aspects of a community as well as its natural and manmade features (Flack et
Moreover, the role of the built environment has been identified as a key component in the promotion of healthy and sustainable communities (Rissel & McCue, 2015). Since World War II, the emphasis on neighborhood design has focused on the creation of auto-dependent enclaves that have low population density and are isolated from urban centers (Durand et al., 2011). As mentioned, there is great importance in shaping built environments to promote health and physical activity habits.

The Blue Zones® were first introduced in a *National Geographic* article focusing on several geographic clusters that comprised the highest percentage of individuals that live to 100 years or more (Buettner, 2005). The initial program focused on four basic elements: (1) eat better; (2) be more physically active; (3) be more socially connected; and (4) find a greater sense of purpose. Some 786 individuals out of 3,465 total participants completed an online survey at the beginning and end of the program. It was found that the vitality scores of these individuals rose by an average of 2.9 years (Buettner, 2010).

From the Albert Lea pilot project four basic elements were refined into what are now known as the Power 9® principles of the Blue Zones® program. The program is currently designed to introduce easily adoptable changes to one’s everyday life (“Blue Zones® Project,” n. d.). Little research has been conducted regarding the practical application of the Blue Zones® and its health outcomes. Further, no studies are known to exist that examine the relationship of walkability, social capital and the built environment in a Blue Zones® Demonstration Site community.
CHAPTER 3

METHODOLOGY

The purpose of the present study is to explore the relationship of the built environment, social capital, and walkability. In particular, the study was undertaken in a select Blue Zones® project demonstration community. As such, the study seeks to explore how one’s perception of walkability and social capital influences one’s life’s activities. This study seeks to explore how participation/residence in the Blue Zones® project may affect the perception of walkability and safety, thus increasing physical activity. Further, the study will explore the linkages, factors, and influences that the built environment imparts to individuals’ physical activity behaviors.

Chapter 3 provides information regarding the methods employed in the study. The chapter is organized in several sections. The first section of the chapter describes the basic research design for the study. The next section of the chapter provides background information regarding the study’s subjects and the setting for the study. The third section of the chapter describes the instrumentation used in this study. The fourth section of the chapter provides information regarding procedures used in data collection. Last, the fifth section of the chapter describes the statistical methods used to analyze the data collected in the study.

Research Design

A non-experimental descriptive research design was employed in this study. This type of research design incorporates a cross-sectional analysis. A cross-sectional analysis refers to an investigation that gathers information at a specific point in time. This type of
observational study is also known as a cross-sectional study, transversal study, and/or a prevalence study (Levin, 2006). In this cross-sectional analysis, data was collected from two subsets of the broader population. One subset was individuals residing in urban city-center type neighborhoods. These neighborhoods are grid-like and typically pre-WWII era. The second subset was individuals living in suburban-type neighborhoods. These neighborhoods are made up of a ratio of grid and non-grid streets constructed more recently (Handy et al., 2006). For the purposes of this study, urban will refer to grid-type neighborhoods and suburban will refer to mixed ratio neighborhoods. To measure an individual’s perception of walkability and social capital a self-reported questionnaire was administered. While it is beyond the scope of this study to evaluate the Blue Zones® program, two items are included to ascertain general awareness of the program and any participation. Additional information collected is demographic including: (1) gender; (2) age; (3) race; (4) number of household members; (5) education; and (6) income.

**Study Subjects**

The study utilized purposive convenience sampling to select participants. The study participants were drawn from a small Midwestern community and included a total number of 40,566 potential respondents (U.S. Census Bureau, 2010). According to the U.S. Census data, the Midwestern community from which the convenience sample was drawn has an average of 2.46 individuals per household (U.S. Census Bureau, 2010.). In this study, participants were selected based on use of U.S. Census tract information. More specifically, participants were identified based on neighborhoods drawn from Census Block groups. A Census Block group is a segment of a U.S. Census tract. Census Block
groups were employed in the study because they enabled the investigator to select neighborhood types, one being urban and the second being urban cluster (suburban). From this point forward urban grid type neighborhoods will be identified as “urban” and urban cluster type neighborhoods will be referred to as “suburban.” This procedure yielded a total of 400 potential participants to serve as respondents in the study. From the pool of potential respondents, 200 were identified in the urban neighborhood group and 200 in the suburban neighborhood group.

Prior to dissemination of the survey, approval was sought from the University of Northern Iowa’s Institutional Review Board. Further, written consent forms were not required from the study participants prior to their participation in the study. The return of a completed survey implied that the participant was presented with information about the research project and had consented to participate.

Instrumentation

The self-report questionnaire consists of four major sections: (1) neighborhood characteristics; (2) places for walking and cycling; (3) neighborhood and community social environment; and (4) demographics. The instrument is located in Appendix A.

The first section of the questionnaire included topics focused on specific locations within one’s community that they can access by walking or cycling (Leyden, 2003; Rogers et al., 2013). The first portion of this question asked the respondents to indicate destinations they can access by walking without too much trouble. Eleven different options were provided including: (1) a local corner shop or convenience store; (2) a church; (3) a local school; (4) a park; (5) a walking/biking trail; (6) a community center
or recreation center; (7) a daycare or childcare facility; (8) a physician’s office or health clinic; (9) a restaurant, coffee shop, bar, or tavern; (10) one’s location of employment; and (11) none of the above. The next portion of this question asked the respondents to designate which destinations from the above list they actually do walk or cycle to (Rogers et al., 2013). This was followed by questions concerning the types of residences in one’s neighborhood. Questions focusing on the types of single-family residences found in one’s neighborhood as well as a question regarding the commonality of apartments and/or condos were included. The next portion of this section of the questionnaire dealing with the availability of places to walk included a series of questions with respondents asked to indicate preferences using a five-item Likert-type scale with responses that range from strongly disagree, disagree, neutral, agree, and strongly agree.

The next portion of the questionnaire focused on the topic of the neighborhood and community social environment. The first portion is focused on the topic of trust, an important way of operationalizing social capital (Saelens et al., 2003). The three questions were directed at the ways in which individuals in one’s neighborhood can be trusted and whether or not a respondent feels safe. The questions focused on concepts of trust, personal safety and norms of reciprocity and are offered with responses using a Likert-type scale and choices that range from strongly disagree, disagree, neutral, agree, and strongly agree. The second portion of the questionnaire included a series of yes or no questions regarding an individual’s participation in community life and reflects opportunities for establishment of the bridging form of social capital (Rogers et al., 2013). These were followed by a series of questions offered using a Likert-type scale
with choices that range from strongly disagree, disagree, neutral, agree, and strongly agree which focused on bonding forms of social capital.

The last section of the questionnaire was focused on gaining an understanding of the demographic variables of the study population. There were two questions directed to ascertain an awareness of the Blue Zones® Project and participation in the program at any level. The following types of information were also sought: (1) gender; (2) age; (3) race; (4) number of household members; (5) estimated household income; (6) level of education.

**Procedure for Data Collection**

U.S. Census block groups were identified for utilization in the study including: 22.002; 22.003; 22.004; 22.005; 23.0011; 26.0011; 26.0032; and 26.0035. For the potential participants in the study, systematic random sampling was employed and mailing addresses were obtained from the Dietrich-Direct marketing service. The instrument was then mailed to each of the households identified through this marketing service. The mail-out packet included a cover letter, the survey instrument, and a return self-addressed stamped envelope. The attached cover letter provided information regarding the study, the purpose of the study, and the confidential nature of the respondent’s replies. The letter also provided individuals with information to ensure their informed consent. Respondents were told that their participation or non-participation would have no direct impact other than perhaps skewing the findings.

The study involved up to five contacts with the respondents. Each time a study participant was sent an item in the mail, that was considered to be a contact (Dillman,
The entire process was projected to be conducted in a four-week period of time. To initiate the first phase of the mail cycle, a letter was sent to potential respondents offering information regarding the importance and value of the study and the need for their involvement in the forthcoming weeks. The next phase of the mail cycle involved the actual distribution of the cover letter, survey instrument, consent form, and a return stamped envelope. This was followed by the distribution of an additional postcard to encourage respondents to submit their questionnaire. Dillman (2007) has suggested that a reminder postcard within the second week of contact finds the respondents more likely to return their questionnaire. During the next phase of the cycle, a second questionnaire was sent out with a letter indicating that the initial questionnaire has not been returned. This correspondence emphasized the importance as well as the voluntary nature of participation in the study. A final questionnaire was sent out to encourage participation to those individuals who had not replied to the first two mailings (Dillman, 2007).

**Reliability and Validity**

Survey instruments used in this study have previously established measures of reliability and validity. Nonetheless, the Cronbach’s alpha statistical measurement was calculated to verify the appropriateness of the instrument utilized in this study. A pilot study was conducted in order to establish the reliability and the internal consistency of the instrument prior to its distribution. The survey contains several items (questions) to measure each construct; Cronbach’s alpha was used to determine if the items have a strong relationship to each other and thus the latent construct of interest (DeVellis, 2012).
Validity of the survey components have been previously established (Rogers et al., 2013; Leyden, 2003; Saelens et al., 2003).

Statistical Methodology and Data Analysis

Version 24 of the SPSS software program was used for the data analysis. To tabulate demographic information including the characteristics of the respondents, descriptive statistics were used. The following descriptive statistics were calculated: means, frequency distribution and percentages. Descriptive statistics provided responses for each of the surveys sub-dimensions including gender, age, race, individuals per household, estimated household income, and level of education. These relate to questions 23 through 28 in the survey instrument. For questions using the Likert-type scale with responses that range from strongly disagree, disagree, neutral, agree, and strongly agree each response was assigned a score from one to five (1-5) and the aggregate response was reported. Items with a low numerical response suggest disagreement, whereas items with a high numerical response suggest agreement. For dichotomized responses such as female/male or no/yes a value of one (1) or two (2) was assigned. A research map is found in Figure 3 that provides the methodology employed in the study.

Several hypotheses will be tested as follows:

To test $H_{01}$, that there is no statistically significant difference between the perceptions of respondents residing in urban or suburban neighborhoods when viewing social capital and walkability, an independent samples t-test was calculated with a probability level set at $p = 0.05$. To test $H_{02}$, that there is no statistically significant difference when comparing demographic variables such as gender, age, race, number of
household members, household income, and education when viewing perceptions of social capital, a one-way ANOVA was calculated for categorical data while a chi-square was calculated for dichotomized data of gender with a probability level set at \( p = 0.05 \). To test \( H_0:3 \), that there is no statistically significant difference when comparing demographic variables such as gender, age, race, number of household members, household income, and education when viewing perceptions of walkability, a one-way ANOVA was calculated for categorical data while a chi-square was calculated for the dichotomized data with a probability level set at \( p = 0.05 \). To test \( H_0:4 \), that there is no statistically significant difference when comparing demographic variables such as gender, age, race, number of household members, household income, and education of the individuals residing in urban and suburban neighborhoods a chi-square was calculated with a probability level set at \( p = 0.05 \). To test \( H_0:5 \), that there are no statistically significant difference when viewing demographic variables such as gender, age, race, number of household members, household income, and education when comparing urban or suburban neighborhoods when viewing social capital and walkability, a chi-square was calculated for dichotomized data with a probability level set at \( p = 0.05 \). In addition, a one-way ANOVA was calculated for categorical data. Where findings were significant, a post hoc analysis was conducted. To test \( H_0:6 \), that there is no statistically significant difference when viewing Blue Zones® program awareness when comparing urban and suburban neighborhoods, a chi-square was calculated with a probability level set at \( p = 0.05 \). To test \( H_0:7 \), that there are no statistically significant differences when viewing demographic variables such as gender, age, race, number of household members,
estimated household income, and level of education when comparing Blue Zones® program awareness a chi-square was calculated with a probability level set at \( p = 0.05 \).

