FOOD ACCESS IN LOCAL FOOD RETAIL STORES:
A MIXED METHOD APPROACH

BY

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THESIS

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ABSTRACT

This mixed methods study focuses on food access in local food retail environments within three neighborhoods in Philadelphia, Pennsylvania. Food deserts are areas in which residents have limited access to healthy foods. African Americans and populations residing in low-income urban neighborhoods often have poor access to supermarkets and healthier food options; and instead have more access to convenience stores that sell low-quality, higher priced and unhealthy food items. This thesis examines how store managers and owners actively shape local food environments by providing different types of foods at their stores located in different neighborhoods. Access is viewed as a relational concept involving actors with different degrees of power.

The first section presents a quantitative analysis of the uneven spatial densities of corner stores, supermarkets and populations in Philadelphia. Results indicate that supermarkets are more geographically available in neighborhoods with high concentrations of white population, whereas corner stores are more available in predominately black neighborhoods. The second section presents a qualitative analysis of the availability of healthful foods within 25 corner...
stores and supermarkets in three contrasting Philadelphia neighborhoods. Using a food checklist and observational methods I analyzed food offerings, store characteristics and social interactions between retail clerks and their customers. Results showed a dearth of fresh food offerings in corner stores and physical and social barriers between store owners and customers in some stores. Differences in food offerings and store operations were also observed between supermarkets belonging to the same chain located in socioeconomically diverse neighborhoods.
To my Mother, family and friends who have supported me through this journey
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Chapter 1

INTRODUCTION

The objective of my thesis research is to understand how and why supermarkets and corner stores located in demographically different neighborhoods differ in the types and quality of foods offered, and store design, layout and operations. I argue that differences between stores reflect how store owners and managers perceive the location of their store and the demographics of the local neighborhood. Specifically, does location influence differences in the quality, availability, and price of food items sold and in other characteristics that affect peoples’ shopping experiences and access to healthful foods? There is a great deal of research on food deserts and food access in urban environments. Food deserts are areas in which residents have limited access to healthy foods. African Americans and populations residing in low-income urban neighborhoods often have poor access to supermarkets and healthier food options; and instead have more access to convenience stores that sell low-quality, higher priced and unhealthy food items. However, much of the literature has ignored how store managers and owners actively shape local food environments by providing different types of foods at their stores located in different neighborhoods. The political, cultural and economic processes that influence food deserts in cities have not been widely studied.
The intellectual merit of this study is to better understand the relationships between accessibility, urban geography, geography of health, and perceptions of access that affect urban food environments. Research has shown that minorities and low-income populations have high rates of obesity, with African Americans often having high rates of obesity, and poor access to more nutritional food options (Coleman-Jensen, Nord, Andrews, & Carlson, 2011; Freedman, 2009; Ploeg et al., 2009). My research will look not only at the locations of food stores, but also at chain store decisions about the types of foods offered, and the implications for residents ‘access to healthy foods.

1.1 Background

Food deserts are areas that lack healthy, affordable food options (Cummins & Macintyre, 2002; Larsen & Gilliland, 2009; C. Smith, Butterfass, & Richards, 2010; Walker, Keane, & Burke, 2010). Lack of supermarkets and fresh produce is associated with higher obesity prevalence, especially in low-income areas (K. B. Morland & Evenson, 2009). Food deserts are also associated with place and health; because in areas of deprivation, availability of and accessibility to healthy foods can be quite difficult because of the lack of stores that sell healthy foods at reasonable prices and poor access to transportation (Walker et al., 2010). According to Moore and Diez Roux (2006), the location of food stores is associated with neighborhood
characteristics such as socioeconomic status and racial/ethnic composition. Moore and Diez Roux (2006) analyzed the association of food store locations and racial/ethnic and socioeconomic composition of the population at the census tract level in selected areas of North Carolina, Maryland and New York. In this study the authors found that predominately white, higher income areas had more supermarkets than predominately minority and low-income areas (Moore & Diez Roux, 2006). Galvez et al (2007) also reported that predominately African American neighborhoods have lower supermarket accessibility compared to racially mixed and predominately white neighborhoods.

