THE ASSOCIATION OF RACIAL RESIDENTIAL SEGREGATION ON PHYSICAL
ACTIVITY AND DIET AMONG OLDER AFRICAN AMERICAN CHURCH MEMBERS
IN THE URBAN SOUTH: A MIXED METHODS STUDY

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ABSTRACT

JANELLE M. ARMSTRONG-BROWN: The association of racial residential segregation on physical activity and diet among older African American church members in the urban South: A mixed methods study
(Under the direction of Eugenia Eng, DrPH)

Background: Physical inactivity and poor diet are two factors contributing to disproportionate disease rates among older African Americans. Previous research indicates that older African Americans are more likely to live in racially segregated neighborhoods and that racial residential segregation is associated with limited opportunities for physical activity and availability of healthy food. Using the concept of therapeutic landscapes, the objective of this study was to examine the relationship between racial residential segregation, physical activity and fruit and vegetable intake among older African American church members living in urban areas of the Southeastern, US.

Methods: In this mixed methods study, 472 participants from three counties in NC completed a baseline survey for a cancer screening and physical activity intervention. Participant addresses were geocoded and linked to census data. Racial residential segregation was measured as the proportion of African Americans residing in a participant's census tract. The study measured a neighborhood walkability score, counts of recreational facilities within a 1-mile radius, and counts of supermarkets, fast food restaurants, and conveniences stores within a 3-mile radius of a participant. Descriptive statistics and multilevel logistic and linear regression analyses were done using Mplus to determine

bivariate and mediational relationships among variables. Qualitative in-depth interviews

were conducted with 12 participants from racially segregated areas in order to understand the

perception of the neighborhood environment on physical activity and diet and to further

explain findings from the quantitative analyses.

Results: Participants living in predominantly African American census tracts had

more minutes of physical activity, but were less likely to meet physical activity

recommendations. Census tracts with greater proportions of African American residents were

found to have more convenience stores. No significant association was found between racial

residential segregation and fruit and vegetable intake. In the qualitative interviews,

participants discussed neighborhood features that facilitated physical activity and

characteristics of places where they purchased food. Participants were able to be physically

active in their neighborhoods, but had limited food options in their local supermarkets and

traveled outside of their neighborhoods to find quality food at a reasonable price.

Conclusion: The Southeastern US has a different historical and social context, which

may operate differently to impact physical activity and fruit and vegetable intake among

older African American church members, as compared to other regions of the US. Future

research is needed to determine the mechanisms by which racial residential segregation can

operate as a therapeutic landscape for older African Americans, which may lead to the design

of effective interventions for this population.

Dedicated to the memory of Ricardo Atkinson and Dr. Marci K. Campbell.

To my mom, Dr. Sonya Armstrong, for her continued love and support

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CHAPTER ONE

INTRODUCTION

Problem Statement

The older population in the United States (U.S.) is projected to increase from 10% to 20% by 2050 (Vincent, Velkoff, & US Census Bureau, 2010). With this rapid growth, chronic diseases like cancer, heart disease, and obesity will continue to be a major public health problem in the U.S.(Velkoff, He, Sengupta, & DeBarros, 2005). Older African Americans suffer disproportionately from these chronic diseases and have the highest mortality and incidence rates of these diseases compared to other racial and ethnic groups(Velkoff et al., 2005). Furthermore, African Americans are twice as likely to be obese and die from cancer and heart disease as compared to their White counterparts (American Cancer Society, 2010; Michimi, 2010; Siegel, Ward, Brawley, & Jemal, 2011). Studies have shown that physical activity and diet may help to reduce the risk of developing these chronic diseases (Cromwell & Adams, 2006; Jemal, Siegel, Xu, & Ward, 2010; Taylor, Poston, Jones, & Kraft, 2006; Wilcox, Castro, King, Housemann, & Brownson, 2007). However, older African Americans are less likely than their White counterparts to meet the recommended guidelines for physical activity and dietary intake (Chodzko-Zajko et al., 2009). Given the physiologic effects of aging, such as the predisposition for more chronic illnesses, the decline in bodily functions, and the loss of muscle strength, physical activity

and proper diet are essential for enhancing the quality of life among this population of older adults (Saelens & Papadopoulos, 2008).

Many physical activity and dietary change interventions have been implemented through the Black church to address chronic illness. Research has demonstrated that the Black church plays a vital role in the lives of most African American adults in the Southern US and can serve as a powerful channel for health promotion efforts (Ammerman et al., 2002; Campbell et al., 2000; DeHaven, Hunter, Wilder, Walton, & Berry, 2004; Eng, Hatch, & Callan, 1985). Interventions that use the church as a conduit for reaching the African American community capitalize on the established social networks found in the Black church. Health promotion efforts in the church may benefit from greater focus on the various factors that influence health behaviors and health outcomes. The Socio-ecological Model (SEM) recognizes that behavior is multifaceted and is influenced by multiple levels, including the individual, interpersonal/social interactions, organizational policies and resources, community and geographic resources, structures and systems (or institutional), and public policies (Campbell et al., 2007; Robinson, 2008). Most church interventions have focused primarily within the lower levels of the SEM, targeting individuals and their social groups (Campbell et al., 2007; Campbell et al., 1999; Wilcox et al., 2007; Young & Stewart, 2006). Although changes in diet and physical activity have been documented in the evaluation of these interventions, low attendance and sustainability were cited as elements that limited greater program success (Yanek, Becker, Moy, Gittelsohn,&Koffman, 2001; Young & Stewart, 2006). This demonstrates the potential need for a more comprehensive approach in intervention development to reach church members. Understanding the influence of the community and geographic resources found in the residential neighborhood of church

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members may offer insight on how to incorporate upper levels of the SEM into future church interventions.

Researchers have begun to more closely examine the influence that social structures play in the manifestation of certain health behaviors. These structures include institutionalized systems that impact access to resources, especially in the residential setting (Miles, Panton, Jang, & Haymes, 2008). Examining the residential setting and its structural components is especially relevant for older African Americans as the social and residential context have more meaning to this population. Older adults have a greater desire to remain in a familiar setting as they age than persons in other age groups (Cutchin, 2003). Determining the neighborhood characteristics that enhance or inhibit church members' health-promoting behaviors can inform the design of relevant church-based health interventions for older African Americans to reduce the disproportionate burden of chronic disease.

The residential context has played a crucial role, historically and currently, in determining access to resources and in turn impacting the health of the African American community (Miles et al., 2008). Health has been influenced by the persistence of racial residential segregation, which has fashioned the landscape of the African American community throughout history. Although the term landscape can be represented by the natural environment, it also refers to the political, social, and economic processes that govern and shape the built environment. Therapeutic landscapes are said to be those landscapes that possess healing or health promoting effects (Braubach, 2007; Gesler, 1992; Pearce, 2008). An interaction between the physical features of a place and the meaning a person ascribes to that place produces an environment that can either be beneficial or detrimental to an

individual's health. Hence, therapeutic landscapes as manifested in place of residence are particularly relevant for older African Americans because their neighborhood can offer a sense of identity and control. Consequently, the residential neighborhood can be vital in facilitating the conditions necessary for a healthy lifestyle among older African Americans.

Guided by the concept of therapeutic landscapes, the goal of this study was to determine how and why the residential neighborhoods of older African American church members, residing in 3 urban areas of North Carolina, influenced their lifestyle behaviors. Specifically, the two research aims were to:

 1) Identify the pathways through which diet and physical activity behaviors among older African American church members are associated with their neighborhood's residential segregation; and

2) Explore with older African American church members the meaning of the physical, social, and political features of the neighborhoods; and how this may facilitate or inhibit their physical activity and dietary intake.

Significance

Understanding the role place of residence plays is critical to more effectively reach the older African American adult community through interventions. There is a paucity of research on the impact of neighborhood on older African Americans' physical activity and dietary intake. The current study used quantitative and qualitative methods to determine the impact of neighborhood on older African American church members. Recognizing how older African American church members interpret their surrounding environments can help researchers develop programs that transform a place into a therapeutic landscape. Therefore, findings from this study will create space for church-based intervention researchers to

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consider the concept of therapeutic landscapes by addressing the environmental factors, such as residential segregation and place stratification.

Dissertation Structure

The next chapter, Chapter Two, includes a literature review on the chronic diseases associated with physical activity and diet and how these are manifested in older African Americans. It will also provide a description of ecological determinants influencing these behaviors, with an emphasis on how racial residential segregation translates into neighborhood resources. Chapter Three outlines the theoretical framework and conceptual models that guided the study. This chapter also describes the study's conceptual model, presents the research questions, and sets forth the hypotheses that were tested. Chapter Four presents a description of the research methods used to investigate this study's research questions.   Chapters Five and Six present the results of the study, in the format of two manuscripts. Chapter Seven provides a synthesis of the results, final conclusions and suggestions for future work.

CHAPTER TWO

LITERATURE REVIEW

Overview

Certain assumptions are made when discussing aging African Americans and the public health issues related to this population. This chapter offers a review of the literature guided by this study's aims and presents the research hypotheses. The literature review will address the following specific topics:

    a) the disproportionate disease burden experienced by older African Americans;

    b) the link from diet and physical activity to disease burden among older African Americans;

    c) how neighborhood factors influence diet and physical activity;

    d) description of racial residential segregation and its association with health;

    e) and the historical role of church in influencing the behavior of its congregation.

Finally, the chapter will conclude by illustrating how the different topics are connected to answer the questions that form the basis for this study.

Disproportionate Burden of Disease among older African Americans

Heart Disease

Cardiovascular disease (CVD) is the leading cause of death in the United States. As with many other chronic diseases, the risk for a heart attack and coronary heart disease increases with age (Michimi, 2010). CVD also disproportionately affects African

Americans, who are 1.3 times more likely to die from heart disease as compared to their White counterparts (Kuzawa & Sweet, 2009; Michimi, 2010). In his article on CVD in African Americans, Ferdinand (2008) asserted that CVD will continue to be a major cause of death and disability due to the aging of the population, high prevalence of hypertension, the increasing rates of obesity, and increase in physical inactivity.

A 23% increase in physical activity from 1980-2000 was attributed to the delay or prevention of approximately 5% of CVD deaths in the U.S. (Lloyd-Jones et al., 2009). It has been reported that accounting for other CVD risk factors (smoking, diabetes, alcohol intake, etc.) physical inactivity contributes to approximately 12% of cardiovascular disease worldwide (Lloyd-Jones et al., 2009). Links have also been made between diet and heart disease. Decreasing dietary fat intake has been shown to lower one's risk for heart disease. Recommendations from doctors stress the importance of maintaining a healthy diet and being physically active.

Cancer

Cancer is the second leading cause of death in the United States. According to the American Cancer Society, it is estimated that over 1.5 million new cases of cancer will be diagnosed and an estimated 571,950 deaths will occur in the United States in 2011 (Siegel et al., 2011). In 2011, prostate, lung and bronchus, and colorectal cancers were predicted to account for nearly 50% of newly diagnosed cases among men, while cancers of the breast lung and bronchus, and colon and rectum were expected to account for 53% of newly diagnosed cases among women (Siegel et al., 2011). The incidence of prostate, lung and bronchus, colorectal, and breast cancer cases was over 26,000 in North Carolina and

approximately 10,000 people were predicted to die from these cancers in 2011 (Siegel et al., 2011).

Research has shown that there are variations in cancer incidence rates with respect to age, gender, race, geographical location and access to health care (Siegel et al., 2011). Within this variation, the cancer incidence rate in the African American population is significantly disproportionate (Jemal et al., 2010). Among all ethnic minorities, African Americans are the most likely to die from cancer (American Cancer Society, 2007). As compared to white men, African American men have a 14% higher cancer incidence rate and a 34% higher cancer mortality rate (Jemal et al., 2010). Among African American women, there is a 7% lower cancer incidence rate, but a 17% higher mortality rate than in white women (Jemal et al., 2010). Cancer is a burden to the people living with the disease and also to the economy in medical care costs (Jemal et al., 2010). According to the National Institutes of Health, health care costs related to cancer were estimated at $93.2 billion in 2008 (American Cancer Society, 2009).

Lifestyle changes have been cited as crucial in preventing cancer incidence and mortality (Fisher et al., 2011; Gotay, 2005). Researchers estimated that approximately one-third of cancer deaths in 2009 were attributed to poor diet and physical inactivity. A diet rich in fruits and vegetables has been shown to have a protective effect for some forms of cancer including mouth, pharynx, larynx, esophageal, and stomach cancers; while a moderate protective effect has been found for colon, pancreas, bladder, and lung cancers (Gotay, 2005; U.S. Department of Agriculture and U.S. Department of Health and Human Services, December 2010). Guidelines outlined by the American Cancer Society, recommend consuming a variety of nutrient rich foods including whole grains, plant sources, and limiting

intake of red meat (Gotay, 2005). Physical activity has also been linked to colorectal cancer,

although researchers have not been able to clearly disentangle physical activity from obesity

(Gotay, 2005). Researchers have demonstrated that physical activity has a moderate

protective effect against colon cancer (Gotay, 2005). Understanding possible avenues for

cancer prevention and intervention as it relates to diet and physical activity could prove to be

crucial in curbing cancer incidence in the older African American population.

Obesity

The World Health Organization (WHO) describes obesity as a disease characterized

by excess body fat resulting in impaired health (World Health Organization, 2000). Obesity

is measured using the Body Mass Index (BMI), which is the ratio of weight in kilograms

divided by the square of height in meters (Ogden, Carroll, McDowell, & Flegal, 2007).

According to the Centers for Disease Control and Prevention, an adult (aged 20 and older)

with a BMI of 25 is considered to be overweight, while someone with a BMI equal to or

greater than 30 is considered to be obese (Freedman, 2011). Obesity is of great concern

because it contributes to many health consequences including hypertension, type 2 diabetes,

heart disease, stroke, and some cancers (Goran, Ball, & Cruz, 2003; Wang & Kumanyika,

2007; Wyatt, Winters, & Dubbert, 2006) .

From 2007-2008, it was estimated that approximately 34% of Americans aged 20 and

older were obese (Flegal, Carroll, Ogden, & Curtin, 2010; Freedman, 2011). This obesity

epidemic continues to be more prevalent in minority populations, especially among African

Americans for the years 2005-2008 (Flegal et al., 2010; Freedman, 2011). The obesity rate

for African American women was higher than that of their White and Mexican American

counterparts (Freedman, 2011).   When looking at different categories of family income,

African Americans tended to have higher rates of obesity in comparison to Whites and

Mexican Americans in the same income bracket (Freedman, 2011). Obesity rates were

higher at 23.9% in less populated metropolitan areas (population less than 1 million) as

compared to 20% in more populated metropolitan areas (population of 1 million or greater)

(Wang & Beydoun, 2007). Obesity has been linked to breast, endometrial, kidney, and

esophageal cancers, and colon cancer (Gotay, 2005). Lack of physical activity and poor diet

are the major contributing factors to obesity. Interventions that focus on improving nutrition

and diet hold promising results for reducing obesity (Howard et al., 2006).

Physical Activity and Diet among Older African Americans

Previous research has confirmed that physical activity and dietary intake are important

components in reducing one's disease risk (Fisher et al., 2011). Studies have shown that

consumption of fruits and vegetables lowered one's risk for developing chronic diseases such

as type 2 diabetes, some forms of cancer, obesity and heart disease (American Cancer

Society, 2010; Fisher et al., 2011; Joshipura et al., 2001). Regular physical activity has been

shown to reduce the risk of heart disease, stroke, colon cancer, diabetes, and hypertension

(Taylor, Baranowski, & Young, 1998).The following sections provide a brief overview of the

patterns of physical activity and diet in older adults and African Americans.

Physical Activity

For older adults, physical activity is essential in improving muscle mass, bone density,

psychological function and cognition (Gallagher et al., 2010). It is recommended that older

adults 65 and over who are physically able should get 150 minutes of moderate physical

activity or 75 minutes of vigorous physical activity per week (Gallagher et al., 2010; U.S.

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Department of Agriculture and U.S. Department of Health and Human Services, December 2010; US Department of Health and Human Services (USDHHS), 2008). Despite the reported benefits of physical activity, many older adults do not meet the recommended guidelines. Furthermore, activity participation decreases with advanced age. Only an estimated 27% of older adults are physically active for at least 150 minutes per week and approximately 25% walk on a consistent basis (Gallagher et al., 2010). Although these estimates did not adjust for functional ability, they examined self-reported health and found that those reporting poor health had lower levels of physical activity. The numbers are more daunting among older African Americans with only 14% of those over 65 indicating that they participate in regular moderate physical activity as compared to 23% of older white adults (Gallagher et al., 2010).

Walking is the preferred physical activity for older adults of all racial and ethnic backgrounds, possibly because it does not require particular skills or equipment and can be incorporated into daily life (Gallagher et al., 2010). It is important to identify factors that impact walking in this population. At the individual level, factors like self-efficacy and demographic characteristics have been reported as influencing physical activity. Self-efficacy is defined as one's confidence in their ability to perform an activity. The more confident a person feels in their ability to carry out the activity, the more likely they are to actually execute the activity (Cromwell & Adams, 2006; Dishman et al., 2004). At the environmental level, neighborhood factors such as aesthetics, sidewalk conditions, lighting, perception of neighborhood crime, and the presence of desired destinations within walking distance have been found to impact physical activity among older adults (Gallagher et al., 2010). These environmental factors were especially salient for older adults who are more

impacted by their neighborhood environment due to their diminished mobility, impaired

hearing and vision, and cognitive functioning (Gallagher et al., 2010).

In 2005, an estimated 57.9% of North Carolinians did not meet the recommendations

for physical activity (Division of Public Health N. C. Department of Health and Human

Services State Center for Health Statistics, 2006). Although the rates of no leisure time

activity declined in older adults from 2001-2005, the 2005 estimates showed that those, age

55 years and over, had the highest rates of no leisure time activity out of any age group

(Division of Public Health N. C. Department of Health and Human Services State Center for

Health Statistics, 2006).   This age group was also the least likely to meet the recommended

guidelines for physical activity. Sixty-six percent of African Americans did not meet the

recommended guidelines for physical activity as compared to 54.4% of Whites (Division of

Public Health N. C. Department of Health and Human Services State Center for Health

Statistics, 2006). Regular physical activity has been shown to reduce the risk of heart

disease, stroke, colon cancer, diabetes, and hypertension (Taylor et al., 1998).   Added

benefits of physical activity included controlling weight, building healthy bones, muscles,

and joints, reducing falls among older adults, and alleviating the pain of arthritis.

Diet

As seen with physical activity, diet also plays an important role in impacting health.

The number of Americans meeting the dietary guidelines mirrors the trend seen with physical

activity, showing only 25% of Whites and 17% of African Americans reporting eating at

least 5 servings of fruits and vegetables a day in 2005. Studies have documented that a diet

consisting of five or more servings of fruits and vegetables a day was effective in reducing a

person's risk for heart disease, stroke, some forms of cancer, and obesity (U.S. Department

of Agriculture and U.S. Department of Health and Human Services, December 2010). The

2010 dietary guidelines from the USDA (2010) build on previous guidelines and state that

adults should increase their consumption of fruits and vegetables; eat a variety of vegetables

especially dark green, red, and orange vegetables; and increase intake of whole grains.

According to the 2005 <u>Behavioral Risk Factor Surveillance Survey (BRFSS)</u>, 77% of North

Carolina residents reported consuming less than 5 or more fruits and vegetables per day

(Division of Public Health N. C. Department of Health and Human Services State Center for

Health Statistics, 2006). Among African Americans, this rate was over 82%.

In recognizing the influence of environmental factors on dietary behaviors, for the

first time the USDA also included in its guideline an emphasis on the need for all Americans

to have access to nutritious food and also focusing on environmental strategies to facilitate

individual behavior change (U.S. Department of Agriculture and U.S. Department of Health

and Human Services, December 2010). These guiding principles are based on research that

shows that food access is associated with dietary consumption.

Disparities in physical activity and dietary intake have prompted researchers to

expand their study beyond individual level factors. They now seek to explore external

barriers that inhibit African Americans from meeting recommended dietary and physical

activity guidelines among African Americans. The following section will present a review of

the exploration of this contextual factor.

Neighborhood Effects on Physical Activity and Diet

Neighborhood factors have been found to be very salient for older adults, since this

population tends to want to remain in familiar settings as they age in order to exercise their

independence and greater control over their environment (Cutchin, 2003). Neighborhood

level factors reported to be pertinent to older adults consisted of aesthetics, sidewalk conditions, lighting, traffic, perception of neighborhood crime, and presence of desired destinations within walking distance (Gallagher et al., 2010). Neighborhood factors that have been found to be associated with increased levels of physical activity are proximity to parks, trails, access to facilities, presence of sidewalks, degree of neighborhood maintenance and cleanliness (Boehmer, Hoehner, Deshpande, Ramirez, & Brownson, 2007). Other environmental factors reported to influence lack of physical activity include heavy traffic, poorly lit streets, unleashed dogs, and high crime rates (Richter, Wilcox, Greaney, Henderson, & Ainsworth, 2002; Wilcox et al. 2000). Given these findings, it is evident that neighborhood characteristics influence physical activity and dietary intake among older African Americans. The following exploratory qualitative studies have examined the possible mechanisms or pathways through which neighborhood factors may influence residents' health behaviors.

Gallagher et al (2010) examined neighborhood factors relevant for walking in older, urban African Americans. This study conducted focus groups with 19 women and 2 men who were recruited from a Senior Center in Detroit, MI, to identify barriers and facilitators to walking. The major themes that emerged included the presence of people, neighborhood safety, aesthetics of the neighborhood, sidewalks and walking trails, and presence of animals. Participants were more motivated to walk when they observed other people walking in their neighborhoods. Seeing familiar and friendly faces and families with children were all described as facilitators for walking among participants. However, participants identified large crowds, young people fighting, and people demanding money as barriers to walking

(Gallagher et al., 2010). Gallagher's study revealed the importance of neighborhood factors in promoting physical activity in older African Americans.

Another study conducted by Gordon-Larsen et al. (2006) found that recreational facilities were limited in low SES neighborhoods and minority neighborhoods (Gordon-Larsen, Nelson, Page, & Popkin, 2006). Limited access to recreational facilities was associated with low levels of physical activity and higher rates of overweight.

Among African Americans, factors found to influence fruit and vegetable consumption included household income, college education (Beydoun & Wang, 2007; Devine, Wolfe, Frongillo, & Bisogni, 1999; Morland, Wing, Diez Roux, & Poole, 2002) living in higher income neighborhoods, access to fresh fruits and vegetables(Morland et al., 2002; Schulz & Northridge, 2004), access to supermarkets (Jilcott, Laraia, Evenson, Lowenstein, & Ammerman, 2007; Rose & Richards, 2007; Zenk et al., 2005) and abundance of fast food restaurants (Jilcott et al., 2007). The presence of convenience stores has been shown to be negatively associated with a healthy diet (Pearce, Hiscock, Blakely, & Witten, 2008). Pearce and colleagues found that individuals living in neighborhoods with the highest access to convenience stores had lower odds of eating the recommended vegetable intake as compared to individuals living in neighborhoods with the lowest access to convenience stores (Pearce et al., 2008).

The utilization of local food environment by urban seniors was examined in a study done by Morland and Filomena (2008). This cross-sectional study looked at food purchasing behaviors of seniors from Senior centers in Brooklyn, NY (Morland & Filomena, 2008). The authors found that African Americans were more likely to travel over a mile for produce than either Latinos or Whites. They also found that seniors living in predominantly mixed or

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black areas reported higher intake of fruits and vegetables than those living in predominantly White areas. It was also determined that fruit and vegetable consumption increased as the miles traveled to a grocery store increased(Morland & Filomena, 2008). The authors demonstrated that the limited availability of fruits and vegetables forced seniors to travel outside of their neighborhood to find these products. From these studies it is apparent that an opportunity to learn more about environmental factors influencing food choices is in order.

Understanding the African American Experience-Social/Contextual Factors

The unique experience of African Americans is unlike that of any other racial, ethnic, or cultural group in the United States. The history of African Americans in the United States began with slavery. With the Emancipation Proclamation, African Americans were promised a taste of freedom, but no rights. As they began to gain more freedoms, around 1876 they were faced with Jim Crow laws that established de jure racial segregation in public facilities, a law that instituted a policy of "separate but equal" for African Americans and lasted for over 80 years. However, this law was anything but equal. When there were accommodations for African Americans, these separate facilities, such as hospitals, schools, churches, restrooms, prisons, and cemeteries tended to be older, run-down, and inferior to that of Whites. This policy of "separate but equal" exposed African Americans to substandard services, education, and treatment which led to social and economic disadvantage. With the passage of Brown vs. Board of Education, "separate but equal" was ruled unconstitutional. Although, separate but equal was no longer constitutional, changes did not occur quickly for African Americans. In the face of prejudice and discrimination, African Americans focused on uplifting the community.

In their model of social determinants of health and environmental health promotion, Schulz and Northridge recognize the role of historical conditions in fostering health disparities (Schulz & Northridge, 2004). The aforementioned historical conditions of African Americans laid the foundation for the manifestation of unequal access to health care, employment, and education. Social contextual factors have been recognized as playing a significant role in determining one's health status (Schulz & Northridge, 2004). Social contextual factors refer to the economic development and maintenance of a community, community capacity, civic engagement and political participation, quality of education in the community, public policies, and enforcement of policies (Schulz & Northridge, 2004). Sorenson et al. define social contextual factors best in the following quote.

..social class may be defined as a social relationship premised on people's structural location within the economy. Thus, social class determines one's prospects in life; access to social, educational, and economic resources; and exposures to life stressors. These patterns reflect larger structural forces that shape the texture of people's day-to-day realities, which we refer to in this article as social context, including an array of social and material resources that ultimately have profound effects on health. (Sorensen et al., 2003)

They further stated that race/ethnicity also shapes the way in which these social/contextual factors are manifested in health behaviors (Sorensen et al., 2003). This is evident in the African American community that has had a history fraught with slavery, segregation, and discrimination, which have had lasting deleterious effects on their health. Although multiple factors contribute to health disparities, examining the social context in which health plays out is an important step in creating an environment in which individuals have equal opportunities to practice living a healthy lifestyle. The social context molds the

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residential context through power, economics, and policies, as seen in the presence of racial residential segregation (Freeman, 2002).

Opportunities to live a healthy lifestyle can be hindered by unequal access to health promoting resources in racially segregated neighborhoods, markedly in predominantly African American neighborhoods. Neighborhood characteristics are integral in the health behaviors and overall health of older African Americans. Neighborhood factors such as walkability and availability of supermarkets predicts the rate of physical activity and dietary intake in this group (Glass, Rasmussen, & Schwartz, 2006; Saelens & Papadopoulos, 2008). The ability to participate in health promoting activities is restricted by the availability of options and resources in one's place of residence. Research has shown that residences that have a majority of African Americans tended to have a prevalence of fast food restaurants, while predominantly White areas were more populated with supermarkets (Lewis et al., 2005; Morland et al., 2002; Sloane et al., 2003). Studies have shown that fruit and vegetable consumption was associated with living in higher income neighborhoods, access to fresh fruits and vegetables (Morland et al., 2002; Schulz & Northridge, 2004), access to supermarkets (Rose & Richards, 2007; Zenk, Schulz, Hollis-Neely et al., 2005; Zenk et al., 2005) and presence of fast food restaurants (Jilcott et al., 2007). Access to facilities, presence of sidewalks, proximity to parks and trails, degree of neighborhood maintenance, low traffic and crime rates have all been cited as community level factors influencing physical activity among African Americans (Frank, Kerr, Sallis, Miles, & Chapman, 2008). These findings provide evidence for the potential impact that a person's place of residence can have on physical activity and dietary behaviors among older African Americans.

Incorporating the residential context of the environment in intervention strategies is one way to address physical inactivity and poor dietary intake in this population.

What is Racial Residential Segregation?

Researchers have found that the racial composition of a residential area is related to health outcomes among its residents (Chang, Hillier, & Mehta, 2009; Ruel & Robert, 2009; White & Borrell, 2006). The physical separation of the races in a residential context is defined as racial residential segregation (Acevedo-Garcia, Lochner, Osypuk, & Subramanian, 2003; Williams, Neighbors, & Jackson, 2003). This is a form of institutionalized discrimination, which refers to discriminatory policies, or practices of organizations that result in differential access to resources and societal opportunities (Karlsen & Nazroo, 2002; Krieger, 2000). Based on the 2000 Census, over 74 Metropolitan Statistical Areas were highly segregated.   Various forms of racial residential segregation were reported, including dissimilarity or unevenness, isolation, clustering, concentration, and centralization (Massey & Denton, 1989; Massey & Denton, 1993). Dissimilarity is the distribution of African American and White residents across a neighborhood in an urban area (Massey & Denton, 1989). Isolation is defined as the average probability of interaction between African Americans and Non-Hispanic Whites at the neighborhood level (Massey & Denton, 1989). Clustering is the degree to which African American neighborhoods are adjacent to each other (Massey & Denton, 1989).   Concentration is the population density of African Americans across an urban area compared to the density of other groups (Massey & Denton, 1989). Centralization is the degree to which African American neighborhoods are positioned near a city's central area (Acevedo-Garcia et al., 2003). The combination of two or more of these

dimensions is referred to as hypersegregation(Massey & Denton, 1989; Massey & Denton, 1993).

History of Racial Residential Segregation in the US and the South

Racial residential segregation in the US can be traced back to the beginning of the 20th century, when the war years and the Great Depression caused large numbers of African Americans searching for jobs to move from the rural south to more urban areas (Massey & Denton, 1993). As African Americans found housing in urban neighborhoods, racial tension escalated and White residents began moving to suburban areas; resulting in inner-city neighborhoods with concentrations of African American residents (Massey & Denton, 1993; Massey, Gross, & Shibuya, 1994). This emergence of predominantly African American neighborhoods gave rise to the finance and banking industry's practice of "redlining." Redlining restricted loan approvals for housing in areas considered high risk, i.e., neighborhoods that could potentially become predominantly African American (Massey & Denton, 1993). As a result, financial investments flowed to White suburban neighborhoods; bypassing urban African American neighborhoods which then led to the decline in property values or foreclosures that would force African Americans to vacate their homes and move into crowded public housing projects (Bond Huie, 2000; Massey & Denton, 1993). The real estate industry further perpetuated this racial divide through covenants, which were contractual agreements between White homeowners, and neighborhood associations that banned the sale, lease, or rental of property to African Americans (Gotham, 2000; Massey & Denton, 1993). The passing of the Fair Housing Act in 1968 aimed to end this de facto system of racial residential discrimination (Charles, 2003). Although these discriminatory systems are no longer overtly practiced, their devastating consequences still linger today.