Table 2 presents the hypothesis statements and the statistical methods used for the various data types. One will note that there is variance in the application of statistical methods depending on the research questions and subsequent hypothesis statements explored.
### Table 2

**Hypothesis Statements and Statistical Treatments**

<table>
<thead>
<tr>
<th>Hypothesis Statement</th>
<th>Statistical Treatment</th>
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<tbody>
<tr>
<td>( H_01 ): There is no statistically significant difference</td>
<td>Independent Samples t-test</td>
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<td>between the perceptions of respondents residing in urban or suburban neighborhoods</td>
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<td>when viewing social capital and walkability</td>
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<td>( H_02 ): There is no statistically significant difference when comparing</td>
<td>One-way Analysis of Variance (ANOVA) with</td>
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<td>demographic variables such as gender, age, race, number of household members,</td>
<td>Tukey HSD post hoc</td>
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<td>household income, and education when viewing</td>
<td>Pearson’s chi-square Test of Independence</td>
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<tr>
<td>perceptions of social capital</td>
<td>Independent Samples t-test</td>
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<tr>
<td>( H_03 ): There is no statistically significant difference when comparing</td>
<td>One-way Analysis of Variance (ANOVA) with</td>
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<tr>
<td>demographic variables such as gender, age, race, number of household members,</td>
<td>Tukey HSD post hoc</td>
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<tr>
<td>household income, and education when viewing</td>
<td>Pearson’s chi-square Test of Independence</td>
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<td>perceptions of walkability</td>
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<tr>
<td>( H_04 ): There is no statistically significant difference when comparing</td>
<td>Pearson’s chi-square Test of Independence</td>
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<td>demographic variables such as gender, age, race, number of household members,</td>
<td>One-way Analysis of Variance (ANOVA) with</td>
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<tr>
<td>household income, and education when viewing the perceptions of the individuals</td>
<td>Tukey HSD post hoc</td>
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<tr>
<td>residing in urban and suburban neighborhoods</td>
<td>Pearson’s chi-square Test of Independence</td>
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<td>( H_05 ): There are no statistically significant differences</td>
<td>One-way Analysis of Variance (ANOVA) with</td>
</tr>
<tr>
<td>when viewing demographic variables such as gender, age, race, number of household</td>
<td>Tukey HSD post hoc</td>
</tr>
<tr>
<td>members, household income, and education when comparing</td>
<td>Pearson’s chi-square Test of Independence</td>
</tr>
<tr>
<td>urban or suburban neighborhoods when viewing</td>
<td>Independent Samples t-test</td>
</tr>
<tr>
<td>social capital and walkability</td>
<td></td>
</tr>
<tr>
<td>( H_06 ): There is no statistically significant difference when viewing Blue Zones</td>
<td>Pearson’s chi-square Test of Independence</td>
</tr>
<tr>
<td>® program awareness when comparing urban and suburban neighborhoods</td>
<td></td>
</tr>
<tr>
<td>( H_07 ): There are no statistically significant differences</td>
<td>Pearson’s chi-square Test of Independence</td>
</tr>
<tr>
<td>when viewing demographic variables such as gender, age, race, number of household</td>
<td></td>
</tr>
<tr>
<td>members, estimated household income, and level of education when comparing Blue</td>
<td></td>
</tr>
<tr>
<td>Zones® program awareness</td>
<td></td>
</tr>
</tbody>
</table>
Figure 3 presents a research map for the study outlining various steps that were undertaken in a sequential fashion. As one can see viewing this figure, the initial steps involved developing the instrument, selecting the sample, pilot testing, revising the instrument and distributing the instrument. This is followed by collecting and analyzing data.

Figure 3. Research map of methodology used in the study.
CHAPTER 4

RESULTS

The purpose of the present study is to explore the relationship among the built environment, social capital, and walkability. In particular, the study was conducted in a selected Blue Zones® project demonstration community. As such, the study seeks to explore how one’s perception of walkability and social capital influences one’s life’s activities. The research study sought to explore how participation in the Blue Zones® project may affect the perception of walkability and safety, thus increasing physical activity. Further, the study explored the linkages, factors, and influences that the built environment imparts to individuals’ physical activity behaviors.

This chapter presents information regarding the results of the study. The first section includes the survey return rates. The second section presents the demographic information. The third section reports on the research study results regarding walkability. This will include an analysis of results of walkability according to neighborhood type and demographic information. This is followed by the fourth section, which provides respondents’ information regarding social capital. This will also include an analysis of the results of social capital according to the neighborhood type and demographic information. The fifth section presents the results regarding awareness and participation of the Blue Zones® program according to neighborhood type. This will also comprise Blue Zones® awareness, participation, and demographic information.
Return of Data

The total study sample included 400 households grouped by neighborhood type, with 200 survey questionnaires sent to households in the urban group and 200 to households in the suburban group. The sample size of 400 exceeds the sample size (n=397) that is sufficient to represent the population in +5% sampling error (Mitra & Lankford, 1999; Salant & Dillman, 1994; Yamane, 1967). Each household received a postcard with information about the study, its importance, and notice that a study packet was forthcoming. The postcard was followed by the survey packet that included the informed consent information, the survey questionnaire and a self-addressed stamped envelope. The return rate for the suburban group was significantly higher than the rate for the urban neighborhood group. As a result, additional contacts were initiated for the urban group. Among the suburban group households, a total of 71 survey questionnaires were returned by the end of the four-week data collection timeframe. Among the urban group mail-out there were 17 undeliverable packets due to vacancies. The final response rate of 48 surveys from urban and 71 surveys from suburban neighborhoods comprise a total of 119 surveys, or 29.9% of the 400 prospective households during the data collection timeframe.

Demographic Information

To report the demographic profile of the study respondents’ frequencies, means and percentages were calculated for gender, age, race, number of household members, household income, and education level. In addition, information regarding respondents’
location in urban or suburban neighborhoods was also reported. These are found in Tables 3 through 10.

Table 3 presents the results regarding the neighborhood type of the respondents. There were 48 respondents from the urban type neighborhoods (40.3%) and 71 (59.7%) from suburban type neighborhoods. Additionally, one study participant neglected to indicate responses to the first page of the survey regarding walkable destinations and neighborhood dwelling makeup while two participants did not provide responses to the demographic portion of the survey.

Table 3

*Frequency and percentage of response by neighborhood type*

<table>
<thead>
<tr>
<th>Neighborhood Type</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>48</td>
<td>40.3</td>
</tr>
<tr>
<td>Suburban</td>
<td>71</td>
<td>59.7</td>
</tr>
<tr>
<td>Total</td>
<td>119</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 4 offers study findings when viewing the results by gender. There were 75 females, or 63.0% of the respondents, and 41 males, or 34.5% of the respondents. An additional choice on the survey instrument was to decline to report one’s gender. One respondent, or 0.8% of the study participants, selected this option.
Table 4

Gender of Respondents

<table>
<thead>
<tr>
<th>Gender</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>75</td>
<td>63.0</td>
</tr>
<tr>
<td>Male</td>
<td>41</td>
<td>34.5</td>
</tr>
<tr>
<td>Not Reported</td>
<td>1</td>
<td>0.8</td>
</tr>
<tr>
<td>Total</td>
<td>117</td>
<td>98.3</td>
</tr>
<tr>
<td>Missing</td>
<td>2</td>
<td>1.7</td>
</tr>
<tr>
<td>Total</td>
<td>119</td>
<td>100.0</td>
</tr>
</tbody>
</table>

The age of the respondents can be found in Table 5. For the purposes of statistical analysis respondents were clustered in three groups. The first were respondents between the ages of 18 and 44, the second were respondents between 45 and 64 years of age, and the third group were respondents 65 years of age and older. As one can see viewing this table, 19 respondents (15.9%) were between the ages of 18 and 44, 35 (29.4%) were between ages 45 and 64, and 63 respondents (52.9%) were 65 and older.
Table 5

*Age of Respondents*

<table>
<thead>
<tr>
<th>Age</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 to 44 years</td>
<td>19</td>
<td>15.9</td>
</tr>
<tr>
<td>45 to 64 years</td>
<td>35</td>
<td>29.4</td>
</tr>
<tr>
<td>65 years and older</td>
<td>63</td>
<td>52.9</td>
</tr>
<tr>
<td>Total</td>
<td>117</td>
<td>98.3</td>
</tr>
<tr>
<td>Missing</td>
<td>2</td>
<td>1.7</td>
</tr>
<tr>
<td>Total</td>
<td>119</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 6 provides information regarding the race of respondents. Although, multiple options were available to the respondents, including identifying one’s self as White, Black or African American, Hispanic/Latino, Asian, American Indian or Alaska Native, or two or more ethnicities. However, an overwhelming number of respondents reported being White. Of those respondents reporting on this question, 116 or 97.5% reported being White. A single respondent indicated being Asian (0.8%). No other racial categories were identified by any of the respondents. As a result, the demographic category of race was excluded from further statistical analysis.
The study also sought information on the number of members in the households studied. Overall, the number of members in the responding households was 266 individuals. The most frequent response was households with two individuals. Of those responding to the study 55 participants, or 46.2 percent of the study population, reported living in households with two individuals. This was followed by households reporting one household member where 30 respondents, or 25.2 percent of the study population, reported living in this situation. For statistical analysis, the number of household members were clustered into three groups where one-member household comprised the first group, two-member households was the second group and three or more members made up the third group. These findings are presented in Table 7.