In low-income minority areas, specifically urban neighborhoods there is often an abundance of small grocery stores, convenience stores, fast food restaurants and liquor stores (Galvez et al., 2008; Moore & Diez Roux, 2006). The quality of food located in small grocery stores and convenience stores is typically low, with many available foods filled with dense and empty calories (Anderson & Butcher, 2006; Walker et al., 2010). Convenience stores are often overpriced, and residents will have to shop there for necessities if they are unable to get to the supermarket due to limited transportation options (Larsen & Gilliland, 2009). Morland and Evenson (2009), found that the “prevalence of obesity is associated with the location of supermarkets, small grocery stores and fast food restaurants” (p. 493). The quality of the food and the location of supermarkets are important variables affecting obesity prevalence.
In summary, research has shown that disadvantaged urban and rural residents are more likely to live in food deserts that lack access to supermarkets selling healthy foods at reasonable prices. However, past studies often assume that all supermarkets are “good,” without considering the types of foods and services offered at specific supermarkets, and how residents view available foods. In a recent study in Pittsburg, PA residents of low-income, African-American neighborhoods perceived that low quality food was “directed” to supermarkets in their neighborhoods (Kumar, Quinn, Kriska, & Thomas, 2011). Supermarket owners and managers may decide what types of foods are offered in particular stores based on characteristics of the neighborhood where the store is located and perceptions of the local population’s food preferences. These decisions can lead to differences in the types and quality of food offered between supermarkets, even supermarkets belonging to the same chain. Understanding how these decisions influence residents’ access to healthy foods is the goal of my research.

1.2 Research Hypotheses

1. Food variety is influenced by location and neighborhood characteristics (e.g. income, race/ethnicity). In deciding what foods to offer at different stores, food retailers consider the population which they are serving and supply goods they believe customers will buy,
either based on demands of residents or, more importantly, socially-constructed perceptions of what neighborhood residents want to eat.

2. The physical presence of a supermarket does not mean full access for the neighborhood residents.

3. Not all stores of the same chain offer the same options and shopping experience.

4. Residents in low-income neighborhoods will have poorer access to healthy nutritious foods. Food retailers may be readily available and accessible in low-income neighborhoods but the supply of healthy produce may be limited and of low quality.

1.3 Study Site

The study area is located in the city of Philadelphia. Three neighborhoods were surveyed: Cobbs Creek, Kingsessing and University City. Each location has somewhat different social demographics. Three zip codes were included in the study areas (19104, 19139 and 19143). Areas within the 19139 and 19143 zip code areas are predominately African American, whereas the University City area has a mixed racial demographic. The University City area is home to some of Philadelphia’s universities, Drexel University and the University of Pennsylvania, which makes for a racially and socioeconomically diverse population. Within each of these zip codes is the location of one supermarket belonging to the same supermarket chain. The three
neighborhoods also contain a large number of small grocery stores known as corner stores. Corner stores are defined as small stores that offer everyday foods and household items and serve a local population.

1.4 Methods

This study uses a mix of methods; including quantitative methods, qualitative methods and spatial analysis. The study will be conducted in two parts. The first part consists of GIS analysis of supermarket and corner store (grocery store) locations and their relationship to socioeconomic characteristics of local populations. Income and demographic data from the Census at the tract level provide social and economic indicators to describe local population characteristics. Business directories provide the addresses of supermarkets located within Philadelphia which are geocoded into a geographic database for GIS mapping.

The second part of the study comprises in-store assessment of food offerings at local corner stores and supermarket chains within the study neighborhoods. I survey selected corner stores and three supermarkets, with all of the supermarkets belonging to the same retail chain.