The residential patterns in the South vary slightly from those in the North and Midwest. After slavery, many African Americans formed communities on the outskirts of towns and also clustered within towns (Parnell, Joyner, Christman, & Marsh, 2004). This is in contrast to the North and Midwest, where African Americans tended to be concentrated in entire towns/cities (Massey & Denton, 1993; Parnell et al., 2004). These migration patterns formed the foundation for the residential patterns that exist today. Due to the variation in residential patterns, different measures may need to be used in order to detect residential segregation in these regions. In research studies, neighborhood is usually approximated using the census tract, which measures population density (Mason, Messer, Laraia, & Mendola, 2009; Zenk et al., 2005). The south tends to have large census tracts, but fewer of them, as compared to the heavily populated North with more census tracts. As such, a measurement of segregation, such as the dissimilarity index at the census tract level does not account for the clustering effect taking place in smaller sections of the census tract in the South (Mason et al., 2009). Racial composition of the census tract may be a more valid proxy of residential segregation in the South(Mason, Messer, Laraia, & Mendola, 2009b)

Why is Contemporary Racial Residential Segregation a Health Matter for Older African Americans?

Although there are a greater number of poor White people, more poor White people are residentially located next to non-poor people, while African Americans are concentrated in high-poverty neighborhoods (Williams & Collins, 2001). One lasting effect of racial segregation, therefore, is the concentration of poverty in today's African American neighborhoods (Charles, 2003). Spending on services in poor neighborhoods is more likely to be cut and residents are less likely to have the power to influence the quality of services that

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are offered in their neighborhoods (Williams & Collins, 2001). Racial residential

segregation continues to restrict access to quality education and employment opportunities,

which directly impact socioeconomic status. The unequal distribution of goods and services

influences health by limiting access to the resources needed for health maintenance (Jemal et

al., 2007).

Zenk and colleagues (2005) examined the association of neighborhood racial

composition and poverty to the accessibility of supermarkets in Detroit, MI, one of the most

racially segregated cities in the United States. They specifically wanted to determine: (1)

whether the distance of supermarkets from African American neighborhoods was farther than

the distance for White neighborhoods, regardless of neighborhood economic conditions; and

(2) if racial disparities in access to supermarkets occurred only in high-poverty

neighborhoods (Zenk et al., 2005). The study utilized 869 neighborhoods within

metropolitan Detroit. Utilizing data from the 2000 Census, population density was defined

as the total population per square mile. The census also provided the data source for racial

composition, which was measured as the percentage of non-Hispanic African American

residents in an area. Neighborhood poverty was also examined and was measured as the

percentage of residents below the poverty line. The study defined supermarkets as

supercenters and full-line grocery stores affiliated with a national or regional grocery chain.

Supermarkets were identified by using the following sources: a 2001 list from the Michigan

Department of Agriculture; 2001-2002 paper telephone directories, online telephone

directories, and company websites. This yielded a sample of 160 supermarkets within a 15

mile radius of Detroit. These supermarkets were than geocoded using ArcView.

Accessibility to a supermarket was measured using a Manhattan block distance and denoted

the distance to the nearest supermarket for a resident located in the middle of the neighborhood. The Manhattan block distance is defined as the distance between two points measured along axes at right angles. The study found that the nearest supermarket was significantly closer to neighborhoods with a low proportion of African Americans and neighborhoods with low poverty levels, while neighborhoods with a high proportion of African Americans and high levels of poverty had supermarkets located at a farther distance. In the most impoverished areas, supermarkets were located closer to areas that had a low proportion of African Americans as compared to the impoverished areas that had a high proportion of African Americans, with distance increasing up to 1.15 miles with higher levels of African American residents. This study did not determine if decreased access to supermarkets translated into poorer dietary behaviors among African Americans. The authors recommended that future studies should examine if accessibility to supermarkets predicts purchasing and dietary behaviors of residents living in these neighborhoods (Zenk et al., 2005). This factor was examined in the current study. Zenk's study took place in an urban Northern state. Few studies have examined the manifestation of racial residential segregation on health in the urban Southeastern United States.

What is the association between Racial Residential Segregation and Health?

As mentioned previously, studies have documented associations between the availability of neighborhood resources and racially segregated neighborhoods (Kwate, 2008; Zenk et al., 2005). One study done by Lopez, examined the link between residential segregation and physical activity using data from the 2001 BRFSS which yielded a study sample of 121,894 participants located in 311 metropolitan areas (Lopez & Hynes, 2006).Hierarchical linear modeling was used to account for clustering among individuals

living in the same metropolitan area. Individuals living in the highest levels of racial residential segregation were 3 times more likely to be physically inactive as compared to individuals living in the lowest level of racial segregation. Using the dissimilarity index, neighborhood level factors accounted for 16.5% of the variance in physical inactivity while 83.7% was attributed to individual level factors (Lopez & Hynes, 2006). The investigators concluded that physical activity was decreased among individuals who lived in racially segregated neighborhoods.

Another study by Chang (2006) looked at the impact of segregation on weight status. It was hypothesized that a greater degree of metropolitan area segregation would be associated with higher weight status among African Americans. Using the isolation index, Chang (2006) measured segregation by examining the degree to which minority group members came into contact chiefly with other minority group members, indexing the percentage of neighborhood co-residents who also were members of minority groups(Chang, 2006). The isolation index ranges from 0 to 1 (1 signifies maximal isolation), and is calculated as the average fraction of African American residents in each census tract, weighted by the proportion of African Americans in each tract (Chang, 2006). The analysis was done on data from the Behavioral Risk Factor Surveillance Survey (BRFSS), which yielded a final study sample size of 44,210. The sample came from 130 metropolitan statistical areas (MSAs). The dependent variables included a measure of BMI and a categorical variable of obese and overweight. Chang (2006) found that on average, African Americans living in racially segregated neighborhoods had a higher BMI and were more likely to be in a high-risk weight category, controlling for individual level SES (Chang, 2006). Chang suggested that future research should examine the effects of segregation at a

smaller geographic level, but also investigate the pathways between segregation and health, such as health behaviors and neighborhood characteristics. These factors were incorporated in the current study.

Grafova et al. (2008), examined the influence of neighborhood environment on the weight status of adults 55 years and older. They assessed the neighborhood environment using scales to represent the economic, built, and social environment. These characteristics were assessed at the census tract level and included things such as percent poverty, unemployment rate, level of street connectivity, number of food stores and restaurants, crime rates and residential segregation (Grafova, Freedman, Kumar, & Rogowski, 2008). They found that living in an economically disadvantaged area was associated with increased odds of being overweight or obese. High levels of street connectivity were associated with reduced overweight and obesity for women, while high immigrant areas were associated with obesity for men (Grafova et al., 2008). The impact of racial segregation was reduced when the authors controlled for individual factors. These findings suggest that neighborhood factors may play a significant role in obesity among older adults. Based on this, it was necessary to investigate the mechanism by which these factors impacted weight. A limitation of Grafova et al.'s study was the omission of a physical activity and diet measure, which could have helped to explain a causal pathway between neighborhood environment and obesity.

The Black Church/Religiosity

The term "Black Church" or African American Church, refers to those churches of any denomination that have a predominantly African American congregation and cater to

African American communities (Giger, Appel, Davidhizar, & Davis, 2008). The Black church plays a vital role in the lives of many African American adults in the southern US, and has served and continues to serve as a powerful channel for health promotion efforts (Ammerman et al., 2002; Campbell et al., 2007; Eng et al., 1985; Giger et al., 2008). Over the past 20 years, numerous health promotion and disease prevention research programs have been conducted through Black churches focused on health behaviors, such as cancer screening, and have used a variety of strategies including educational sessions, awareness and screening programs, and lay health advisors. Churches serve many social, organizational, and religious functions and offer unique opportunities for promoting healthy behaviors among African Americans. This study used African American church members as the sample to identify potential avenues for intervention development that focused on fusing the Black church with the neighborhood to promote healthy behaviors within this population.

Summary

As illustrated in the literature review, older African Americans bear a disproportionate burden of disease as compared to other populations of older adults. The potential to alleviate this disease burden may be influenced by behavior change in this population, specifically dietary intake and physical activity. Based on previous research, evidence has demonstrated that environmental factors are linked to diet and physical activity. As mentioned previously, racial residential segregation is an environmental factor that studies have shown to be associated with behavioral and health outcomes. Little research has been conducted to examine the manifestation of racial residential segregation in the South and its association with health. Furthermore, little research has been done to explore the mechanism by which racial residential segregation is associated with health among older

African Americans. The objective of this study was to use a mixed methods approach to examine the possible pathways by which residential segregation maybe associated with neighborhood resources and in turn health behaviors.

CHAPTER THREE

THEORETICAL FRAMEWORK, CONCEPTUAL MODEL, & SPECIFIC AIMS

Overview

Several concepts and theoretical models informed this dissertation research. This section begins with an overview of the place stratification model, which provides a perspective on the development and persistence of residential segregation. This is then followed by the concept of therapeutic landscapes which examines the healing and health promoting effects a person's place of residence may have on that person's overall health.

Theoretical Framework

Place Stratification Model

The place stratification model is one of the theoretical models used to explain patterns of racial residential segregation. This model posits that residential patterns are based on a hierarchy and are shaped by prejudice and discrimination. There is a hierarchy of places, classified by their desirability and the quality of life afforded to their residents (Freeman, 2002). Characteristics of desirable places include, but are not limited to, access to good schools and local services, proximity to jobs, and protection from crime (Freeman, 2002). By living in these desirable places, people who hold the power in the society maintain this power by distancing themselves spatially and socially from their minority counterparts (Alba & Logan, 1993; Freeman, 2002; Friedman, Singer, Price, & Cheung, 2005; Iceland & Wilkes, 2006). The place stratification model is most relevant in describing residential

segregation patterns between African Americans and Whites because it reflects more of the historical context that exists between the two groups. For other minority groups such as Hispanics or Asians, increases in income translate into higher quality neighborhoods and housing (Iceland & Wilkes, 2006). However, even with socioeconomic gains, African Americans tend to live in less advantaged areas than their white counterparts (Williams & Collins, 2001). The evidence of this theory is seen in the zoning ordinances and bank lending practices that prevented African Americans from moving into predominantly white neighborhoods. It is further supported by "white flight", a term used to describe the migration of whites out of neighborhoods as more African Americans move in. Studies have shown that even after controlling for socioeconomic status this spatial distance still occurs (Farley & Frey, 1994). A study by South and Crowder (1998) examining migration patterns of African Americans and whites, demonstrated that within a six-year period Whites were less likely to move to racially-mixed or predominantly African American areas (South & Crowder, 1998). The place stratification model informed the conceptual model for the current study because it supports the pathway between racial residential segregation and neighborhood resources, such that more resources would be available in predominantly White neighborhoods as compared to African American neighborhoods.

Therapeutic Landscapes

The term, landscape, has various interpretations that are relevant for public health (Duncan, 1995; Gesler, 1992). It has been defined as "a combination of physical features and the imprint of human occupation, the result of ever changing interplay between human activity and the physical environment" (Gesler, 1992). Landscape has been used to describe the natural environment, such as trees, waterways, and air. It has also been used to describe

elements of the environment that are man-made, for example, buildings, streets, and sidewalks. Other ways that landscape has been used is in the description of political, social, cultural, and economic processes that manifest themselves in the environment. This can be seen in wealthy neighborhoods whose residents have the political power to dictate where certain businesses can operate. Areas that represent ethnic enclaves, such as Chinatown or Little Italy, are some examples of cultural landscapes. The impact of economic processes is apparent in everyday life as businesses open and close, new housing developments are created, while other homes are going into foreclosure. Social processes that have affected the landscape are evident in the recent movement to a healthier lifestyle in the United States, such as the promotion of organic and homegrown products, and municipal policies that ban smoking in public places and Trans fats in food products. It has been noted that the different types of landscapes overlap with one another and their combined features can exert damaging or therapeutic effects on human health (Gesler & Kearns, 2002).

The concept of therapeutic landscapes first appeared in the health geography literature. Gesler described therapeutic landscapes as places that are associated with treatment or healing (Braubach, 2007; Gesler, 1992). This concept has been used to examine the role of the physical, social, and symbolic environment on the mental health and well-being of an individual as it relates to place. The main components of therapeutic landscapes include the physical and built environment, social interactions, and the symbolism and meaning that an individual attaches to these components (Braubach, 2007). "Places not only provide an identity and satisfy a human need for roots, but are also locations of social networks, providing settings for essential activities such as employment and services, and often sought out for their aesthetic qualities" (Gesler, 1992). Williams (2007) further stated

that therapeutic landscapes could also be used to describe facets of the environment that are not only healing, but health promoting (Braubach, 2007; Williams, 2007).

The concept of therapeutic landscapes draws on humanistic and structuralist theories. In humanistic theory, these landscapes are seen as being constructed by the ways in which people attach meaning to them. Whereas, structuralist theory conceptualizes the political, economic, cultural, and social processes that help shape places. These theories can be useful in explaining the ways by which a certain place can be healing and/or health promoting. In Geographies of Health: Therapeutic Landscapes, Braubach argued that there are five characteristics of urban neighborhoods that may indirectly or directly impact health. These characteristics are as follows: 1) physical characteristics of the environment shared by all residents; 2) healthy environments that include the conditions and functionality of home, work, school, or recreational settings; 3) services provided to support the daily life of residents; 4) socio-cultural features of neighborhoods; and 5) reputation of the neighborhood. Although he derived these characteristics in the context of urban settings, they could also be applied to suburban and rural areas (Williams, 2007). Braubach posited, as seen in the diagram below, that an individual's health status is impacted by a process that starts at the individual's physical and psychosocial environment, this is then filtered through how the individual perceives and ascribes meaning to this environment, which then can produce either good or poor health status and overall well-being (Williams, 2007).

| Physical and Psychosocial environments | Individual Assessment/Perception and Value Systems | Physical and Mental Health Status/ Well-Being |

Input   Filter Function   Output
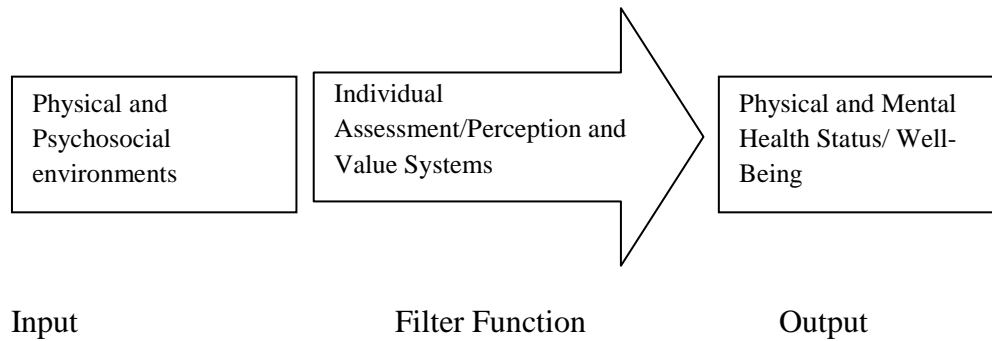
Figure 3.1 Model of Place effects on health adapted from Braubach(Williams, 2007)

Braubach presented findings from a study that examined the impact of the 5 characteristics of urban settings on the health status of residents in eight European nations. Data were collected by the following means: face-to-face interview questionnaire on satisfaction with residential neighborhood conditions by the households; individual self-administered health questionnaire; and inspection check list to rate the quality of residential neighborhood conditions. Outlined below are the neighborhood conditions that were rated:

- Greenery, public spaces, and play areas (vegetation along streets; recreational areas for children; places to sit and relax)

- Noise exposure (traffic noise; surrounding area noise)

- Public safety (assessment of residential area safety at night, perception of safety in the home)

- Upkeep and maintenance (graffiti; amount of litter)

- Transportation issues (connection to city center).

The study found that those reporting a higher level of satisfaction with their neighborhood were more likely to live in places with lots of open space, good transportation, limited noise, high safety, and areas that were well-maintained. This relationship held true for residents reporting high self-rated health, with the strongest association being high safety

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and low surrounding area noise. From these findings, Braubach proposed his conceptual framework to explain the mechanisms by which aspects of neighborhoods impact the health of residents (Braubach, 2007; Williams, 2007).

The concept of therapeutic landscapes has also been used to describe places that are associated with healing, such as spas, beaches, winter retreats, or specialty health care facilities. These are places that people may feel provide some type of physical, mental or spiritual healing (Braubach, 2007; Williams, 2007). For many people, healing occurs in their place of worship. This is especially true for African Americans. It has been stated that the Black church became an institutional center of the Civil Rights Movement through the provision of leadership, economic resources, and a support network for the African American community (Wortham, 2009). It has also been cited as a source of social reform through its effective leadership, community based ministries and social activism (Wortham, 2009).The following section will briefly describe how the Black church can be seen as a therapeutic landscape.

Black Church as a Therapeutic Landscape

In the history and lives of African Americans, the Black church can be viewed as a therapeutic landscape. McRae et al. (1999) noted that the Black church offers a system-centered approach to address the mental health needs of African American populations. The church is not simply a building used for religious expression; the church represents people coming together for worship and service and provides a sense of belonging, and material and psychological support (McRae et al., 1999;McRae, Carey, & Anderson-Scott, 1998; Thompson & McRae, 2001). As with any landscape, the Black church as an institution is shaped by its environment through the interchange of people, materials, energy, ideas, and

other factors (McRae et al., 1998). Black churches are sustained through the development and maintenance of traditions and group norms, and by adapting to their environment(McRae et al., 1998; Thompson & McRae, 2001). In a study, Griffith et al (1984) found that certain aspects of the church service, including testimony, dancing, and speaking in tongues, provided members with a sense of relief and an emotionally ecstatic feeling. McRae and colleagues assert "Black churches provide an array of emotional and learning experiences and embody therapeutic factors that enhance group cohesion and promote empowerment and social change" (McRae et al., 1998). The therapeutic functions of the Black church are further cited in McRae, Thompson, and Cooper, where they highlighted Gilkes illustration of the Black church as a group process (McRae et al., 1999; Thompson & McRae, 2001). Gilkes hypothesizes that this group process is manifested through the following religious practices in the Black church:

> …including a tradition of giving voice to the suffering (through music and emotional expression), identifying persecutors (within the family and the larger society), providing a safe haven for "acting out" (primarily through dancing, possession, shouting, and crying), and validating the Black experience, especially that of racism in the dominant culture. (McRae et al., 1999)

McRae, Thompson, and Cooper (1999) explored this concept further through the use of seven focus groups consisting of a total of 84 people. In their investigation they identified four themes that reflected the therapeutic role of the Black church: church as a family, empowerment, spiritual renewal, and interpersonal learning (McRae et al., 1999). Focus group members stated that they felt strong connections to other church members, a sense of belonging, a group identity, and a sense of tradition. Members experienced joy and

rejuvenation from attending church services, which was essential for them in persevering through personal struggles. The church instilled in them a desire to take action to address issues in Black communities. These and other elements of the Black church serve as a buffer to the stresses of urban life (Griffith et al., 1984).

The perspective of the Black church as a therapeutic landscape sheds light on why it has been used as a conduit for health intervention in the African American community. Although the proposed study is unable to fully look at the extent to which the Black church plays a role in the lives of the study participants, it will examine how best neighborhoods can be used to enhance the therapeutic effects of the church. Also through qualitative interviews, the current study intended to explore ways in which the church functions in the lives of its members.

Conceptual Model

The study used the aforementioned models and concepts to examine the impact of neighborhoods on health behaviors and the health status of African American church members. This study focused on the neighborhood characteristic of racial residential segregation because it is an environmental condition shaped by social, historical, and political processes fraught with racism and discrimination, as laid out in the place stratification model. As such, residents in these neighborhoods may ascribe different meaning to their residential experience than those living in predominantly White or integrated neighborhoods. Although the concept of therapeutic landscapes helps to explain the impact of one's environment on their well-being, it has some shortcomings in explaining the proposed conceptual model in its entirety. The concept asserts that the mechanism by which people attain a good sense of well-being occurs through exposure and interpretation of

their physical and psychosocial landscape. It does not, however, clearly outline a specific pathway that links health promoting landscapes to an overall sense of well-being. Nonetheless, the concept of therapeutic landscapes was the best fit for the proposed study's conceptual model.

The conceptual model (Figure 3.2) illustrates the relationship between racial residential segregation and dietary intake and physical activity. The model hypothesizes that the relationship between independent and dependent variables is partially mediated by changes in neighborhood resources/characteristics. On the left side of the model, racial residential segregation is depicted as the independent variable. The mechanism that is hypothesized to link racial residential segregation to physical activity and diet is place stratification. The filter function of therapeutic landscapes is represented in the model with a dotted line because this is reflected in the qualitative data conducted with the participants. A person's perception of their neighborhood will influence the type of behaviors that they participate in. The filter function in effect acts as a mediator, mediates the relationship between access to resources and health behaviors as interpreted by the person. To achieve research aim 1, I conducted a cross-sectional study using baseline data from the ACTS study, geocoded data, census data, and business data. I intended to look at the mediating effects of place stratification as operationalized by supermarkets, convenience stores, fast food restaurants, recreational facilities and the walk score.

Place Stratification Model

Recreational Facilities
Walk Score
Supermarkets
Fast Food Restaurants
Convenience Stores

a

b

Racial Residential Segregation

c,

Physical Activity

Fruit and Vegetable Intake

Physical and psychosocial environments

Individual Assessment/perception and value systems

Physical and mental health status/ well-being
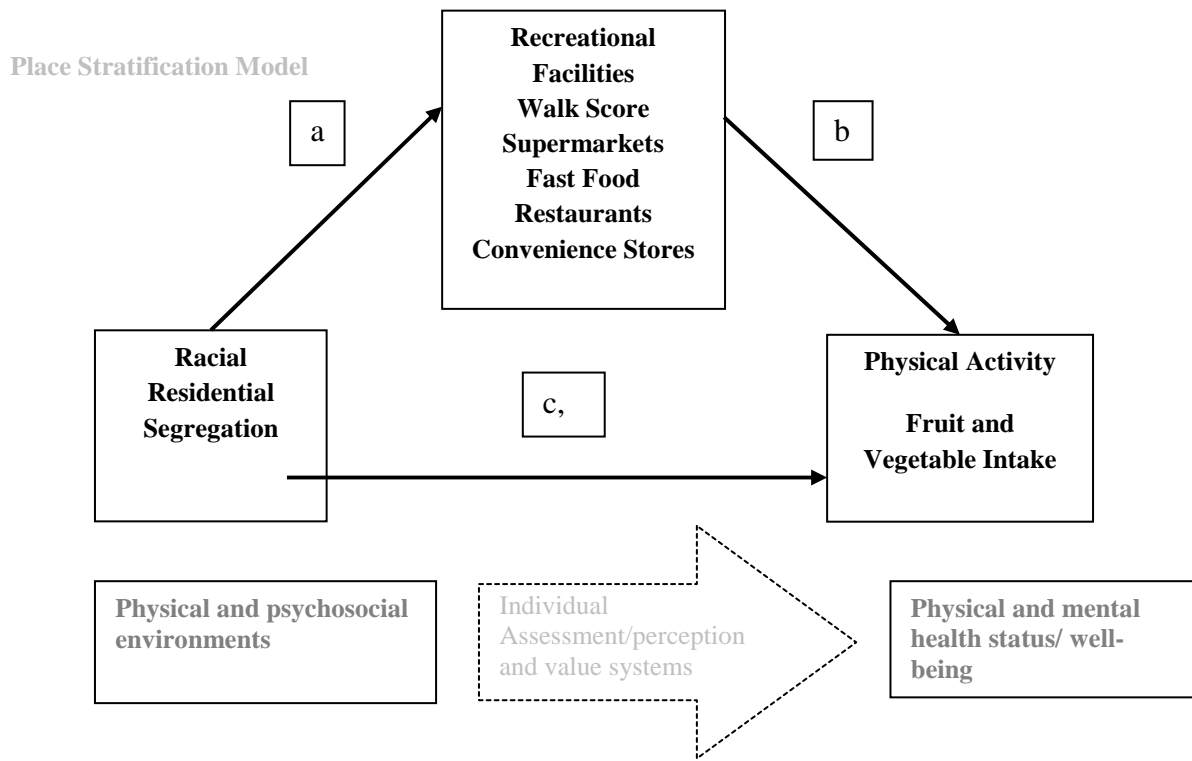
Figure 3. 2 Conceptual Model of Therapeutic Landscapes for Health Promotion

Study Research Aims, Questions, and Hypotheses

Informed by the concept of therapeutic landscapes, the goal the current study was to determine how and why residential neighborhoods of older African American church members, residing in three urban areas of North Carolina, influenced their lifestyle behaviors. This was accomplished using mixed methods, quantitative and qualitative. The quantitative methods used a cross-sectional design to identify the pathways through which diet and physical activity behaviors among older African American church members were associated with their neighborhood's racial residential segregation. Drawing from the filter function of therapeutic landscapes, qualitative methods were used to explore with older African American church members the meaning of the physical, social, and political features

of the neighborhoods of their church and where they live in facilitating or inhibiting their physical activity and dietary intake. The qualitative interviews were also used to help explain findings of the quantitative analyses. The following sections will outline the aims and methods.

Research Aim 1

To examine the pathways between racial residential segregation, and diet and physical activity among older African American church members

Specific Aim 1: To look at the relationship between residential segregation, place stratification and diet.

Research Question 1a: Is the degree of racial residential segregation in a church member's census tract related to the place stratification (as measured by the number of supermarkets), which in turn is related to the diet of African American church members?

*Hypothesis 1a***:** Church members living in census tracts with a lower proportion of African American residents will have more supermarkets within 3 miles of their address and have good dietary intake

Research Question 1b: Is the degree of racial residential segregation in a church member's census tract related to the place stratification (as measured by the number of convenience stores), which in turn is related to the diet of African American church members?

Hypothesis 1b: Church members living in census tracts with a lower proportion of African American residents will have fewer convenience stores within 3 miles of their address.

Specific Aim 2: To look at the relationship between residential segregation, place stratification and physical activity.

Research Question 2: Is the degree of racial residential segregation in a church member's census tract related to the place stratification (as measured by number of recreational facilities), which in turn is related to the physical activity of older African American church members?

Hypothesis 2-Church members in census tracts with a lower proportion of African American residents will have more recreational facilities within 1 mile of their address and in turn have more minutes of physical activity.

*Specific Aim 3***:** To look at the relationship between residential segregation and walking.

*Research Question 3***:** Is the degree of racial residential segregation in a church member's census tract related to place stratification, which in turn is related to walking of older African American church members?

Hypothesis 3-Church members living in census tracts with a lower proportion of African American residents will have higher walk scores and in turn more minutes of walking.

Research Aim 2

The aim of the second part of the study was to describe qualitatively how older African American church members conceptualize the role of neighborhoods and church in facilitating or inhibiting their physical activity and dietary intake. The subsequent chapter outlines the methods and analysis used to test the associations laid out in the specific aims.

CHAPTER FOUR

RESEARCH DESIGN AND METHODS

The current study used a mixed methods design. As described in Chapter 2, most studies that have investigated these variables have been either quantitative or qualitative. The need to understand how participants interpreted the quantitative data necessitated "a voice," which is usually missing in purely quantitative studies. On the other hand, a purely qualitative study does not quantify outcomes.   This being the case, a study utilizing both methodologies was ideal for the current study.   The following sections describe the 1) study setting, 2) data sources, 3) study sample, 4) construction and operationalization of study variables, and 5) methods used for the analysis.

Quantitative Methods

The study was conducted using secondary data collected through face-to-face interviews with older African American church members participating in the ACTS of Wellness study and primary data created through geocoded addresses, census data, and business information. In order to accomplish specific aim 1, a cross-sectional study design was utilized. The research questions for research aims 1-3 were answered using secondary data to identify associations between racial residential segregation, neighborhood resources, and health behaviors.

Study Setting

Data from the parent study were collected from African American church members in Raleigh, Durham, and Greensboro between Fall 2007-Summer 2009.

Table 4.1 Racial Composition of Study Areas

County	Total Population	% African American	% White	Metropolitan Area
Durham, NC	267,587	38	46.4	Durham
Wake, NC	900,993	20.7	66.3	Raleigh
Guilford, NC	488,406	32.5	57	Greensboro

NC rates adjusted for the 2010 census. Source: U.S. Census Bureau: State and County QuickFacts.

Table 4.2Median Income of Study Areas

	Durham	Greensboro	Raleigh	North Carolina
Median household income in 2006-2010	49, 894	42, 260	63,770	45,570
Median household income of Whites	65, 561	56,744	74,666	51,638
Median Household income of Blacks	36,631	32,329	41,415	31,977

2010 Census Data American Fact Finder

Overview of Parent Study

Sample

The data used for this dissertation research came from Action through Churches in Time to Save lives(ACTS) of Wellness project, a CDC-funded church-based intervention designed to increase colorectal cancer screening and physical activity (PI: Marci Campbell, PhD). The study design for the intervention test was a two-group randomized trial with the church as the unit of randomization.

Eligibility and Criteria

Churches were eligible for the ACTS of Wellness study if they: a) had a predominantly African Americans congregation; b) had no less than 250 active adult members on their

roster; c) had at least 100 members that were 50 and over ; and d) agreed to be randomized to intervention or control arm. Church members were eligible to participate in the ACTS of Wellness study if they: a) were aged 50 and over; b) English-speaking; and c) gave consent to participate in the study.

Recruitment and Enrollment

In North Carolina, the project coordinator was responsible for recruiting churches. The project coordinator called and met with pastors of potential churches. In some instances, the coordinator met with members of the church to explain the project in detail. Recruitment of churches began in May 2007. Church members were invited to participate in the study from January 2008 to August 2009. Recruited churches were excluded from the study if they were unable to obtain at least 30 church members. This yielded a total of 18 churches drawn from two urban areas of the U.S. (12 from Raleigh-Durham North Carolina and 6 from MI). This study focused on the churches from North Carolina. Churches were randomly selected to be in the intervention and control groups. The intervention group received tailored newsletters and motivational interviewing on colorectal cancer and physical activity, while control group received the Body and Soul Program, which had 4 pillars that incorporated pastoral influence, peer counseling, church activities, and changes in church environment related to healthy eating.