### Table 6

**Race**

<table>
<thead>
<tr>
<th>Race</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>116</td>
<td>97.5</td>
</tr>
<tr>
<td>Asian</td>
<td>1</td>
<td>0.8</td>
</tr>
<tr>
<td>Total</td>
<td>117</td>
<td>98.3</td>
</tr>
<tr>
<td>Missing</td>
<td>2</td>
<td>1.7</td>
</tr>
<tr>
<td>Total</td>
<td>119</td>
<td>100.0</td>
</tr>
</tbody>
</table>
When examining the study by urban or suburban neighborhood type, there were 108 (40.6%) of respondents who were members of households in urban settings and 158 (59.4%) were members in suburban settings. Table 8 illustrates these findings.
Table 8

*Number of Individuals in Urban and Suburban neighborhoods*

<table>
<thead>
<tr>
<th>Neighborhood Type</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>108</td>
<td>40.6</td>
</tr>
<tr>
<td>Suburban</td>
<td>158</td>
<td>59.4</td>
</tr>
<tr>
<td>Total</td>
<td>266</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 9 presents information regarding household income of the respondents. Two (1.7%) of the respondents reported an income of under $15,000. Three (2.5%) indicated incomes ranging from $15,000 – $24,999. Seven (5.9%) specified incomes ranging from $25,000 – $34,999. Eighteen (15.1%) reported incomes ranging from $35,000 – $49,999. Thirty-one (26.1%) indicated incomes ranging from $50,000 – 74,999. Seventeen (14.3%) specified incomes ranging from $75,000 – $99,999. Twenty (16.8%) stated incomes ranging from $100,000 – $149,999. Eight (6.7%) report incomes ranging from $150,000-$199,000 and eleven (9.2%) indicated incomes $200,000 and over. For statistical analysis, income level was converted to three groups, low ($0-$34,999), middle ($35,000-$99,999), and high ($100,000 and above).
Table 9

*Estimated Household Income*

<table>
<thead>
<tr>
<th>Household Income</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under $15,000</td>
<td>2</td>
<td>1.7</td>
</tr>
<tr>
<td>$15,000-$24,999</td>
<td>3</td>
<td>2.5</td>
</tr>
<tr>
<td>$25,000-$34,999</td>
<td>7</td>
<td>5.9</td>
</tr>
<tr>
<td>$35,000-$49,999</td>
<td>18</td>
<td>15.1</td>
</tr>
<tr>
<td>$50,000-$74,999</td>
<td>31</td>
<td>26.1</td>
</tr>
<tr>
<td>$75,000-$99,999</td>
<td>17</td>
<td>14.3</td>
</tr>
<tr>
<td>$100,000-$149,999</td>
<td>20</td>
<td>16.8</td>
</tr>
<tr>
<td>$150,000-$199,999</td>
<td>8</td>
<td>6.7</td>
</tr>
<tr>
<td>$200,000 and over</td>
<td>11</td>
<td>9.2</td>
</tr>
<tr>
<td>Total</td>
<td>117</td>
<td>98.3</td>
</tr>
<tr>
<td>Missing</td>
<td>2</td>
<td>1.7</td>
</tr>
<tr>
<td>Total</td>
<td>119</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 10 provides information regarding the respondents’ educational attainment.

Two respondents (1.7%) report having less than a high school diploma. Fifteen (12.6%) indicated having a high school diploma. Sixteen (13.4%) specified having attended college without earning a degree. Eight (6.7%) of respondents’ report earning an associate’s degree. Twenty-eight (23.5%) indicate earning a bachelor’s degree. Forty-
eight (40.3%) report earning a graduate or professional degree. For statistical analysis, educational level was clustered into three groups, first (no diploma, diploma and some college but no degree), second (associate’s and bachelor’s), and last (graduate or professional).

Table 10

*Educational Achievement Level*

<table>
<thead>
<tr>
<th>Education</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than High School</td>
<td>2</td>
<td>1.7</td>
</tr>
<tr>
<td>High School Graduate</td>
<td>15</td>
<td>12.6</td>
</tr>
<tr>
<td>Some College, no degree</td>
<td>16</td>
<td>13.4</td>
</tr>
<tr>
<td>Associate Degree</td>
<td>8</td>
<td>6.7</td>
</tr>
<tr>
<td>Bachelor’s Degree</td>
<td>28</td>
<td>23.5</td>
</tr>
<tr>
<td>Graduate or Professional Degree</td>
<td>48</td>
<td>40.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>117</td>
<td><strong>98.3</strong></td>
</tr>
<tr>
<td><strong>Missing</strong></td>
<td>2</td>
<td><strong>1.7</strong></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>119</td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>
Walkability

To answer the research question “what are the perceptions of walkability in a select Blue Zones® project demonstration community?” several questions were included in the instrument. The following provides the results related to this question. The results are found in Tables 11 through 14. It should be noted that a single respondent neglected to respond to all items found on the first page of the study instrument.

Table 11 reports on the number of potentially walkable locations with the question “Which destinations from the list could you access by walking from your home?” Participants were presented with a list of potential walkable locations. For this question the issue was not one of determining specific location types, but the number of locations respondents felt were within a walkable distance. Participants were provided a list of common destinations one might frequent as part of their daily routine. The list included such places as a local corner shop or convenience store, a local school, a park, a walking/biking trail, a community center or recreation center, a daycare or child care facility, a physician’s office or health clinic, a restaurant/coffee shop, bar/tavern, or the location of their employment. Participants were also provided a choice indicating no walkable destinations.

As one can see viewing Table 11 the range of walkable locations was between zero and ten. The most frequent response indicated that there were two walkable locations, reported by 22 individuals or 18.5%. This was followed by 17 respondents, or 14.3% of the participants of the study, who indicated seven locations. Other potentially walkable sites included three and eight locations, each representing 11.8% of the
respondents. When combined these four response options represent 56.4% of the total respondents.

Table 11

*Number of Potentially Walkable Locations*

<table>
<thead>
<tr>
<th>Number of Locations</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>0.8</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
<td>3.4</td>
</tr>
<tr>
<td>2</td>
<td>22</td>
<td>18.5</td>
</tr>
<tr>
<td>3</td>
<td>14</td>
<td>11.8</td>
</tr>
<tr>
<td>4</td>
<td>11</td>
<td>9.2</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>4.2</td>
</tr>
<tr>
<td>6</td>
<td>12</td>
<td>10.1</td>
</tr>
<tr>
<td>7</td>
<td>17</td>
<td>14.3</td>
</tr>
<tr>
<td>8</td>
<td>14</td>
<td>11.8</td>
</tr>
<tr>
<td>9</td>
<td>13</td>
<td>10.9</td>
</tr>
<tr>
<td>10</td>
<td>5</td>
<td>4.2</td>
</tr>
<tr>
<td>Total</td>
<td>118</td>
<td>99.2</td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
<td>0.8</td>
</tr>
<tr>
<td>Total</td>
<td>119</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Table 12 provides the response frequencies and percentages for destinations to which respondents do walk. Utilizing the same list of potentially walkable destinations, respondents were asked for reactions to the question “Which destinations do you walk to from your home?” Table 12 shows the highest number reported was two locations or 30.3% by 36 individuals. This was followed by seventeen individuals 14.3% reporting that they walked to one location. Sixteen individuals reported walking to three or four locations respectively, or 13.4% for each of these reported frequencies. When combining these four items respondents represent 71.4% of the total study population.
Study respondents were asked to identify the number of detached single-family residences and the number of apartments or condos from one to three stories are in their neighborhood. These results are found in Table 13. The greatest frequency of response

<table>
<thead>
<tr>
<th>Number of Locations</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>12</td>
<td>10.1</td>
</tr>
<tr>
<td>1</td>
<td>17</td>
<td>14.3</td>
</tr>
<tr>
<td>2</td>
<td>36</td>
<td>30.3</td>
</tr>
<tr>
<td>3</td>
<td>16</td>
<td>13.4</td>
</tr>
<tr>
<td>4</td>
<td>16</td>
<td>13.4</td>
</tr>
<tr>
<td>5</td>
<td>10</td>
<td>8.4</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>5.0</td>
</tr>
<tr>
<td>7</td>
<td>3</td>
<td>2.5</td>
</tr>
<tr>
<td>8</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>9</td>
<td>11</td>
<td>0.8</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>0.8</td>
</tr>
<tr>
<td>Total</td>
<td>118</td>
<td>99.2</td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
<td>0.8</td>
</tr>
<tr>
<td>Total</td>
<td>119</td>
<td>100.0</td>
</tr>
</tbody>
</table>
for single family residences was “most” with 47 or 39.5% and the highest response for the number of apartments/condos was “few” with 34 or 28.6%.

Table 13

*Types of Dwellings*

<table>
<thead>
<tr>
<th>Dwelling</th>
<th>None (%)</th>
<th>Few (%)</th>
<th>Some (%)</th>
<th>Most (%)</th>
<th>All (%)</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-family residences</td>
<td>17 (14.3)</td>
<td>10 (8.4)</td>
<td>16 (13.4)</td>
<td>47 (39.5)</td>
<td>28 (23.5)</td>
<td>3.5</td>
<td>1.332</td>
</tr>
<tr>
<td>Apartments or condos</td>
<td>30 (25.2)</td>
<td>34 (28.6)</td>
<td>26 (21.8)</td>
<td>16 (13.4)</td>
<td>12 (10.1)</td>
<td>2.54</td>
<td>1.285</td>
</tr>
</tbody>
</table>

Table 14 provides results of survey items directed at participants’ neighborhood and walkability. Respondents were asked to rate their perception on walkability using a 5-point scale (*1* = *strongly disagree*, 2 = *disagree*, 3 = *neutral*, 4 = *agree*, 5 = *strongly agree*). For the question “There are sidewalks on most streets in my neighborhood,” the most frequent response was *strongly agree* with 92 (77.3%). For the next question “The sidewalks in my neighborhood are well maintained,” (paved, even, and not a lot of cracks) the most frequent response was *strongly agree* with 67 (56.3%). This was followed by a question which asked “There are bicycle or pedestrian trails in or near my neighborhood that are easy to get to” had the highest response *agree* of 71 (59.7%) reported. The next question asked “Sidewalks are separated from the road/traffic in my neighborhood by parked cars” with the most frequent selection being *agree* with 30
(25.2%). Last, respondents were asked “There is a grass/dirt strip that separates the streets from the sidewalks in my neighborhood” presented the highest response rate of strongly agree at 79 responses (66.4%).

Table 14
Perceptions of Walkability

<table>
<thead>
<tr>
<th>Variable</th>
<th>Strongly Disagree (%)</th>
<th>Disagree (%)</th>
<th>Neutral (%)</th>
<th>Agree (%)</th>
<th>Strongly Agree (%)</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>There are sidewalks on most streets in my neighborhood.</td>
<td>4 (3.4)</td>
<td>0 (0)</td>
<td>1 (.8)</td>
<td>22 (18.5)</td>
<td>92 (77.3)</td>
<td>4.66</td>
<td>.805</td>
</tr>
<tr>
<td>The sidewalks in my neighborhood are well maintained (paved, even, and not a lot of cracks).</td>
<td>3 (2.5)</td>
<td>4 (3.4)</td>
<td>5 (4.2)</td>
<td>40 (33.6)</td>
<td>67 (56.3)</td>
<td>4.38</td>
<td>.911</td>
</tr>
<tr>
<td>There are bicycle or pedestrian trails in or near my neighborhood that are easy to get to.</td>
<td>1 (.8)</td>
<td>6 (5.0)</td>
<td>8 (6.7)</td>
<td>33 (27.7)</td>
<td>71 (59.7)</td>
<td>4.40</td>
<td>.886</td>
</tr>
<tr>
<td>Sidewalks are separated from the road/traffic in my neighborhood by parked cars.</td>
<td>21 (17.6)</td>
<td>26 (21.8)</td>
<td>16 (13.4)</td>
<td>30 (25.2)</td>
<td>26 (21.8)</td>
<td>3.12</td>
<td>1.433</td>
</tr>
<tr>
<td>There is a grass/dirt strip that separates the streets from the sidewalks in my neighborhood.</td>
<td>3 (2.5)</td>
<td>2 (1.7)</td>
<td>3 (2.5)</td>
<td>32 (26.9)</td>
<td>79 (66.4)</td>
<td>4.53</td>
<td>.842</td>
</tr>
</tbody>
</table>
Social Capital: Neighborhood and Community Social Environment