To evaluate differences in food offerings between the stores, I visit each store and record the types of foods offered; which foods are displayed prominently, cleanliness and layout of the
store, food freshness (if possible) and other qualitative characteristics that impact people’s access to healthy foods and shopping experience.

1.5 Project significance

The results from this study reveal ongoing disparities in access to healthy foods plaguing disadvantaged populations. Results from the proposed research can add to the growing literature on perceptions of food access and local food environments. Also, the proposed research can aid in the public outreach in local communities regarding opportunities for purchasing healthy foods and eating healthy. The results can be beneficial to the local public health agencies in addressing consumer health issues in disadvantaged neighborhoods.

1.6 Thesis Organization

This thesis is divided into four chapters. Chapter 2 presents the literature review and theoretical foundation of access and food environments. Concepts and theories of access are addressed in relation to the local food environment. Drawing on research by Penchansky and Thomas (1981) and Ribot and Peluso (2003), access theories are applied in understanding food access, a kind of re-evaluation of how food access research is approached. Literature on obesity and the environment is also reviewed in this chapter, focusing on studies of food deserts and the local food environment. Current literature on food deserts is discussed, with emphasis on accessibility, availability and perceptions of access by study participants. Supermarkets and the
history of supermarket retail in urban environments are studied for having a role in creating food deserts.

Chapter 3 discusses the quantitative analysis of the concentration of grocery stores (corner stores) and supermarkets in Philadelphia, in relation to the population and other demographics. The quantitative analysis consists of kernel density analysis and correlations to detect clustering of stores and to assess whether clustering is associated with socioeconomic variables describing local populations. One prominent feature is the segregation of black and white populations in the city – a feature that frames the uneven locations of corner stores and supermarkets.

Chapter 4 presents the results of the qualitative analysis which uses in-store observations and the healthy food checklist to analyze differences between stores in foods offered and other store characteristics. The results for corner stores and supermarkets are discussed separately, giving detail to physical appearance, food offerings, service, and maintenance of those stores, as well as in-store social interactions. Interaction between store clerks/owners and patrons is important when addressing food access. These everyday exchanges shape the shopping experience of the customers.

Chapter 5, the discussion section, ties everything together. This chapter expresses the relevance of the findings in relation to the literature on food environment and access to healthful
foods. The quantitative and qualitative analyses findings are examined and explored with respect to their implications for local food environments and food access. Limitations and future research directions are also reviewed in this chapter.
Chapter 2

FOOD ENVIRONMENT AND HEALTH: BUILDING A FOUNDATION

The extensive literature on food environments in the United States may be a result of the increasing interest in the dietary health outcomes of many Americans. Obesity and obesity related diseases have increased over time throughout the United States. The Centers for Disease Control offer visuals and data, available to the general public that show increasing annual trends of obesity (Ogden, Carroll, Kit, & Flegal, 2012). This problem has gathered the attention of First Lady Michelle Obama who issued a healthy food initiative program, Let’s Move!, to help promote healthy eating and healthy lifestyles for children around the country. Obesity is a problem, and for many population groups, especially disadvantaged and marginalized populations, this problem has been linked to food insecurity issues. Food insecurity -- inaccessibility to affordable food needed for an active healthy life (Coleman-Jensen et al., 2011; Seligman, Laraia, & Kushel, 2010)-- is part of an overall food environmental problem, which has access to healthful foods at its center. Research on food deserts delves into the issue of accessibility to healthful food options in disadvantaged areas.

2.1 Concepts and Theories of Access in Relation to the Food Environment
The extensive amount of literature on food deserts and the local food environment has brought about new conceptual frameworks that link food deserts and the local food environment to human interactions and behaviors. Often times these conceptual frameworks are broken down into separate categories from the macrolevel to the microlevel which describe factors that contribute to the local food environment. The usual categories found in the literature often include social and physical attributes. Underpinning conceptual frameworks of food environments is the concept of access. Access is a major focus in the food desert literature. Low-income areas often do not have access to supermarkets at the same rate as more affluent areas. Many smaller grocery stores do not offer healthy food, and these stores are more prevalent in disadvantaged areas. A review of both the conceptualization of food environments and access theories will be discussed.