Baseline survey data included collection of address, demographic information, dietary intake, and physical activity type and duration from approximately 616 African American adults aged 50 and over living in North Carolina. All individual-level data and variables (demographic, behavioral, and health) came from the baseline survey of the ACTS of Wellness program.

Data Collection

Trained research staff collected baseline data for the ACTS of Wellness study using a face-to-face self-administered survey. Surveys took an average of 30-40 minutes to complete. Data collected from the survey included demographic information, health information, self-rated health, fruit and vegetable intake, physical activity, and psychosocial factors related to these behaviors. A summary of individual-level variables and data sources is presented in Table 4.3

Table 4. 3Study Variables and Data Sources

Variables	Data Source	Year Collected	Scale of Data Collection
Behavior information (Physical activity and diet)	ACTS of Wellness Baseline Survey	2008-2009	NC Metropolitan area
Racial composition	Census 2000	2000	National
Address information	ACTS of Wellness Baseline Survey	2008-2009	NC Metropolitan area
Supermarkets	ReferenceUSA	Obtained March 2010	National
Convenience stores	ReferenceUSA	Obtained March 2010	National
Recreational Facilities	ReferenceUSA	Obtained March 2010	National
Walk score	http://www.walkscore.com/	2010	National

Additional Data and Sources

ReferenceUSA compiles its data using phone books, annual reports, business directories, and public record data. The data is cleaned and matched with the USPS National Change of Address every month in order to ensure address accuracy. ReferenceUSA includes over 22 million businesses in the United States. A custom search was done to

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identify supermarkets, convenience stores, fast food restaurants, and recreational facilities in the vicinity of the participants' residence. This was done using the custom search options of business type and geography. In order to ensure that all businesses were included, counties in which at least 1 participant resided were selected. The primary codes from the North American Industry Classification System (NAICS) were used to identify businesses. The following NAICS codes were used to categorize businesses that were supermarkets (44511003), convenience stores (44719005, 44512001, 44719005), fast food restaurants (722211), and recreational facilities or parks (71394015, 62411006, 71219004).

Address information provided by the participants was geocoded using Excel Geocoder from Juice Analytics and then the latitudinal and longitudinal coordinates were linked to census block group data. Neighborhood characteristics that were examined included proportion of African Americans, poverty level, number of recreational facilities and parks, number of supermarkets, fast food restaurants, and convenience stores.

Census 2000 data was used to assess neighborhood-level variables including racial composition (which was used to assess the degree of racial residential segregation), education and poverty level of each neighborhood at the census tract level. The variables along with their source can be found in table 4.5. Walk scores were obtained from the walk score website at http://www.walkscore.com/.

Geocoding

In order to prepare the address information to be geocoded, it was necessary to enter the address information into an excel spreadsheet. Five columns were created with the following headings: participant id, address, city, state, and zip code. The data was then added to ArcMap, followed by the streetsmap data, which were located on the University of

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North Carolina-Chapel Hill AFS space. The address locator, Street_Addresses_US was then

added to ArcMap. An address locator stores the address, attributes, associated indexes, and

rules that define the process for translating nonspatial descriptions of places such as street

addresses, into spatial data that can be displayed as features on a map (ESRI). After the

address locator was added, 616 participant addresses were geocoded using ArcMap. The

initial geocoding process resulted in 122 unmatched addresses, which meant that latitude and

longitude coordinates were not able to be located for these addresses. The 122 unmatched

addresses were reviewed for spelling errors and rematched. These yielded approximately 13

matched addresses. For the purpose of matching the remaining addresses, an address locator

was created using street information from Tigerline. The process for creating this address

locator is detailed in Appendix A. After this process generated 66 matched addresses, the

remaining data were excluded from analysis, if address information was not accurate. This

yielded 573 participants with matched addresses. Census 2000 data were downloaded from

the American Fact Finder website and imported into ArcMap. A spatial join was done in

order to link participant address data to census 2000 data.

Data on neighborhood resources was obtained from ReferenceUSA. As mentioned

earlier, codes were used to categorize food stores, recreational facilities and restaurants. A

custom search was done using the specified codes and county. The seven counties identified

based on the baseline data included Chatham, Durham, Franklin, Guilford, Johnston, Orange,

and Wake counties. The custom search produced all businesses that categorized themselves

with that specific code. The business data was then downloaded to an excel spreadsheet. In

order to prepare this data to be imported into ArcMap, it was necessary to clean the data so

that it only included the business name, address, and the latitude and longitude coordinates.

The excel data sheets for supermarkets, fast food restaurants, convenience stores, and recreational facilities were then imported into ArcMap. The next step in the data preparation phase was to link the business data to the participant data. In order to do this, a polygon that encompassed a 3-mile and 1-mile area around each participant was created. A count of businesses located within each polygon was used to determine the proximity of each participant to the specified resource. There were a few options available to measure the distance of a person to a business. For the purpose of this study, the driving distance was used, which incorporated all the streets a person needs to use in order to get to the desired destination. This method is in contrast to using the Euclidean distance, which is a straight-line distance between two points.

To facilitate the driving distance method, a network data set for streets was retrieved in order to set up the spatial parameters for analysis. The steps for conducting this method can be found in Appendix A. Once the system had generated all the polygons a spatial join was done to join points (facilities) to polygons (3-mile driving distance around each participant's place of residence). The steps for outlining the process of identifying the polygon that each facility lies within are in Appendix A. Figure 4.1 depicts the final study sample used for analysis after all addresses were matched.

```
                        ┌──────────────┐
                        │ Original     │
                        │ 955          │
                        └──────────────┘
                       ↙                ↘
        ┌──────────────┐              ┌──────────────┐
        │ North Carolina│              │ Michigan     │
        │ 616          │              │ 339          │
        └──────────────┘              └──────────────┘
         ↙            ↘
┌──────────────┐   ┌──────────────────┐
│ Unmatched    │   │ Matched Addresses │
│ addresses    │   │ 573              │
│ 43           │   └──────────────────┘
└──────────────┘      ↙            ↘
        ┌──────────────┐      ┌──────────────┐
        │ Missing Data │      │ Final Data Set│
        │ 101          │      │ 472          │
        └──────────────┘      └──────────────┘
```
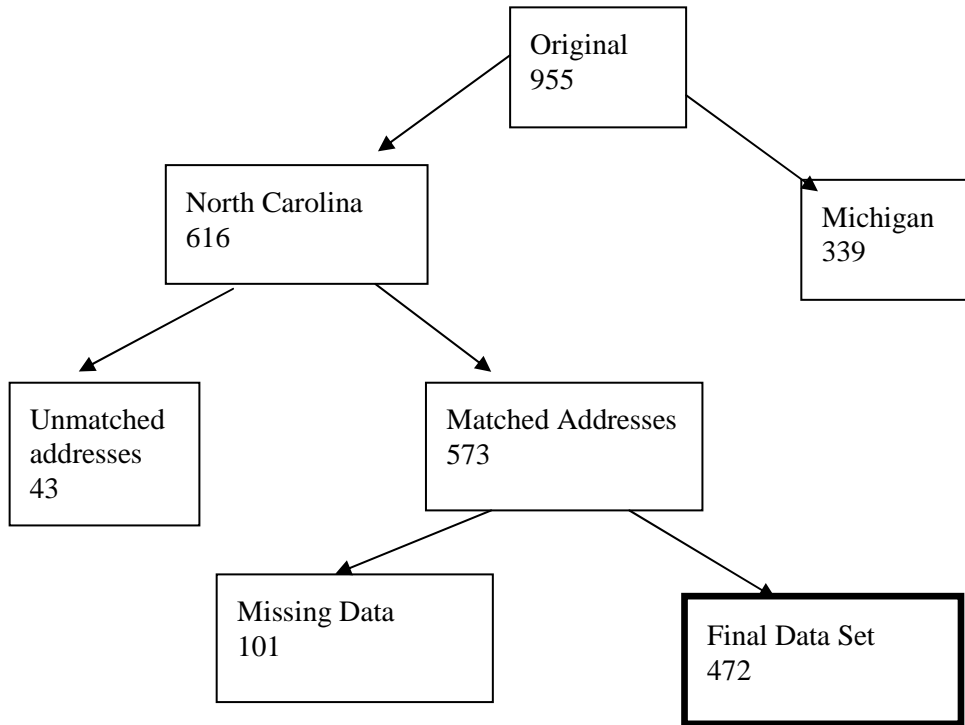
Figure 4. 1 Consort Table

Measures

Description of the Study Instruments

       The ACTS of Wellness baseline questionnaire was developed by adapting previously

validated measures for most constructs. New items were designed and modified when such

measures were not available. The instrument contained sections on the following topics: fruit

and vegetable intake, physical activity, subjective norms, physical activity behavior self-

efficacy, colorectal cancer screening history, beliefs and attitudes toward colorectal cancer

screening, demographics. The current study was limited to the following variables from the

survey: fruit and vegetable intake, physical activity, and demographics. The questions used

for this study can be found in Appendix B.

Demographic information included age groups, sex, educational level (six categories:

8th grade or less, less than high school degree, high school degree or equivalent, some college

or beauty/trade school, college graduate, education beyond college), marital status

(married/living with partner, single, divorced, widowed), income (six categories ranging

from under $10,000 to $75,000/year or higher) and health status (fair, good, excellent).

Independent Variable

Racial Residential Segregation. The index of dissimilarity (I.D.) is a commonly used

measure to assess the degree of segregation in a census tract. This is a measure of evenness

and is computed with the following formula:

I.D. = 1/2Ó ABS[(b/B)-(w/W)]

The following is an example of variables used in the formula if comparing white and African

American population:

b = the African American population of the kth area, e.g. census block group

B = the total African American population of the large geographic entity for which the index

of dissimilarity is being calculated (census tract or metropolitan area)

w = the white population of the kth area

W = the total white population of the large geographic entity for which the index of

dissimilarity is being calculated.

ABS is the Absolute Value of the calculations within the brackets

Dissimilarity ranges from 0 (complete integration) to 1 (complete segregation) and signifies

the percentage of a group's population that would have to change residence for each

neighborhood to have the same percentage of that group as the metropolitan area overall

(Iceland & Wilkes, 2006). Scores less than 0.3 indicate low segregation, 0.3-0.6 is moderate

segregation, and scores over 0.6 indicate a very high level of segregation (Massey & Denton, 1993). The ID was calculated for each participant. Based on the calculations and previous work done by Mason et al, the ID was deemed as an unsuitable representation of the degree of segregation in the South for this study sample (Mason et al., 2009). This is due to the fact that when compared to the North that has a large density of African Americans in one census tract, the South is less densely populated and has fewer census tracts (Mason et al., 2009). Therefore, residential segregation was measured by calculating the proportion of African Americans in each census tract.

Dependent Variables

Physical activity and diet were selected as the dependent variables because both have been shown to be associated with increased heart disease, cancer risk, and obesity. Walking was also chosen because studies have shown that walking is the preferred activity for older people.

Physical activity. Moderate to vigorous physical activity (MVPA) was measured using an 11-item instrument derived from existing instruments and modified for cultural appropriateness in WATCH project (James, Campbell, & Hudson, 2002; Resnicow et al., 2003). The device assessed frequency of different types of activity in the past 30 days, with response options of: rarely/never, 1-3 times/month, 1-2 times/week, 3-4 times/week, or 5 or more times/week within the past 30 days. Items included walking, jogging, swimming, biking, and sports like basketball/baseball, light sports as bowling/pool, fishing/hunting, weight lifting, home repairs, dancing, aerobics, household chores, yard work, lifting weights, praise or liturgical dancing, aerobics classes, hard physical labor at place of employment and other exercises and other exercises. For each activity, participants estimate the activity

duration as either less than 20 minutes or 20 minutes or more per session. The duration of

activity was defined as less than 20 minutes (estimated as 15 minutes for analysis) or 20 or

more minutes (estimated as 30 minutes). Physical activity was assessed in three ways. First,

physical activity was examined as the number of minutes of activity per week in the last

month. The second measure was dichotomous and was used to assess whether participants

met the physical activity recommendations. From the physical activity information obtained

in the survey, weekly energy expenditure in metabolic Equivalent Task hours (MET) was

calculated.   More specifically METs are the ratio of the metabolic rate of the average person

while seated and resting, to the metabolic rate of a particular person while performing some

task (Trost, Kerr, Ward, & Pate, 2001).

   *Dietary intake.*This was assessed using the 13-item NCI fruit and vegetable screener

(Thompson et al., 2000). This instrument assessed the frequency of consumption and portion

size for consumed F&V and has been validated against other instruments. Participants were

able to choose from 6 response options, ranging from '0 per day' -'7 or more a day'. Fruit

and vegetable item frequencies were converted to servings/day and then summed to provide

total daily consumption values for fruit, vegetables, and total fruit and vegetables

   Walking. This was measured separately because walking is the most common form of

physical activity among older adults. Walking was measured with the same instrument as

outlined for physical activity. Walking was defined as the number of minutes walked per

week in the last 30 days.

Mediator Variables

   Count of supermarkets. This was measured as the number of supermarkets within 3

miles of a participant's address. Supermarkets included Walmart Super Center, Whole Foods

Market, Super Target, Trader Joe's, Save-A-Lot, Piggly Wiggly, Lowes Foods, Kroger, Kmart Supercenter, Harris Teeter, and Food Lion.

Count of convenience Stores. This was measured as the number of convenience stores located within 3 miles of participant's address. Convenience stores were defined as free standing stores and also those attached to gas stations.

Counts of fast food restaurants. This was measured as the number of fast food restaurants located within 3 miles of participant's address. Fast food restaurants were defined as limited service restaurants and included restaurants such as McDonald's, Burger King, and Wendy's.

Count of recreational facilities. This was measured as the number of parks and recreational centers located within 1 mile of a participant's address. These facilities included Fitness & Recreational Sports Centers, nature parks and similar institutions, and child and youth services

Walk Score. This is a number between 0 and 100 that measures the walkability of any address. Walk Score calculates the walkability of an address based on the distance from a person's house to nearby amenities. Walk Score measures how easy it is to live a lifestyle that requires little use of a car. It uses a patent-pending system to measure the walkability of an address. The Walk Score algorithm awards points based on the distance to the closest amenity (transit, grocery, restaurants, coffee, bars, movies, schools, parks, libraries, books, fitness, and pharmacies) in each category. If the closest amenity in a category is within .25 miles (or .4 km), the maximum number of points is assigned. The number of points declines as the distance approaches 1 mile (or 1.6 km)—no points are awarded for amenities further than 1 mile. Each category is weighted equally and the points are summed and normalized to

yield a score from 0-100. Distance is measured using "as the crow flies" distances rather than

walking directions. "As the crow flies" distance is a measure of the straight-line distance

between two points (http://www.walkscore.com/)

Table 4. 4Walk Score Categories

Walk Score	Description
90–100	**Walkers' Paradise** — Daily errands do not require a car.
70–89	**Very Walkable** — Most errands can be accomplished on foot.
50–69	**Somewhat Walkable** — Some amenities within walking distance.
25–49	**Car-Dependent** — A few amenities within walking distance.
0–24	**Car-Dependent** — You can walk from your house to your car.

http://www.walkscore.com/

Control Variables

Demographic information. This information collected from participants included

address, age, gender, marital status, educational status, and income status. These variables

were controlled for in the analysis. Education and poverty at the census tract level was also

controlled for in the analyses. Census tract was measured as the participant's neighborhood

and is referred to as this in the following sections.

Table 4. 5 Independent, Dependent, and Mediator Variables

Independent Variable	Definition	Type of variable	Response Coding	Source
Racial residential segregation	Proportion of African American residents in a Census Block group	Independent Continuous	proportion of the census tract population who reported their race as Black/African American in the 2000 census 1.1-98%	Census 2000
Dependent Variable	**Definition**	**Type of variable**	**Response Coding**	**Source**
Meet physical activity recommendations	Frequency and duration - defined as 150 or more minutes per week	Dichotomous	Meet the recommendations for physical activity (Y/N)	ACTS of Wellness Survey
Physical Activity	Frequency and duration of activities	Continuous	# of minutes of physical activity per week in the past 30 days	ACTS of Wellness Survey
Walking	Frequency and duration	Continuous	# of minutes walked per week in the past 30 days	ACTS of Wellness Survey
Fruit and Vegetable Intake	Index used to assess dietary behavior	Dependent	Dietary score	Acts of Wellness Survey
Mediator Variables	**Definition**	**Type of variable**	**Response Coding**	**Source**
Recreational facilities	Measured as # of recreational facilities within a 1-mile radius of participant's home	Count Variable		Geocoded data from ReferenceUSA
Convenience Stores	Measured as # of convenience stores within a 3-mile radius of participant's home	Count Variable		Geocoded data from ReferenceUSA
Fast Food Restaurants	Measured as # of fast food restaurants within a 3-mile radius of participant's home	Count Variable		Geocoded data from ReferenceUSA

Supermarkets	Measured as # of supermarkets within a 3-mile radius of participant's home	Count Variable		Geocoded data from ReferenceUSA
Walk Score	Measure the walkability of a person's neighborhood based on their address	Continuous	Values ranging from 0-100	Walk Score website

Table 4. 6 Control Variables

Variable	Data Source	Categories for the analysis	Measurement
Gender	ACT 95 Are you: (select one) 1 = Male 2 = Female	1 = Male 2 = Female	Nominal
Age Group	ACT96 What is your date of birth __mm ____ dd _____year	Dummy Variables for: 50-60; 61-70; 71-80; over 80	Categorical
Marital Status	ACT97 What is your marital status? 1= married or living with a partner 2= never been married 3= divorced	Dummy Variables for: Married or living with a partner; widow; single	Categorical/Dummy
Educational attainment	ACT99 What is the highest grade of school or amount of college you have completed? (Choose one) 1= eighth grade or less 2= some high school 3= high school graduate or GED 4= trade or beauty school graduate 5= some college 6= college graduate 7= more than college (some post graduate, post graduate, or professional degree) 98 = Refused to answer	Dummy Variables for: Less than High School High School More than High School College Post college	Ordinal
Income	What is your total yearly household income (before taxes)? 1= under $10,000 2= $10,000-$19,999 3= $20,000-$29,999 4= $30,000-$49,999 5= $50,000-$69,999 6= $70,000-	Dummy Variables for: Low income High income Middle income	

	$99,999 7= $100,000-$149,999 8= $150,000 or over		
Health Status	ACT16 Overall, is your health: Excellent, very good, pretty good, fair, poor	Dummy Variables for: Excellent Health Good health Fair health	
Neighborhood Poverty	Census 2000	Median household income in 1999	Percent of the census tract population who lived below the poverty line 2000 census
Neighborhood Education	Census 2000	Educational Attainment	Percent of the census tract that had at least a high school diploma

Data Structure

Hierarchical data structures are those in which multiple micro-level units are sampled for each macro-level unit. This can happen when individuals are sampled from naturally occurring groups as in the case with the parent-study for the proposed study. Participants were clustered within churches and nested within different neighborhoods. Neighborhood was the higher level. Church was a secondary level, followed by individuals at the lower level. The macro-level units of neighborhood and church violated the assumption of independence of the data, which indicated that observations from the same macro-level units may have been correlated, and each observation may not have been providing unique information. Therefore, the standard errors would be too small and the test statistics would be too big resulting in an incorrect conclusion that effects exist. A multilevel model was created in order to address the issue of the clustered data.

Church was a mechanism used for the identification of respondents. The sampling procedures were conducted such that people within churches were surveyed; therefore the effect of church needed to be accounted for in the analysis. To account for this, the

differences among churches were modeled as fixed effects in the analyses by creating dummy variables. The church that had the longest serving pastor was used as the reference group.

Analysis Plan

A comparison of missing observations and non-missing observations was conducted using t-tests. Initially a test was done to determine if the income, education, gender, age, physical activity, and fruit and vegetable consumption of participants missing address information varied from those participants that provided address information. No significant differences were found among these variables between the missing address participants and the non-missing address participants. Similarly, a comparison was conducted with the independent and outcome variables. This was done to determine if the people missing date for income, education, gender, health status, and weight status had differed significantly from those not missing any data on the independent and dependent variables. There were no significant differences found between missing and non-missing observations. In order to test for multicollinearity among the variables, variance inflation factors were conducted on all independent, dependent, and mediator variables. There were no issues of multicollinearity.

A multilevel linear regression analysis was done to test the association between independent variables, mediators and dependent variables. Data were analyzed using Mplus version 6.1. All analyses controlled for and examined the effect of demographic variables and neighborhood characteristics, while examining the measures of health behaviors, and neighborhood characteristics. Multiple linear regression models will be used to evaluate the effect of a continuous independent variable on continuous outcomes. Using Mplus 6.1, regression coefficients, standard errors, and confidence intervals were estimated.

Analysis Specific Aims 1-3

A mediated hypothesis was proposed among the variables. The following describes the steps involved in a mediation analysis. Using the steps proposed by Baron and Kenny(Baron & Kenny, 1986) tests for mediation examine the attenuation of effects between neighborhood percent African American and individual level access to resources with the addition of individual risk behavior variables. Formal tests of significant mediated effects are assessed using the difference in coefficients method after standardizing the regression parameters.

The first step in the analysis is to regress the outcome variable on the predictor variable (path c). For specific aim 1, dietary intake would be regressed on racial composition. The next step would be to regress the number of supermarkets on racial composition (path a). Next the dependent variable, dietary intake, would be regressed on supermarkets (path b). Then dietary intake would be regressed on racial composition, while controlling for the number of supermarkets. If all pathways are significant then the significance of the mediated effect would then be tested using the Sobel test.

Regression coefficients assess the amount of change in a dependent variable associated with a one-unit increase in the independent variable, holding constant the values for other variables in the model. The significance of the mediated effect would then be tested using the Sobel test.

Traditional mediation analysis assumes that each individual observation is independent of all the others. As discussed previously, participants were sampled from churches and lived across different neighborhoods resulting in a violation of the assumption

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of independence. This phenomenon can be estimated by calculating the intraclass correlation (ICC) (Diez-Roux, 2004; Mujahid, Diez Roux, Morenoff, & Raghunathan, 2007).

The intraclass correlation coefficient (ICC) measures the proportion of variance in the outcome variable attributable to differences between groups; the remainder (1-ICC) is a measure of the proportion of variance in the outcome variable attributable to differences between individuals within groups. An ICC was calculated to assess whether there was correlation in outcomes among participants that lived in the same neighborhood. The ICC's ranged in value from 0.022 to 0.87. Although some of the correlations were small, multilevel models were used to account for this in the analyses. When clusters or groups are chosen as the unit of analysis, mediation with single level models poses two major problems. First, it violates the assumption of independent observation of ordinary least squares estimation (Carvajal, Baumler, Harrist, & Parcel, 2001). Second, it results in downwardly biased standard error estimates with overly large test statistics and inflated Type I error rates.

Multilevel mediation models were used because this technique preserved the individual level variables, while also modeling the homogeneity of errors within-group by estimating the error terms for both the individual and the group (Krull & MacKinnon, 1999). Multilevel models are more complex than single level models in terms of structure and nature of the error terms. Multilevel mediation models corrected the standard error estimates and gave a more appropriate significance test result. Using the coefficients and standard errors generated with the multilevel equations, significance of the mediated effect, $\beta a\beta b$, was tested using the following formula:

$S \beta a\beta b = \sqrt{(S^2_{\beta a}\beta_b^2 + S^2_{\beta b}\beta_a^2)}.$

There are two basic prerequisites to applying multilevel meditational models: (a) clustered data with positive ICC and b) a proposed three-variable meditational model in which the outcome variable is measured at the lowest level of the data (individual level). Additionally, multilevel mediation models require that a variable affect another variable measured at the same level or at a lower level, but not at a higher level (Krull & MacKinnon, 2001).

For this study, the predictor variable was a group level variable, thus a $2 \rightarrow 1 \rightarrow 1$ model was used, as depicted in Figure 4.2 and detailed in Table 4.7. In this model, the predictor level 2 variable (X_j) represented a characteristic of the group, which affected an individual level mediator (M_{ij}), which, in turn, affected an individual level outcome (Y_{ij})(Krull& MacKinnon, 2001). In the multilevel specification, the group level initial variable is incorporated into group level equations (Krull & MacKinnon, 2001).
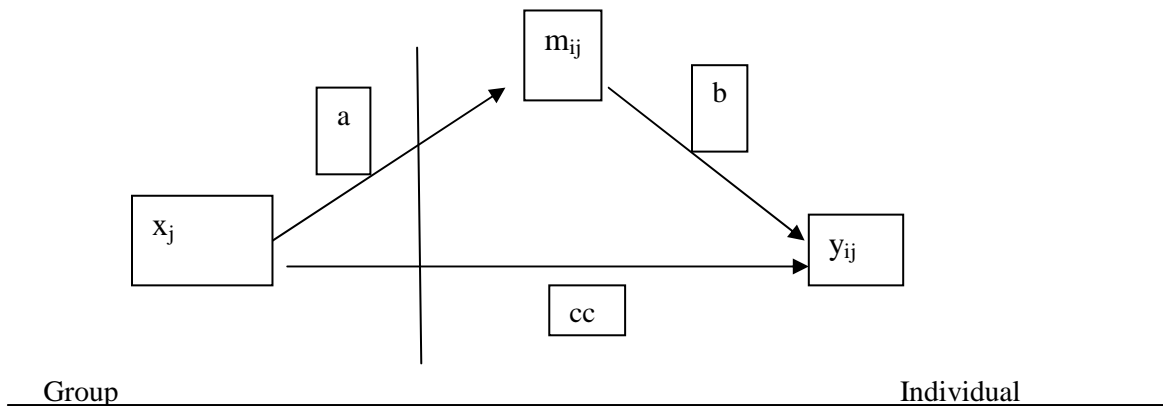

Figure 4. 2 Multilevel Mediation Model

Table 4. 7 Multilevel Equations for Meditational Analysis

2→ 1→ 1	
Equation 1: $Y_{ij} = \beta_o + \beta_c X_{ij} + r_{ij}$	Level 1: $Y_{ij} = \beta_{oj} + r_{ij}$ Level 2: $\beta_{oj} = \gamma_{00} + \gamma_c{}'X_j + \mu_{0j}$
Equation 2: $Y_{ij} = \beta_o + \beta_{c'}X_{ij} + \beta_b M_{ij} + r_{ij}$	Level 1: $Y_{ij} = \beta_{oj} + \beta_b M_{ij} + r_{ij}$ Level 2: $\beta_{oj} = \gamma_{00} + \gamma_{c'}X_j + \mu_{0j}$
Equation 3: $M_{ij} = \beta_o + \beta_a X_{ij} + r_{ij}$	Level 1: $M_{ij} = \beta_o + r_{ij}$ Level 2: $\beta_{oj} = \gamma_{00} + \gamma_a X_j + \mu_{0j}$

Multivariate Behavioral Research (Krull & MacKinnon, 2001, p258)

Additional analyses were conducted with weight status groups in the models with fruit and vegetable consumption as the outcome variable because approximately 50% of the sample was obese. The groups were dichotomized into non-obese and obese groups. Estimates and standard errors were compared to determine if fruit and vegetable consumption was significantly different across the groups.

Listwise deletion was used to deal with missing data. Listwise deletion involved removing observations with missing data and running analyses on observations that had complete data for all variables (Patrician, 2002).

Qualitative Methodology

The purpose of the qualitative portion of this dissertation study was to more closely examine the filter function as outlined in Braubach's Model of Place Effect on Health in Figure 3.1(Braubach, 2007). This allowed participants to provide an interpretation of their

experience within the residential and church setting. Informed by the findings from the quantitative study, I developed a question guide to be used for specific aim two to ascertain social contextual factors that are relevant to older African American church members living in predominantly African American neighborhoods. This guide was used to conduct semi-structured interviews with this population. To achieve Research Aim 2, interviews were conducted with approximately 12 older African American church members. Observations were also done in the participant's neighborhood to get a different perspective of their neighborhood. The study was approved by the Institutional Review Board at the University of North Carolina. The recruitment script, letter to participant, informed consent and interview guide can be found in Appendices C-F. The purpose of the study was to understand the experience of older African Americans living in predominantly African American neighborhoods

Study Design

In order to develop a stronger theoretical basis for the proposed conceptual model, I conducted semi-structured interviews to understand perceived ideas and notions of participants' residential environment and church in relation to their physical activity and diet based on the results obtained from the analysis of the baseline surveys. These in-depth interviews were used to elicit information on how church members define their neighborhood, to determine what resources they have access to in their neighborhood, and to determine what influences their decisions to engage in physical activity, and maintain a healthy diet. Through the semi-structured interviews, I learned more about what the participants considered to be the boundaries of their neighborhood, where most of their daily activities took place, how active they were in their church, where participants engaged in

physical activity, what types of physical activity they usually engaged in, what barriers

existed to engaging in physical activity, and their awareness of physical activity opportunities

in their area.

Sample Recruitment

Participants were drawn from the ACTS of Wellness study. The follow up survey to

the study had a question that asked participants if they would be willing to answer additional

questions. From this follow-up survey, 112 of the participants agreed to answer additional

questions and also came from census tracts with a population of 50% or more African

Americans will be considered to be highly segregated areas (Williams & Collins, 2001).

Purposive stratified sampling was used to select church members by rate of residential

segregation in their census block group, gender, and geographic location. Data were

collected from 3 different urban areas.

The goal of recruitment was to identify participants, both male and female from

Greensboro, Durham, and Raleigh. The script used for recruitment can be found in Appendix

C. Thirty participants were contacted via their home or work phone. A voicemail was left for

participants that did not answer the phone in addition to three follow up calls placed at

various times on different days. Participants were excluded because they either did not

answer their phone or declined to participate. This yielded a total sample of 12 participants

for the qualitative portion of the study. Upon agreeing to participate, a study information fact

sheet was mailed out to participants that provided them details of the study.

Data Collection
Observation

Prior to interviewing participants, I visited their residential neighborhood and kept

field notes in order to document what I observed. I drove my own car to the different

neighborhoods and used a digital recorder to capture all that I observed. The Active

Neighborhood Checklist, found in Appendix G served as a guide during the observations to

document physical characteristics that I felt could contribute to the health and well-being of

individuals residing in these areas. Some of these characteristics included the presence of

sidewalks, location of supermarkets, convenience stores, and fast food restaurants, physical

appearance of buildings and residential structures, and upkeep of the physical environment.

This direct observation was conducted to allow for comparisons across census tract indicators

and participants' perceptions of their neighborhood (Laraia et al., 2006).