Table 15 reports on perceptions of the respondents regarding their neighborhood and community social environment. In this table like the one above, a 5-point scale was employed (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree). When asked the question “In general, you feel that people can be trusted,” respondents mostly agree 62 (52.1%). In response to the question “People in your neighborhood can be trusted,” the most selected response of strongly agree, indicated by 57 (47.9%). When answering the question “You feel safe when you walk or bike in your neighborhood,” participants reported strongly agree 71 times (59.7%). Asking respondents if “You feel connected with your community,” most participants, 63 (52.9%) reported that they agree. This was followed by a question “You frequently visit your neighbors,” with 55 respondents 46.2% indicating that they agree. The last question asked “Your neighbors frequently visit you,” and 46 respondents (38.7%) indicated that they agree.
Table 15

Perceptions of Neighborhood and Community Social Environment

<table>
<thead>
<tr>
<th>Variable</th>
<th>Strongly Disagree (%)</th>
<th>Disagree (%)</th>
<th>Neutral (%)</th>
<th>Agree (%)</th>
<th>Strongly Agree (%)</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>In general, you feel that people can be trusted.</td>
<td>2(1.7)</td>
<td>4(3.4)</td>
<td>16(13.4)</td>
<td>62(52.1)</td>
<td>35(29.4)</td>
<td>4.04</td>
<td>.848</td>
</tr>
<tr>
<td>People in your neighborhood can be trusted.</td>
<td>1(.8)</td>
<td>0(0)</td>
<td>11(9.2)</td>
<td>50(42.0)</td>
<td>57(47.9)</td>
<td>4.36</td>
<td>.722</td>
</tr>
<tr>
<td>You feel safe when you walk or bike in your neighborhood.</td>
<td>1.(8)</td>
<td>1(8)</td>
<td>1(8)</td>
<td>45(37.8)</td>
<td>71(59.7)</td>
<td>4.55</td>
<td>.648</td>
</tr>
<tr>
<td>You feel connected with your community.</td>
<td>1(8)</td>
<td>4(3.4)</td>
<td>31(26.1)</td>
<td>63(52.9)</td>
<td>20(16.8)</td>
<td>3.82</td>
<td>.781</td>
</tr>
<tr>
<td>You frequently visit your neighbors.</td>
<td>3(2.5)</td>
<td>20(16.8)</td>
<td>31(26.1)</td>
<td>55(46.2)</td>
<td>10(8.4)</td>
<td>3.41</td>
<td>.951</td>
</tr>
<tr>
<td>Your neighbors frequently visit you.</td>
<td>3(2.5)</td>
<td>25(21.0)</td>
<td>35(29.4)</td>
<td>46(38.7)</td>
<td>10(8.4)</td>
<td>3.29</td>
<td>.977</td>
</tr>
</tbody>
</table>

Table 16 presents information regarding participation in various civic activities.

In this table, participants were asked to select a dichotomized yes or no response to each of the questions. When asked the question “Have you worked on a community project within the past year?” respondents mostly replied no: 81 (68.1%) chose this response
option. Responding to the question “Have you volunteered in your community in the past year?” 51 participants (57.1%) indicated yes. When answering the question “Have you attended a city council meeting in the past year?” 101 participants (84.9%) reported no. When asked “Did you vote in the last general election?” most participants (106 or 89.1%) indicated yes.

Table 16

*Community Participation*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Yes – f(%)</th>
<th>No – f(%)</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you worked on a community project</td>
<td>38(31.9)</td>
<td>81(68.1)</td>
<td>1.32</td>
<td>.468</td>
</tr>
<tr>
<td>Have you volunteered in your community</td>
<td>68(57.1)</td>
<td>51(42.9)</td>
<td>1.57</td>
<td>.497</td>
</tr>
<tr>
<td>Have you attended a city council meeting</td>
<td>18(15.1)</td>
<td>101(84.9)</td>
<td>1.15</td>
<td>.360</td>
</tr>
<tr>
<td>Did you vote in the last general election</td>
<td>106(89.1)</td>
<td>13(10.9)</td>
<td>1.89</td>
<td>.313</td>
</tr>
</tbody>
</table>
Hypothesis Statements for Demographics, Walkability, Social Capital and Neighborhood Type

Several research questions were posited to guide the study. These are found in Chapter 1. A number of hypothesis statements were established in null form from the research questions to aid in the statistical analysis. The following provides the results related to the hypothesis statements.

$H_0$: There is no statistically significant difference between the perceptions of respondents residing in urban or suburban neighborhoods when viewing social capital and walkability. The results demonstrated that there was a statistically significant difference between the perceptions of respondents residing in urban or suburban neighborhoods when viewing social capital and walkability. In order to determine whether or not a relationship existed between perception of walkability and neighborhood type, an independent samples t-test was calculated ($t(117) = 3.607, p < .05$). The results demonstrated that there was a statistical difference between urban ($m = 37.3125, SD = 5.4074$) and suburban groups ($m = 33.6338, SD = 5.49087$) when viewing perceptions of walkability. The results comparing perceptions of social capital and neighborhood type showed a statistically significant difference ($t(117) = -3.363, p < .05$) between urban ($m = 28.0417, SD = 3.67255$) and suburban ($m = 30.3239, SD = 3.60466$) neighborhood types. Therefore, the null hypothesis that there is no statistically significant difference between the perceptions of respondents residing in urban or suburban neighborhoods when viewing social capital and walkability is rejected. These results can be found in Table 17 and Table 18.
Table 17

*Walkability and Neighborhood Type Independent Samples t-Test*

<table>
<thead>
<tr>
<th>Neighborhood Type</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>F</th>
<th>t-value</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>48</td>
<td>37.3125</td>
<td>5.40747</td>
<td>.076</td>
<td>3.607</td>
<td>.000*</td>
</tr>
<tr>
<td>Suburban</td>
<td>71</td>
<td>33.6338</td>
<td>5.49087</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. *p < .05

Table 18

*Social Capital and Neighborhood Type Independent Samples t-Test*

<table>
<thead>
<tr>
<th>Neighborhood Type</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>F</th>
<th>t-value</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>48</td>
<td>28.0417</td>
<td>3.67255</td>
<td>.083</td>
<td>-3.363</td>
<td>.001*</td>
</tr>
<tr>
<td>Suburban</td>
<td>71</td>
<td>30.3239</td>
<td>3.60466</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. *p < .05

H₂: There is no statistically significant difference when comparing demographic variables such as gender, age, race, number of household members, household income and education when viewing perceptions of social capital. To test this hypothesis a one-way ANOVA was calculated for categorically grouped data. No statistically significant differences were found for age \((F(2,114) = .136, p > .05)\) and household members \((F(2,114) = .013, p > .05)\). However, household income \((F(2,114) = 4.116, p < .05)\) and level of education \((F(2,114) = 4.470, p < .05)\) were significant. These results can be found in Table 19.
Table 19

*Social Capital and Selected Demographic Variables One-way ANOVA*

<table>
<thead>
<tr>
<th>Variable</th>
<th>$F$</th>
<th>Sig.</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>.136</td>
<td>.873</td>
<td>2, 114</td>
</tr>
<tr>
<td>Household Members</td>
<td>.013</td>
<td>.987</td>
<td>2, 114</td>
</tr>
<tr>
<td>Household Income</td>
<td>4.116</td>
<td>.019*</td>
<td>2, 114</td>
</tr>
<tr>
<td>Education</td>
<td>4.470</td>
<td>.014*</td>
<td>2, 114</td>
</tr>
</tbody>
</table>

Note. *$p < .05$*

A Tukey’s HSD was calculated to identify the differences among income groups. The analysis revealed that the high-income group had a higher mean social capital score ($m = 30.64, SD = 3.98$) than the mean score for the low-income group ($m = 27.50, SD = 4.42$). The middle-income group did not differ significantly from either of the two other groups ($m = 29.02, SD = 3.40$). The post hoc analysis for educational level showed that the mean social capital score for the no diploma/diploma/no degree group was lower ($m = 28.212, SD = 4.435$) than the mean social capital score for the graduate/professional group ($m = 30.583, SD = 3.841$). The associate’s/bachelor’s degree group did not significantly differ from either of the other groups. These results are presented in Tables 20 and 21.
Table 20

**Social Capital and Household income Tukey HSD**

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Income</td>
<td>12</td>
<td>27.50*</td>
<td>4.42</td>
</tr>
<tr>
<td>Middle Income</td>
<td>66</td>
<td>29.02</td>
<td>3.40</td>
</tr>
<tr>
<td>High Income</td>
<td>39</td>
<td>30.64*</td>
<td>3.98</td>
</tr>
</tbody>
</table>

Note. *p < .05

Table 21

**Social Capital and Education Level Tukey HSD**

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Diploma/Diploma/ No Degree</td>
<td>33</td>
<td>28.21*</td>
<td>4.44</td>
</tr>
<tr>
<td>Associate’s/Bachelor’s</td>
<td>36</td>
<td>28.92</td>
<td>3.20</td>
</tr>
<tr>
<td>Graduate/Professional</td>
<td>48</td>
<td>30.58*</td>
<td>3.48</td>
</tr>
</tbody>
</table>

Note. *p < .05

To test H:02 for dichotomized demographic variables of gender and social capital, a chi-square test of independence was calculated. No statistically significant relationship was found ($\chi^2(36) = 24.79, p > .05$). These results are presented in Table 22.
Therefore, in its entirety, the hypothesis that there is no statistically significant difference when comparing demographic variables such as gender, age, race, and number of household members was retained. However, the demographic variables of household income and educational attainment when viewing perceptions of social capital were statistically significant. The incidence of variables showing no significance outweigh those that showed significance and therefore overall the null hypothesis was retained.

H$_{03}$. There is no statistically significant difference when comparing demographic variables such as gender, age, race, number of household members, household income, and education when viewing perceptions of walkability. To test this hypothesis a one-way ANOVA was calculated for categorically grouped variables. No statistical significance was found for age ($F(2,114) = 1.857, p > .05$). Age group 1 (18 to 44 years) had a mean score of 36.57 ($SD = 6.3$), group 2 (45 to 64 years) produced a mean score of 36.05 ($SD = 5.99$), and age group 3 (65 years and older) had a mean score of 34.22 ($SD = 5.38$).
The comparison of perception of walkability scores and household income groups (low, middle, and high) was computed using a one-way ANOVA. The means of walkability scores showed no significant difference between low, middle, and high income groups \( (F(2,114) = 2.544, p > .05) \). Low income households had a mean walkability score of 32.92 \( (SD = 4.12) \), middle income households produced a mean walkability score of 34.67 \( (SD = 5.51) \), and the mean walkability score of the high-income households was 36.67 \( (SD = 6.36) \).

No significance was found when viewing perception of walkability and level of education using a one-way ANOVA \( (F(2,114) = .701, p > .05) \). The mean walkability score for the low education group (less than high school diploma, high school diploma, and some college) was 35.27 \( (SD = 5.1) \). The mean walkability score for the medium education group (associate’s degree, bachelor’s degree) was 34.25 \( (SD = 5.5) \) and the high education group (graduate or professional) had a mean walkability score of 35.75 \( (SD = 6.39) \). However, significance was found for number of household members \( (F(2,114) = 3.441, p < .05) \). These results are found in Table 23.
Table 23

*Walkability and Selected Demographic Variables One-way ANOVA*

<table>
<thead>
<tr>
<th>Variable</th>
<th>F</th>
<th>Sig.</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>1.857</td>
<td>.161</td>
<td>2, 114</td>
</tr>
<tr>
<td>Household Members</td>
<td>3.441</td>
<td>.035*</td>
<td>2, 114</td>
</tr>
<tr>
<td>Household Income</td>
<td>2.544</td>
<td>.083</td>
<td>2, 114</td>
</tr>
<tr>
<td>Education</td>
<td>.701</td>
<td>.498</td>
<td>2, 114</td>
</tr>
</tbody>
</table>

Note. *p < .05

A Tukey HSD analysis of the variable, household members, was calculated and revealed that the mean walkability score of the couple group (m = 33.818, SD = 5.581) was significantly lower than the mean walkability score for the three or more household member group (m = 37.063, SD = 5.512). The single member household mean walkability score was not significantly different from the other two groups. These results are shown in Table 24.