2.1.1 Conceptualizing the Food Environment

Researchers have defined the food environment in diverse ways. Some researchers describe the food environment as the number and types of food stores and retailers within a given location (K. Morland, Wing, Diez Roux, & Poole, 2002). Others have conceptualized food environments as being multi-level, as involving a complex interplay of personal, neighborhood, regional and national factors (Gittelsohn & Sharma, 2009; Glanz, 2009). For the purpose of this
paper, food environment is defined as the availability of different types of food stores and services within a given location. Many conceptual frameworks have been proposed for understanding food environments and their relationship to health outcomes and behaviors (Glanz, Sallis, Saelens, & Frank, 2005). The healthful food access literature has paid great attention to the spatial aspects or physical locations of food stores and services. Some literature has also focused on the perceptions of food access among consumers such as Kumar et al (2011), Moore et al (2008), Giskes et al (2007), Sharkey, Johnson & Dean (2010), and Freedman & Bell (2009).

The concept of the food environment for this paper derives from three articles that followed a multi-level conceptual approach to both the food environment and social environment. Larson and Story (2009), Gittelsohn and Sharma (2009), and de Hollander and Staatsen (2003) have published research covering multiple components that make up the health and food environments. From their literature arose two categories, 1) the social environment; and 2) the physical environment.

Larson and Story’s (2009) article reviews the multilevel environmental influences on food choices. The authors forgo the use of the individual-level factors such as perceptions and attitudes that affect eating behavior due to excessive research on these topics. Instead the authors use the social environment, physical environment and macroenvironment levels to address food choices and eating behaviors. Larson and Story (2009) emphasize the role of the social
environment in food access, proposing a social interaction approach that emphasizes social networks, and family and home life that in turn affect food choices, consumption and dietary habits. Physical environments, according to the authors, are places of activity; areas where interactions and exchanges take place (i.e., schools, worksites, food retail stores, etc.) that influence dietary intake and health outcomes. The third level, macroenvironment, includes the socioeconomic and cultural factors and beliefs and values that impact eating habits. Some of the possible reasons for placing SES, culture and beliefs and values under the macroenvironment and not the social environment, may be that they are shared among groups and individuals and result from wider social, economic and political processes. Low-income residents are concentrated with other low-income residents, because their mobility is restricted based on income. The macroenvironment also includes macro-level structures and systems like public policies that affect individual eating habits.

Gittelsohn and Sharma (2009) formulated a model based on the conceptual framework by researchers Glanz and colleagues (2005) that attempts to address impacts of the food environment on food choices and obesity in diverse settings (i.e., rural v. urban, domestic v. international). Their model considers not only the types of food available in a locality, but also how people gain access to food and the barriers they face. The modified model adheres to three aspects of the food environment, 1) physical aspects; 2) consumer-related aspects; and 3) social
aspects. The physical aspect consists of four parts: defining the geographic limits of the food environment; accurately identifying the types of food sources; documenting variation in accessibility of foods within stores; and assessing use of prepared food sources. These dimensions focus on the physical locales in which people make food choices such as distances and types of food stores located in a given area, and accessibility within the stores, such as barriers of store layouts, and availability of unhealthy, high caloric foods.

The consumer-related aspects focus on five features, specifically: the availability of fresh produce; the adequacy of the food supply; relevant aspects of pricing; food-assistance program participation and perceptions of food quality. These characteristics involve the interactions between the consumers and the food retailer. By interaction I refer to the relationship (positive, negative, neutral) between retail owners and their patrons. These interactions include how the retail owner views the store’s customers which may be a deciding factor on what to offer in their stores, and how the customers feel they are perceived by the retailer. The last dimension of the food environment is the social aspect. Gittelsohn and Sharma (2009) refer to the social aspects of the food environment as “ways in which food retailers interact with their customers.” This dimension has three elements, but only one really serves a purpose in this paper. The third mechanism, assessing language and related cultural factors, is important in many studies focusing on the interaction of patrons to their local corner store, supermarket or grocer.
Language and cultural factors can serve as barriers to food access if they make people feel uncomfortable or unwanted in patronizing specific retail food stores.