Interviews

The in-depth interviews consisted of semi-structured questions that were developed a priori

(Morse & Richards, 2002). Additional questions were added to the interview guide based on

the findings from the quantitative analyses. The interviews were conducted over the phone

at the participant's convenience and were recorded using two digital recorders, with one

serving as back-up in order to ensure the quality of the audio recordings. During the course

of the interview, probes were used to build on participant answers. Interviews lasted

anywhere from 1.5 to 4 hours. The interview guide can be found in Appendix F.

Validity

Some threats to validity that I noted, included participant's social desirability

(responding in a manner that is deemed to be socially acceptable regardless if it is based on

truth) and "acquiescent response" (consistently agreeing or disagreeing with an

answer)(Munhall & National League for Nursing, 2001). Two measures were taken to

reduce this threat to validity in the interview process. Interview questions were worded in a

manner that was neutral and without judgment (Nederhof, 1985). The other technique used

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to reduce threats of social desirability is to select interviewers that are not from the same social group as the respondent (Nederhof, 1985). As the interviewer, I did not consider myself to be part of the same social group as the respondents because I am from a different age and generational cohort.

Data Management

Data was transcribed verbatim and then organized and managed using Atlas-ti® qualitative text analysis software. Transcripts were analyzed using an iterative coding process with triangulation on final thematic findings. A codebook based on the interview guide was developed and used to code transcripts. Field notes were taken and maintained in order to track activities and behaviors of participants during interviews and observations.

Analysis

Qualitative analysis involves a cyclical, inductive, and iterative approach (Hesse-Biber & Leavy, 2006). As such, analysis and writing began while data was still being collected because they informed one another. (Ryan & Bernard, 2000) A codebook was created to track the different types of codes that emerged from the data. I developed initial coding categories that reflected the research questions and themes from Braubach's model of place effects on health (Braubach, 2007). The codebook created for this study can be found in Appendix H. Through the course of the analysis, I developed hypotheses about what was going on with participants and their social interactions within and outside the neighborhood. These formed the basis of additional codes.

In their book, Richards and Morse describe three types of coding, descriptive, topic and analytic coding, all of which were used in the analysis of this study's data (Morse & Richards, 2002). Descriptive coding focuses on storing information such as people and places

(Morse & Richards, 2002). Examples of descriptive coding documented for this study included names of food stores and people that influenced participant's health. Topic coding involves compiling data together that have the same subject matter (Morse & Richards, 2002). Topic coding examples included participants' descriptions of their physical neighborhoods. More interpretation of the data was required with analytic coding which led to the emergence of themes (Morse & Richards, 2002). A theme is a general idea that is consistent throughout the data.

As outlined in Miles and Huberman (2002), I developed an accounting scheme for codes that were not necessarily based on the content (Huberman & Miles, 2002). A general scheme that was presented in Miles and Huberman (2002) includes the following categories: setting/context, definition of the situation, perspectives, ways of thinking about people and objects, process, activities, events, strategies, relationships and social structures (Huberman & Miles, 2002).   After more in depth review of the transcript, I then did pattern coding which entailed grouping the first level codes into a more manageable, smaller set of themes and constructs (Huberman & Miles, 2002). These pattern codes were then compared to other data collected including observations, field notes, and pictures.

Reflexivity

As an African American researcher I feel that I shared some similar experiences to the study participants with whom I interacted. I believe that these shared experiences facilitated rapport-building with participants and enabled them to open up more so than they would with someone from a different racial background. A drawback of this shared experience is that my knowledge of certain terms kept me from probing to gain a better understanding of what the participant was trying to convey. For example, one participant

mentioned that she was not getting "The Word" from her pastor so she left the church. I

understood what she was referring to when she mentioned that, so I did not feel the need to

probe further.   I neglected to garner more information from this participant and interpreted it

based on my knowledge and previous experiences. A struggle with this also lies in the fact

that by probing further, I could have lost the rapport that I had developed with the participant,

because they now feel that we do not share similar experiences if I question something that is

supposedly common knowledge.

The following two chapters present the findings from the data analyses.

CHAPTER FIVE

EXPLORING THE RELATIONSHIP BETWEEN RACIAL RESIDENTIAL SEGREGATION AND PHYSICAL ACTIVITY AMONG OLDER AFRICAN AMERICAN CHURCH MEMBERS: A MIXED METHODS APPROACH

Introduction

Health disparities between African Americans and Whites have been widely documented (Landrine & Corral, 2009; Robert & Ruel, 2006; Satcher, 2001; Siegel et al., 2011). Differences in the rates of physical activity between these two groups have been offered as one plausible explanation for the disparities in health outcomes (Bopp et al., 2006; Bopp et al., 2007; Powell, Martin, & Chowdhury, 2003). In 2008, sixty-five percent of African Americans did not meet the recommended guidelines for physical activity as compared to 54.4% of Whites (Nelson et al., 2007). Studies have shown that this disparity persists in older African Americans, who have lower rates of physical activity than their White counterparts. For older adults, physical activity is essential in improving muscle mass, bone density, psychological function and cognition, and reducing functional limitations (Chodzko-Zajko et al., 2009; Elavsky et al., 2005; Keysor, 2003).

Currently, the physical activity recommendations for older adults state that older adults should engage in at least 150 minutes of moderate physical activity or 75 minutes of vigorous physical activity per week (Nelson et al., 2007). Nationally, 26% of older African Americans, over the age of 65, and 37% of those aged 45-64, reported that they had met the physical activity recommendations as compared to 41% of older white adults over age 65 and

49% of White adults aged 45-64 (Nelson et al., 2007; Gallagher et al., 2010). In North

Carolina, 24% of African American over 65 and 36% of those aged 45-64 met the physical

activity recommendations in comparison to 38% of Whites over age 65 and 44% of those

aged 45-64 (Nelson et al., 2007). Differences in the rates of physical activity between these

groups have recently been linked to external and environmental factors.

A growing body of literature has demonstrated an association between the

neighborhood context and physical activity among older adults (de Leon et al., 2009;

Friedman et al., 2005; Gallagher et al., 2010). Since walking is the preferred method of

physical activity for older adults, a neighborhood environment conducive to walking is

imperative (Gallagher et al., 2010). Among older African American adults, aspects of the

neighborhood environment that have been found to be associated with walking include the

presence of people, neighborhood safety, seeing familiar faces, sidewalks and walking trails,

and the aesthetics of the neighborhood (Gallagher et al., 2010). However, there is little

research showing what effect living in a racially segregated or predominantly African

American neighborhood may or may not have on facilitating physical activity among older

African Americans.

Racial residential segregation is defined as the physical separation of races in a

residential context (Acevedo-Garcia et al., 2003; Williams et al., 2003). This is a form of

institutionalized discrimination, which refers to discriminatory policies, or practices of

organizations that have resulted in differential access to resources and societal

opportunities(Karlsen & Nazroo, 2002). Based on the 2000 Census, over 74 Metropolitan

Statistical Areas were highly segregated, with African Americans being the most segregated

group in the United States (Iceland & Wilkes, 2006). Research has shown that segregation is

associated with poor health outcomes for African Americans living in these areas (Williams, 2001). LaVeist (2003) found that older African Americans were more likely to live in racially segregated neighborhoods. An increase in lifetime exposure to racial residential segregation has been connected to higher rates of mortality among African Americans (Laveist, 2003). This continual exposure to segregation, may not only impact health outcomes, but also the health behaviors, such as physical activity, that lead to these health outcomes.

The research on the association between residential segregation and physical activity is inconclusive. Lopez examined the relationship between racial segregation and physical activity using the Behavioral Fisk Factor Surveillance System (BRFSS) and the Dissimilarity Index (DI), a measure of segregation described as the percentage of African Americans who would have to move in order to achieve a uniform distribution across a metropolitan area (Lopez, 2006; Massey & Fischer, 2000). The Isolation Index, ranges in value from 0 (totally integrated) to 100 (totally segregated), and is a measure of the distribution of African Americans and Whites across the neighborhoods of a metropolitan statistical area (Corral et al., 2011). Lopez, found that in a nationally representative sample of diverse adults, an increase in the degree of segregation was associated with an increase in physical inactivity (Lopez, 2006). Another study conducted by Corral and colleagues, used BRFSS data and the Isolation Index to examine the relationship of physical activity and residential segregation in African American adults (Corral et al., 2011). Corral et al, found no significant relationship between segregation and physical activity (Corral et al., 2011). Examining more specific measures of segregation based on an individual's address and the individual's proximity to

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physical activity resources may expand our understanding of how racial residential segregation is associated with physical activity.

Racial residential segregation has recently been linked to access to resources and health outcomes in older African Americans. Specific resources such as parks, sidewalks, playgrounds, and recreational facilities have the potential to promote physical activity among residents (Chaudhury, Mahmood, Michael, Campo, & Hay, 2011; Gallagher et al., 2010; Michael, Perdue, Orwoll, Stefanick, & Marshall, 2010). Recreational facilities have been shown to be less present in minority neighborhoods although no difference was found in the number of parks across neighborhoods (Moore, Diez Roux, Evenson, McGinn, & Brines, 2008; Powell, Slater, Mirtcheva, Bao, & Chaloupka, 2007). Access to resources within the neighborhood are relevant for older adults as they tend to perform most of their daily activities close to home and become more dependent on their residential surroundings (Cutchin, 2003; de Leon et al., 2009). As the number of amenities in the neighborhood increases, the more potential opportunities exist for walking in this population.

The inconclusive association between racial residential segregation and physical activity and the potential pathways between the two warrants further examination. In addition, the perception of neighborhood influence on physical activity among older African Americans has received little attention in the literature. The studies that have examined physical activity among older African Americans did not include objective measures of neighborhood characteristics (Gallagher et al., 2010). Incorporating a mixed methods model may be useful to subjectively and objectively investigate how living in racially segregated areas influences the physical activity of older African Americans.

The concept of therapeutic landscapes can be used to describe what aspects of a person's external environment contribute to their health and well-being. Gesler first described therapeutic landscapes as places that are associated with treatment or healing (Gesler, 1992). Later, Braubach (2007) added that therapeutic landscapes could also be used to describe facets of the environment that are not only healing, but health promoting (Braubach, 2007). In Geographies of Health: Therapeutic Landscapes, Braubach argued that there are five characteristics of urban neighborhoods that may indirectly or directly impact health. These characteristics are as follows: 1) physical characteristics of the environment shared by all residents; 2) healthy environments that include the conditions and functionality of home, work, school, or recreational settings; 3) services provided to support the daily life of residents; 4) socio-cultural features of neighborhoods; and 5) reputation of the neighborhood (Braubach, 2007). Braubach posited, as seen in Figure 3.1, that an individual's health status is impacted by a process that starts at the individual's physical and psychosocial environment(Braubach, 2007). This process is then filtered through how the individual perceives and ascribes meaning to this environment, which can then produce both good or poor health outcomes and overall well-being(Braubach, 2007).

Utilizing the concept of therapeutic landscapes as described in Braubach's*Model of Place Effects on Health*, the purpose of this study was to: 1) examine the association between racial residential segregation and physical activity and their potential mediating pathways; and 2) using the filter function, explore the perspectives of older African American church members living in segregated neighborhoods. Through a mixed methods approach, understanding the intersection between objective measures of resources and perceived

resources for physical activity can help in the creation of a supportive environment for

physical activity for older African American church members.

Using a quantitative approach, this study tested the following hypotheses:

1. Older African American church members living in neighborhoods with a lower degree of

racial residential segregation will have more recreational facilities in their neighborhood, and

in turn have more minutes of physical activity.

2. Older African Americans church members living in neighborhoods with a lower degree of

racial residential segregation will have a higher walk score, and in turn have more minutes of

walking.

Using qualitative methods to explore the filter function, as outlined in Braubach's*Model of

Place Effects of Health*, the research question was:

How do older African American church members conceptualize the role of their racially

segregated landscape, defined as neighborhoods, in facilitating or hindering their physical

activity?

Methods

Design and data

This study used a mixed methods design to facilitate triangulation of qualitative and

quantitative data. The quantitative methods, analysis, and results will be presented first,

followed by that of the qualitative component. This study was reviewed and approved by the

Institutional Review Board of the University of North Carolina at Chapel Hill.

Quantitative

A cross-sectional study design was used to test hypothesized associations between

racial residential segregation, neighborhood resources, and physical activity. The secondary

data came from the Action through Churches in Time to Save lives (ACTS) of Wellness project, a CDC-funded church-based intervention conducted in North Carolina and Michigan to increase to increase colorectal cancer screening and physical activity among older African American church members. This study analyzed the baseline data collected from the 12 church sites in NC.

Parent Study Sample and Baseline Data Collection

ACTS of Wellness study design was a two-group randomized trial with the church as the unit of randomization. Churches were randomly assigned to be in the intervention and control groups. The intervention group received tailored newsletters and motivational interviewing on colorectal cancer and physical activity. The control group received the Body and Soul Program which has 4 components that incorporate pastoral influence, peer counseling, church activities, and changes in church environment related to healthy eating.

Churches were eligible for the ACTS of Wellness study if they: a) had a predominantly African American congregation; b) had no less than 250 active adult member on their roster; c) had at least 100 members that were 50 and over ; d) agreed to be randomized to intervention or control arm. Church members were eligible to participate in the ACTS of Wellness study if they: a) were aged 50 and over b) English-speaking; c) gave consent to participate in the study; and d) a member of the church.

The project coordinator, who was responsible for recruiting churches, telephoned and met with pastors of potential churches. In some instances, the coordinator met with members of the church to explain the project in detail. Recruitment of churches began in May 2007, which yielded a total of 12 churches drawn from three urban areas of N.C. From January 2008 to August 2009, which yielded a total of 616 church members (approximately 50 from

each of the 12 churches) were enrolled and administered a baseline survey.   Trained research

staff used a face-to-face self-administered questionnaire that took an average of 30-40

minutes to complete. Baseline data included demographic information, health information,

self-rated health status, fruit and vegetable consumption, physical activity, psychosocial

factors related to these behaviors, and participant home address.

For this study, participant home addresses were geocoded using ArcMap.   A 1-mile

buffer was created around each participant. Data on neighborhood resources were obtained

from ReferenceUSA. Numeric identification codes were used to categorize parks and

recreational facilities. A custom search was done using the specified codes and county.

Census 2000 data was used to assess neighborhood-level variables including racial

composition, which was used to assess the degree of racial residential segregation, education,

and poverty level of each neighborhood at the census tract level. Census tract served as the

proxy for neighborhood. Walk scores were obtained from the walk score website at

http://www.walkscore.com(Carr, Dunsiger, & Marcus, 2010).

Measures

Independent Variable

Racial Residential Segregation was measured as a continuous variable using the racial

composition of the neighborhood. This was done by calculating the percent of non-Hispanic

African Americans living in the neighborhood. Neighborhoods that were predominantly

African American were considered racially segregated neighborhoods.

Dependent Variables

Moderate to vigorous physical activity (MVPA) was measured using a 16-item instrument

derived from existing instruments and modified for cultural appropriateness in the WATCH

(Wellness for African Americans Through Churches) project (Campbell et al., 2004). The device assesses frequency of different types of activity, with response options of: rarely/never, 1-3 times/month, 1-2 times/week, 3-4 times/week, or 5 or more times/week within the past 30 days. Items included walking, jogging, swimming, biking, and sports like basketball/baseball, light sports as bowling/pool, fishing/hunting, weight lifting, home repairs, dancing, aerobics, household chores, yard work, lifting weights, praise or liturgical dancing, aerobics classes, hard physical labor at place of employment and other exercises. For each activity, participants estimated their activity duration as less than 20 minutes (estimated as 15 minutes for analysis) or 20 or more minutes (estimated as 30 minutes) per session. The physical activity of walking, however, was examined separately and duration was measured as the number of minutes walked per week in the last 30 days.

For this study, three physical activity variables were created. First, total number of minutes of physical activity per week in the last month was the sum of all 16 items. The second variable was based on the total number of minutes and used to assess whether participants met the physical activity recommendations. The third variable was the metabolic equivalent task (MET) hours. One MET is equivalent to the amount of oxygen (energy) the average person consumes while seated and resting (Campbell et al., 2004). MET hours/week were computed based on frequency, duration, and a MET (intensity) value from 11 of the 16 items (Campbell et al., 2004). The items that were excluded dealt with daily living and occupational activity. This physical activity measure, tested in a similar population showed good validity with a modified 7-day physical activity recall (for MET hours/week scores, $r=.6$, $p<.01$; duration of activity for those reporting< 20 min/day averaged 15 min and for those reporting ≥ 20 min/day averaged 31 minutes (Campbell et al., 2007).

Mediators

The Walk Score is a number between 0 and 100 that measures the walkability of an address, based on the distance from a person's house to nearby amenities. AWalk Score indicates how easy it is to live a lifestyle that requires little use of a car. It uses a patent-pending system to measure the walkability of an address. The Walk Score algorithm awards points based on the distance to the closest amenity (transit, grocery, restaurants, coffee, bars, movies, schools, parks, libraries, books, fitness, pharmacies) in each category. The categories are displayed in Table 4.4. If the closest amenity in a category is within .25 miles (or .4 km), the maximum number of points is assigned. The number of points declines as the distance approaches 1 mile (or 1.6 km)—no points are awarded for amenities further than 1 mile. Each category is weighted equally and the points are summed and normalized to yield a score from 0—100. Distance is measured using "as the crow flies" distances rather than walking directions. "As the crow flies" distance is a measure of the straight-line distance between two points (http://www.walkscore.com/)l. The walk score has been tested as a valid estimation of access to walkable amenities (Carr et al., 2010).

Recreational facilities were compiled from the ReferenceUSA business database. ReferenceUSA compiles its data using phone books, annual reports, business directories, and public record data. ReferenceUSA includes over 22 million businesses in the United States. A custom search was done to identify recreational facilities in the vicinity of the participants' residence. This was done using the custom search options of business type and geography. In order to ensure that all businesses were included, counties in which at least 1 participant resided in were selected. The primary codes from the North American Industry Classification System (NAICS) were used to identify businesses. The following NAICS codes were used to

categorize businesses that were recreational facilities or parks (71394015, 62411006, 71219004).

Availability of recreational facilities was measured as the number of recreational facilities located within 1 mile of the participant. These facilities included fitness and recreational sports centers, community centers, nature parks and similar institutions.

Control Variables

Variables were included in the models that could potentially confound the association between racial residential segregation and physical activity. Male served as the reference category for gender. Age was categorized as age 50-60; age 61-70 (reference category); age 71-80 and age greater than 80. Education was categorized as less than high school; high school; college; and post college (reference category). Individual income was categorized into low income (<$10,000-$29,999), middle income ($30,000-$69,999) (reference category), and high income (>$70,000). Marital status was categorized as single; married (reference category); and widowed. Neighborhood poverty and neighborhood education were measured as continuous variables. Neighborhood poverty was measured as the percent of residents that lived below the poverty line. Neighborhood education was measured as the number of residents that had more than a high school diploma.

Analyses

Descriptive statistics were calculated and a matrix of the correlations of the study variables was examined to assess for potential issues of multicollinearity. Multilevel meditational regression analyses were conducted using Mplus version 6.1 to test this study's hypotheses (Baron & Kenny, 1986). Logistic regression models were used to test the association between racial residential segregation and meeting physical activity

recommendations because meeting physical activity recommendation was a dichotomous variable. A multilevel technique was used in order to account for the possibility that respondents living in a given neighborhood might share similar outcomes because they live in the same neighborhood (Lopez, 2006). In order to control for the clustering effects of the church, churches were treated as fixed effects. Each church was entered into the model as a dummy variable, with the church with the longest serving pastor acting as the reference category.

Results

The descriptive statistics for hypothesis 1 and hypothesis 2 are shown in Table 5.1. The final data set consisted of 472 participants, of whom 68% were women. Their mean age was 65 years, with the majority being age 61-70 years. Sixty percent was married. The participants in the sample were highly educated, with approximately 46% having at least a college degree.   With regard to annual household income, 45% reported at least $50,000, whereas 19% reported less than $20,000.   Participants lived in census tracts for which the mean proportion of African American residents was 46.4% and ranged from 1.1%-98.0%. The mean proportion of census tract residents living below the poverty line was 12.1% and ranged from 1.1% to 56.1%. The mean proportion of census tract residents without a high school diploma was 17.9% and ranged from 1.0% to 50.0%. Participants lived within 1 mile of at least 1 recreational facility, and the mean Walk Score for their home address was 30. With regard to physical activity, 34% of participant met the physical activity recommendations. Their mean METs was 8.4. On average, participants reported engaging in 114 minutes of physical activity per week in the last 30 days. Of these physical activity minutes, an average of 55 minutes was devoted to walking.

Table 5. 1 Characteristics of Participants

	Total N of Participants N=472
Female (%)	68
Mean Age (SD)	65 (8.4)
Age Groups (%)	
50-60	34.1
61-70	41.5
71-80	18.9
>81	5.5
Marital Status(%)	
Married	60.2
Single/Divorced	23.5
Widowed	16.3
Education Level (%)	
Less than high school	6
High school	48
College	21
Post College	25
Income (%)	
Low income	30
Middle income	43
High income	27
People Meeting Physical activity Recommendations (%)	34
Mean METS (SD)	8.4 (8.6)
Mean minutes of physical activity (SD)	114.6 (114.1)
Mean minutes of walking (SD)	55.7 (54.9)
Mean Neighborhood African American Composition (SD)	46.4 (30)
Mean Neighborhood Poverty (SD)	12.1 (8.8)
Mean Neighborhood Education (SD)	17.9 (10.3)
Mean Recreational Facilities within 1 mile of participant (SD)	1 (1.8)
Mean Walk Score (SD)	30.2 (9.3)

Factors Associated with Physical Activity

Hypothesis 1: Older African American church members living in census tracts with a lower degree of racial residential segregation will have more recreational facilities in their block group and in turn have more minutes of physical activity.

The first part of the mediated pathway, the regression of recreational facilities within 1 mile on the proportion of African American residents in a person's neighborhood was not supported. As the data show in Table 5.2, there was no significant association between these two variables, thus it was not possible to conduct the meditation analysis. Fewer recreational facilities were located within 1 mile to men as compared to women. High-income participants lived within 1 mile to significantly fewer recreational facilities than middle-income participants. As the number of recreational facilities within 1 mile to a participant increased, the neighborhood poverty level also significantly increased.

The second mediated pathway that was examined was between the Walk Score and the proportion of African American residents in a person's neighborhood. As with the previous mediator, there was no significant association between these two variables. Thus, the mediated hypothesis is not supported. Men were significantly more likely to have a lower Walk Score as compared to women. High-income participants were significantly more likely to have a lower Walk Score as compared to middle-income participants. There was a significant positive association between Walk Score and neighborhood poverty; the higher the Walk score, the higher the neighborhood poverty.

Table 5. 2 Direct Effect of Physical Activity Resources on Neighborhood Proportion of African American Residents

	Walk Score	Recreational Facilities w/n 1 mile
	β	β
Racial Residential Segregation	-.384	-.313
Female		
Male	-2.696**	-2.323**
Age 61-70		
Age 50-60	-1.670	-1.740
Age 70-80	-.564	-.552
Age >80	1.043	.646
Middle Income		
Low Income	-.004	-.329
High Income	-3.289*	-3.171*
Post Grad		
Less than High School	-1.032	-1.016
High School	-1.247	-1.044
College	.859	.670
Married		
Single	-.949	-.733
Widow	-1.511	-1.022
Excellent Health		
Fair Health	-.861	-.805
Good Health	-.566	-.862
Neighborhood poverty	1.201***	1.162***
Neighborhood Education	-.503	-.476

*p<0.05 ** p<0.01 *** p<0.001

Reference group in italics

The results in Table 5.3 show how the mediators and independent variable together are associated with the different measures of physical activity. Two models were analyzed for each measure of physical activity. One model included recreational facilities within 1 mile to the participant (Model 1) and the other model included the walk score (Model 2). The results of the measure of METs on the mediators and independent variable are presented in the first part of Table 5.3.   There was a positive significant association between METs and the proportion of African American residents in a participant's neighborhood for both

Models 1 and 2. Greater proportions of African American residents in the participant's neighborhood were associated with 0.6 greater METs in Model 1 and 0.5 greater METs in Model 2. There was a significant negative association between METs and neighborhood education in model 2. Higher METs was associated with significantly lower neighborhood education. In both models, participants who reported either fair or good health had significantly lower METs, than participants who reported an excellent health status.

The results of minutes of physical activity regressed on the independent variable and the mediators are presented in the second part of Table 5.3. Recreational facilities within in 1 mile are measured in model 1, while the walk score is measured in Model 2.

In Model 1, minutes of physical activity were positively significantly related to the proportion of African American residents in a participant's neighborhood. Greater proportions of African American residents in a neighborhood were associated with 8.3 more minutes of physical activity. The same pattern was observed in Model 2, in which greater proportions of African American residents in a neighborhood, was associated with 9.2 more minutes of physical activity. Participants who reported either fair or good health had significantly fewer minutes of physical activity than participants who reported an excellent health status. There was a significant negative association between minutes of physical activity and neighborhood poverty in Model 2. Lower levels of neighborhood poverty were associated with significantly more minutes of physical activity.

The third part of the table includes a logistic regression of the odds of meeting physical activity recommendations. In Model 1, greater proportions of African American residents in a neighborhood was associated with 81% lower odds of meeting physical activity

recommendations (OR .81, p<.01).   There was no significant relationship between meeting

physical activity recommendations and available recreational facilities.

Table 5. 3 Adjusted Multilevel Regression Models of Physical Activity

	METs		Minutes of PA		Meet PA Recommendations	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
	β		β		OR	
Racial Residential Segregation	.557*	.521***	8.318*	9.167**	.186**	.197**
Recreational Facilities within 1 mile of participant		.152	3.200		1.078	
Walk Score	.038			.467		1.011
Female	1.488	1.371				
Male			11.416	13.743	.928	.959
Age 61-70						
Age 50-60	-.525	-.643	-7.592	-5.115	1.013	1.045
Age 70-80	1.650	1.590	4.301	5.954	.984	1.004
Age >80	-.559	-.730	-21.975	-20.548	.621	.651
Middle Income						
Low Income	-.547	-.579	-7.561	-6.505	.681	.696
High Income	2.108	1.898	14.919	19.967	1.369	1.456
PostCollege			3.969	4.167		
Less than High School	-.485	-.453	3.292	7.015	1.388	1.347
High School	1.203	1.124	.056	2.081	1.115	1.137
College	.995	1.013			.877	.872
Married						
Single	-.871	-.930	-14.881	-14.200	.740	.751
Widow	-.548	-.559	-15.328	-14.553	1.129	1.103
Excellent Health						
Fair Health	-3.447**	-3.500**	-39.508	-27.246*	.701	.619
Good Health	-2.259**	-2.294**	-28.955	-37.809*	.609*	.712*
Neighborhood poverty	-.116	-.069	-1.619	-1.908*	-.033	-.044
Neighborhood Education	-.085	-.108***	-1.074	-.956	-.027	-.021

*p<0.05 ** p<0.01 *** p<0.001

Reference group in italics

Hypothesis 2: Older African American church members living in census tracts with a lower degree of racial residential segregation will have a higher walk score and in turn have more minutes of walking.

Table 5.4 shows the results of walking and its relationship to the proportion of African American residents in a neighborhood, the Walk Score, and recreational facilities within 1 mile. Recreational facilities within 1 mile are represented in the Model 1 and the Walk Score is outlined in Model 2. In Model 1, there is a positive significant association between minutes of walking and proportion of African American residents in the neighborhood. In Model 1, participants who reported good health had significantly fewer minutes of walking than participants who reported excellent health status. Model 2 had similar results, whereby minutes of walking were significantly associated with proportion of African American residents in a neighborhood.

Table 5. 4 Adjusted Multilevel Regression Models of Walking

| | Model 1 | Model 2 |
	β	β
Racial Residential Segregation	3.569*	3.768*
Recreational Facilities within 1 mile of participant	-.081	
Walk Score		.090
Female		
Male	4.152	4.692
Age 61-70		
Age 50-60	-2.951	-2.150
Age 70-80	-1.416	-.859
Age >80	-13.932	-13.846
Middle Income		
Low Income	-1.103	-1.200
High Income	4.702	6.082
Post-Graduate		
Less than High School	7.742	9.136
High School	-4.878	-3.437
College	-9.310	-8.415
Married		
Single	-5.622	-5.354
Widow	-9.822	-9.072
Excellent Health		
Fair Health	-16.455	-15.977
Good Health	-8.002*	-7.759
Neighborhood poverty	-.827	-.957
Neighborhood Education	-.117	-.087

*p<0.05 ** p<0.01 *** p<0.001
Reference group in italics

In sum, these findings indicate that living in a neighborhood with a greater proportion of African American residents was associated with higher levels of physical activity. Although racial residential segregation was not associated with each measurement of physical activity, no association was shown between racial residential segregation and access to physical activity resources or between available physical activity resources and engaging in physical activity. To explore possible explanation for the higher rates of physical activity

reported by older African American church members living in predominantly African American neighborhoods, qualitative methods were used.

Qualitative

Building on the findings from the quantitative portion of this study, qualitative methods were used to understand the experiences of older African American church members living in racially segregated neighborhoods. This was done to explore the filter function presented in Braubach's Model of Place Effects on Health, which focuses on the individuals' perceptions of their neighborhood's influence on their physical activity (Braubach, 2007). Additionally, qualitative methods were used to gain insight into why the hypotheses were not supported.

Purposive sampling was used in the selection of the study participants, who had completed the baseline and follow-up survey for the ACTS of Wellness study in NC. The participants selected for the follow-up survey were contacted if they indicated that they would be willing to answer additional questions and lived in a predominantly African American census tract. Of the 467 participants, 112 met the criteria for living in a census tract with 50% or more African American residents (Williams & Collins, 2001; Sallis, Kraft, & Linton, 2002)

Sampling was done to include both men and women and participants from the three different study regions. Participants were recruited through phone calls made to their home or work place. To be eligible for the study, the person could not have any physical restrictions that prevented them from being physically active. They also had to be willing to devote at least an hour of their time to complete the interview. Once the participant agreed to be interviewed a study fact sheet was mailed to their address.

Field observations were done in the participant's neighborhood prior to the interview. I drove through the participant's neighborhood and surrounding areas. Using a digital recorder and digital camera, I documented neighborhood characteristics that could potentially contribute to the health and well-being of individuals including the presence of safe parks and recreation centers and the upkeep of the physical environment (Sallis et al., 2002).