Table 24

*Walkability and Number of Household Members Tukey HSD*

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td>30</td>
<td>35.567</td>
<td>1.081</td>
</tr>
<tr>
<td>Couple</td>
<td>55</td>
<td>33.818*</td>
<td>.753</td>
</tr>
<tr>
<td>Three or more</td>
<td>32</td>
<td>37.063*</td>
<td>.974</td>
</tr>
</tbody>
</table>

Note. *p < .05
To test this hypothesis (H\(_0\):3) for the dichotomized demographic variable of gender and walkability, a chi-square test of independence was calculated. No statistically significant relationship between gender and perception of walkability was found ($\chi^2(48) = 33.001, p > .05$). These results can be seen in Table 25.

Table 25

*Walkability and Gender chi-square*

<table>
<thead>
<tr>
<th>Gender</th>
<th>N</th>
<th>$\chi^2$</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>75</td>
<td>33.001</td>
<td>.951</td>
</tr>
<tr>
<td>Male</td>
<td>41</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. $p > .05$

Statistical significance was found for number in household and walkability scores ($p < .05$). More specifically, the significance was between the couple group and the three or more member household group. The couple group (m = 33.818, $SD = 5.581$) was significantly lower than the mean walkability score for the three or more household member group (m = 37.063, $SD = 5.512$). Therefore the hypothesis that there is no statistically significant difference when comparing demographic variables such as gender, age, race, household income, and education when viewing perceptions of walkability was retained. Only number of household members was statistically significant. The incidence of variables showing no significance outweigh those that showed significance and therefore overall the null hypothesis was retained.
H04. There is no statistically significant difference when comparing demographic variables such as gender, age, race, number of household members, household income, and education when viewing the perceptions of individuals residing in urban and suburban neighborhoods. To test this hypothesis for gender, a Chi-square Test of Independence was performed with a probability level set at \( p = 0.05 \). No statistical significance was found \( (\chi^2(2) = .702, p > .05) \) regarding gender and neighborhood type. The results can be found in Table 26.

Table 26

*Gender and Neighborhood Type*

<table>
<thead>
<tr>
<th>Gender</th>
<th>Female</th>
<th>Male</th>
<th>Prefer Not To Say</th>
<th>Total</th>
<th>( \chi^2 )</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neighborhood Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>31</td>
<td>17</td>
<td>0</td>
<td>48</td>
<td>.702</td>
<td>2</td>
<td>.704</td>
</tr>
<tr>
<td>Suburban</td>
<td>44</td>
<td>24</td>
<td>1</td>
<td>69</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>75</td>
<td>41</td>
<td>1</td>
<td>117</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note* \( p > .05 \)

To test this hypothesis for age, a chi-square test of independence was performed with a probability level set at \( p = 0.05 \) comparing age by neighborhood type. No statistically significant difference was found \( (\chi^2(2) = 2.781, p > .05) \) when viewing age and neighborhood type. Results can be seen in Table 27.
Table 27

Age and Neighborhood Type

<table>
<thead>
<tr>
<th>Age</th>
<th>N</th>
<th>( \chi^2 )</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>48</td>
<td>2.781</td>
<td>.249</td>
</tr>
<tr>
<td>Suburban</td>
<td>69</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note* \( p > .05 \)

To test this hypothesis for number in household, a chi-square was calculated with a probability level set to \( p = .05 \). A statistically significant difference was found (\( \chi^2(2) = 17.604, p < .05 \)). These results are found in Table 28.

Table 28

Number of Household Members and Neighborhood Type

<table>
<thead>
<tr>
<th>Household Number</th>
<th>Single</th>
<th>Couple</th>
<th>Three or More</th>
<th>N</th>
<th>( \chi^2 )</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>20</td>
<td>12</td>
<td>16</td>
<td>48</td>
<td>17.604</td>
<td>.000*</td>
</tr>
<tr>
<td>Suburban</td>
<td>10</td>
<td>43</td>
<td>16</td>
<td>69</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note* \( p < .05 \)

Table 29 presents results from further statistical analysis to identify where the significance is found. The method of Beasley and Schumacker (1995) for post hoc analysis of contingency tables was utilized. This transformation is used to generate a
significance value from the residual when a chi-square statistic has three or more levels and a statistically significant result is indicated based on a Bonferroni adjusted \( p \) value (Beasley & Schumacker, 1995). As one can see in viewing this table, there was a statistically significant value for the single and couple groups. The significance was found in urban and suburban neighborhood types when comparing the single and couple groups.

Table 29

*Number in Household and Neighborhood Type Post Hoc*

<table>
<thead>
<tr>
<th>Neighborhood Type</th>
<th>Number in Household</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>Count</td>
<td>Single</td>
<td>Couple</td>
<td>Three or more</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20.00</td>
<td>12.00</td>
<td>16.00</td>
</tr>
<tr>
<td></td>
<td>% within</td>
<td>41.67</td>
<td>25.00</td>
<td>33.33</td>
</tr>
<tr>
<td></td>
<td>Adjusted residual</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Sig)</td>
<td>.001*</td>
<td>.000*</td>
<td>.226</td>
</tr>
<tr>
<td>Suburban</td>
<td>Count</td>
<td>10.00</td>
<td>43.00</td>
<td>16.00</td>
</tr>
<tr>
<td></td>
<td>% within</td>
<td>14.49</td>
<td>62.32</td>
<td>23.19</td>
</tr>
<tr>
<td></td>
<td>Adjusted residual</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Sig)</td>
<td>.001*</td>
<td>.000*</td>
<td>.226</td>
</tr>
</tbody>
</table>

Note * \( p < .05 \)
To test this hypothesis for household income, a chi-square was calculated with a probability level set to $p = .05$. A statistically significant difference was found ($\chi^2(2) = 8.428, p < .05$) when comparing income by neighborhood type. These results can be found in Table 30.

Table 30

*Household Income and Neighborhood Type*

<table>
<thead>
<tr>
<th>Income Neighborhood Type</th>
<th>Lower income</th>
<th>Middle Income</th>
<th>Higher Income</th>
<th>N</th>
<th>$\chi^2$</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>9</td>
<td>28</td>
<td>11</td>
<td>48</td>
<td>8.428</td>
<td>.015*</td>
</tr>
<tr>
<td>Suburban</td>
<td>3</td>
<td>38</td>
<td>28</td>
<td>69</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note* $p < .05$

Table 31 contains results from further statistical analysis to ascertain where the significance is found. The method of Beasley and Schumacker (1995) for post hoc analysis of contingency tables was performed. This transformation is used to generate a significance value from the adjusted residuals of a contingency table when a chi-square statistic has three or more levels and a statistically significant result is indicated (Beasley & Schumacker, 1995). A Bonferroni adjustment to the $p$ value was also used. As one can see when viewing this table, there is a statistically significant value for the urban and suburban low-income groups.
Table 31

*Household Income and Neighborhood Type Post Hoc*

<table>
<thead>
<tr>
<th>Neighborhood Type</th>
<th>Urban</th>
<th></th>
<th></th>
<th>Suburban</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>Low</td>
<td>Medium</td>
<td>Count</td>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td>Income Level</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>9.00</td>
<td>28.00</td>
<td>11.00</td>
<td>3.00</td>
<td>38.00</td>
<td>28.00</td>
</tr>
<tr>
<td>% within</td>
<td>18.75</td>
<td>58.33</td>
<td>22.92</td>
<td>4.35</td>
<td>55.07</td>
<td>40.58</td>
</tr>
<tr>
<td>Adjusted residual (Sig)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>.011*</td>
<td>.726</td>
<td>.011*</td>
<td>.726</td>
<td>.047</td>
</tr>
</tbody>
</table>

Note * p < .05

To test this hypothesis for education level, a chi-square was calculated with a probability level set to $p = .05$. No statistically significant difference was found ($\chi^2(2) = 3.477, p > .05$). These results can be found in Table 32.
Table 32

*Education level and Neighborhood type*

<table>
<thead>
<tr>
<th>Education Level</th>
<th>Neighborhood Type</th>
<th>Less than a Degree</th>
<th>Associate’s/Bachelor’s</th>
<th>Graduate/Professional</th>
<th>N</th>
<th>$\chi^2$</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Urban</td>
<td>18</td>
<td>13</td>
<td>17</td>
<td>48</td>
<td>3.477</td>
<td>.176</td>
</tr>
<tr>
<td></td>
<td>Suburban</td>
<td>15</td>
<td>23</td>
<td>31</td>
<td>69</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note* p > .05

H$_{05}$. There are no statistically significant differences when viewing demographic variables such as gender, age, race, number of household members, household income, and education when comparing urban or suburban neighborhoods when viewing social capital and walkability. The above hypothesis statement encompasses all of the variable groups. The various statistical tests have been previously calculated and reported. Therefore, the presentation of results regarding the hypothesis statement (H$_{05}$) that “there are no statistically significant differences when viewing demographic variables such as gender, age, race, number of household members, household income, and education when comparing urban or suburban neighborhoods when viewing social capital and walkability” are presented in table format and can be viewed in Table 33.
### Table 33

**Walkability, Social Capital, Neighborhood Type and Selected Demographic Variables**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Gender</th>
<th>Age</th>
<th>Number in Household</th>
<th>Household Income</th>
<th>Educational Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walkability</td>
<td>$\chi^2 = 33.001$</td>
<td>$F = 1.857$</td>
<td>$F = 3.441^*$</td>
<td>$F = 2.544$</td>
<td>$F = .701$</td>
</tr>
<tr>
<td>Social Capital</td>
<td>$\chi^2 = 24.79$</td>
<td>$F = .136$</td>
<td>$F = .013$</td>
<td>$F = 4.116^*$</td>
<td>$F = 4.470^*$</td>
</tr>
<tr>
<td>Neighborhood Type</td>
<td>$\chi^2 = .702$</td>
<td>$\chi^2 = 2.781$</td>
<td>$\chi^2 = 8.428^*$</td>
<td>$\chi^2 = 3.477$</td>
<td>$\chi^2 = 17.604^*$</td>
</tr>
</tbody>
</table>

Note* $p < .05$

As one can see viewing Table 33, a chi-square was calculated to determine the statistical significance of gender and walkability, social capital, and neighborhood type. Findings for the variable gender and walkability were ($\chi^2 = 33.001$, $p = .05$), for gender and social capital ($\chi^2 = 24.79$, $p = .05$) and gender and neighborhood type ($\chi^2 = .702$, $p = .05$). A one-way ANOVA was calculated to determine the statistical significance of age when viewing walkability ($F = 1.857$, $p = .05$) and social capital ($F = .136$, $p = .05$) respectively. To determine the statistical significance of age and neighborhood type a chi-square was calculated ($\chi^2 = 2.781$, $p = .05$).