De Hollander and Staatsen (2003) come from an environmental health approach that focuses on environments in general, not just the food environment. However, de Hollander and Staatsen’s conceptual model exploring the determinants of health is also applicable to the study of the food environment. Four categories comprise the determinants of health: lifestyle, physical environment, social environment, and endogenous (genetic, acquired). For the purpose of this paper, only the first three categories will be of relevance. Lifestyle describes personal characteristics or the way in which an individual or group of individuals live, such as diet, smoking, physical activity and so forth. The physical environment in this regard includes physical factors (outdoor/indoor environments; spatial characteristics of neighborhoods, etc.) that affect health. The social environment emphasizes social networks and social inequalities that encompass disparities in wealth, poverty, education and access to resources, along with cultural influences. The authors express that these determinants interact with one another to contribute to health outcomes. These determinants can be applied to the food environment as well.

All three of these conceptual frameworks interlock with one another. The reoccurring features are the social and the physical. The social in all three articles involves social interactions, social networks, and socioeconomic inequalities. Larson and Story (2009) place
factors of socioeconomic status and culture in a “macroenvironment” category, unlike Gittelsohn and Sharma (2009) and de Hollander and Staatsen (2003) who organize these factors under social environments. The physical component in all three articles involves lived, active spaces, physical factors that are part of an individual’s daily life. The food environment encompasses the interlocking social and political processes that affect people’s access to healthy foods.

2.1.2 Theories of Access

The concept of access has been essential in health related research for many decades. In health care research, access is the focus in understanding why patients utilize (or not) health services, and how patients and providers interact. Are there enough physicians in a certain location per population? What does this mean in regards to access? Access is measurable both quantitatively and qualitatively. Using two different notions of access, Penchansky & Thomas’s (1981) “fit” model and Ribot and Peluso’s (2003) theory of access, I will address their relation to the food environment and food access.

Penchansky and Thomas (1981) proposed the “fit” model to address interaction between patients and the health care system. The “fit” model involves what the authors refer to as dimensions of access. These dimensions are availability, accessibility, accommodation, acceptability and affordability. *Availability* is the relationship of existing services and resources to the populations’ need – the supply of services in relation to need. *Accessibility* is the
relationship of the location of resources and services to the location of the population. It can be
measured by the geographical barriers people face in reaching services expressed in terms of
physical distance, time-distance or travel cost. Accommodation describes the degree to which
services are organized to fit the populations’ need and the populations’ ability to meet those
needs. For example, are the hours of operation convenient for clients? Acceptability includes
social and cultural factors that affect the interactions between the population and service
providers’. Affordability is the relationship of price of services to the populations’ ability to pay
for said services.

Ribot and Peluso’s (2003) A Theory of Access article defines access as “the ability to
benefit from things.” They describe “ability” as analogous to power, power being “the capacity
of some actors to affect the practices and ideas of others” (pp. 155-156) and power always being
attached to people (Ribot & Peluso, 2003). The authors also address access as being relational,
such that access is always changing based on the actors in positions of power within social
relationships. Also, “different political-economic circumstances change the terms of access,
which may change the specific individuals or groups most able to benefit from a set of resources”
(Ribot & Peluso, 2003, p. 158). Ribot and Peluso divided the concept of access into access
control and access maintenance. For the intent of this paper, access control will do. Access
control, as defined by the authors, is “the ability to mediate others’ access” (Ribot & Peluso, 2003, p. 158).