I conducted the semi-structured interviews via the phone from May to July, 2011. This method was chosen to reduce the burden on the participant. It has been documented that data obtained from phone interviews can be an adequate substitute for face-to-face interviews when contact has already been made with participants and rapport established (Carr & Worth, 2001; Sturges & Hanrahan, 2004). This was the case in this study, because I had conducted baseline surveys with the participants previously through my participation as a graduate research assistant on the ACTS of Wellness study. Verbal informed consent was acquired over the phone prior to the initiation of the interview. The semi-structured in-depth interviews consisted of open-ended questions that were developed a priori (Morse & Richards, 2002). These questions included information on the perception of the neighborhood's influence on participants' physical activity and diet. During the course of the interview, probes were used to build on participant answers. The interview guide is provided in Appendix F. Participants were mailed a $30 Visa gift card upon completion of the interview. The approximate duration of each call was between 45-240 minutes. The interviews were digitally recorded and then transcribed verbatim by experienced transcribers. The interviews generated on average 30 pages of text. I listened to the recording of each call while reading through the transcripts to ensure accuracy.

Analysis

The goal of using content analysis was to inductively gain knowledge and understanding of how older African American church members living in predominantly African American neighborhoods gave meaning to their residential context and its role in influencing their health, specifically physical activity and diet (Hsieh & Shannon, 2005). Content analysis is an approach that involves "subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns" (Hsieh & Shannon, 2005). Directed content analysis can be used when the existing concepts or theories used to describe a phenomenon are limited in scope and may benefit from further description (Hsieh & Shannon, 2005; Zhang & Wildemuth, 2009). A directed content analysis approach is apropos for this study because the concept of therapeutic landscapes as outlined by Braubach is limited in its description of a health-promoting neighborhood. As such, initial categories defined for the concept of therapeutic landscapes were used to code the data, while simultaneously; additional codes were created for text that represented a new category or a subcategory of an existing code (Hsieh & Shannon, 2005).

Coding involves assigning distinctive labels to the text in the transcripts that reflect certain categories of information (Huberman & Miles, 2002). As stated in the preceding paragraph, initial codes were developed based on categories from Braubach's description of a health-promoting neighborhood. These codes included 1) neighborhood physical characteristics; 2) healthy environments; 3) services provided to support the daily life of residents; 4) socio-cultural features of neighborhoods; and 5) reputation of the neighborhood (Braubach, 2007). All transcribed data were organized and managed using ATLAS.ti version 6.2 qualitative text analysis software. The use of ATLAS.ti assisted me in the coding of data,

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retrieval of text based on keywords, visual representations of codes and their relationships to one another, and documentation of coding changes throughout the analysis process (Zhang & Wildemuth, 2009).

Using an inductive approach, I generated additional codes after the first interview based on categories that were identified in the text. This study focused on data related to understandings, perceptions, actions, and social constructions of the racial residential context and its potentially therapeutic characteristics as described by participants. In addition, in order to gain understanding to why the quantitative hypotheses were unsupported, this study focused on data related to neighborhood characteristics that could possibly describe the association found between racial residential segregation and physical activity in the quantitative analyses. This process involved identifying segments of the text that provided a description of what people were doing, why they acted in the manner in which they did, and how they were thinking about the way they acted (Warren & Karner, 2010). A codebook was developed that included codes, a label, a definition, a description of when each code should be applied, and an example of a quote (Carey, Morgan, & Oxtoby, 2006; Ryan & Bernard, 2000). I applied the codes to the transcripts using the coding scheme.

Trustworthiness in qualitative research is dictated by how confident a researcher is with the truth of the findings based on the research design, informants, and context (Krefting, 1991). Several steps were implemented to establish the trustworthiness of the qualitative data. Trustworthiness was established in this study through triangulation and peer examination. Triangulation was achieved through the convergence of multiple perspectives for mutual verification of data to ensure that all aspects of a phenomenon have been examined (Krefting, 1991). The strategy used to achieve triangulation in this study was by

employing multiple methods of data collection including interviews and participant

observations. Peer examination involves the researcher's discussion of the research process

and findings with unbiased colleagues/peers who have experience with qualitative methods

(Krefting, 1991). For this study, peer examination was accomplished through consultation

with a doctoral candidate who checked the coding scheme against 17% percent of the

transcripts which allowed for a critical assessment of my interpretations from the direct

quotes (Krefting, 1991).

Findings

A total of thirty people were contacted to assess their interest in completing the

interviews. Twelve participants residing in 3 different urban areas of North Carolina, 9

women and 3 men agreed to participate. Their characteristics are provided in Table 5.5.

Table 5.5 Characteristics of Interview Participants (N=12)

Sex	Age	BMI	Length of Residence	Minutes of Physical Activity	Minutes of Walking	MET hours	Meet Physical Activity Recommendations (Y/N)	Walk Score	Recreational Facilities
M	75	26	38	45	0	4.5	N	25	0
F	65	32	30	150	75	10	Y	60	1
F	59	43	59	15	15	.9	N	54	8
F	66	39	9	0	0	0	N	34	1
M	65	32	10	255	150	16.6	Y	86	10
F	61	34	23	180	52.5	19	Y	86	10
F	74	30	30	472.5	150	31.2	Y	15	1
F	71	20	15	180	150	11.2	Y	15	1
F	62	32	26	0	0	0	N	69	3
F	62	35	50	165	15	.9	N	29	1
F	65	26	30	30	15	2.1	N	42	1
M	56	25	25	270	150	20.6	Y	28	0

The findings from the quantitative study were contrary to the proposed hypotheses. It

was expected that people living in racially segregated or predominantly African American

neighborhoods would have significantly lower levels of physical activity. The concept of

therapeutic landscapes served as a guide to determine how residents of these communities

perceived and placed meaning on their surroundings and how this contributed to their

physical activity. The major themes are presented below.

Physical and Social Appearance of Community

A majority of the participants described their neighborhood as being well-maintained.

Participants were focused on beautifying their overall neighborhood. Some of the

participants stated that living in a place that looked good made it a pleasant and comfortable

place to live.

> Well my immediate neighborhood is a very comfortable place where people tend to take care of their property, of their lawns and things of the sort. (Male, 75)

Homeownership was equated to taking care of the property. A majority of the participants

made a distinction between owning and renting property.

> … the property that was owner-occupied property became rental property and if you can imagine.. that meant unfortunately meant that the pride and ownership of the property was not there - so the property was allowed to run down. (Female, 62)

One participant stated that several features of her neighborhood influenced her walking

including, shade trees and the absence of dogs. Another participant had never viewed her

neighborhood as being able to influence her physical activity. However, during the interview

she realized that if she observed her neighbors walking in a group this could have the

potential to motivate her to exercise. This was the case with a male participant, whose

physical activity behaviors were influenced by observing his neighbors exercise.

> Most of the people in the neighborhood do things like running and go to the gym. You see them walking, running, stuff like that. And everybody, you know, try to be

healthy. Their younger people then we are and they try to keep theirs so we try to keep ours too. (Male, 65)

Neighborhood Opportunities for Physical Activity

Other places that were mentioned as spaces for physical activity included the Young Men's Christian Association (YMCA), community recreational centers, and church.   These places tended to be located within 6-8 miles or 10-15 minutes away from participants' homes. A couple of the participants mentioned community centers close to their home that offered exercise classes for older people. However, these participants did not utilize these resources. One participant who walked in her neighborhood and went to the gym felt that her neighborhood was not necessarily conducive for being physically active. She stated that the neighborhood lacked nature trails, bike trails, sidewalks, and although there was a community center, it lacked exercise equipment. This participant felt the addition of these features to her neighborhood would encourage people to be physically active.   Additionally, some of the participants mentioned the absence of sidewalks in their neighborhoods. The field observations conducted by the first author captured the absence of sidewalks in some of the participants' neighborhoods. This however, did not prevent them from walking. Some participants stated that there had never been sidewalks in their neighborhood, and it was hard to miss something that was never there. For one participant, the absence of sidewalks meant that people would stay off of her lawn. Some participants also stated that they used the walking trails and parks located in their neighborhoods.

Figure 5. 1 Photos of Participants' Neighborhood walking environment

Knowing your neighbors

This was an important theme that emerged from the interviews. A majority of participants had lived in their neighborhood for over 30 years. Their children and their neighbors' children grew up together. Knowing their neighbors offered participants a sense of stability and security. They could count on their neighbors to alert them of any problems in the neighborhood. Being familiar with the neighbors encouraged several of the participants to walk the neighborhood. Although participants stated that they did not frequent their neighbors' homes, the sense of familiarity from knowing their neighbors was welcoming. They felt more comfortable walking around because they know their neighbors and the neighbors know them.

> It's pleasant to walk through. It's not a new neighborhood but it's pleasant. I know that when I get out there I'm going to see or speak to somebody. So I don't really mind getting out there and walking because of that. (Female, 65)

> Most of the people I know and they know me because all my neighbors now, even if they don't know me on the newer end, they say, "Oh, you're out doing your walking this morning. I should be joining you." And I say, "Well, you will." And I keep on walking. I feel very comfortable there because they know me. (Female, 74)

Within this theme of knowing their neighbors, many participants specifically discussed the

experience of living in a predominantly African American neighborhood. This is evidenced

in the subsequent statement where two of the participants described their experience of living

in an integrated neighborhood as compared to living in a predominantly African American

neighborhood.

> It was all black people. When I lived in Colorado it was mixed. You might have blacks, Hispanics, whites in the same neighborhood. It wasn't bad but it wasn't the closeness as in . . . it was a different kind of atmosphere between being there and being in the South. It was totally different. (Male, 56)

> It was a . . . I had a house but I did not have a neighborhood. My neighbors next door didn't speak; they didn't care if I was sick or dead. There were no club functions because it was a mixed neighborhood and every now and then you saw a black person. It wasn't a neighborhood for me. (Female, 65)

Feeling of safety

The feeling of safety was described by participants in terms of the physical aspects of

the neighborhood along with the social environment. Issues of safety were mainly a concern

for the women interviewed. This theme focused on characteristics of the neighborhood that

affected feelings of safety among the participants. Traffic was one safety concern that some

of the participants addressed. Some participants avoided walking during the morning, which

was a high traffic time for the neighborhoods. Some participants mentioned that they

enjoyed walking in their neighborhood because she did not have to worry about dogs. The

presence of too many trees prevented one participant from using the walking trails in her

neighborhood because she did not know who could be hiding in the trees. Another

participant highlighted how safety issues in her neighborhood had changed over time, which

influenced her willingness to walk.

> I used to walk a lot in the neighborhood and then I stopped when the neighborhood changed with the gangs and that. I stopped walking. So I started to walk again

because the neighborhood has changed back to a much more peaceful area. (Female, 62)

As seen in the theme of knowing your neighbors, living in a predominantly African American neighborhood influenced participants' feelings of safety. Some of the participants expressed that they felt safe living in a predominantly African American neighborhood because they felt a sense of belonging and acceptance. One participant illustrated this in the quote below.

> I felt totally accepted in my neighborhood, it was an all-black neighborhood, I was totally safe. There were a group of us; we did everything together. We played together, we competed in basketball, we went to Sunday school and church together. It was a safe environment. Did we know about other environments? Yes we did, but we didn't have to worry about those other environments because we were safe. Now, I know you're supposed to train your children to be global but you can't train them to be global and accepted in the global society until they have a very good understanding of who they are. You don't worry about them until they can fend for themselves. And I always said, hey, the schools are there, I want my children in the best schools, and they're going to have to go to school with children from everywhere. But even if they're from stress, from stressful school situations, they don't have to be involved with that when they come home. And that's the way I grew up. (Female, 65)

Other neighborhood characteristics that were mentioned by participants as it related to feeling safe in a predominantly African American neighborhood included togetherness, tight-knit community, and people looking out for each other.

Discussion

Few studies have been conducted that examined variables associated with both racial residential segregation and physical activity among older African American church members. This study found that living in predominantly African American neighborhoods was associated with increased physical activity. Although racial residential segregation was

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associated with each measurement of physical activity, this study found no association between racial residential segregation and access to physical activity resources nor between physical activity resources and engaging in physical activity. People living in predominantly African American neighborhoods were less likely to meet physical activity recommendations. The physical activity recommendations state that older adults should get at least 150 minutes of moderate to vigorous physical activity per week (Nelson et al., 2007). This level of physical activity is in addition to light-intensity everyday routine activities (Nelson et al., 2007). Moderate to vigorous physical activity is described as an activity that significantly raises your heart rate (Nelson et al., 2007). This study included many different types of physical activity, some of which were not moderate to vigorous activities. So although people living in predominantly African American neighborhoods had more minutes of physical activity, the activities may not have been vigorous enough to meet the physical activity recommendations.

These findings were inconsistent with those of other studies that have found no effect between racial residential segregation and physical activity(Corral et al., 2011; Lopez, 2006). This study included more measures of physical activity than found in the other studies. The other studies used a single-item measure of physical activity in the past month (Corral et al., 2011; Lopez, 2006). In contrast, this study used four different physical activity variables, derived from the number of minutes of eleven different types of exercises, per week in the last 30 days. Moreover, this study extended previous research with the addition of qualitative interviews with a subset of the study sample.

Based on the findings from the qualitative interviews, living in a predominantly African American neighborhood may not always hinder physical activity. Many of the

interviewees reported that they, along with most of their neighbors, had lived in their neighborhood for over 30 years. Over the course of their tenure in their neighborhood, they had developed a sense of community based on shared experiences. The participants felt that their predominantly African American neighborhoods created for their children a safe haven where they were free from the effects of racism. Participants created the same sense of belonging and acceptance that they had experienced growing up in predominantly African American neighborhoods. It is this connection with their neighbors that seemed to provide a more pleasant environment for walking. The feelings of comfort, safety and acceptance that the participants described of living in predominantly African American neighborhoods, may explain why physical activity was higher among participants with a higher percentage of African Americans in their neighborhoods. These feelings described by the interviewees are concepts that form the basic tenets of social capital.

Social capital is defined as the web of social networks that consist of shared values, mutual expectations, and trust (Carpiano, 2006). Social capital resides in the relationships individuals have with one another (Schulz & Northridge, 2004). Studies have found that communities with high levels of social capital have community members that report good health(Kawachi, Subramanian, & Kim, 2008; Kawachi& Berkman, 2000). The social capital that interviewees expressed existed in their neighborhood served to buffer the harmful effects that other studies have found to impact residents of racially segregated neighborhoods (Landrine & Corral, 2009). Understanding more about the mechanisms by which racial residential segregation impacts health is essential to determine how best to reduce health burdens experienced by residents living in these neighborhoods.

A noteworthy finding was the fact that availability of physical activity facilities was not associated with their being used. In the interviews, participants mentioned various opportunities for physical activity that were in close proximity to their place of residence. However these participants did not use these resources. It is important to note that these participants did not cite financial barriers as a reason for not using these facilities. Time constraints and individual responsibility were cited as the main reason for not using these facilities. One participant stated that her neighborhood did not influence her physical activity behavior and that she just needed to get motivated.

Previous studies have documented the association between access to physical activity resources and actual engagement in physical activity (Heinrich et al., 2008; Hoehner, Brennan Ramirez, Elliott, Handy, & Brownson, 2005; Humpel, Owen, & Leslie, 2002). This study did not support those findings. One explanation for the inconsistent findings is the limited assessment of potential moderators. In the presence of these moderators the relationship between access to physical activity resources and engagement in physical activity may vary. These factors could include safety, comfort with neighbors, and neighborhood. For example, the relationship between access to physical activity resources and engagement in physical activity may vary based on the level of crime in the area. Future research should be examined to determine what strategies could be used to increase utilization of local physical activity resources. Additionally, future research needs to explore how to more effectively address individual factors and environmental factors simultaneously, that inhibits physical activity among people who have access to physical activity resources.

There could be several explanations for the insignificant association between access to physical activity resources and actual physical activity. This study did not examine street

connectivity or presence of sidewalk, both of which have been linked to walking in older

adults (Michael et al., 2010). Recreational facilities were grouped into one variable.

Examining the facilities as separate variables, for example measuring parks alone, may have

provided a more accurate assessment of their relation to physical activity and racial

residential segregation. Asking participants to report the name, location and proximity to

residence of the physical activity facilities they utilized could have strengthened this study.

This study was cross-sectional in nature, so causality cannot be determined. It cannot be

assessed whether living in predominantly African American neighborhood leads to more

physical activity or that more physically active people move to predominantly African

American neighborhoods.

 For the purpose of this study a neighborhood was defined as the participant's census

tract. These census tracts did not necessarily correspond with the participants' self-defined

neighborhood. This study is limited because the sample is not necessarily representative of

all older African Americans as these participants were drawn from churches.

 The interviewed participants tended to live in their neighborhoods for an extended

period of time. The longevity of the participants in their neighborhood contributed to their

comfort with their residential space. Interviews were only conducted with participants living

in predominantly African American neighborhoods. This study was unable to determine if a

similar effect would occur among residents living in integrated neighborhoods or

predominantly White neighborhoods.

 This study was strengthened by the use of the concept of therapeutic landscapes.

Guided by the concept of therapeutic landscapes as depicted in Braubach's Model of place

effects on health, this study was able to understand how participants perceived their neighborhood environment and in turn how this contributed to their physical activity. Braubach's Model of place effects on health posits that neighborhood resources and characteristics can impact an individual's health outcomes depending on how the individual perceives or filters these factors (Braubach, 2007). Understanding this filtering process was achieved in this study with the use of the semi-structured interviews. The interviewees were very aware of the characteristics of their neighborhood, especially its racial composition. The interviewees identified how the racial composition of their neighborhood influenced their life and their health. The racial composition of all interviewed participants' neighborhoods was predominantly African American. Most participants viewed this as a positive aspect of their neighborhood that contributed to a sense of comfort and security. For some participants, this comfort and security translated into health promoting behaviors such as walking. The place effects model can be employed in other studies to discover how individuals perceive their neighborhood's influence on their health.

Another strength of this study was the application of a mixed method mode of inquiry. Most studies of racial residential segregation solely examine objective measures and do not get information from participants' experience of living in these neighborhoods (Laveist, 2003; Lopez, 2006; Mason et al., 2009a). The use of mixed methods in this study offered a plausible explanation for the positive association of living in racially segregated neighborhoods and being physically active found among participants. Additionally, a strength of this study was the fact that individuals were linked to specific addresses, which allowed for a more accurate assessment of neighborhood physical activity resources, in contrast to other studies that approximate individual's access.

Conclusions

This study revealed that the intersection of health and place for older African Americans is multifaceted, especially for those living in predominantly African American neighborhoods. The facets include, physical, social, historical and individual. The way researchers conceptualize access to physical activity resources differs from the way it is conceptualized by the older African American church members interviewed for this study. For example, the absence of sidewalks, which is reported to hinder walking (Gallagher et al., 2010), was not perceived as a barrier for this population. The way in which some older African Americans place meaning on their physical neighborhood environment may differ from the meaning that someone else places on the same environmental feature. Barriers for one population may be perceived as assets to another population. Researchers should account for this in their study of neighborhood access and health behaviors.

The emphasis that participants placed on knowing their neighbors highlights the importance of the neighborhood social environment. For some of the participants, the familiarity with their neighbors allowed for greater ease of walking within the neighborhood and overall well-being for this population. The neighborhood environment may have great meaning for older African Americans, especially those living in predominantly African American neighborhoods. The historical context of the neighborhood is another facet of place and health relevant for older African Americans. For many of these people, their neighborhood once represented a place of solace in a time of turmoil. Although, older African Americans may not presently look to their neighborhood for solace as they did in their past, their shared experiences connect them to their neighborhood and to their neighbors. Many of the current therapeutic effects of the neighborhood described by the

interview participants were a function of their experiences accumulated over an extended period of time spent in the neighborhood.

The meaning that the individual interview participant placed on their neighborhood environment was indirectly related to their health and overall well-being. Studying the influence of the neighborhood environment can be enhanced by expanding research to focus on objective and subjective measures of the social and physical environment. The use of Braubach's Model of place effects on health was important in combining the neighborhood level and the individual level, both of which together influenced health.

Racial residential segregation, which is viewed by many as a deleterious to health, was not described as such by residents living in these neighborhoods, primarily because of their perceptions of their neighborhood. Future research on older African Americans, especially those living in predominantly African American neighborhoods should employ a broader approach in assessing neighborhood barriers to physical activity, by examining beneficial aspects of the neighborhood environment.   In doing this, more interventions can be targeted to building on existing resources in neighborhoods to promote healthy living.

CHAPTER SIX

USING A MIXED METHODS APPROACH TO EXAMINE THE ASSOCIATION OF RACIAL RESIDENTIAL SEGREGATION AND FRUIT AND VEGETABLE CONSUMPTION AMONG OLDER AFRICAN AMERICAN CHURCH MEMBERS

Introduction

Substantial research has been conducted on the association between racial residential segregation and health (Laveist, 2003; Robert & Ruel, 2006;Williams & Collins, 2001). Racial residential segregation describes the pattern seen when there is a physical separation of races in a residential setting. Racial residential segregation has been documented as one of the underlying factors that contribute to the health disparities that exist between African Americans and Whites (Williams & Collins, 2001). Specifically, living in a predominantly African American neighborhood has been linked to poorer health outcomes and higher mortality rates among African Americans (Chang, 2006; Haas et al., 2008; Laveist, 2003; Mason et al., 2009). For example, Chang found that African Americans living in racially segregated neighborhoods had a higher body mass index (BMI) and greater odds of being overweight (Chang, 2006). One explanation offered for the association between racial residential segregation and poor health outcomes among African Americans, is the differential access to health promoting resources in their neighborhoods, such as resources for healthy eating (Kwate, 2008; Zenket al., 2005).

Research has shown that predominantly African American neighborhoods have less access to the health promoting resources, such as supermarkets, that are associated with fruit

and vegetable consumption (Franco, Diez Roux, Glass, Caballero, & Brancati, 2008; Galvez et al., 2008; Morland et al., 2002; Morland & Filomena, 2007). Morland et al (2002) found that supermarkets were more likely to be located in predominantly White neighborhoods as compared to predominantly African American neighborhoods. Additionally, Bodor and colleagues (2010) found that the availability of fresh fruits and vegetables was lower in predominantly African American neighborhoods than in racially mixed neighborhoods (Bodor, Rice, Farley, Swalm, & Rose, 2010). Studies have also documented that as the distance to supermarkets increases, fruit and vegetable consumption decreases (Michimi & Wimberly, 2010; Jeffery, Baxter, McGuire, &Linde, 2006). Conversely, another aspect of the food environment that can negatively influence fruit and vegetable consumption is the presence of fast foods and convenience stores. Fast food restaurants are more prevalent in predominantly African American neighborhoods and eating at fast food restaurants is negatively associated with vegetable consumption (Jeffery et al., 2006; Block, Scribner, & DeSalvo, 2004).

The inequitable distribution of food resources in predominantly African American neighborhoods may negatively impact the fruit and vegetable consumption of African Americans. In a study looking at the trend of fruit and vegetable consumption among adults in the United States, African Americans reported eating fewer servings of fruits and vegetables a day than their White counterparts (Casagrande, Wang, Anderson, & Gary, 2007). The 2010 dietary guidelines from the USDA build on previous guidelines and state that adults should increase their consumption of fruits and vegetables; eat a variety of vegetables especially dark green, red, and orange vegetables; and increase consumption of whole grains. Studies have documented that a diet consisting of five or more servings of

fruits and vegetables a day was effective in reducing a person's risk for heart disease, stroke, some forms of cancer, and obesity (U.S. Department of Agriculture and U.S. Department of Health and Human Services, December 2010). This is especially relevant for older African Americans who are disproportionately affected by these diseases (Velkoff et al., 2005). African Americans are 1.3 times more likely to die from heart disease, more likely to die from cancer, and more likely to be obese as compared to their White counterparts (Michimi, A. 2010; Kuzawa, 2009).

A study done by Bowman (2009) found that older African Americans had significantly less fruit and vegetable consumption than their White counterparts. In another study that examined fruit, vegetable, and fat intake among a sample of African Americans, although older people were more likely to consume healthier foods, only 16% of participants met the national guidelines for diet (Gary et al., 2004). Proximal access to fruit and vegetables is posited as one determinant of fruit and vegetable consumption among older African Americans, who tend to have decreased mobility as they age (Yen, Michael, & Perdue, 2009). Thus, neighborhood factors become particularly relevant for this group.

Measuring access to food store primarily involves identifying food stores that are in close proximity to an individual (Michimi & Wimberly, 2010). Several studies have shown that greater access to supermarkets is associated with healthier diets (Laraia, Siega-Riz, Kaufman, & Jones, 2004). Similarly, proximal access to fast food restaurants is associated with increased consumption of fast food and poorer diet (Moore, Diez Roux, Nettleton, Jacobs, & Franco, 2009). Although these studies were able to measure access, they did not determine if participants actually frequent these establishments (Michimi & Wimberly, 2010; Richardson, Boone-Heinonen, Popkin, & Gordon-Larsen, 2011). Understanding the reasons

for why people shop at certain food stores can help to gain a clearer picture of the environmental impact on fruit and vegetable consumption among older African Americans.

As health-promoting resources have been reported to be lower in predominantly African Americans neighborhoods (Bodor et al., 2010; Casagrande, Whitt-Glover, Lancaster, Odoms-Young, & Gary, 2008; Morland & Filomena, 2007; Zenket al., 2005), accessing healthy food options becomes problematic for older African Americans living in these areas. Few studies have examined how access to fruits and vegetables may affect fruit and vegetable consumption of older African Americans living in racially segregated neighborhoods. Determining what aspects of the neighborhood affect fruit and vegetable consumption among older African Americans can help in identifying avenues for intervention to increase fruit and vegetable consumption in this population. To understand how access to food store influences fruit and vegetable consumption, it is essential to ascertain the process used by older African Americans in food selection based on their surrounding environment. To further explore these relationships, this study applied the concept of therapeutic landscapes.

The concept of therapeutic landscapes has been applied in research examining how physical, social, and cultural environment improves the quality of life and mental well-being of older people (Martin, Nancarrow, Parker, Phelps, & Regen, 2005; Milligan, Gatrell, & Bingley, 2004). Gesler introduced the concept of therapeutic landscapes in the cultural geography literature and states that this concept can be used to "understand how the healing process works itself out in places (or in situations, locales, settings, milieus)" (Gesler, 1992). Extending this concept beyond healing, Williams posited that this concept could be used to describe places that were health promoting (A. Williams, 2007). Braubach built on this idea

in his development of the place effects model. The place effects model depicted in Figure

3.1, shows a process by which an individual assesses their physical and psychosocial

environment and makes health behavior decisions based on this assessment, contributing to

their health status and mental well-being (Braubach, 2007). In Geographies of Health:

Therapeutic Landscapes, Braubach argued that there are five characteristics of urban

neighborhoods that may indirectly or directly impact health. These characteristics are: 1)

physical characteristics of the environment shared by all residents; 2) healthy environments

that include the conditions and functionality of home, work, school, or recreational settings;

3) services provided to support the daily life of residents; 4) socio-cultural features of

neighborhoods; and 5) reputation of the neighborhood (Braubach, 2007).

The place stratification model offers one explanation for the inequitable access to

supermarkets found in racially segregated neighborhoods. The place stratification model is

one of the theoretical models used to explain patterns of racial residential segregation. This

model reasons that residential patterns are based on a hierarchy and are shaped by prejudice

and discrimination. A hierarchy of places exists, classified by their desirability and the

quality of life afforded to their residents (Freeman, 2002). Characteristics of desirable places

include, but are not limited to, access to good schools, proximity to jobs, access to local

goods and services, such as supermarkets, and protection from crime (Freeman, 2002). By

living in these desirable places, people who hold the power in the society maintain this power

by distancing themselves spatially and socially from their minority counterparts (Alba &

Logan, 1993; Freeman, 2002; Friedman et al., 2005; Iceland & Wilkes, 2006).

This model states that people move into neighborhoods that offer better resources

than other areas. In order to preserve these resources, people in power restrict the access of

groups without power to their areas of residence. The place stratification model is most relevant in describing residential segregation patterns between African Americans and Whites because it reflects more of the historical context that exists between the two groups. For other minority groups such as Hispanics or Asians, increases in income translate into higher quality neighborhoods and housing (Iceland & Wilkes, 2006). However, even with socioeconomic gains, African Americans tend to live in less advantaged areas than their White counterparts (Williams & Collins, 2001).

The evidence of this model is seen in the zoning ordinances and bank lending practices that prevented African Americans from moving into predominantly White neighborhoods (Massey & Denton, 1993). It is further supported by "White flight", a term used to describe the migration of Whites out of neighborhoods as more African Americans move in (Massey & Denton, 1993). Studies have shown that even after controlling for socioeconomic status this spatial distance still occurs (Farley & Frey, 1994). A study by South and Crowder (1998) looking at migration patterns of African Americans and Whites, demonstrated that within a six-year period Whites were less likely to move to racially-mixed or predominantly African American areas. The place stratification model informed the conceptual model for the current study because it supports the pathway between racial residential segregation and neighborhood resources.

Guided by the concept of therapeutic landscapes as interpreted in Braubach's model of place effects on health, the goal of this study was to examine the food environment of older African American church members to determine its impact on their fruit and vegetable consumption. Specifically, this study examined the association between racially segregated neighborhoods and access to food stores and how this association influenced fruit and

vegetable consumption among older African American church members. A secondary goal of the study was to explore how older African American church members living in racially segregated areas perceived the effect of their food environment on their diet. The research questions and hypotheses are outlined below.

Research Question 1a: Is the degree of racial residential segregation in older African American church members' neighborhood related to the number of supermarkets, which in turn is related to the fruit and vegetable consumption of participants?

*Hypothesis 1a***:** Older African American church members living in neighborhoods with a lower degree of racial residential segregation will have more supermarkets in their neighborhoods and have higher levels of fruit and vegetable consumption.

Research Question 1b: Is the degree of racial residential segregation in older African American church members' neighborhood related to the number of convenience stores, which in turn is related to the fruit and vegetable consumption of older African American church members?

Hypothesis 1b- Older African American church members living in neighborhoods with a lower degree of racial residential segregation will have fewer convenience stores in their neighborhood and in turn have higher levels of fruit and vegetable consumption.

Research Question 1c: Is the degree of racial residential segregation in a participant's neighborhood related to the number of fast food restaurants, which in turn is related to the fruit and vegetable consumption of older African American church members?