A one-way ANOVA was calculated to determine the statistical significance of number in household and walkability ($F = 3.441$, $p < .05$) and number in household and social capital ($F = .013$, $p > .05$). To determine the statistical significance of number in household and neighborhood type a chi-square was calculated ($\chi^2 = 17.604$, $p < .05$).
A one-way ANOVA was calculated to determine the statistical significance of household income and walkability ($F = 2.544, p > .05$) and household income and social capital ($F = 4.116, p < .05$). To determine the statistical significance of household income and neighborhood type a chi-square was calculated ($\chi^2 = 8.428, p < .05$).

A one-way ANOVA was calculated to determine the statistical significance of educational level and walkability ($F = .701, p > .05$) and educational level and social capital ($F = 4.470, p < .05$). To determine the statistical significance of educational level and neighborhood type a chi-square was calculated ($\chi^2 = 3.477, p > .05$).

In sum, statistical significance was found for gender, age, number in household, income level, and educational attainment. The preponderance of the findings showed no significance. Therefore, the hypothesis (H:05) that “there are no statistically significant differences when viewing demographic variables such as gender, age, race, number of household members, household income, and education when comparing urban or suburban neighborhoods when viewing social capital and walkability” is retained.

H:06. There is no statistically significant difference when viewing Blue Zones® program awareness and participation when comparing urban and suburban neighborhoods. To test this hypothesis a chi-square was calculated comparing Blue Zones® awareness and participation in urban and suburban neighborhoods with a probability level set at $p = .05$. This procedure initially determining the number of participants that were either aware or not aware of the Blue Zones® program.

The numeric findings of the respondent’s indication of Blue Zones® program awareness and participation by neighborhood type are located in Table 34 and Table 35.
In viewing Table 34 one can discern that the vast majority of individuals (109 of 117) indicated that they are aware of the Blue Zones® program. This is the case in both urban and suburban neighborhoods. In urban neighborhoods, 44 of 48 responses (92%) indicated program awareness. As for suburban neighborhoods, 65 of 69 responses (94%) indicated program awareness. Table 35 shows that a greater number of individuals, 79 of 117 (68%), indicated that they did not participate in the Blue Zones® program in any way than those reporting participation. This is true in both urban and suburban neighborhoods. In urban neighborhoods, 33 of 48 responses (69%) indicated no participation. As for suburban neighborhoods, 46 of 69 responses (67%) indicated no participation of any kind.

Table 34

Blue Zones® Program Awareness by Neighborhood Type

<table>
<thead>
<tr>
<th>Neighborhood Type</th>
<th>Blue Zones® Program Awareness</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No (%)</td>
<td>Yes (%)</td>
</tr>
<tr>
<td>Urban</td>
<td>4(8.3)</td>
<td>44(91.7)</td>
</tr>
<tr>
<td>Suburban</td>
<td>4(5.8)</td>
<td>65(94.2)</td>
</tr>
<tr>
<td>Total</td>
<td>8(6.8)</td>
<td>109(93.2)</td>
</tr>
</tbody>
</table>
Table 35

*Blue Zones® Program Participation by Neighborhood Type*

<table>
<thead>
<tr>
<th>Neighborhood Type</th>
<th>No (%)</th>
<th>Yes (%)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>33(68.8)</td>
<td>15(31.3)</td>
<td>48</td>
</tr>
<tr>
<td>Suburban</td>
<td>46(66.7)</td>
<td>23(33.3)</td>
<td>69</td>
</tr>
<tr>
<td>Total</td>
<td>79(67.5)</td>
<td>38(32.5)</td>
<td>117</td>
</tr>
</tbody>
</table>

When calculating the chi-square analysis, no statistically significant relationship was found for Blue Zones® awareness ($\chi^2 (1) = .286, p > .05$) or Blue Zones® participation ($\chi^2 (1) = .056, p > .05$). Neighborhood type, Blue Zones® program awareness and participation appear to be independent. Results for the chi-square analysis are shown in Table 36.
Table 36

*Blue Zones® and Neighborhood Type*

<table>
<thead>
<tr>
<th>Neighborhood Type</th>
<th>Urban</th>
<th>Suburban</th>
<th>$X^2$</th>
<th>df</th>
<th>sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No (%)</td>
<td>Yes (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4(8.3)</td>
<td>44(9.2)</td>
<td>.286</td>
<td>1</td>
<td>.593</td>
</tr>
<tr>
<td>Awareness</td>
<td>4(5.8)</td>
<td>65(94.2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participation</td>
<td>33(68.8)</td>
<td>15(31.3)</td>
<td>.056</td>
<td>1</td>
<td>.813</td>
</tr>
<tr>
<td></td>
<td>46(66.7)</td>
<td>23(33.3)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. $p > .05$

Therefore, the hypothesis statement ($H_0$) that “there is no statistically significant difference when viewing Blue Zones® program awareness and participation when comparing urban and suburban neighborhoods” was retained.

$H_0$. There are no statistically significant differences when viewing demographic variables such as gender, age, race, number of household members, estimated household income, and level of education when comparing Blue Zones® program awareness and participation. To test this hypothesis a chi-square was performed with a probability level set at $p = .05$.

The findings for gender, age, race, number of household members, estimated household income, and level of education when comparing Blue Zones® program awareness is found in Table 37. None of the statistical calculations were significant at the $p = .05$ level for gender ($\chi^2(2) = 2.869, p > .05$), age ($\chi^2(2) = 1.658, p > .05$), number in household ($\chi^2(2) = 1.034, p > .05$), estimated household income ($\chi^2(2) = .277, p > .05$).
and level of education ($\chi^2(2) = .382, p > .05$). The demographic variables of age, race, number of household members, estimated household income, and level of education appear to be independent.

Table 37

Blue Zones® Awareness in Selected Demographic Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>$\chi^2$</th>
<th>df</th>
<th>sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>2.869</td>
<td>2</td>
<td>.238</td>
</tr>
<tr>
<td>Age</td>
<td>1.658</td>
<td>2</td>
<td>.436</td>
</tr>
<tr>
<td>Household Members</td>
<td>1.034</td>
<td>2</td>
<td>.596</td>
</tr>
<tr>
<td>Household Income</td>
<td>.277</td>
<td>2</td>
<td>.870</td>
</tr>
<tr>
<td>Education</td>
<td>.382</td>
<td>2</td>
<td>.826</td>
</tr>
</tbody>
</table>

Note. $p > .05$

The findings for gender, age, race, number of household members, estimated household income, and level of education when comparing Blue Zones® program participation is found in Table 38. None of the statistical calculations were significant at the $p = .05$ level for gender ($\chi^2(2) = 1.502, p > .05$), age ($\chi^2(2) = 1.387, p > .05$), number in household ($\chi^2(2) = 1.084, p > .05$), estimated household income ($\chi^2(2) = 1.080, p > .05$), and level of education ($\chi^2(2) = .486, p > .05$). The demographic variables of age, race, number of household members, estimated household income, and level of education seem to be independent. Therefore, the hypothesis ($H_0$) statement “there are no
statistically significant differences when viewing demographic variables such as gender, age, race, number of household members, estimated household income, and level of education when comparing Blue Zones® program awareness and participation was retained.

Table 38

*Blue Zones® Participation and Selected Demographic Variables*

<table>
<thead>
<tr>
<th>Variable</th>
<th>$\chi^2$</th>
<th>df</th>
<th>sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>1.502</td>
<td>2</td>
<td>.472</td>
</tr>
<tr>
<td>Age</td>
<td>1.387</td>
<td>2</td>
<td>.500</td>
</tr>
<tr>
<td>Household Members</td>
<td>1.084</td>
<td>2</td>
<td>.582</td>
</tr>
<tr>
<td>Household Income</td>
<td>1.080</td>
<td>2</td>
<td>.583</td>
</tr>
<tr>
<td>Level of Education</td>
<td>.486</td>
<td>2</td>
<td>.791</td>
</tr>
</tbody>
</table>

Note. $p > .05$  

Summary of Findings

Chapter 4 provided an analysis of the findings and results of the study. The research was aimed at investigating the relationships among walkability, social capital, neighborhood types, and selected demographic variables. In addition, the study was conducted in a Blue Zones® Demonstration site community. Overall, 119 individuals participated in the study, with 48 from urban neighborhoods and 71 from suburban neighborhoods. Age groups ranged from 18 to 44 years, 45 to 64 years, and 65 plus years.
There were 75 female and 41 male participants, with one respondent who did not report on gender. The study focused on the participants’ perception of walkable locations, and other variables such as neighborhood type, community social environment, and engagement.

Seven hypothesis statements were used in the formulation of the study. They were: (1) there is no statistically significant difference between the perceptions of respondents residing in urban or suburban neighborhoods when viewing walkability and social capital; (2) there is no statistically significant difference when comparing demographic variables such as gender, age, race, number of household members, estimated household income, and level of education when viewing perceptions of social capital; (3) there is no statistically significant difference when comparing demographic variables such as gender, age, race, number of household members, estimated household income, and level of education when viewing perceptions of walkability; (4) there is no statistically significant difference when comparing demographic variables such as gender, age, race, number of household members, estimated household income, and level of education when viewing the perceptions of the individuals residing in urban and suburban neighborhoods; (5) there are no statistically significant differences when viewing demographic variables such as gender, age, race, number of household members, estimated household income, and level of education when comparing urban or suburban neighborhoods when viewing social capital and walkability; (6) there is no statistically significant difference when viewing Blue Zones® program awareness and participation when comparing urban and suburban neighborhoods; and (7) there are no statistically
significant differences when viewing demographic variables such as gender, age, race, number of household members, estimated household income, and level of education when comparing Blue Zones® program awareness and participation. The preponderance of calculations showed no statistically significant differences among hypothesis statements and in the main they were retained. A single hypothesis statement (H:01) was rejected. The hypothesis investigated walkability and social capital when viewing neighborhood type.
CHAPTER 5
SUMMARY, DISCUSSION AND RECOMMENDATIONS

Introduction
The purpose of the present study was to explore the relationship among the built environment, social capital, and walkability. In particular, the study was conducted in a selected Blue Zones® project demonstration community. As such, the study sought to explore how one’s perception of walkability and social capital influences one’s life’s activities. The research study sought to explore how participation in the Blue Zones® project may affect the perception of walkability and safety, thus increasing physical activity. Further, the study explored the linkages, factors, and influences that the built environment imparts to individuals’ physical activity behaviors.

This chapter presents a discussion of the findings and recommendations. The first section provides a summary and discussion of the findings with a particular emphasis on the hypothesis statements. The next section presents recommendations concerning implications for professional practice. The third section offers recommendations for future research. The last section provides conclusions to the study.

Summary and Discussion
The way in which communities are designed, developed, and organized has a great deal to do with promoting higher quality of life and community livability. Often the term the “built environment” describes both natural and manmade areas, facilities, and structures and not just the physical or natural environment. Indeed, the built environment also encompasses social and cultural factors which are unique to a given community.
(Flack et al., 2013). Increasingly, greater attention has focused on crafting the built environment to promote more walkable streetscapes, and opportunities for community engagement and social capital have become more prominent in the minds of citizens, community developers, and public policy planners. Especially at the vanguard of this undertaking, there has been an increased concern for existing developments integrated with new walkways and structures. Such new structures are often developed with the human scale in mind, which makes them more accessible and integrated into residents’ daily lives.