By applying the “fit” model of Penchansky and Thomas (1981) and access theory of Ribot and Peluso (2003) to the concept of food access, we are able to view food access in terms of relational interactions between people and resources. Regarding the “fit” model, the food desert and food environment literature cover the availability, accessibility and in some cases the affordability aspects of the model. The availability of healthful foods and supermarkets in disadvantaged neighborhoods has been researched extensively especially when focusing on diet related health outcomes and food insecurity. Availability concentrates on the number of healthful food options that exist to meet the population’s needs, the main topic addressed in the food deserts literature. Are there enough supermarkets in the area and what do they offer the people?

Accessibility includes the ability of the population to access the stores that offer healthful food options, and it usually includes cost, distance and transportation (geographic accessibility). Accommodation of food retail stores describes how the stores incorporate the populations’ needs. Accommodation can come in the form of hours of operation, availability of foods to meet dietary restrictions (i.e., gluten free, diabetic, etc.), handicap accessibility, and other services.

Acceptability of food retail owners to the community in which they serve is important. The exchange of business between customers and the retailer can be positive or a negative experience
based on the interactions between them and how both view each other. The retail owner may display certain attitudes to certain customers of the local community, based on the location of the store, thus ascribing characteristics of the neighborhood onto the people. The customers of the store may have certain attitudes about the owner based on phenotype, language barriers, and attitudes of the owner or stereotypes. These perceptions and interactions influence people’s shopping experiences and their decisions about patronizing certain stores. Finally, affordability refers to the price of healthful foods in a given location and the community’s ability to pay. Healthier foods are known to be more expensive than their less healthy counterparts (Jetter & Cassady, 2006). It is important to determine if prices differ based on location or type of store and whether healthy foods are affordable for the local population.

Ribot and Peluso’s (2003) access theory applied to the study of food deserts will address how and why these differences occur. Merchant’s perception of the neighborhood may influence pricing food at higher prices, and they have the power to do that, but it limits the customers’ access to affordable food. Merchant have greater power than consumers, because the merchants can limit access to goods and services based on profitability criteria as well as the merchants’ own biases and perceptions.

2.2 Growing Pains: America’s Obesity Problem
Obesity and obesity related diseases are a problem in America. Recent findings on obesity from the CDC and the National Health and Nutrition Examination Surveys (NHANES) found from 2009-2010, show that more than one-third of adults were obese, along with 17% of youth (Ogden et al, 2012). Obesity is defined as having a body mass index (BMI), greater than 30. BMIs are calculated based on the ratio of weight to height. They are correlated with body fat but do not directly measure body fat (Wang & Beydoun, 2007). A different measurement of obesity is used for children and adolescents. Not only is obesity an important problem, but also it is an increasing trend throughout the United States.

The Centers for Disease Control provide timeline maps of obesity that show dramatic increases in obesity rates in all 50 states since the 1980s. Energy imbalance, consuming more calories than burning, is the main contributor of obesity. The consumption of high caloric, processed foods and the increase in physical inactivity impact energy balance because there is little depletion of those excess calories that are being consumed (Stafford et al., 2007). Obesity is associated with local food environments (Morland & Evenson, 2009) and social characteristics such as socioeconomic status (Drewnowski, Rehm, Kao, & Goldstein, 2009).

2.2.1 Neighborhood Environment and Obesity

*Socioeconomic status.* Socioeconomic status (SES) consists of three variables: educational attainment, occupation, and income level. Socioeconomic status is an important
variable because, “it influences people’s access to foods, exercise facilities and health care services as well as affecting their living and working environments, which might influence the association between SES and obesity” (Zhang & Wang, 2004, p. 1177). Health disparities and inequalities are more prevalent among individuals and groups of low SES (Stafford et al., 2007). Individuals with low levels of education (less than high school) tend to have low-wage jobs, thus having low-incomes. People with a less than high school education have a higher prevalence of obesity compared to those who have college degrees (Black, Macinko, Dixon, & Fryer, 2010; Wang & Beydoun, 2007). Low-income neighborhoods are deprived of resources needed for physical activities, and are unable to obtain and afford the foods needed to maintain healthy diets, which increases the risk of obesity (Singh, Siahpush, & Kogan, 2010). However, in studies on SES and obesity many researchers have found inconsistent relationships between SES and obesity by race, ethnicity and gender (Wang & Beydoun, 2007; Zhang & Wang, 2004).