Hypothesis 1c- Older African American church members living in neighborhoods with a lower degree of racial residential segregation will have fewer fast food restaurants in their neighborhood and in turn have higher levels of fruit and vegetable consumption.

Methods

Design and data

This study used a mixed-methods approach to facilitate triangulation of qualitative and quantitative data. The methods, analysis and results for the quantitative and qualitative sections are presented sequentially. This study was reviewed and approved by the Institutional Review Board of the University of North Carolina at Chapel Hill.

Quantitative

A cross-sectional design was used to examine the associations between racial residential segregation, food resources and fruit and vegetable consumption. The secondary data came from the Action through Churches in Time to Save lives (ACTS) of Wellness project, a Centers for Disease Control and Prevention (CDC)-funded church-based intervention implemented in North Carolina and Michigan to increase colorectal cancer screening and physical activity among older African American church members. This study's analysis was restricted to the baseline data collected from 12 church sites in NC.

Parent Study Sample and Baseline Data Collection

The ACTS of Wellness study design was a two-group randomized trial with the church as the unit of randomization. Churches were randomly assigned to be in the intervention and control groups. The intervention group received tailored newsletters and motivational interview on colorectal cancer and physical activity. The control group

received the Body and Soul program which has 4 components that incorporate pastoral influence, peer counseling, church activities and changes in church environment related to healthy eating.

Churches were eligible for the ACTS of Wellness study if they: a) had a predominantly African American congregation; b) had no fewer than 250 active adult members on their roster; c) had at least 100 members age 50+ years; and d) agreed to be randomized to intervention or control arm. Church members were eligible to participate if they: a) were age 50 years and older; b) were English-speaking; and c) consented to participate in the study.

The project coordinator, who was responsible for recruiting churches, telephoned and met with pastors of potential churches and in some cases with members of the church. Recruitment of churches began in May 2007, which yielded a total of 12 churches drawn from three urban areas of N.C. From January 2008 to August 2009, a total of 616 church members (approximately 50 from each of the 12 churches) were enrolled and administered a baseline survey. Trained research staff collected baseline data for the ACTS of Wellness study using a face-to-face self-administered survey that took an average of 30-40 minutes to complete. Baseline data included demographic information, health information, fruit and vegetable consumption, physical activity, and psychosocial factors related to these behaviors and participant home address.

For the purposes of the current study, participant home addresses were geocoded using ArcMap. A 3-mile buffer was created around each participant's residence. Data on neighborhood resources were obtained from ReferenceUSA. Numeric identification codes were used to categorize supermarkets, convenience stores, and fast food restaurants. A

custom search was executed using the specified codes and county. Census tract served as the proxy for neighborhood. Census 2000 data were used to assess neighborhood-level variables including racial composition of residents, education, and poverty level of residents within a census tract.

Measures

Independent Variable. Racial Residential Segregation was measured as a continuous variable using the racial composition of the neighborhood. This was done by calculating the proportion of non-Hispanic African Americans living in the neighborhood. The final variable was measured using 10% increments for the proportion of African American residents in the neighborhood. Neighborhoods that were predominantly African American were considered racially segregated neighborhoods.

Dependent Variable. Fruit and vegetable consumption was assessed using the 13-item NCI fruit and vegetable screener (Thompson et al., 2000).   This instrument assessed the frequency of consumption and portion size for consumed fruit and vegetable (F&V) and has been validated against other instruments. Participants could choose from six response options, ranging from '0 per day' -'7 or more a day'. Fruit and vegetable item frequencies were converted to servings/day and then summed to provide total daily consumption values for fruit, vegetables, and total fruit and vegetables.

Mediators. A count of supermarkets, convenience stores, or fast food restaurants was measured separately as the number of each entity located within a 3-mile buffer zone around each participant's residence. The North American Industry Classification System (NAICS) codes were used to categorize all three entities.   The NAICS code used to identify supermarkets was 44511003. Supermarkets included Walmart Super Center, Whole Foods

Market, Super Target, Trader Joe's, Save-A-Lot, Piggly Wiggly, Lowes Foods, Kroger, Kmart Supercenter, Harris Teeter, and Food Lion. Convenience stores were identified using the following NAICS codes: 44719005, 44512001, 44719005. Examples of convenience stores included free standing stores and those attached to gas stations, like Sheetz or BP. Fast food restaurantswere identified using the NAICS code 722211. Examples of fast food restaurants included McDonald's, Burger King, Wendy's, Bojangles, Kentucky Fried Chicken, Cookout, and Subway.

Control Variables. Variables were included in the models that could potentially confound the association between racial residential segregation and physical activity. Male served as the reference category for gender. Age was categorized as age 50-60; age 61-70 (reference category); age 71-80 and age greater than 80. Education was categorized as less than high school; high school; college; and post college (reference category). Individual income was categorized into low income, middle income (reference category) and high income. Marital status was categorized as single; married (reference category); and widowed. Neighborhood poverty and neighborhood education were measured as continuous variables. Neighborhood poverty was measured as the proportion of residents that lived below the poverty line and neighborhood education was measured as the number of residents with more than a high school diploma.

This study also controlled for obesity status because diet is a major factor contributing to obesity and therefore warranted further inquiry. Obesity was measured using the Body Mass Index (BMI), which is the ratio of weight in kilograms divided by the square of height in meters (Ogden et al., 2007). According to the CDC, an adult (aged 20 and older) with a BMI of 25 is considered overweight, while someone with a BMI equal to or greater

than 30 is considered overweight (Freedman, 2011). Two obese categories were created for

obese and non-obese, with obese being any participant with a BMI of 30 or over. Non-obese

was the reference category. Results are reported for the entire sample and also by obesity

status.

Analyses

Descriptive statistics were calculated and correlations among study variables were

examined to assess for potential issues of multi-collinearity. Observations with missing data

were excluded using listwise deletion. Cross-tabulations and independent t-tests were

conducted to examine significant differences in the descriptive statistics. A Wald chi square

test was used to examine significant differences in the obesity models. To test this study's

hypotheses, multilevel multivariate regression analyses were conducted using Mplus version

6.1, because the observations were not independent of one another. Using this technique

accounted for the possibility that respondents living in a given neighborhood might share

similar outcomes because they live in the same neighborhood (Lopez, 2006). In order to

control for the clustering effects of the church, churches were treated as fixed effects. Each

church was entered into the model as a dummy variable; the church with the longest serving

pastor served as the reference category.

A mediated hypothesis was tested using the steps proposed by Baron and Kenny

(1986). Tests for mediation examined the attenuation of effects between racial residential

segregation (proportion of African American residents in the neighborhood) and available

resources (number of supermarkets, convenience stores, or fast food restaurants in the

neighborhood, with the addition of fruit and vegetable consumption behavior variables

(Baron & Kenny, 1986). Formal tests of significant mediated effects were assessed using the

difference in coefficients method after standardizing the regression parameters. The

mediation pathway is illustrated in Figure6.1.
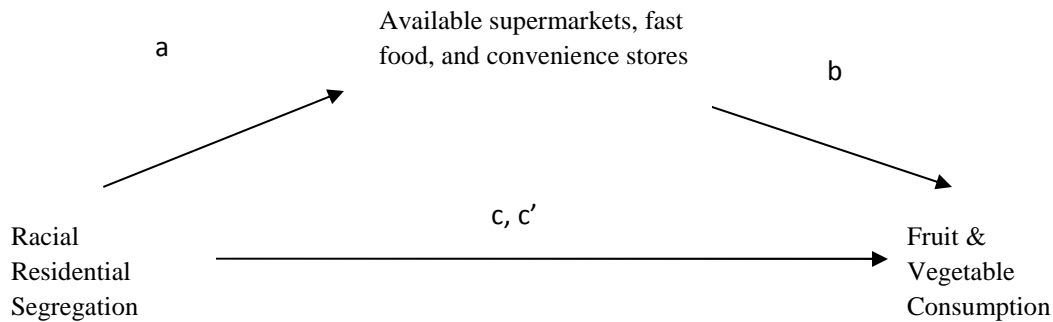
Figure 6. 1 Mediation Technique

The first step in the analysis was to regress the dependent variable on the independent

variable (path c). For specific aim 1, fruit and vegetable consumption was regressed on

racial composition. The second step was to regress the number of supermarkets on racial

composition (path a). Next the dependent variable, fruit and vegetable consumption was

regressed on supermarkets (path b). Then fruit and vegetable consumption was regressed on

racial composition, while controlling for the number of supermarkets (path c'). If all

pathways were significant then the significance of the mediated effect would then be tested

using the Sobel test (Baron & Kenny, 1986).

Results
The final sample consisted of 472 participants with a mean BMI of 31, of whom 234

were obese with a mean BMI of 36.   The distribution of gender, age, marital status,

education, and income for the entire sample, and each of the obese and non-obese, weight

groups are provided in Table 6.1. At 68%, women comprised a large portion of the study

sample. There were significantly more women in the obese group as compared to the non-

obese group. The mean age for all participants was 65 years, with 42% falling between 61-70 years. More than half were married, regardless of weight status. With regard to education attainment, 46% of participants had at least a college degree, but significantly more of the obese group had completed high school (22.3%) than the non-obese group (13.4%). While 46% reported an annual household income of at least $50,000, significantly more of the obese group (16.7%) reported an income of $20,000-$29,999, as compared to 5.4% for the non-obese group. The mean daily fruit and vegetable consumption was 4.1 regardless of weight status. With regard to characteristics of participants' neighborhoods, no significant differences were found by weight status. The mean BMI for the entire sample was 31. The meanproportion of African American residents in a participant's neighborhood was 46.4% and ranged from 1.1% to 98%. The mean proportion of residents living below the poverty line in a participant's neighborhood was 12.1% and ranged from 1.1% to 56.1%. The proportion of residents without a high school diploma in a participant's neighborhood was 17.9% and ranged from 1% to 50%. The mean number of food stores within three miles of a participant's residence was 3 supermarkets, 2.9 convenience stores, and 13 fast food restaurants.

Table 6. 1 Sample Characteristics

	Total Number of Participants N=472	Non-obese N=238	Obese N=234	Difference Obese/Non-obese
Demographic Background				
Female (%)	68	60.5	75.6	p<.001
Age Groups (%)				
50-60	34.1	33.6	38	—
61-70	41.5	37.4	44	—
71-80	18.9	21.4	15	—
>81	5.5	7.6	3	p<.05
Marital Status(%)				
Married	60.2	62.7	57.5	—
Single/Divorced	23.5	20.5	26.6	—
Widowed	16.3	16.7	15.9	—
Education Level (%)				
Eighth grade or less	1.5	2.5	.43	—
Some high school	4.7	5.7	3.4	—
High school graduate or GED	17.8	13.4	22.3	p<.01
Trade or Beauty school graduate	4.2	3.4	5.2	—
Some college	26.1	28.9	28.2	—
College Graduate	21.2	21.8	20.6	—
More than college	24.6	24.3	25	—
Income (%)				
<$10,000	7.2	8.8	5.6	—
$10,000-$19,000	11.9	13	10.7	—
$20,000-$29,999	11	5.4	16.7	p<.001
$30,000-$49,999	24.8	27.2	22.3	—
$50,000--$69,999	18	18	18	—
$70,000-$99,999	14.4	13	15.9	—
$100,000-$149,999	8.1	9.2	6.9	—
>150,000	4.7	5.4	3.4	—
Fruit and Vegetable Consumption (mean)	4.1 (2.8)	4.1 (2.6)	4.1 (2.9)	—
Mean BMI (SD)	31 (6.8)	26.1 (2.4)	36 (6.3)	p<.001
Participant Neighborhood Characteristics				
Neighborhood African American Composition	46.4 (30)	44.6 (3.1)	48.3 (2.9)	—
Neighborhood Poverty	12.1 (8.8)	11.7 (8.5)	12.4 (9.2)	—
Neighborhood Education	17.9 (10.3)	17 (10.3)	18.7 (10.2)	—
Mean Supermarkets within 3 miles of participant	3.1 (2.3)	3.2 (2.4	3 (2.2)	—
Mean Convenience stores within 3 miles of participant	2.9 (2.7)	2.9 (2.8)	2.9 (2.6)	—
Mean Fast Food restaurants within 3 miles	13.3 (9.8)	13.7 (10.2)	12.8 (9.3)	—

Factors associated with Fruit and Vegetable Consumption

Hypothesis 1a: Older African American church members living in neighborhoods with a lower degree of racial residential segregation will have more supermarkets in their neighborhood and in turn will have higher levels of fruit and vegetable consumption

Hypothesis 1b: Older African American church members living in neighborhoods with a lower degree of racial residential segregation will have fewer convenience stores in their neighborhood and in turn will have higher levels of fruit and vegetable consumption.

Hypothesis 1c: Older African American church members living in neighborhoods with a lower degree of racial residential segregation will have fewer fast food restaurants in their neighborhood and in turn have higher levels of fruit and vegetable consumption.

The research hypotheses proposed a mediation pathway. Table 6.2 displays the first part of the mediated pathway, the regression of supermarkets, fast food restaurants, and convenience stores on the proportion of African American residents in a participant's neighborhood. No significant association was found for supermarkets or fast food restaurants.

- Men lived within 3 miles to significantly fewer supermarkets than females (β= -.221, p< .01). A grater number of supermarkets within 3 miles of the participant was associated with higher levels of neighborhood poverty (β= .070, p< .05), but lower levels of neighborhood education (β= -.083, p< .05).
- Men lived within 3 miles to significantly fewer fast food restaurants than females (β= -.748, p< .05). Participants in the 70-80 age group lived within 3 miles to significantly more fast food restaurants as compared to people in the 61-70 age

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group (β= 1.131, p<.05). Participants with a high school education (β= 1.299, p< .05) or a college education (β= 1.440, p<.05) lived within 3 miles to significantly more fast food restaurants than participants with post-college education. There was a positive significant association between neighborhood poverty and fast food restaurants. Higher levels of neighborhood poverty was associated with greater numbers of fast food restaurants located within 3 miles of a participant's residence (β= .415, p<.01). Neighborhood education was significantly associated with fast food restaurants. More fast food restaurants within 3 miles of a participant's residence was associated with a lower percentage of people without a high school diploma in the neighborhood (β= -.330, p<.05).

A significant association was found, however between the proportion of African Americans residing in the neighborhood and the number of convenience stores located within 3 miles of a participant's residence (β= .494, p< .01). Specifically, greater proportions of African American residents in the neighborhood were associated with a 0.5more convenience stores located within a 3-mile radius of a participant's residence. Hence, the availability of convenience stores could be a potential mediator between racial residential segregation and fruit and vegetable consumption. The significant relationships among the variables in the models used to assess mediation are discussed below.

Table 6. 2Mediation Path a- Regression of Food Stores on Proportion of African American Residing in a Participant's Neighborhood

(N=472)

	Supermarkets within 3 miles of participant	Convenience Stores within 3 miles of participant	Fast Food Restaurants within 3 miles of participant
	β	β	β
Racial Residential Segregation	.080	.494**	.178
Female (Reference)			
Male	-.221**	-.055	-.748*
Age 61-70 (Reference)			
Age -50-60	-.079	-.081	-.333
Age 70-80	.208	-.169	1.131*
Age >80	.273	-.109	1.256
Middle Income (Reference)	.079	.153	.461
Low Income	.066	-.002	.346
High Income			
Post College (Reference)	.309	.318	1.650
Less than High School	.150	.246	1.299*
High School	.323	.344	1.440*
College			
Married (Reference)			
Single	-.019	-.076	-.285
Widow	.094	-.011	.063
Non-obese (Reference)			
Obese	-.098	-.016	-.479
Neighborhood poverty	.070*	.048	.415**
Neighborhood Education	-.083*	-.035	-.330*

All analyses adjusted for church as a primary sampling unit within the survey design of the study

*significant at p<0.05   ** significant at p<0.01   *** significant at p<0.001

The tests of Path B and C of the mediated pathway are displayed in Table 6.3.   Three

different models are presented in Table 6.3. Model 1 represents the relationship of fruit and

vegetable consumption on proportion of African Americans residing in a participant's neighborhood and supermarkets within 3 miles of participants' residence as stated in hypothesis 1a.   In Model 2, the relationship of fruit and vegetable consumption on the proportion of African Americans residing in a participant's neighborhood and convenience stores within 3 miles of participants is presented as outlined in hypothesis 1b. Model 3 represents the relationship of fruit and vegetable consumption on the proportion of African Americans residing in a participant's neighborhood and fast food restaurants within 3 miles of participants' residence as described in hypothesis 1c.

Fruit and vegetable consumption was not significantly associated with the proportion of African American residents in a neighborhood or the availability of food stores. Paths b and c were not significant; therefore a mediated pathway did not exist among the variables. Men had significantly lower levels of fruit and vegetable consumption than women in Model 1 (β= -1.108, p<.001) and in Model 2 (β= -1.127, p<.001). Another significant association in Model 2 was between fruit and vegetable consumption and neighborhood education. Higher levels of fruit and vegetable consumption was associated with a lower percentage of people in the neighborhood without a high school diploma (β= -.084, p<.01).

Model 3 had similar results to the previous models. Men had significantly lower fruit and vegetable consumption as compared to women (β= -1.123, p<.001). There was a significant association between fruit and vegetable consumption and neighborhood education. Higher levels of fruit and vegetable consumption was associated with a lower percentage of people in the neighborhood without a high school diploma (β= -.076, p<.01).

In sum, in all three models men consistently had significantly lower levels of fruit and vegetable consumption than women. Neighborhood education was significant in the models

that included convenience stores and fast food restaurants. No significant association was

found between fruit and vegetable consumption and proportion of African American

residents in a neighborhood.

Table 6. 3Mediation Paths b and c- Regression of Fruit and Vegetable Consumption on Proportion of African Americans Residing in a Participant's Neighborhood and Food Stores

 (N=472)

	Model 1 β	Model 2 β	Model 3 β
Racial Residential Segregation	.071	.069	.072
Supermarkets within 3 miles of participant	.101		
Convenience stores within 3 miles of participant		-.013	
Fast Food restaurants within 3 miles			.020
Female (Reference)			
Male	-1.108***	-1.127***	-1.123***
Age 61-70 (Reference)			
Age -50-60	.017	.020	.012
Age 70-80	.281	.318	.291
Age >80	.724	.756	.747
Middle Income (Reference)			
Low Income	.407	.475	.398
High Income	.322	.300	.317
Post College (Reference)			
Less than High School	-.611	-.345	-.606
High School	-.394	-.335	-.398
College	-.033	.022	-.024
Married (Reference)			
Single	.351	.357	.358
Widow	-.213	-.062	-.195
Obese	-.085	-.132	-.077
Neighborhood poverty	.033	.045	.032
Neighborhood Education	-.073	-.085**	-.076**

*significant at p<0.05   ** significant at p<0.01   *** significant at p<0.001

Research Question 2: *How does obesity status impact the relationships hypothesized in research hypotheses 1a-1c?*

Similar analytical techniques used for testing hypotheses 1a-1c were employed to test the mediation pathways for obese and non-obese participants, respectively. These research hypotheses are referred to as 2a-2c . Table 6.4 shows that for obese and non-obese participants, the availability of supermarkets or fast food restaurants was not significantly associated with the proportion of African American residents in a neighborhood.

- A significant association was found between the proportion of African Americans residing in the neighborhood and the number of convenience stores located with 3 miles of a participant's residence for obese (β=.556, p<.01) and non-obese participants (β= .355, p<.01). However these values were not significantly different from each other.

Non-obese participants with a college education (β= 3.446, p<.05), lived within 3 miles to significantly more fast food restaurants as compared to non-obese participants with post college education. This was significantly different from the obese group.

In the obese group, the number of supermarkets, convenience stores, and fast food restaurants was negatively associated with the number of people without a high school diploma in the neighborhood. For both non-obese and obese groups, a higher number of fast food restaurants was associated with a higher level of neighborhood poverty.

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Table 6. 4 Regression of Food stores on Proportion of African Americans Residing in a Neighborhood by Obesity Status

	Supermarkets within 3 miles of participant		Difference non-obese/ obese	Convenience Stores within 3 miles of participant		Difference non-obese/ obese	Fast Food Restaurants within 3 miles of participant		Difference Non-obese/ obese
	Non-obese N=238	Obese N=234		Non-obese N=238	Obese N=234		Non-obese N=238	Obese N=234	
Proportion of African Americans	.012	.166		.355**	.556**	p<0.1	-.109	.483	
Female (Reference)									
Male	-.072	-.221		-.073	-.308*		.162	-.981	
Age 61-70 (Reference)									
Age 50-60	.449*	.209		-.149	.046		-1.616	.967	
Age 70-80	.079	.399*		-.114	-.091		1.347	1.559	
Age >80	-.052	.819		-.078	-.187		1.414	1.980	
Middle Income (Reference)									
Low Income	.006	.209		.099	.004		-.707	1.349	
High Income	.092	-.230		.040	-.144		.564	-.573	
Post college (Reference)									
Less than High School	.523	.121		.503	.230		3.366*	.062	
High School	.292	.044		.627	.228		2.881*	.505	
College	.441	-.065		.900	.019		3.446*	-.684	p<0.05
Married (Reference)									
Single	.027	-.024		-.086	.103		1.236	-.910	
Widow	.343	-.461		.265	-.389		1.620	-2.144	
Neighborhood poverty	.056	.118**		.076	.033		.382*	.564**	
Neighborhood Education	-.058	-.157**	p<0.1	-.014	-.085*		-.279	-.480**	

*significant at p<0.05   ** significant at p<0.01   *** significant at p<0.001

The analysis comparing the fruit and vegetable consumption of the non-obese and obese groups is provided in Table 6.5. The models include the same variables that were presented in Table 6.3.

Obese people living in predominantly African American neighborhoods had significantly higher levels of fruit and vegetable consumption as compared to non-obese participants living in predominantly African American neighborhoods. Obese participants with a high income had significantly higher fruit and vegetable consumption than obese participants in the middle-income bracket, which significantly differed from the non-obese group. Obese people living in neighborhoods with a greater proportion of residents without a school diploma had higher levels of fruit and vegetable consumption as compared to non-obese participants living in the same type of neighborhood.

For Model 2, obese participants with a high income in the obese group had significantly higher fruit and vegetable consumption than obese participants in the middle-income bracket ($\beta= 1.172$, $p<. 05$). This was significantly different from the non-obese participants in the same income brackets. Participants in Model 3 with a high income in the obese participants had significantly higher fruit and vegetable consumption than obese participants in the middle-income bracket ($\beta= 1.300$, $p<. 05$).

Table 6. 5 Multilevel Regression Models of Fruit and Vegetable Consumption by Weight Status

	Model 1			Model 2			Model 3		
	Non-obese N=238	Obese N=234		Non-obese N=238	Obese N=234		Non-obese N=238	Obese N=234	
Proportion of African Americans	-.070	.238***	p<.05	-.078	.277		-.070	.243	
Supermarkets within 3 miles of participant	.080	.158*							
Convenience stores within 3 miles of participant	--			.032	-.082				
Fast Food restaurants within 3 miles							.019	.025	
Female (Reference)									
Male	-1.095***	-1.022***		-1.095***	-1.136**		-1.109***	-1.047*	
Age 61-70 (Reference)									
Age -50-60	-.156	.194		-.198	.241		-.165	.211	
Age 70-80	.130	.375		.094	.517		.112	.455	
Age >80	.776	.127		.764	.241		.781	.197	
Middle Income (Reference)									
Low Income	.209	.506		.238	.597		.201	.515	
High Income	-.759	1.345*	p<0.05	-.747	1.172*	p<0.05	-.760	1.300*	p<0.05
Post College (Reference)									
Less than High School	-.048	-1.665*		-.014	-1.544		-.068	-1.598	
High School	-.0452	-.532**		-.439	-.451		-.468	-.510	
College	.833	-.931		.824	-.904		.811	-.889	
Married (Reference)									
Single	-.045	.597***		-.035	.607		-.062	.625	
Widow	-.618	.225		-.608	.011		-.599	.192	
Neighborhood poverty	-.040	.026		.044	.050		.038	-.030	

*significant at p<0.05   ** significant at p<0.01   *** significant at p<0.001

The findings revealed that the proportion of African American's residing in the neighborhood was not associated with fruit and vegetable consumption among this sample. Greater proportions of African Americans residents in a neighborhood were associated with more convenience stores located within a 3 mile radius of a participant's residence. The number of convenience stores, fast food restaurants, and supermarkets located within 3 miles of a participant's residence was not associated with participant's fruit and vegetable consumption. For obese participants, living in a neighborhood with greater proportions of African American residents were associated with higher levels of fruit and vegetable consumption than their non-obese counterparts. Higher levels of fruit and vegetable consumption for obese participants was found to be associated having a high income. Based on the findings, racial residential segregation and availability of fast food restaurants, supermarkets, and convenience stores was not associated with fruit and vegetable consumption. Qualitative methods were used to explore the filter function of the concept of therapeutic landscape and to further explore possible explanations for these insignificant findings.

Qualitative

In addition to understanding the filter function of the concept of therapeutic landscapes, the findings from the quantitative portion of this study called for further inquiry into experiences of older African American church members living in racially segregated neighborhoods. These experiences were examined through qualitative in-depth interviews that explored the role and meaning of their neighborhood environment to their health, in general and on their fruit and vegetable consumption in particular. These interviews sought

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to reveal the filter function, as presented in the Model of place effects on health, of neighborhood as a therapeutic landscape.

Purposive sampling was used in the selection of the study participants who came from the ACTS of Wellness study across three urban counties of NC. The post-intervention survey had a question that asked participants if they would be willing to answer additional questions. From the 467 people who responded favorably to this question, 112 met the criteria for living in a racially segregated area characterized as a predominantly African American neighborhood. Racially segregated neighborhoods were classified as neighborhoods having 50% or more African American residents (Williams & Collins, 2001).

Recruitment

Recruitment consisted of contacting participants via phone at their home or place of business. Eligibility criteria included the following: a) the participant had to have access to a phone; and b) had to be willing to devote at least an hour to complete the interview. Once the participant agreed to be interviewed a study fact sheet was mailed to their address. This study was approved by the institutional review board.

Data Collection

I conducted the semi-structured interviews via the phone from May to July, 2011. This method was chosen to reduce the burden on the participant. It has been documented that data obtained from phone interviews are comparable to face-to-face interviews, and can be used when contact has already been made with participants (Carr & Worth, 2001; Sturges & Hanrahan, 2004). Verbal informed consent was acquired over the phone prior to the initiation of the interview. The semi-structured in-depth interviews consisted of open-ended questions that were developed a priori (Morse & Richards, 2002). These questions included

information on the perception of the neighborhood's influence on participants' physical

activity and diet. During the course of the interview, probes were used to build on participant

answers. All interviews were digitally recorded and transcribed verbatim. For compensation,

$30 Visa gift card was mailed to all participants upon completion of the interview.

Analysis

Data were analyzed using content analysis to determine how participants perceived

the influence of their neighborhood on their fruit and vegetable consumption through the

availability of food stores. The interviews and photographs served as the main source of data

for the content analysis.The goal of using content analysis was to inductively gain knowledge

and understanding of how older African American church members living in predominantly

African American neighborhoods gave meaning to their residential context and its role in

influencing their health, specifically diet (Hsieh & Shannon, 2005). Content analysis is an

approach that involves "subjective interpretation of the content of text data through the

systematic classification process of coding and identifying themes or patterns" (Hsieh &

Shannon, 2005). Directed content analysis can be used when the existing concepts or

theories used to describe a phenomenon are limited in scope and may benefit from further

description (Hsieh & Shannon, 2005; Zhang & Wildemuth, 2009). A directed content

analysis approach was suitable for this study because the concept of therapeutic landscapes

as outlined by Braubach is limited in its description of a health-promoting neighborhood as it

related to food acquisition.   As such, initial categories from the concept of therapeutic

landscapes were used to code the data, while simultaneously; additional codes were created

for text that represented a new category or a subcategory of an existing code (Hsieh &

Shannon, 2005).

Coding involved assigning distinctive labels to the text in the transcripts that reflected certain categories of information (Huberman & Miles, 2002). As stated in the preceding paragraph, initial codes were developed based on categories from Braubach's description of a health-promoting neighborhood. These codes included 1) neighborhood physical characteristics; 2) healthy environments; 3) services provided to support the daily life of residents; 4) socio-cultural features of neighborhoods; and 5) reputation of the neighborhood (Braubach, 2007). All transcribed data were organized and managed using ATLAS.ti version 6.2 qualitative text analysis software. The use of ATLAS.ti assisted the first author in the coding of data, retrieval of text based on keywords, visual representations of codes and their relationships to one another, and documentation of coding changes throughout the analysis process (Zhang & Wildemuth, 2009).

Using an inductive approach, I generated additional codes after the first interview based on categories that were identified in the text. This study focused on data related to understandings, perceptions, actions, and social constructions of the racial residential context and its association with availability of quality food stores as described by participants. This process involved identifying segments of the text that provided a description of what people were doing,why they acted in the manner in which they did,and how they were thinking about the way they acted (Warren & Karner, 2010). A codebook was developed that included codes, a label, a definition, a description of when each code should be applied, and an example of a quote (Carey et al., 2006; Ryan & Bernard, 2000). I applied the codes to the transcripts using the coding scheme.

Trustworthiness in qualitative research is dictated by how confident a researcher is with the truth of the findings based on the research design, informants, and context (Krefting,

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1991). Several steps were implemented to establish the trustworthiness of the qualitative data. Trustworthiness was established in this study through triangulation and peer examination. Triangulation was achieved through the convergence of multiple perspectives for mutual verification of data to ensure that all aspects of a phenomenon have been examined (Krefting, 1991). The strategy used to achieve triangulation in this study was by employing multiple methods of data collection including interviews and participant observations. Peer examination involves the researcher's discussion of the research process and findings with unbiased colleagues/peers who have experience with qualitative methods (Krefting, 1991). For this study, peer examination was accomplished through consultation with a doctoral candidate who checked the coding scheme against 17% percent of the transcripts which allowed for a critical assessment of the first author's interpretations from the direct quotes (Krefting, 1991).

Results

A total of 30 participants were contacted to assess their interest in participating in the interviews. Twelve participants representing 3 different counties participated in the semi-structured interviews. The final qualitative sample consisted of 9 women and 3 men, ranging in age from 56-75. Participant characteristics are presented in Table 6.6. The average length of time that participants had lived in their neighborhood was 29 years.