Participants in this study focusing on walkability and social capital in urban and suburban environments included 119 respondents. Forty-eight (40.3%) respondents were from urban neighborhoods and 71 (59.7%) were from suburban neighborhoods. There were 75 females (63.0 % of the respondents) and 41 males (34.5%) included in the study. One respondent declined to report their gender. The respondents’ ages were clustered in three categories (ages of 18 to 44; 45 to 64 years of age; and 65 years of age and older). The largest group was 65 and older, with 63 participants (52.9%) reporting this age range. Nineteen respondents (15.9%) were between the ages of 18 and 44 and 35 (29.4%) were between the ages of 45 and 64. An overwhelming number of respondents reported being white (116 individuals or 97.5%). One respondent indicated being Asian (0.8%).

The number of individuals living in all of the households combined was reported as being 266. The most frequent response to the question number of individuals residing in an individual household was two persons, with 55 respondents 46.2%) selecting this response option. Also, 108 individuals (40.6%) of respondents were drawn from urban
neighborhoods. Suburban environments included 158 individuals (59.4%) of the respondents. Twelve (10.3%) of the respondents reported an estimated annual income of $0.00 to $34,999. Sixty-six (56.4%) of study participants report estimated annual incomes ranging from $35,000 – $99,999. Thirty-nine (33.3%) of households stated estimated annual incomes of $100,000 and over.

Study participants were asked to report their level of educational attainment. Thirty-three (28.2%) reported no high school diploma, diploma, or some college. Eight (6.7%) report earning an associate’s degree. Twenty-eight (23.5%) indicate earning a bachelor’s degree. Combined, those earning an associate’s or a bachelor’s degree accounted for 36 (30.8%) of total responses. Forty-eight (40.3%) of respondents indicated that they held a master’s or professional degree.

Respondents were also asked to provide their perceptions of walkability in a select Blue Zones® project demonstration community. The research study sought to explore how participation in the Blue Zones® project may affect the perception of walkability and social capital. Respondent were asked to provide information comparing selected demographic variables when viewing walkability. Further, respondents were asked to provide information their residing in urban or suburban neighborhoods when viewing walkability.

A fascination with longevity has given rise to an examination of geographical locations where the populations have a larger than normal number of inhabitants that experience lifespans of 100 years or more (Buettner, 2005; 2008; 2014). The Midwestern community within which this study took place adopted the Blue Zones® strategy as a way
of improving quality of life and enhancing community livability ("Blue Zones® Demonstration," n.d.; "Blue Zones® Project," n.d.). Although the respondents in this study were aware of the Blue Zones® initiative, no attempt was made to evaluate the program’s effectiveness. However, one might suggest that walking as physical activity and building social capital may be central to longevity (Ball et al., 2001; Bracy et al., 2014; Yi et al., 2001).

More specifically, respondents were asked to identify the number of locations that they could walk to, and the number of locations that they do walk to. The list that respondents were asked to react to included common destinations. Over half or 56.4 percent of respondents noted that they could walk to seven or more locations. And 71.4 percent of the study participants reported that there were three or fewer locations to which they do walk. Leyden (2003) qualified neighborhoods as more walkable when participants reported that there were seven or more locations to which one could walk (Leyden, 2003). This study supported Leyden’s findings, although it is evident that respondents in this study are less inclined to utilize walking as a means of transportation in spite of reporting that their perception of walkable destinations in their neighborhood is higher than the actual locations they visit. This finding would lead the researcher to believe that the desirability and quality of walkable destinations may influence the decision whether to walk or use some other means of transportation. Studies conducted by Rogers et al., (2013), Saelens and Handy (2008), and Sallis (2009) suggest some of the possible reasons for selecting walking may include commonly cited built environment features such as sidewalks, safety, time commitment, lighting, and weather. Thus, the
findings of the current study are somewhat consistent with other research investigations focused on walking in the built environment. Again, it was evident that walkability and the built environment studied in both urban and suburban environments are enhanced with features such as sidewalks, appropriate lighting, and amenities such as safety, weather, and the availability of time (Badland et al., 2009; Bartram, 2015; Bracey et al., 2014).

As noted, this study was concerned with the way in which social capital can be fostered and as mentioned, walking does in fact provide opportunities for positive interaction among individuals. As Putnam (2000) has noted, social capital can be built through social bonding and social bridging. Walking provides an opportunity to interact with relatives, friends, and others as they engage in walking activity. Social bridging as a result of walking can occur when they share their common experiences and highlights of the walking experience (Leyden, 2003).

Closely related to the importance of building social capital within a community is that of civic participation. This study queried the respondents’ participation in community projects, volunteer activities, attending city council meetings, and participating in local elections. The findings for this set of questions are consistent with what is found in the literature (Cloley, 2014). Incidences of volunteerism have reportedly decreased (Cloley, 2014) in the states. The U.S. Bureau of Labor Statistics reports that volunteering is at a ten-year low and that the volunteerism rate has declined 1.1 percent to 25.45% of the population (Cloley, 2014).
Several null hypothesis statements were formulated from the research questions. The findings of the statistical calculations to determine whether these were retained or rejected are summarized in the paragraphs below and in Table 40.

When calculating a one-way ANOVA comparing age and perception of walkability scores it was demonstrated that there was no statistical difference between age groups. Also, a one-way ANOVA comparison of the number of household members and perception of walkability was calculated. A significant difference was found among three groupings (one member, two members, and three or more members). Further analysis showed that perception of walkability scores for two-member households were significantly lower than those with three or more members. A comparison of perception of walkability scores and household income groups (low, middle, and high) was computed using a one-way ANOVA. No significance was determined among low, middle, and high-income groups. When viewing perceptions of walkability and level of education no significance was found. A chi-square test for independence was calculated to determine the relationship of walkability scores and gender. No significant relationship between gender and perception walkability was found.

This study disputes findings from Grant et al. (2010) which found relationships among walkability, social capital, and demographic variables. More specifically, when studying individuals 65 years and older of high and low socioeconomic status, Grant et al. (2010) found that walkability varied between neighborhood types. More specifically they found that higher income level played a role when viewing walkability (Grant et al.,
The present study found no such relationship among income levels and the perception on walkability.

An independent samples t-test was calculated comparing the mean score of perception of walkability and neighborhood type. A significant difference between the walkability scores of urban and suburban neighborhoods was found. It may be that different structures found in urban and suburban neighborhoods as well as the layout and design of these communities has an influence on the decision for individuals to walk (Tully et al., 2013). In urban environments the construction of walkways and providing lighting may enhance the desire to walk. On the other hand, suburban environments which feature more naturalistic elements may encourage walking behaviors and facilitate social capital (Leyden, 2003). These findings are complimentary to studies conducted by Grant et al., (2010) and Wood et al. (2008). The finding relative to differences between neighborhood types and social capital may be attributed to the environment, living in either an urban or suburban environment. Urban living tends to facilitate a need for a greater sense of community connectedness (Leyden, 2003). Those living in suburban environments where spatial arrangements are greater provide fewer opportunities to interact with one’s neighbors. Additionally, when comparing walkability and neighborhood type those residing in urban environments have a greater need for planned walkways contiguous to their living environments whereas those living in suburban environments, may require structured walkways, or at least walking on or non-designated walkways (Leslie et al., 2005).
The null hypothesis, that there is no statistically significant difference when comparing demographic variables such as gender, age, race, number of household members, estimated household income, and level of education when viewing perceptions of social capital, was also retained. Studies conducted by (Rogers et al., 2013; Hanibuchi & Nakaya, 2013) are parallel to these findings. It may very well be that in this study demographic variables do not have a significant influence on perception of social capital. However, it is highly unlikely that one’s perceptions of social capital would not be influenced by gender, age, race, number of household members, estimated household income, and level of education. For example, there were statistically significant results for household income and educational attainment were found in the present study. There was a significant difference between low income and high-income groups as well as levels of educational attainment (Grant et al., 2010; Putnam, 1997). Likewise, the null hypothesis that there is no statistically significant difference when comparing demographic variables such as gender, age, race, number of household members, estimated household income, and level of education when viewing perceptions of walkability was also retained. This finding has been confirmed by Leyden (2003) that showed a small number of significant values for age, church going, and education. However, overall Leyden (2003) was unable to suggest a preponderance of significance to allow Leyden to declare that the relationship of walkability and demographic variables exists. The demographic variable which was found to be significant in the present study was the number of individuals in a household. The couple group (m = 33.818, SD = 5.581) was significantly lower than the mean walkability score for the three or more
household member group (m = 37.063, SD = 5.512). It may be that one’s living arrangement, single couple or family has an impact on one’s perception of walkability. On one hand, households with larger numbers of individuals may influence occupants to get out and walk. Couples may find walking together provides a means of enhancing their communication and building their social bonding (Putnam, 1993; 1997).

As noted, this research study sought to explore how participation in the Blue Zones® project may affect the perception of walkability and social capital. However, there were no statistically significant results. There were no statistically significant differences when viewing Blue Zones® program awareness and comparing urban and suburban neighborhoods. Further, there are no statistically significant differences when viewing demographic variables such as gender, age, race, number of household members, estimated household income, and level of education when comparing Blue Zones® program awareness. This study did not intent to evaluate Blue Zones® project but rather, gauge program awareness and participation in relation to a number of variables including demographics and neighborhood type.

Table 39 summarizes the retention or rejection of the hypothesis statements. These were previously reported in Chapter 3 in Table 2. This previously reported table includes more detailed information such as aspects of the hypothesis statements demonstrating areas of significance.
### Table 39

**Summary of Hypothesis Statements**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Retained</th>
<th>Rejected</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is no statistically significant difference between the perceptions of respondents residing in urban or suburban neighborhoods when viewing walkability and social capital.</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>There is no statistically significant difference when comparing demographic variables such as gender, age, race, number of household members, estimated household income, and level of education when viewing perceptions of social capital.</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>There is no statistically significant difference when comparing demographic variables such as gender, age, race, number of household members, estimated household income, and level of education when viewing perceptions of walkability.</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>There is no statistically significant difference when comparing demographic variables such as gender, age, race, number of household members, estimated household income, and level of education when viewing the perceptions of the individuals residing in urban and suburban neighborhoods.</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>There are no statistically significant differences when viewing demographic variables such as gender, age, race, number of household members, estimated household income, and level of education when comparing urban or suburban neighborhoods when viewing social capital and walkability.</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>There is no statistically significant difference when viewing Blue Zones® program awareness and participation when comparing urban and suburban neighborhoods.</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>There are no statistically significant differences when viewing demographic variables such as gender, age, race, number of household members, estimated household income, and level of education when comparing Blue Zones® program awareness and participation.</td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>
Implications for Professional Practice

The following implications for professional practice are offered. They are as follows:

1. The design of future communities and their neighborhoods should take into consideration. For example, constructing widened walkways which creating greater opportunities to promote walking.

2. Factors such as age, gender, and relevant socioeconomic data should be taken into consideration when designing opportunities for walking.

3. Focus on issues of pedestrian safety when designing walkways should reviewed. Issues such as lighting, signage, crosswalk design and placement, relationship automotive and bicycle traffic.

4. Consideration in design related to personal space and other dimensions of social capital should be identified.

5. Ways to enhance social capital, community engagement and way which assisting in building community should be considered developing opportunities for walking.

6. Measures to improve perceptions of social capital of community residents should be undertaken especially as related to walkability should be considered.