**Race and ethnicity.** Minorities have higher obesity prevalence rates than their white counterparts (Ogden et al, 2012; Freedman, 2011). Many minority communities are located in low-income areas that lack access to health-promoting services and resources (Scharoun-Lee, Adair, Kaufman, & Gordon-Larsen, 2009). Because African Americans and Hispanics reside in these areas they are subjected to the deprivation of resources of the neighborhoods which can be a risk factor for obesity (Galvez et al., 2008; Lovasi, Hutson, Guerra, & Neckerman, 2009).
Among African Americans and Hispanics, non-Hispanic black females have highest prevalence of obesity (Loves, et al., 2009; Wang & Beydoum, 2007).

**Built environment.** The built environment is defined as “…aspects of one’s surroundings that are human made or modifiable, such as residential or commercial buildings, transportation infrastructure, and parks or other open spaces” (Lovasi, et al., 2009, p.8). Neighborhood population characteristics and the built environment are interrelated, because the type of services and infrastructures located within a given area are determined by funding and management by governmental agencies, as well as by the local populations’ ability to afford and utilize neighborhood services. Many characteristics of the built environment are associated with risk of obesity (Kligerman, Sallis, Ryan, Frank, & Nader, 2007; Lovasi et al., 2009). Lack of nutritious foods, recreational areas such as parks and fitness facilities, and lack of sidewalks are associated with higher obesity prevalence (Black et al., 2010; Kilgerman, et al., 2007; Lovasi, et al., 2009; Singh, Siahpush, & Kogan, 2010). These kinds of health-promoting resources are typically lacking in low-income, African-American and Hispanic neighborhoods. Areas of deprivations vary in size from remote rural areas to urban centers. People residing in low-density rural areas with few amenities are reliant on cars to get around. In these settings, long travel times and lack of cars can create major barriers to access. People living in dense, urban areas can walk, or take public transportation, if available, to move around making the individual physically active
(Stafford et al., 2007). However, urban residents who face long travel times by walking and public transit, or who have limited mobility, may face significant geographic barriers to access.

According to Singh et al. (2009), “ethnic minority and socially disadvantaged children were generally more likely than other to live in neighborhoods with unfavorable physical or built environmental characteristics” (p.506). Children growing up in these obesogenic, obesity promoting, environments usually face many challenges to healthy behaviors, challenges perpetuated by a cycle of poverty. According to Black et al. (2010), black residents in a predominately black neighborhood of New York City had very limited access to fitness facilities and restaurants, but more access to fast food restaurants compared to people living in predominately white neighborhoods. These disparities are associated with obesity among ethnic minority populations in the U.S.

2.3 The Food Environment: Food Deserts

Food deserts are areas that lack healthy, affordable food options (Cummins & Macintyre, 2002; Larsen & Gilliland, 2009; C. Smith et al., 2010; Walker et al., 2010). Lack of supermarkets and fresh produce is associated with higher obesity prevalence, especially in low-income areas (Morland & Evenson, 2009). Food deserts are also associated with place and health, because in areas of deprivation, availability of and accessibility to healthy foods is quite difficult
(Walker et al., 2010). According to Moore and Diez Roux (2006), the location of food stores is associated with neighborhood characteristics such as socioeconomic status and racial/ethnic composition.