Table 6. 6Characteristics of interview participants
(N=12)

Sex	Age	BMI	Length of Residence	FruitVeg Sum	Fast Foods	Convenience Stores	Supermarkets
M	75	26	38	2.8	13	1	1
F	65	32	30	3.4	16	3	3
F	59	43	59	2.9	18	5	5
F	66	39	9	4.7	16	3	3
M	65	32	10	3.6	22	5	5
F	61	34	23	3.9	22	5	5
F	74	30	30	19.1	22	0	6
F	71	20	15	5.4	22	1	6
F	62	32	26	2.5	21	9	8
F	62	35	50	12	14	3	2
F	65	26	30	3.8	10	3	3
M	56	25	25	5.1	13	2	3

It was expected that people living in racially segregated or predominantly African American neighborhoods would have significantly lower access to supermarkets and in turn have lower levels of fruit and vegetable consumption. The concept of therapeutic landscapes served as a guide to determine what influences the neighborhood may have on fruit and vegetable consumption. Fruit and vegetable consumption is partially determined by access to and purchasing of these items (Bodor, Rose, Farley, Swalm, & Scott, 2008). The qualitative findings from this study focused on the factors that determined where a participant chose to purchase their groceries, including fruits and vegetables.   The major themes that emerged are presented below.

Types of food stores

To assess the influences the neighborhood had on fruit and vegetable consumption, it was important to ascertain where participants obtained these items. Participants named several places they shopped for food. The food stores mentioned by participants included Food Lion, Krogers, *Walmart,Save-a-Lot*, *Harris Teeter*, *Sam's Club*, *Costco's*, and the

Farmer's Market. A couple of the participants stated that they had personal gardens where

they grew various fruits and vegetables. One participant mentioned that she did not do as

much cooking at home because the last time she cooked she forgot, due to early onset of

dementia, that she had food on the stove and a fire started in the kitchen. Instead of

describing a supermarket, she listed one restaurant, Outback Steakhouse, as a place where

she shopped. The reasons for shopping at the various stores are highlighted in the remaining

themes.

Price Differential

A majority of the participants cited price as the main reason why they shopped at

certain stores. Participants were looking for stores that were "more reasonable" in terms of

price. Some participants traveled to food stores outside of their immediate neighborhood in

search of better prices. Two of the participants lacked their own transportation and depended

on family members and public transportation to get to supermarkets. One of these

participants that did not have transportation lived within walking distance to a supermarket,

but she rarely frequented that supermarkets because of its high prices. A couple of the

participants mentioned that based on price comparisons, they would buy one food item at a

specific store and then another item from a different store.   These views are illustrated in the

subsequent quotes.

> … and with mine not minding to drive 3 or 4 miles to supermarkets then I will go
> there based on if has bargains and what I might need. (Male, 75)
> Well the [Store B] where I live now is very expensive. Too expensive. That's the
> reason I don't go there a lot. I go elsewhere to buy my groceries. I go to [Store D]
> because it's cheaper. (Female, 66)

A majority of participants reported finding more reasonable prices in another neighborhood,

in which residents were predominantly White. In contrast, one of the male participants stated

that he was able to get everything he needed at the supermarket located in his neighborhood

and he did not think there was a better supermarket. This male also acknowledged that he

went to his sister's house where she prepared a majority of his meals.

Variety of food

The variety of food stocked at the different food stores was another influence on

participants' decision to shop at that establishment. Some participants were able to find

different types of vegetables at food stores located outside of their neighborhood. These

participants commented on the difference between the foods found in the supermarkets in

predominantly African American neighborhoods in comparison to the foods found in

predominantly White neighborhoods. These supermarkets offered low calorie and diet

options. One of the male participant noted that supermarkets located in predominantly

African American neighborhoods tended to stock more foods that were conducive with what

African Americans eat, such as ham hocks, fatback, and seasoned meats. Some participants

mentioned that they were able to find more foods, such as canned goods, at the stores located

in predominantly White neighborhoods

> They were just saying, and I picked up on it, that they don't have the same things in
> this store that they have in a predominantly white neighborhood. And I couldn't see
> it. But as I shopped I could see the difference. (Female, 62)

One participant, who shared a community garden with some of her neighbors, highlighted the

fact that no supermarkets were located in her neighborhood and that she felt this was

common in low income African American neighborhoods.

> And particularly in the African-American community, the poor African-American
> community in particular because there are no grocery stores. You have convenience
> stores, but no grocery stores in the neighborhood. (Female, 65)

The variety of food options across neighborhood was pronounced, not only in the type of food available in the stores, but also in the type of stores located in certain neighborhoods.

Quality of food

A few participants noted the difference in the food quality across stores and neighborhoods. Participants stated that in certain supermarkets they were able to find better produce, better cuts of meat, and fresh food. In most instances, the supermarkets that carried the better quality food were located in predominantly White neighborhoods.

> I guess [Store A] maybe a little bit closer to me and [Store B] and [Store C], they're not that far away from. If I had a choice I would go to [Store B] or [Store C]. It's because I don't think [Store A], I don't know, they don't necessarily have a good selection. (Female, 65)

> We go to Store C because Store C has a better cut of meats than Store B has. (Male, 65)

Store ambiance

Several of the participants mentioned the influence of young people preventing them from using their local food stores. One participant mentioned that the young people crowded around the store, which made it hard for her to enter into the store and move around once she got in. Another participant was concerned about the conduct of the young people working at her local supermarket. She felt the way the young people conducted themselves was inappropriate.

> I guess it's…look, I'm old and too many young folks, as we say, hanging out. Like, I don't have enough room to get in the store because the store's not that large, so you're bumping into people. You have to wait because you can't get to the item you want. (ID 3)

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I think what threw me is this [Store A] up here for me is… I went in there one day and they had a lot of teenagers running the register, which is fine. But, to me, on the job is not the place for laughing, carrying on, using ugly foul language, you know what I mean? And they do that and people are waiting in line. So that just threw me from frequenting that [Store A]. (ID 11)

Discussion

Based on the concept of therapeutic landscapes and previous empirical studies of racial residential segregation and availability of food stores, this study hypothesized that these two factors would influence fruit and vegetable consumption among older African American church members living in NC. In addition, this study explored with older African American church members, living in racially segregated neighborhoods, how they perceived the influence of their neighbohrood's food environment on their diet. Although this study found a significan positive association between racial residential segregation and the availability of convenience stores, no association was found with fruit and vegetable consumption.

The sole focus of this study on fruit and vegetable consumption may have failed to capture the effect of food store availability on overall diet. Other components of a healthy diet include high consumption of nuts and soy protein, white meat, cereal fiber, and polyunsaturated fat, and low consumption of trans fatty acids (McCullough & Willett, 2006). The availability of convenience stores in a neighborhood may have a significant positive association with the consumption of trans fatty acids. In short, if overall diet had been examined by this study, significant associations may have been found with racial residential segregation and the availability of food stores.

Moreover, a previous study found that availability of supermarkets was associated with higher fruit and vegetable consumption among people living in metropolitan areas, but

not among those living in nonmetropolitan areas (Michimi & Wimberly, 2010), concluding that there may be a threshold for which distance no longer becomes an issue to accessing supermarkets. Their conclusion was echoed by the 12 participants who completed qualitative interviews for this study. They indicated that travel distance to supermarkets outside their immediate neighborhood did not prevent them from obtaining the foods that they wanted or needed. The main factors that influenced their utilization of certain supermarkets were price, variety of food, quality of food, and store ambience. Participants that had a supermarket in close proximity to their homes were more likely to patronize supermarkets outside of their neighborhood, located in predominantly White neighborhoods, to find quality food at a reasonable price. Approximately 80% of the participants mentioned that they had their own transportation which allowed them to travel to supermarkets outside of their immediate neighborhood. The remaining participants that did not have their own transportation depended on family members to take them food shopping. Thus, participants were not limited by the availability of food options in their local supermarkets and traveled outside of ther neighborhoods to find quality food at a reasonable price. In short, this study found that availability of supermarkets did not necessarily predict actual frequenting of these establishments.

Similar themes were documented in a study examining environmental barriers and adapative strategies to acquiring food in a low-income African American neighborhoods (Zenk et al., 2011). Zenk et al (2011) reported that the women in their study faced several barriers to obtaining resonably priced food in their neighborhoods. These women developed what the authors termed as "adaptive strategies" to obtaining desired foods (Zenk et al., 2011). These adaptive strategies included shopping at multiple food stores and traveling

outside their neighborhood (Zenk et al., 2011). Although this illustrates that people are able to obtain food when there is limited access to quality foods in their local supermarkets, efforts should still be made to create equitable access across neighbhorhoods regardless of the racial composition of the neigbhorhood.

This study also found that among obese participants, living in a more predominantly African American neighbohrood had a positive significant association with their fruit and vegetable consumption, but no significant association for non-obese participants. A possible explanation may be that signficantly more obese women lived in predominantly African American neighborhoods. Furthermore, this finding could imply that along with consuming fruits and vegetables, obese people living in predominantly African American neighborhoods may also be consuming high fat foods. This study did not measure the consumption of high fat food and thus was unable to determine if availability of fast food restaurants or convenience stores influenced high fat food consumption. A study conducted among African Americans in NC, found that people consuming high fat foods from fast food restuarants were more likely to be obese (Satia, Galanko, & Siega-Riz,1988). Other studies have shown that racial residential segregation is associated with obesity among African Americans (Chang, 2006; Chang et al., 2009). Chang et al observed that for African American women, the relationship between racial residential segregation and obesity was partially mediated by the physical disorder of the neighborhood. Physical disorder was measured by examining the number of vacant lots and vacant residential properties, housing code violations, and fires on property (Chang et al., 2009). In short, further research is warranted into how other potential mediators between racial residential segreation and fruit and vegetable consumpiton may vary by obesity status.

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One strength of this study was the use of mixed methods to first, examine relationships between fruit and vegetable consumption, food stores, and racial residential segregation, and secondly, to understand how living in a predominantly African American neighborhood impacted fruit and vegetable consumption among older African American church members. Many studies have shown that racially segregated neighborhoods have fewer supermarkets than predominantly White neighborhoods (Morland & Filomena, 2007). In contrast, this study found a significant difference in the number of convenience stores, but no difference in availability based on the racial composition of the neighborhood. Guided by the concept of therapeutic landscapes, as described in the model place effects health, this study explored the process by which participants made food-purchasing decisions based on what was presented in their neighborhood. According to Braubach's model of place effects on health, physical and psychosocial inputs from the environment are assessed by the individual who translates that into physical and mental well-being(Braubach, 2007). In this study, the physical inputs of the environment were racial residential segregation, supermarkets, fast food restaurants, and convenience stores. This study did not examine potential psychosocial aspects of the environment with all participants. However, the interviews conducted with the 12 participants attempted to gain a better understanding of how these individuals interacted with their social environment to access certain food options. An example of this was the description of a local food store that a participant did not frequent because of the manner in which the staff behaved around customers. This example highlights how this participant assessed the inputs from her physical environment (the supermarket) and her social environment (interactions with supermarket staff) and made health behavior decision to purchase her food elsewhere.

This was a cross-sectional study; therefore causal relationships could not be assessed. Another limitation of the study was the absence of interviews with participants residing in integrated neighborhoods or predominantly White neighborhoods. The experiences discussed by the interview participants may not be unique to people living in racially segregated areas. However, participants traveled outside of their neighborhood to predominantly white neighborhoods to obtain the desired food items. This may be in contrast to older African Americans, living in predominantly White neighborhoods, who may be able to find all the desired food items within their neighborhood. Future research should examine the different experiences of people living in racially mixed and predominantly White neighborhoods to determine ease of access to local food stores.

Conclusion

The examination of the impact of racial residential segregation on health and health behaviors is critical in understanding and alleviating disease burden among African Americans. This is even more important for older African Americans who are likely to have lived in their neighborhoods for an extended period of time and had a longer exposure to the effects of racial residential segregation (Laveist, 2003). Participants interviewed for this study described being proactive in obtaining desired foods when they were unable to find them in their local supermarkets; availability of supermarkets did not impact their fruit and vegetable consumption. However, as older African Americans continue to age and become less mobile, opportunities for accessing food stores in their local neighborhood will likely become more critical. Future studies should examine strategies, such as gardening and zoning ordinances that can be applied to food stores across neighborhoods. In addition to implementing changes to the food store environment in racially segregated areas, measures

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should also be taken to simultaneously address individual level factors that impact fruit and

vegetable consumption among older African Americans.

CHAPTER SEVEN

SYNTHESIS

The objective of this study was to apply the concept of therapeutic landscapes using a mixed methods approach to examine the relationship between racially segregated neighborhoods and physical activity and fruit and vegetable consumption among older African American church members living in urban areas of North Carolina. This chapter synthesizes the findings from the two sections of the study described earlier and the contextual framework around them and their connection. The chapter concludes with limitations, strengths and implications for future research.

Racial Residential Segregation, Physical Activity, and Fruit and Vegetable Consumption: What is the Connection?

One goal of this study was to examine the pathways between racial residential segregation and physical activity among older African American church members. Based on existing literature, mediating hypotheses were proposed for the relationship between racial residential segregation and physical activity. It was hypothesized that participants living in predominantly African American neighborhoods would have poorer health behaviors, as a result of inequitable availability of physical activity resources, than participants living in integrated neighborhoods or predominantly White neighborhoods. The results partially refuted the hypotheses.

Three different measures derived from self-reported data were used to examine physical activity behaviors among the sample. The proposed pathways for this study included a count of recreational facilities within 1 mile of the participants' residence and the walk score, which was a measure of all facilities located within 1 mile of the participant's address. The findings showed that greater proportions of African American residents in a neighborhood were associated with more minutes of physical activity as well as more metabolic equivalent task hours (MET). However, greater proportions of African American residents in a neighborhood were associated with lower odds of meeting physical activity recommendations. Based on the findings from this study, a direct relationship exists between racial residential segregation and physical activity. Qualitative methods were used to better understand this relationship and to explore the experience of older African American church members residing in predominantly African American neighborhoods. The findings from the qualitative methods revealed that interviewed participants had lived in their neighborhood for an extensive period of time, which cultivated a sense of comfort and familiarity with their neighborhood and neighbors. This created an environment favorable for physical activity.

In sum, this study found that older African American church members living in predominantly African American neighborhoods had higher levels of physical activity, although this was not enough to meet the physical activity recommendations. An examination of the types of activities that are most prevalent in this group is warranted along with identification of potential mediators that may exist between racial residential segregation and physical activity. Based on the findings from the qualitative study, future research that measures physical activity and racial residential segregation should include

measures of neighborhood social cohesion and perceived neighborhood access to opportunities for physical activity.

Another goal of the study focused on examining the relationship between racial residential segregation and fruit and vegetable consumption. Although it was hypothesized that greater proportions of African American residents living in a neighborhood would be associated with less fruit and vegetable consumption, no association was found between these two variables. These relationships were also assessed by obesity status. The analysis showed that greater proportions of African American residents in a neighborhood were associated with significantly higher levels of fruit and vegetable consumption for obese participants more so than for their non-obese counterparts. The proposed mediators, convenience stores, supermarkets, and fast food restaurants, did not explain the possible pathway between racial residential segregation and fruit and vegetable consumption. Greater proportions of African American residents in a neighborhood were associated with a greater number of convenience stores located within 3 miles of the participant. These relationships were explored further using qualitative methodology. Interviews with participants revealed that a majority of the participants traveled at least 3 miles outside of their neighborhood to obtain foods including fruits and vegetables. The interviewees that did most of their food shopping outside of their neighborhood reported that the selection of food in their neighborhood supermarkets was not equitable to the food found in supermarkets outside of their neighborhood.

This study found that there was a differential impact of racial residential segregation on physical activity and diet. As expressed by the interview participants, the effects of racial residential segregation appeared to be more salient for physical activity among the

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participants. Physical activity and fruit and vegetable consumption are distinct health behaviors with different determinants. According to the US Department of Health and Human Services (2008), older adults should get at least 120 minutes of moderate exercise a week. Studies have shown that neighborhood opportunities for physical activity encouraged older adults to be more physically active (Bopp et al., 2007; Gallagher et al., 2010). Access to these resources fills a more proximate and immediate need.

In contrast, fruit and vegetable consumption has been found to be associated with access to fruits and vegetables in the home and not necessarily access to supermarkets (Jago, Baranowski, & Baranowski, 2006). The availability of fruits and vegetables in the home is based on the frequency of food shopping. A study done by Yoo et al.(2006) found that African Americans shopped for food less frequently than Asians, Whites, and Hispanics, regardless of distance from home to shopping place. Shopping for groceries is not an activity that is usually done on a daily basis (Yoo et al., 2006). While people may have proximate access to supermarkets within three miles of their homes, they also may have access to supermarkets that are close to their church, work, or other areas outside of their immediate neighborhood. In contrast, physical activity is an activity that is dependent on daily access to physical activity resources. Thus immediate and proximate access to these resources may have a greater impact on physical activity, than proximate access to supermarkets has on consumption of fruits and vegetables. When examining neighborhood access to supermarkets, researchers should determine where people shop, how often they shop, and what items are purchased.

Therapeutic Landscapes

The current study's findings supported the existing literature on therapeutic landscapes and provided more evidence to the use of therapeutic landscapes to describe

places as not only healing, but also health promoting. The findings demonstrated that the neighborhood environment, as described by the interview participants, provided opportunities for being physically active. The integration of Braubach's model of place effects on health highlighted the importance of examining the meanings that people placed on their surrounding environment. These meanings, more so than the actual surroundings, determined how people interacted with their environment and used it for the purpose of health promotion. Environmental resources such as sidewalks that were absent in many of the neighborhoods were viewed by most participants as normal and did not prevent them from walking. Subsequent studies examining neighborhood influences on health can use Braubach's model of place effects on health as a guide to ascertain how neighborhood features influence health

Racial Residential Segregation as a Therapeutic Landscape?

Many studies have reported the detrimental effects of living in racially segregated neighborhoods (Charles, 2003; Messer, Oakes, & Mason, 2010; Williams, 2001). This has been attributed to the concentration of poverty and limited resources often found in these areas (Williams, 2001). While these negative effects persist, positive attributes of predominantly African American neighborhoods also exist. Although some studies have identified some protective effects of racial residential segregation, living in a predominantly African American has been shown to have an overall negative impact on one's health (Messer et al., 2010).

This study sought to examine how racial residential segregation differentially impacted the health behaviors of residents living in these areas and also to explore what the experience was like for people residing in these areas. Previous research has documented the

negative aspects of racial residential segregation. Few of these studies examined how the residents living in these neighborhoods viewed the influence of their neighborhood on their health. Understanding how individuals perceive their neighborhood environment can help researchers to identify ways to build neighborhood capacity for a health-promoting environment. In terms of physical activity, participants living in predominantly African American neighborhoods reported higher levels of physical activity. However, they were less likely to meet the recommendations for being physically active. These findings suggest that living in a predominantly African American neighborhood created an environment conducive for physical activity; however the sample did not meet recommendations within this study. Understanding individual perceptions of the neighborhood environment helped in the identification of health promoting features of predominantly African American neighborhoods.

Interviewed participants used such terms as a sense of belonging and acceptance and community to describe their neighborhoods. Many of these participants had been in their neighborhoods for over 30 years and had seen them transform from predominantly White areas to predominantly African American areas. The increase in the number of people with a shared experience led to group solidarity and neighborhood cohesiveness that created a sense of security. This sense of security stayed with participants and allowed them to feel comfortable being physically active in their neighborhoods.

The therapeutic effects identified as potential contributors to exercise were not observed in relation to fruit and vegetable consumption. Fruit and vegetable consumption did not vary based on the racial composition of the person's neighborhood. Although it was not statistically significant, more supermarkets, fast food restaurants and convenience stores

were located in predominantly African American neighborhoods as compared to other neighborhoods. The effect of proximal access to food stores was not an issue for many of the interviewed participants. Participants identified the stores that they utilized to purchase their groceries. Although the findings from the interviews showed that the availability of food stores did not hinder participants from obtaining fruits and vegetables, the fact still remained that the availability of fruits and vegetables in predominantly African American neighborhoods was not equitable to the availability of these items in other neighborhoods. Policy efforts should be made to ensure that availability, as it relates to price, variety, and quality, of fruits and vegetables is equitable across neighborhoods.

Church as a Therapeutic Landscape?

The current study posited that the church would serve as a therapeutic landscape for this population by providing opportunities for healing and health promotion. Several studies have demonstrated that higher levels of church attendance are associated with better health behaviors, such as colorectal cancer screening and physical activity and better health outcomes (Levin, Taylor, & Chatters, 1994; Musick, House, & Williams, 2004; Reindl Benjamins & Brown, 2004). Additionally, Levin and Chatters (2008) found that older African Americans reported higher levels of religious involvement than their White counterparts. The role of church for all of the participants could not be fully captured in the baseline survey. Items on the ACTS of Wellness baseline survey did not ask about length of membership at church, church attendance, participation in church activities, and interactions with other church members. These questions would have been useful in assessing the role church played in impacting the health behaviors of its members, especially given the fact that studies have shown that older African Americans are more likely to participate in church,

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than their White counterparts (Levin et al., 1994; Taylor, Chatters, & Jackson, 2007; Taylor et al., 2009). Thus, understanding the influence of church affiliation with physical activity and fruit and vegetable consumption is important because many interventions are conducted in African American churches to in an effort to reach African Americans (Campbell et al., 2007). Although this study was not able to ascertain this from all participants, this was discussed at length with the 12 interviewed participants. All participants grew up in the church and some remained members of the church and were still members at the church they attended as a young child. Many described church as "a social support system where you could interact with like-minded people". Church was depicted as a "place of peace where your burdens were lifted". One participant went so far as to describe her church as a "second family."

Participants felt that church played a critical role in promoting health among its members. Health information distributed through church newsletters was mentioned by a few of the participants as ways in which their church had tried to influence health behaviors within the congregation. Many participants believed that the church should "feed you spiritually and physically". One participant noted that the church has the opportunity to reach out to community members by extending church-sponsored health activities beyond church members. These findings revealed that the church has the potential to serve many roles in the lives of older African American church members and can be used to target people outside of the church. The findings from this study in conjunction with findings from previous studiesadd to the argument that church affiliation creates an environment of peace, rejuvenation, and healing that is reflected in the health of its members.

Limitations

This study was conducted with older African American church members. Thus the findings cannot be generalized to all older African Americans. However, it is important to note that higher percentages of older African Americans attend church as compared to their White counterparts, so a large proportion of this population is represented in this study (Levin et al., 1994). All data was collected through self-report, therefore responses may not actually represent participants' true behavior (Newell, Girgis, Sanson-Fisher, & Savolainen, 1999). Several issues that arise with self-reported data include, lack of knowledge, inability to recall, misunderstanding of survey questions, and social desirability (Newell et al., 1999). As recommended by Newell's (1999) systematic review, strategies were used to help reduce any inaccuracies in the self-reported data. Some of these strategies included verifying that participants comprehended the survey questions, providing specific time periods to recall behaviors, and creating clear questions with limited response options. This study did not capture all participants' perceptions of their neighborhood. The participants' length of time in their neighborhood was also not measured. This is important because studies have shown that the cumulative exposure to neighborhood factors can have an effect on a person's health status (Laveist, 2003).

Another measurement limitation is the measurement of racial residential segregation. Consensus has not been reached on a consistent way to measure racial residential segregation (Kramer, Cooper, Drews-Botsch, Waller, & Hogue, 2010). The most commonly used measures have included racial composition, dissimilarity index, and the isolation index derived at the census tract level (Kramer et al., 2010; Mason et al., 2009). Dissimilarity is the distribution of African American and White residents across a neighborhood in an urban

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area. Isolation is defined as the average probability of interaction between African

Americans and Non-Hispanic Whites at the neighborhood level (Chang et al., 2009).

Another strategy that may have yielded different results is measuring segregation at the

census block group level. Measuring racial residential segregation as a continuous variable

assumes that the effect of racial residential segregation is linear. In contrast to a linear effect,

there may be a certain threshold where the effect of racial residential segregation is more

pronounced. Defining racial residential segregation as a dichotomous or categorical variable

may provide a better assessment of the effects of racial residential segregation on residents

residing in these areas (Kramer et al., 2010). One possible approach for researchers to

employ in future studies that examine racial residential segregation is to incorporate all

measures of racial residential segregation and determine if health outcomes vary across these

measures.

In addition to the aforementioned limitations, interview participants may have been

influenced by exposure to the intervention. After participating in the ACTS of Wellness

study (focused on colorectal cancer screening), or the Body and Soul program (focused on

fruit and vegetable consumption), participants may have had heightened awareness to

physically active and healthy eating. However, for the majority of the interviewed

participants, behavioral responses did not vary from the data collected at baseline and time of

interview.

Strengths

In spite of the aforementioned limitations, this study was unique in its use of mixed

methods to observe the relationships between racial residential segregation and health

behaviors among an older African American church population. Quantitative methods alone

are limited in their ability to comprehend the context or setting in which the relationships between variables occurs, a limitation that is made up for with the addition of qualitative methodology (Creswell & Clark, 2007). In combination, these methods provide the direct voice of the participant through qualitative methodology, while quantitative allows for the generalizability of the findings (Creswell & Clark, 2007). Together, these methodologies offset the weaknesses of the other.

For this study, qualitative data enhanced the understanding of racial residential segregation by exploring the perceptions of people living in these neighborhoods that were not captured with the quantitative measures. For example, the number of supermarkets within a three-mile radius of the participants' residence was not associated with fruit and vegetable consumption. Through the qualitative interviews, participants were able to offer explanations for this insignificant association, by reporting that they shopped at supermarkets that were located outside of the three-mile radius. This information gave context to the quantitative findings and helped to strengthen the study.

Implications for Future Research and Conclusions

Racial residential segregation is socially constructed. As such, understanding its influence on health requires incorporating a social perspective that transcends the measures of neighborhood racial composition and examines the experiences of people residing in these areas, especially older African Americans who may have resided in these areas over an extended period of time. Few studies have examined the influence of racial residential on the health of older African American church members. Future studies that examine place, health and older African Americans should employ a life course perspective.

Studies applying a life course perspective recognize that the different time periods in a person's life have an accumulative effect on their present health (Baker, 1987). This is relevant for older African Americans because studies have shown that across the life span African Americans have higher rates of morbidity and mortality. The life-course prospective speculates that for African Americans, early exposure to negative life circumstances, such as racism, poverty, and segregation can be detrimental to the physical, mental, and social growth as this group ages (Jackson & Sellers, 1996).   For older African Americans, understanding the influence of social, economic, and environmental conditions across the life span can aid researchers in identifying what factors are most salient for this group in fostering a healthy lifestyle.   This life-course perspective can also be viewed from a positive vantage point in which resilience, group solidarity, and racial identity buffer the harmful effects of environmental factors. These are manifested in predominantly African American neighborhoods through feelings of acceptance and comfort and shared experiences among neighbors. Recognizing that two distinct neighborhood attributes, both positive and negative, exist in predominantly African American neighborhoods is critical for asset building, which can lead to community change.

APPENDIX A

Steps for Bringing in roads to ArcMapfromTigerline

1. Go to http://www.census.gov/geo/www/tiger/tgrshp2009/tgrshp2009.html
2. Select Download the 2009 TIGER/Line Shapefiles now Select State and County-based Shapefiles; Click submit
3. Select "All Lines" at top of screen
4. Click download selected files
5. Open file and double click on zip file

Steps for importing Tigerline Data into ArcMap

1. Open up ArcMap
2. Select AddData button
3. Select shapefile from jumpdrive

The Tigerline data includes all types of lines; for my research I'm only interested in roads. Roads were separated out by using the feature class codes. Definition for the feature class codes are located in the metadata. Metadata is accessed with the following steps.

1. Right click on shapefile under New data frame
2. Select Data→View Meta Data
3. Then in the "Stylesheet" box select "FGDC Classic"
4. Select Identification Information
5. Then look for Atribute_Label: MTFCC
6. Then identify all names and corresponding "Enumerated_Domain_Value" that are applicable to your shapefile
7. Write down "Enumerated_Domain_Value" and definition

In order to only display the roads a definition query is put on the data with the following steps.

1. Right click on the shapefile
2. Go to "Properties"
3. Select "Definition Query"
4. Select "Query Builder
5. In the Top Box, scroll down to "MTFCC"
6. Double click on MTFCC
7. Then select "Get Unique Values"
8. Click on the "=" sign then select the Enumerated_Domain_Values that you previously identified.
9. Then click "OR"
10. Then repeat steps 6-8 until you have added in all your Enumerate_Domain_Values
11. Then hit ok
12. In the next screen hit "apply" then hit "ok"

The roads/lines that met the criteria set out in the query, create a new shapefile following the steps below:

1. Select each road shapefile
2. Then go to Data→Export Data
3. Save new shapefile to jump drive

These shapefiles were used to geocode the remaining addresses. It was necessary to create an address locater.

There is a tool Arctool box called 'create an address locator"

Maps the field in the spatial data with the fields in the tabular data

Check the address locater that you would like ArcMap to use

Creating Polygons in ArcMap

1. Add the network dataset (streets)\afs\isis\data\esri\dm08\streetmap\data\streets
2. Go to the tools icon and select Network Analyst (A new box appears)
3. In this box go to the view icon, then select Toolbars, then Network Analyst
4. Select network Analyst tools then select new service area
5. Show the network analyst window button on the toolbar
6. Right click facilities, then load locations (church participants' addresses
7. In the Network Analyst Window, click the Service Area Properties button to bring up the Layer properties dialog box. Click the Analysis Settings tab.
8. Click the Impedance dropdown list and select distance (miles)
9. Type "1,3" in the Default polygon breaks text box. (A 5 mile radius was chosen for the proposed study)
10. Under direction, click away from facility
11. Click Nowhere from the Allow U-turns dropdown list
12. Check Oneway in the Restrictions list to honor one way restrictions.
13. Check the ignore invalid Locations checkbox.
14. Click the polygon generation tab
15. Verify that Generate Polygons is checked
16. Un-check the Trim Polygon option
17. Click Overlapping polygons per facility under Multiple Facilities Options. This results in individual polygons per participant that may or may not overlap
18. Click discs for the overlap type. Then click apply to save the settings
19. Click the line generation tab
20. Leave the box labeled Generate lines unchecked. Then click Ok to save settings
21. Click Solve

To bring in Restaurant/FoodStores/Refacilities

Right click on file geodatbase and import data single

Specify field type float

Right click on Polygon 1

Select Join and Relates

In the table of contents, right click drive time polygon, point to Joins and Relates and select Join.

Choose Join data from another layer based on spatial location.