7. Ways to improve an appreciation for the aesthetics of the environment which emphasize social capital and walkability should be undertaken.
8. Programs and events should be developed which enhance opportunities to promote walkability and social capital especially one that facilitate the interaction of these two themes. For example, walking programs that promote both social bonding and bridging could be targeted and developed.

9. The benefits of walking, perhaps one of the lowest common denominators in leisure time physical activity, should be emphasized especially as it relates to one’s health, well-being and quality of life.

10. Walking provides an excellent medium for building partnerships with allied community agencies including non-profit organizations, governmental entities and businesses. Such partnerships should be actively sought.

**Recommendations for Future Research**

The following recommendations for future research are offered. They are as follows:

1. An investigation of the benefits and outcomes warrant additional examination.

2. A study of the factors that motivate individuals to walk should be undertaken. Special consideration should be given to the way in which tangible and intangible elements support walking activity.

3. A recommendation is to engage in a comparative analysis of walkability and social capital among urban and rural communities. As Brown and Swanson (2003) have pointed out, challenges are becoming evident regarding multiple quality of life issues for residents of rural communities. It would be beneficial to see if the same items that were investigated in the current study are visible
in rural communities as well. Using one of the thematic elements that Edwards and Matarrita-Cascante (2011) highlighted in their work can also narrow the lens of investigation for future research. A study of the actual composition of households in terms gender, age and number of individuals. This should factor in the setting of the household whether it be urban or suburban.

4. Research regarding the design of communities should be undertaken to facilitate walkability and its relationship to promoting social capital.

5. As this study was conducted in a Blue Zones® demonstration site community further research regarding the ways in which walking and social capital contribute to the principles of this program should be considered.

6. A study comparing the difference when viewing Blue Zones® programs and walking activities in other communities should be undertaken.

7. An investigation of various design aspects including safety features such as lighting, mixed usage, as well as separation from traffic and aesthetic elements draw individuals into the environment to walk should be considered.

8. Research regarding programs and events that facilitate opportunities to promote walkability and social capital especially ones that investigate the interaction of these two themes.

9. Design features related to personal space and other dimensions of social capital should be identified and investigated.
Conclusions

Increasingly communities throughout the world have paid greater attention to issues related to quality of life. Many of the concerns focus on enhancing community life have dealt with design of the built environment. Developing more effective ways to promote more walkable streetscapes, opportunities for community engagement and social capital are prominent in the minds of citizens, community developers and public policy planners. At the forefront of this movement has been a heightened concern for existing developments integrated with new walkways and structures built with the human scale in mind.

The purpose of this study was to examine the relationship of the built environment, social capital, and walkability. The study was undertaken in a certified Blue Zones® project demonstration community. As such, the study explored how one’s perception of walkability and social capital influences ones involvement in leisure and physical activity. The study examined how participation in the Blue Zones® project may affect the perception of walkability and safety, thus increasing physical activity. The primary data collection instrument was a questionnaire.

There were 119 respondents who participated in this study. Of this number 48 or 40.3% were from urban and 71 or 59.7% were from suburban neighborhoods. When viewing the results by gender there were 75 females or 63.0% of the respondents and 41 males or 64.1% of the respondents. The respondents ages were clustered in three categories: (1) 18 to 44 (15.9%); (2) 45 to 64 (29.4%); and (3) 65 years of age and older
(52.9%). When viewing by gender there were 75 females or 63.0% of the respondents and 41 males or 64.1% of the respondents.

Several null hypothesis statements were formulated from the research questions as follows: (1) There is no statistically significant difference between the perceptions of respondents residing in urban or suburban neighborhoods when viewing walkability and social capital; (2) There is no statistically significant difference when comparing demographic variables such as gender, age, race, number of household members, estimated household income, and level of education when viewing perceptions of social capital; (3) There is no statistically significant difference when comparing demographic variables such as gender, age, race, number of household members, estimated household income, and level of education when viewing perceptions of walkability; (4) There is no statistically significant difference when comparing demographic variables such as gender, age, race, number of household members, estimated household income, and level of education when viewing the perceptions of the individuals residing in urban and suburban neighborhoods; (5) There are no statistically significant differences when viewing demographic variables such as gender, age, race, number of household members, estimated household income, and level of education when comparing urban or suburban neighborhoods when viewing social capital and walkability; (6) There is no statistically significant difference when viewing Blue Zones® program awareness and participation when comparing urban and suburban neighborhoods; and (7) There are no statistically significant differences when viewing demographic variables such as gender, age, race, number of household members, estimated household income, and level of education.
when comparing Blue Zones® program awareness. The majority of statistical calculations demonstrated no statistically significant differences among hypothesis statements and therefore they were retained. A single hypothesis statement was rejected for $H_{01}$ which investigated neighborhood type when viewing walkability and social capital.

It is evident that one’s neighborhood type – urban or suburban – may have influence on individuals’ perceptions of walkability and social capital. This difference may be due to structure of the urban and suburban built environment. The urban environment is often more densely populated with less open space for walking. On the other hand, suburban environments are more spread out, often featuring walkways, bike paths, and parks. In addition, this factor may be due to the number of individuals residing in a given household. The research demonstrated that there was a difference between households of two individuals when compared to households comprised of three or more members. This suggests that larger households may be more inclined to engage in walking and building social capital (Saelens et al., 2003).
REFERENCES


Heath, G. W., Brownson, R. C., Kruger, J., Miles, R., Powell, K. E., & Ramsey, L. T. (2006). The effectiveness of urban design and land use and transport policies and practices to increase physical activity: A systematic review. *Journal of Physical Activity & Health, 3,* S55-S76.


APPENDIX A

INVITATION TO PARTICIPATE AND INFORMED CONSENT

Project Title: The relationship of walkability, social capital and the built environment in a Blue Zones® demonstration site community

Name of Investigator(s): Thomas Flack, Christopher Edginton

Dear Blackhawk County Resident:

We are writing to invite you to participate in our study. The purpose of this study is to measure the relationship of walkability and social capital in your community. More specifically, the relationship of inhabitants’ perception of walkability and social capital in urban-like and suburban-like neighborhoods. We seek to understand any role that neighborhood type might have regarding one’s level of reported walkability and social capital.

Walkability can be thought of as the overall quality or ability of a neighborhood to promote or support walking for leisure, exercise or transportation. While social capital can be viewed as the connections formed among individuals. These connections can form our social networks and establish norms and trust within the neighborhood and the community.

Participation in the study is entirely optional, even if you receive multiple reminders to complete and return the questionnaire. The answers you provide in the survey will be kept absolutely confidential, and your responses to the researcher will be completely anonymous. Participants for the study were randomly selected from the community.

Although participation in the study is optional, the responses you supply are very important to this research study. Return of the completed survey implies you have been presented with information about the research project and give your consent to participate.

For more information or to ask questions related to the research project, please contact Thomas Flack by email at tmflack@uni.edu. In addition to contacting Thomas, participants may also contact Dr. Christopher Edginton at the School of Health, Physical Education and Leisure Services, University of Northern Iowa, at 319-273-2840. Specific questions related to participant rights and the review process may be directed to the Institutional Review Board (IRB) Administrator, University of Northern Iowa, at (319) 273-6148.
Sincerely,

Thomas M. Flack
Ed.D. Candidate, Allied Health, Recreation and Community Services
University of Northern Iowa
APPENDIX B

STUDY INSTRUMENT

Please take a few moments of your time to complete the following survey. The purpose of this survey is to better understand walkability, the built environment and social capital in the neighborhood and community in which you live. All responses are kept confidential. Thank you! Your participation is greatly appreciated!

Neighborhood Characteristics

1. Which destinations from the list below COULD you access by walking to from your home?

Please check all that apply.

- A local corner shop or convenience store
- A church
- A local school
- A park
- A walking/biking trail
- A Community Center or Recreation Center
- A daycare or child care facility
- A physician’s office or health clinic
- A restaurant, coffee shop, bar or tavern
- The location of your employment
- None of the above. It is hard to go anywhere without a car

2. Which destinations DO you walk to from your home?

Please check all that apply.

- A local corner shop or convenience store
- A church
- A local school
- A park
- A walking/biking trail
- A Community Center or Recreation Center
- A daycare or child care facility
- A physician’s office or health clinic
- A restaurant, coffee shop, bar or tavern
- The location of your employment
- None of the above. It is hard to go anywhere without a car

3. How common are detached single-family residences in your immediate neighborhood?

☐ None ☐ A few ☐ Some ☐ Most ☐ All

4. How common are apartments or condos 1-3 stories in your immediate neighborhood?

☐ None ☐ A few ☐ Some ☐ Most ☐ All
**Places for walking and cycling**

Please check the answer that best applies to you and your neighborhood.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
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</thead>
<tbody>
<tr>
<td>5.</td>
<td>There are sidewalks on most streets in my neighborhood.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>6.</td>
<td>The sidewalks in my neighborhood are well maintained (paved, even, and not a lot of cracks).</td>
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<tr>
<td>7.</td>
<td>There are bicycle or pedestrian trails in or near my neighborhood that are easy to get to.</td>
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<tr>
<td>8.</td>
<td>Sidewalks are separated from the road/traffic in my neighborhood by parked cars.</td>
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</tr>
<tr>
<td>9.</td>
<td>There is a grass / dirt strip that separates the streets from the sidewalks in my neighborhood.</td>
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</tbody>
</table>

**Neighborhood and Community Social Environment**

Please check the answer that best applies to you and your neighborhood.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.</td>
<td>In general, you feel that people can be trusted.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>11.</td>
<td>People in your neighborhood can be trusted.</td>
<td></td>
<td></td>
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<tr>
<td>12.</td>
<td>You feel safe when you walk or bike in your neighborhood.</td>
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</table>

Please check Yes or No to the following questions.

14. Have you worked on a community project within the past year? □ Yes □ No

15. Have you volunteered in your community in the past year? □ Yes □ No

16. Have you attended a city council meeting in the past year? □ Yes □ No

17. Did you vote in the last general election? □ Yes □ No

Please check the answer that best applies to you and your community.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>18.</td>
<td>You feel connected with your community.</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>19.</td>
<td>You frequently visit your neighbors.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td>Your neighbors frequently visit you.</td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
About You

20. Are you aware of the Blue Zones® Project? □ Yes □ No

21. Do you actively participate in the Blue Zones® Project in any way? □ Yes □ No

22. Are you □ Female □ Male □ Prefer not to say?

23. How old are you?
   □ 18 to 24 years □ 35 to 44 years □ 55 to 64 years □ 75 years and over
   □ 25 to 34 years □ 45 to 54 years □ 65 to 74 years

24. What is your race?
   □ White □ Asian
   □ Black or African American □ American Indian or Alaska Native
   □ Hispanic / Latino □ Two or more ethnicities

25. How many individuals live in your household? ______

26. What is your estimated household income this year?
   □ Under $15,000 □ $15,000 – $49,999 □ $100,000 – $149,999
   □ $15,000 – $24,999 □ $50,000 – $74,999 □ $150,000-$199,999
   □ $25,000 – $34,999 □ $75,000 – $99,999 □ $200,000 and over

27. What is your level of education achieved?
   □ Less than high school diploma □ Associates degree
   □ High School graduate (includes equivalency) □ Bachelors degree
   □ Some College, no degree □ Graduate or professional degree

This completes the survey. Thank you for your time!