Select Facilities as the layer to join to this layer

Select the first radio button labeled "it falls inside" to add the attributes of polygon to all that points that fall inside the polygon.

Specify the output shapefile to save the result of the join as drivetime10wfac.

Click OK to perform the join. Select YES, when the computer asks if you want to add the shapefile.

Right click the newly added feature layer and select Open Attribute Table. Each row displays the participant and the count of facilities in that drive distance.

Export polygons

Add location number to Church member attribute table

Export shapefile for 1 mile radius

Then Exportshapeflie for 3 mile raduis

Repeat steps 1-11 to import recreational facilities, supermarkets, and convenenince stores

☐☐ - ☐☐☐ *ACTS Baseline Survey*

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IDEN v. 1.0
Page 1 of 1

This survey should take about 20-30 minutes for you to complete.
**Your participation is voluntary and your answers will remain
confidential. Your answers will not be shared with your pastor
or anyone else at your church.**

You will be asked to complete one more survey in six months. In order to keep track of your surveys
we need to have your name, address and phone number. Once your survey is received in our main
office this information will be removed from your survey. This assures the confidentiality of the
information that you share.

How to complete this form:

Use a blue or black pen--do not use a pencil.

Do not make stray marks or "doodle" on the page.

Answer all the questions by filling in the circle ⟵ ○ No ● Yes
completely like this:

Mark only one choice unless the instructions indicate it's okay to choose more than one.

If you mark the wrong circle, fill in the right circle, circle it and ⟵ ● No (● Y̶e̶s̶) *correct*
write "correct" next to the right answer like this:

Please print your name, mailing address, phone numbers and today's date inside the boxes below:

IDENfirst
First Name

IDENmi
Middle Initial Last Name

IDENlast

IDENaddress1
Street Address

IDENaddress2
Apartment Number

IDENcity
City

IDENstate   *IDENzip*
State   Zip

IDENhome
Home Phone

IDENwork
Work Phone (if applicable)

Today's Date: *IDENdate*

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☐☐ - ☐☐☐ *ACTS Baseline Survey*

1. Have you been diagnosed with any of the following illnesses?
   [Fill in the circle next to your answer.]

	1	**0**	**2**	
a. high blood pressure	○ yes	○ no	○ don't know	ACT1a
b. heart disease	○ yes	○ no	○ don't know	ACT1b
c. diabetes	○ yes	○ no	○ don't know	ACT1c
d. arthritis	○ yes	○ no	○ don't know	ACT1d
e. Crohn's Disease	○ yes	○ no	○ don't know	ACT1e
f. ulcerative colitis	○ yes	○ no	○ don't know	ACT1f
g. cancer	○ yes	○ no	○ don't know	ACT1g

   ACT1g 1

   ↳ If yes, what kind of cancer? _____

2. Are you currently following a special diet?

   ACT2 ○ yes ➔ 2a. What type? *[Fill in the circle for all that apply.]*

   ○ no

   ○ don't know

ACT2a_1 ○ for diabetes	ACT2a_5 ○ vegetarian		ACT2a_6a
ACT2a_2 ○ low fat	ACT2a_6 ○ other ➔ specify other	_____
ACT2a_3 ○ low salt	ACT2a_7 ○ don't know	
ACT2a_4 ○ weight loss		

   The first few questions are about the fruits and vegetables you eat.
   Instructions: Think about all the fruits and vegetables that you ate **over the last month.** Include those that were: raw and cooked; eaten as snacks and at meals; eaten at home and away from home (at restaurants or friends houses, or take-out); and eaten alone and mixed with other foods. Mark how many times per month, week or day you ate each food.
   Choose the best answer for each question and fill in the circle below it.

   ---

3. Over the last month, how many times per month, week, or day did you drink **100% juice** such as orange, apple, grape, or grapefruit juice? **Do not count** fruit drinks like Kool-Aid, lemonade, Hi-C, Tang, and Twister. Include juice you drank at all mealtimes and between meals. *[Fill in **only one** circle.]*

1 never	**2** 1-3 times per month	**3** 1-2 times per week	**4** 3-4 times per week	**5** 5-6 times per week	**6** 1 time per day	**7** 2 times per day	**8** 3 times per day	**9** 4 times per day	**10** 5 or more times per day
ACT3 ○	○	○	○	○	○	○	○	○	○

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4. Over the last month, how many times per month, week, or day did you eat fruit? Count any kind of fruit--fresh, canned, and frozen. Do not count juices. Include fruit you ate at all mealtimes and for snacks. *[Fill in only one circle.]*

1	2	3	4	5	6	7	8	9	10
never	1-3 times per month	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 times per day	4 times per day	5 or more times per day

ACT4

O   O   O   O   O   O   O   O   O   O

5. Over the last month, how often did you eat **salad with lettuce (with or without other vegetables)**? *[Fill in only one circle.]*

never	1-3 times per month	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 times per day	4 times per day	5 or more times per day

ACT5

O   O   O   O   O   O   O   O   O   O

6. Over the last month, how often did you eat **French fries** or **fried potatoes**? *[Fill in only one circle.]*

never	1-3 times per month	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 times per day	4 times per day	5 or more times per day

ACT6

O   O   O   O   O   O   O   O   O   O

7. Over the last month, how often did you eat **other white potatoes**? Count **baked, boiled, and mashed potatoes, potato salad,** and **white potatoes that were not fried.** *[Fill in only one circle.]*

never	1-3 times per month	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 times per day	4 times per day	5 or more times per day

ACT7

O   O   O   O   O   O   O   O   O   O

8. Over the last month, how often did you eat **cooked dried beans**? Count **baked beans, bean soup, refried beans, pork and beans** and **other bean dishes.** *[Fill in only one circle.]*

never	1-3 times per month	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 times per day	4 times per day	5 or more times per day

ACT8

O   O   O   O   O   O   O   O   O   O

☐☐ - ☐☐☐ *ACTS Baseline Survey*

9. Over the last month, how often did you eat **vegetables by themselves?**
[Fill in **only one** circle.]

> **Do not count:** lettuce salads, white potatoes, cooked dried beans, vegetables in mixtures such as: sandwiches, omelets, casseroles, Mexican dishes, stews, stir-frys, soups, etc.
>
> **Count:** all other vegetables--raw, cooked, canned, and frozen (for example, broccoli, carrots, etc.)

never	1-3 times per month	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 times per day	4 times per day	5 or more times per day
ACT9									
O	O	O	O	O	O	O	O	O	O

10. Over the last month, how often did you eat **mixtures that included vegetables?**
Count such foods as sandwiches, casseroles, stews, stir-frys, omelets and tacos.
[Fill in **only one** circle.]

never	1-3 times per month	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 times per day	4 times per day	5 or more times per day
ACT10									
O	O	O	O	O	O	O	O	O	O

11. Over the last month, how often did you eat **tomato sauce?** Include tomato sauce on pasta or macaroni, rice, pizza and other dishes. [Fill in **only one** circle.]

never	1-3 times per month	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 times per day	4 times per day	5 or more times per day
ACT11									
O	O	O	O	O	O	O	O	O	O

12. Over the last month, how often did you eat **vegetable soups?** Include tomato soup, gazpacho, beef with vegetable soup, minestrone soup, and other soups made with vegetables.

never	1-3 times per month	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 times per day	4 times per day	5 or more times per day
ACT12									
O	O	O	O	O	O	O	O	O	O

For the next two questions, think again about **all** the fruits and vegetables that you ate over the **last month.**

Include those that were: raw and cooked; eaten as snacks and at meals; eaten at home and away from home (restaurants, friends, take-out); and eaten alone and mixed with other foods. **Please fill in the circle by your answer.**

13. How many servings of **fruit** do you usually eat each day?
ACT13

O 0   O 1   O 2   O 3-4   O 5-6   O 7 or more

☐☐ - ☐☐☐ *ACTS Baseline Survey*

14. How many servings of **vegetables** do you usually eat each day?

1   *2*   *3*   *4*   *5*   *6*

ACT14 ○ 0   ○ 1   ○ 2   ○ 3-4   ○ 5-6   ○ 7 or more

15. What do you think is the **recommended** minimum number of fruit and vegetable servings you should eat each day for good heatlh?

0   *1*   *2*   *3*   *4*   *5*   *6*   *7*   *8*   *9*   *10*

ACT15 ○ 0   ○ 1   ○ 2   ○ 3   ○ 4   ○ 5   ○ 6   ○ 7   ○ 8   ○ 9   ○ 10 or more

The next few questions are about your health and about going to the doctor or other health care provider.

ACT16

16. Overall, is your health: ○ excellent   ○ very good   ○ pretty good   ○ fair   ○ poor

ACT17a

17. How tall are you?   ☐ feet ☐☐ inches

ACT18

18. What is your weight?   ☐☐☐.☐ pounds

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☐☐ - ☐☐☐ *ACTS Baseline Survey*

The next few questions are about physical activities and your health.

70. Do you have any current medical conditions that keep you from being physically active?
ACT70   ACT70a

○ no   ○ yes ➔ 70a. What is this condition?

_____

Even if you are limited in your ability to be physically active, please answer the following questions. Some questions may include activities you have been able to do over the last month.

*Thinking about all of the physical activities that you did **over the last month**, in Section 1 please fill in the circle that tells how often you did that activity, if at all. Then please fill in the circle in Section 2 that tells how often you usually do this activity -- for less than 20 minutes at a time or 20 minutes or more at a time.*

			Section 1				Section 2	
Over the last month, how often did you . . .		rarely or never	1-3 times per month	1-2 times per week	3-4 times per week	5 or more times per week	less than 20 minutes	20 minutes or more
		1	*2*	*3*	*4*	*5*	*1*	*2*
71. run or jog?	ACT71a	○	○	○	○	○	ACT71b ○	○
72. bike?	ACT72a	○	○	○	○	○	ACT72b ○	○
73. play active sports like basketball or baseball?	ACT73a	○	○	○	○	○	ACT73b ○	○
74. play light sports like bowling or pool?	ACT74a	○	○	○	○	○	ACT74b ○	○
75. dance?	ACT75a	○	○	○	○	○	ACT75b ○	○
76. swim?	ACT76a	○	○	○	○	○	ACT76b ○	○
77. do yard work or gardening?	ACT77a	○	○	○	○	○	ACT77b ○	○
78. fish or hunt?	ACT78a	○	○	○	○	○	ACT78b ○	○
79. walk or hike?	ACT79a	○	○	○	○	○	ACT79b ○	○
80. lift weights?	ACT80a	○	○	○	○	○	ACT80b ○	○
81. do home repairs (such as painting or carpentry)?	ACT81a	○	○	○	○	○	ACT81b ○	○

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☐☐ - ☐☐☐ *ACTS Baseline Survey*

Over the last month, how often did you . . .		**1** rarely or never	**2** 1-3 times per month	**3** 1-2 times per week	**4** 3-4 times per week	**5** 5 or more times per week		**1** less than 20 minutes	**2** 20 minutes or more
				Section1				Section 2	
82. do housework?	ACT82a ○	○	○	○	○		ACT82b ○	○
83. do child care?	ACT83a ○	○	○	○	○		ACT83b ○	○
84. do hard physical work at your job, like lifting or carrying?	ACT84a ○	○	○	○	○		ACT84b ○	○
85. do aerobics or other classes?	ACT85a ○	○	○	○	○		ACT85b ○	○
86. do praise or liturgical dancing?	ACT86a ○	○	○	○	○		ACT86b ○	○
87. do another activity that was not mentioned?	ACT87a ○	○	○	○	○		ACT87b ○	○

ACT87c   specify ↓

_____

□□ - □□□ *ACTS Baseline Survey*

The last few questions ask about your background.

ACT95

95. Are you: ○ male ○ female

ACT96

96. What is your date of birth? □□ / □□ / 1 9 □□
    month   day   year

97. What is your marital status?
    ACT97

    ○ married or living with a partner   ○ separated

    ○ never been married   ○ widowed

    ACT97a
    ○ divorced   ○ other ➔ *specify* _____

98. Do you consider yourself: *[Choose only one.]*
    ACT98

    ○ Black   ○ Native American

    ○ African American   ○ Multi-racial

    ○ White (not Hispanic)/European American   ○ Asian/Pacific Islander

    ACT98a
    ○ Hispanic   ○ other ➔ *specify* _____

99. What is the highest grade of school or amount of college you have completed?
    ACT99

    ○ eighth grade or less   ○ some college

    ○ some high school   ○ college graduate

    ○ high school graduate or GED   ○ more than college
                                      (some post graduate, post
    ○ trade or beauty school graduate   graduate, or professional degree)

    ACT100

100. What is your total yearly   ○ under $10,000   ○ $50,000-$69,999
     household income (before taxes)?
                                   ○ $10,000-$19,999   ○ $70,000-$99,999

                                   ○ $20,000-$29,999   ○ $100,000-$149,999

                                   ○ $30,000-$49,999   ○ $150,000 or over

Thank you for taking time to complete this survey.

APPENDIX C

Recruitment Form

Script to be used for recruitment

Hello, my name is Janelle Armstrong-Brown. I am currently a PhD candidate from UNC at Chapel Hill. I served as a graduate research assistant on the ACTS of Wellness project that you participated in at your church. As you may recall, I was one of the people that came to your church and administered baseline and follow up surveys. I am continuing that study independently and I am looking at the relationship of health and place among older African American church members. I am calling because you indicated on the follow up survey that you would be willing to answer follow up questions. Are you still willing to answer questions? *(If not, thank them for their time.)*

(If interested in participating in the study),

<u>Thank you for your interest in participating in this research study</u>. I would like to set up an interview time with you now. I will send you a consent form that includes more information about the study. At the time of the interview I will ask for your verbal consent to participate in the study.

Letter to participant

THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL

GILLINGS SCHOOL OF GLOBAL PUBLIC HEALTH
AND SCHOOL OF MEDICINE

{DATE}

Dear {Participant Name},

It was a pleasure speaking with you on the phone. Thank you for your willingness to participate in this study. Please find enclosed an information sheet that describes the study in detail. Since the interview will take place over the phone, I will ask for verbal consent instead of written consent. If you have any questions about the study, please feel free to call me at 585-820-6911. I look forward to speaking with you again. Thank you in advance for your participation.

Warm regards,

Janelle Armstrong-Brown

Consent Form

University of North Carolina-Chapel Hill

Information about a Research Study

_____

IRB Study #: 11-0149

Consent Form Version Date: February 24, 2011

Title of Study: Exploring Older African Americans Health and Place

Principal Investigator: Janelle Armstrong-Brown, MPH

UNC-Chapel Hill Department: Health Behavior and Health Education, School of Public Health

Phone: 919-966-9296

Email: jab@unc.edu

Faculty Advisor: Eugenia Eng, DrPH

Phone: 919-966-3909

Email: eeng@email.unc.edu

Study Contact telephone number: 919-966-9296

Study Contact email: jab@unc.edu

_____

What are some general things you should know about interviews and research studies?

You are being asked to take part in an interview for a research study. Participating in this interview is totally voluntary. You may refuse to be interviewed, or you may agree to participate and then withdraw your consent to be interviewed at any time and for any reason, without penalty.

Interviews are a part of research studies designed to obtain new knowledge that may help people who will be part of the research study. In general, a person being interviewed may, or may not, receive any direct benefit from being interviewed. It is important to know that there also may be risks to being interviewed.

Details about this particular study and this interview are discussed below to help you understand the purpose of the interview, the possible benefits of taking part, as well as any risks involved. It is important that you understand this information so that you can make an informed choice about being interviewed.

You will be given a copy of this consent form. You should feel comfortable asking the researchers named above, or staff members who may assist them, any questions you have about this study at any time.

What is the purpose of this interview?

One of my research goals is to promote the health and well-being of older African Americans through their surrounding environments. The purpose of this interview is to understand more about what it's like to be you, and specifically your personal experiences in the area where you live. This is about you, so there are no wrong or right answers.

How many people will be interviewed?

If you decide to participate, you will be one of up to 12 people who will be interviewed.

How long will the interview last?

Each interview should last about 60 to 90 minutes.

What will happen if you participate in the interview?

I will ask you questions about your experience in your neighborhood. Mainly you will be asked to discuss your views and experiences. With your permission, I will tape record this interview. I will use this information to understand what it is like to be an older African American living in your area and interacting in the local neighborhood. Your participation is voluntary and will not affect your status or involvement in your church.

What are the possible benefits from being in this study?

Research is designed to benefit society by gaining new knowledge.

What are the possible risks or discomforts involved from being in this study?

I do not expect any risks or discomfort to you from being in this study. Sharing your personal feelings about yourself and your experiences in your neighborhood may make you feel uncomfortable. You may skip any questions that you feel uncomfortable answering.

How will your privacy be protected?

Every effort will be taken to protect your identity as a participant in this study. You will not be identified in any report or publication of this study or its results. Your name will not appear on any transcripts; instead, you will be given a code number. The list which matches names and code numbers will be kept in a locked file cabinet. After the interview tape has been transcribed, and the tape is no longer useful for our research the tape will be destroyed, and the list of names and numbers will also be destroyed.

Will you receive anything for being in this study?

You will receive a gift card for $15 after completion of each interview to thank you for your time.

Will it cost you anything to be in this study?

There will be no costs for being in the study other than your time.

What if you have questions about this study?

You have the right to ask, and have answered, any questions you may have about this research. If you have questions, or concerns, you should contact me at 585-820-6911 while I am working here in your community. You can also contact me or my advisor in the United States at the phone numbers and email addresses listed at the beginning of this form.

What if you have questions about your rights as a research participant?

All research on human volunteers is reviewed by a committee that works to protect your rights and welfare. If you have questions or concerns about your rights as a research subject you may contact, anonymously if you wish, the Institutional Review Board at 919-966-3113 or by email to IRB_subjects@unc.edu.

Thank you for helping me with this study.

Interview Guide

Date:

Introduction

Hello, my name is Janelle Armstrong-Brown. I am currently a PhD candidate from UNC at Chapel Hill. You may remember participating in the ACTS of Wellness study at your church. I am calling because you said that you would be willing to answer follow up questions. Are you still willing to answer questions? *If no, then thank them for their time. If yes, then continue with the script.*

By this time, I hope you have received and have had a chance to look at the fact sheet mailed to you regarding this study. Do you have any questions regarding this study? Based on the information provided, do you give your consent to participate in this study?

Answer any questions. If participant gives verbal consent, continue with the script. If not, thank participant for his/her time.

I am doing a small project from the ACTS study to understand more about your personal experiences in your neighborhood and church through 2 interviews. Today I want to look at how your neighborhood and church influence your life and your health. In the first interview, I would like to hear your description of your neighborhood and your church. In the second interview we will focus on how your church and neighborhood influence your health. This discussion will help me learn from you about your thoughts on this topic. This information will be useful in creating physical activity and diet promotion efforts that are designed for an older African American/ African American audience. I would like to tape record this conversation so that I can accurately capture what you say. I will not use your name as we talk so that there will be no way to identify you on the tape. If you want to make a comment that you don't want recorded, just say so and I will turn off the recorder until you are done. I would like you to share all your ideas and opinions. There are no right or wrong answers. This call will last between 60-90 minutes. I want to thank you in advance for sharing your experience. Do you have any questions? Is it okay to get started?

Background

1. If someone were to ask you about your neighborhood what would you tell them?
2. Can you tell me if your neighborhood has a particular name?

3. How long have you lived there? How did you end up living there?

Daily life

1. I've never been to the area where you live, so I don't really have an idea of what it's like. Could you kind of take me through your neighborhood and tell me what it's like, what I would see if I went to your neighborhood and walked around?
2. Can you walk me through your typical day? Tell me about the places you go to and why.
3. Tell me about the places that are important to you in your neighborhood. Why are they important? What goes on at these places?
4. *If I were to come visit you, what aspects of your neighborhood would you want me to see?*
5. *What things do you like about your neighborhood? Why? What things annoy you about your neighborhood? Why?*
6. *Tell me about your favorite places to go? Why?*
7. *What are your least favorite places to go? Why?*
8. *How does it make you feel when you travel outside of your home?*
9. Would you like to get out more? Where? With who?
10. Do you like living in this neighborhood? Why?
11. What types of interactions do you have with the people in your neighborhood?
12. How do community groups influence your life?
13. What types of activities do you participate in? Do these activities take place in your neighborhood? If not, where do these activities take place?
14. How do you feel your neighborhood impacts your health?
15. Is there anything else you would like to add about your neighborhood?

Church

Note: Religious and spiritual beliefs/practices include individual constructs such as personal faith, individual prayer, relationship/dialog with God, reading the Bible, counseling from pastor/priest or leader of faith and help or counseling by ancestor(s); and group constructs such as prayers from fellow church members and others, attending religious services, meditation, finding and spending time at locations of spiritual energy (i.e., churches, specific geographical locations, or certain natural settings).

1. How long have you been a member of the church you currently attend?
2. How close do you live to your church? What would you do if you lived farther away from your church?

3. How often do you participate in church activities (services, bible study, and church events)? Does how far you live away from your church influence how often you participate in church activities?

How do you feel when you attend church activities? What do you get out of this experience?

Describe for me the role that church has played in your life.

How often do you interact with other church members outside of church?

Interview 2

Physical Activity/Diet

 Tell me what you think of when you hear the words "physical activity."

Tell me about your thoughts on physical activity and health.

What kind of physical activity, if any, do you do?*Probe for those who are active:* How often do you do it? How long have you been doing this activity?

Are there things that are helpful or could be helpful for you in being physically active? What are these things.

Picture your neighborhood and tell me what things may influence your decision to be physically active.

Eating patterns and habits:

Describe for me a typical meal. What would you describe as a healthy meal?

What are your favorite foods and drinks? Probes: What are your reasons for eating and drinking these foods/drinks?

What eating habits (foods or food rituals) would you say are particular to African American culture?

If you had to put these food habits into 2 groups "Habits that are not healthful" and "Habits that are healthful" what would you put in each group?

If I wanted to get groceries for a nice/healthy dinner, where would be a good place to shop for these food items?

How do you feel the food in your neighborhood compares to food found in orther neighborhoods? Grocery? Restaurant?

If quality food cannot be found in your neighborhood, what do you do? Are there other places to obtain good quality foods?

What connection is there, if any, between religion or spirituality and physical activity and diet?

What role, if any, do you think that the church should play in helping people to be more active?

NOTE: Due to the open-ended nature of the questions, additional questions may arise that may emerge from the information that is shared

Active Neighborhood Checklist

Date: _____ Segment ID: _____

Auditor ID: _____ Neighborhood ID: _____

Street Name: _____

Start Time: _____

Is any building or section of the sidewalk or roadway under construction or being repaired?
- Yes, specify
- No

A. What land uses are present?

1. Are residential and non-residential land uses present?
- All residential
- Both residential and non-residential
- All non-residential

2. What is the predominant land use?
Check one or two that apply.
- Residential buildings/yards
- Commercial or public/government buildings
- School/school yards (elementary, middle, high school)
- Parking lots or garages
- Park with exercise/sport facilities or playground equipment
- Vacant lot/abandoned building
- Undeveloped land
- Designated green space
- Other non-residential, specify

3. What types of residential uses are present?
Select all that apply.
- None
- Abandoned homes
- Single family homes
- Multi-unit homes (2-4 units)
- Apartments or condominiums (>4 units, 1-4 stories)
- Apartments or condominiums (>4 stories)
- Apartment over retail
- Other (retirement home, mobile home, dorms)

4. What parking facilities are present?
Select all that apply
- None (no parking allowed on street at any time)
- On-street, including angled parking
- Small lot or garage (<30 spaces)
- Medium to large lot or garage

5. What *public* recreational facilities and equipment are present (including in the schoolyard if publicly accessible)?
Select all that apply.
- Park with exercise/sport facilities or playground equipment
- Off-roadway walking/biking trail
- Sports/playing field
- Basketball/tennis/volleyball court
- Playground
- Outdoor pool
- Other:

6. (OPTIONAL) What types of non-residential uses are present?
Select all that apply
- None
- Abandoned building

Specific types of destinations:
- Small grocery, convenience store (including if gas station), or pharmacy
- Food establishment (restaurant, bakery, café, coffee shop, bar)
- Entertainment (e.g., movie theatre, arcade)
- Library or post office
- Bank
- Laundry/dry cleaner
- Indoor fitness facility

Educational facilities:
- School (elementary, middle, high school)
- College, technical school, or university

Large buildings housing 1+ businesses/services:
- High-rise building (>5 stories)
- Big box store (eg., Walmart, Office Depot, Best Buy)
- Mall
- Strip mall
- Supermarket
- Large office building, warehouse, factory, or industrial building

Land use notes:

B. Is public transportation available?

	No	Yes, one side	Yes, both sides
1. Any transit stop (bus, train, or other)?	go to C1		
1a. Bench or covered shelter at transit stop?			
Transit stop notes:			

C. What street characteristics are visible?

	No	Yes
1. Enter posted speed limit (99 if none):		
2. Enter special speed zone (99 if none):		
3. Enter total # of lanes on street.		
4. Marked lanes?		
5. Median or pedestrian island?		
6. Turn lane?		
7. Crosswalk for crossing this segment?		
8. "Walk" / "Don't Walk" signs?		
9. Traffic calming device (roundabout, curb bulb-outs, speed bump, brick road, other)?		* if yes, specify type(s)
10. Cul-de-sac (dead-end street)?	go to D1	
10a. Sidewalk cut-through in cul-de-sac?		
Street characteristic notes:		

D. What is the quality of the environment?

	No	Yes
1. Any commercial buildings adjacent to the sidewalk?		
2. Any amenities?		
2a. Bench (excluding at transit stop)?		
2b. Drinking fountain?		
2c. Other? Specify.		
3. Public art (e.g., statues, sculptures)?		
4. Graffiti or broken/boarded windows?		
5. Litter or broken glass?		None or a little / Some / A lot
6. Tree shade on the walking area?		None or a little / Some or a lot
7. Steepest slope along walking area?		Flat/gentle / Moderate / Steep

Pedestrian environment notes:

E. Do you have a place to walk or bicycle?

	No	Yes, one side	Yes, both sides
SIDEWALKS			
1. Sidewalk present?	go to E10		
2. Any grassy or other buffer between curb and sidewalk along most of the segment?	go to E3		
2a. Tree(s) in buffer?			
3. Sidewalk continuous within segment?			
4. Sidewalk continuous between segments at both ends?			
5. Width >5 ft for most of the sidewalk?			
6. Width <3 ft for any part of the sidewalk?			
7. Any missing curb cuts or ramps at intersections or driveways?			
8. Any major misalignments or cracks in the sidewalk?			
9. Any permanent obstructions (trees, signs, tables) blocking the 3-ft walk area?			
10. *If a sidewalk is not present on any part of the segment*, do you have another safe place to walk, including			
Street or shoulder (if safe)?			
Unpaved pathway?			
Other? Specify:			
Sidewalk notes:			

	No	Yes, one side	Yes, both sides
SHOULDERS (OPTIONAL)			
11. Designated bike route sign or marking or "Share the Road" sign?			
12. On-street, paved, and marked shoulder?	go to E16		
13. Width of marked shoulder > 4 ft?			
14. Shoulder continuous between segments at both ends?			
15. Any permanent obstructions in the shoulder (including drainage grates, parked cars)?			
16. *If a paved, marked shoulder is not present on any part of the segment*, do you have another safe place to bicycle, including			
Street?			
Wide outside area (>15 ft)?			
Other? Specify: _____			
Shoulder notes:			

Stop time: _____

Codebook

Code	Definition/Description
Accessing Food Stores	Mention of where people purchase food. Any reference to where they get food from, including grocery stores, supermarkets, convenience stores, and restaurants. This also includes places where food is obtained, neighbors, family, garden, etc. This code can be also be used if people indicate that they don not have access.
Accessing Physical Activity Resources	Any reference to places where people go to for exercise. This includes neighborhoods, recreational centers, senior centers, gyms, community centers, parks, and/or trails. This code can also be used if people say that they don't have access.
Aging as a process	Any reference to changes that come with getting older. This can include exercising more, having more health concerns, and having to take care of others (grandchildren or parents). This code also includes any age-related concerns, such as not wanting to drive after dark, issues with managing finances, retirement, etc.
Being there for neighbors	Any reference to neighbors helping one another. This can include watching a neighbor's house, bringing food to a neighbor
Connection to community	Any description of the feeling they have when discussing their neighborhood; Wanting the best for the neighborhood.
Defining the neighborhood	Use in response to the question that asks "what comes to mind when you hear the word neighborhood?"
Describing the neighborhood	Any description of the person's neighborhood.

Description of healthy foods	Use in response to the question that asks "Can you describe a healthy meal for me?"
Eating habits	Any reference to when participant eats, what they eat, where they eat, and how the food is prepared
Feeling of safety	Specific references to things in the neighborhood that make the participant feel comfortable or secure about their surroundings.
Health	Any reference to diseases, health concerns, or family health history
Historical	Use this code when participants mention events from the past, how things used to be in the past, how things have changed from the past, how the past influences where they are now (Recognizing struggles as you better your life).
Influence of Church on health	Any discussion of specific things that the church does or does not do related to health. For example, any reference to the food served, opportunities for exercise, messages on preventing diseases.
Influence of distance	Any mention of how the proximity to a location impacts whether the person will frequent that place.
Interacting with neighbors	Description of the interactions that participants have with their neighbors. This can include waving to neighbors, stopping to talk to neighbors, knowing who your neighbors are, interactions at neighborhood functions and/ or block parties
Keeping up property	Use when participants talk about the maintenance of the houses , lawns, streets, and overall neighborhood/community
Length of membership	Use when the participant says how long they have been a member of their church
Length of residence	Apply this code when participant mentions how long they have lived in his/her neighborhood
Neighborhood	Any reference to the benefit of things , such as

convenience	restaurants, parks, being close by
Personal choice	Use this code when participants state that personal decisions are impacted by individual processes and not anything external to the individual
Racism	Any mention of race or racial issues, experiences of discrimination, instances of race determining access to housing, facilities, jobs, churches, etc.
Social Support	Any reference to doing activities with other people, instances of people helping participant or vice versa. Depending on others during their daily life and activities
Therapeutic effect of church	A description of overall mental, spiritual, and physical well-being that is obtained from being affiliated with church and God.
Therapeutic effect of neighborhood	A description of overall mental, spiritual, and physical well-being that is obtained from being living in their neighborhood.
Types of exercise	Any activity that participant does that they describe as being physically activity. Include any reference to when participant exercises, how often they exercise, what types of exercise they do, where they exercise, and who they exercise with

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