Supermarkets, large, self-servicing food retail stores, are more prevalent in affluent, predominately white neighborhoods (Freedman & Bell, 2009; Hendrickson, Smith, & Eikenberry, 2006; Larson, Story, & Nelson, 2009; Moore & Diez Roux, 2006; Walker et al., 2010) and are associated with higher fresh fruit and vegetable consumption rates (Larson et al, 2009). Predominately African American neighborhoods have lower supermarket accessibility compared to racially mixed and predominately white neighborhoods (Galvez et al, 2007). Supermarket access is also related to better dietary health outcomes such as lower obesity rates (K. B. Morland & Evenson, 2009). Although good access to supermarkets has been shown to be beneficial, some neighborhoods will benefit more from the presence of supermarkets than others. Studies also show that smaller grocery stores, bodegas and corner stores tend to locate in urban environment, especially in low-income neighborhoods (Walker et al, 2010). These stores are frequently found in urban “hub” neighborhoods. Urban hubs harbor more ethnic enclaves and ethnic food stores than do rural or suburban areas (Gordon et al., 2011).

“Grocery stores – medium-sized stores that offer a moderate selection of food items --” are prevalent in low-income, African American neighborhoods (Moore & Diez Roux, 2006; K.
Morland et al., 2002). Compared to their larger counterparts (supermarkets), grocery stores offer fewer types of fresh produce and more processed, pre-packaged foods that are high in fat, sodium and empty calories (Anderson & Butcher, 2006; Lucan, Karpyn, & Sherman, 2010). In a study by Freedman and Bell (2009) which focused on perception versus reality among urban, food insecure populations, over half of the participants reported lacking accessibility to fresh produce in their neighborhood, which reflected the actual reality that about 60% of the stores surveyed did not offer any fresh fruits and vegetables.

Healthy foods have been recorded to be more expensive than traditional foods (Jetter & Cassady, 2006). In addition, food retail stores in low-income areas have higher prices for their products (Hendrickson et al., 2006; Larsen & Gilliland, 2009; C. Smith et al., 2010).

Hendrickson et al (2006) reported that a food retailer owner charged higher prices due to crime in the location. Acts of burglary and theft had prompted the owner to increase prices to make up for the risk. Consumers also perceive healthful foods to be more expensive than traditional foods (McGee et al., 2011). McGee et al (2011) used a focus group to assess participant’s perception of food access in the Mississippi Delta, a high-poverty area. In the study, participants reported that they believed healthful foods were high in price and unaffordable. In addressing the food environment and availability, research should consider cultural preferences in food purchases. Food retailers may offer products that represent what the retailer perceives as the cultural choices
of consumers. Likewise, consumers may purchase specific foods related to their cultural preferences. Retailers’ decisions and consumer purchases may reinforce each other, perpetuating lack of access to healthful foods. It should be noted that culture may influence purchasing behaviors and food consumption (Gittelsohn & Sharma, 2009; Gordon et al., 2011; Grigsby-Toussaint, Zenk, Odoms-Young, Ruggiero, & Moise, 2010; Larson & Story, 2009; Odoms-Young, Zenk, & Mason, 2009; Pearson, Russell, Campbell, & Barker, 2005).

Transportation matters greatly in access to food retail stores. In rural areas transportation is very important due to long distances traveled to the nearest supermarket (McGee et al, 2011; Hendrickson et al, 2006). Transportation is also an issue for low income residents, because many low-income individuals do not have their own private vehicle (Walker et al, 2010; Hendrickson et al, 2006; Morland et al, 2002). In urban areas public transportation is necessary for major shopping trips, because it is very difficult to carry large amounts of groceries (Russell & Heidkamp, 2011). Informal taxis such as jitneys (Kumar et al, 2011) and hacks (Cannuscio, Weiss, & Asch, 2010) are used in place of friends, relatives and public transportation. These informal taxis station themselves outside of supermarkets and other large retail stores and offer rides to customers exiting the store for an informal, negotiable fare.

2.3.1 Perceptions of Food Access
Observing food access from an objective standpoint is important, however understanding how individuals view or perceive food access is equally important. Comparing perception versus reality is another way of analyzing how healthful food access is related to the local food environment. A study by Kumar, Quinn, Kriska, and Thomas (2011) examined the perceptions of African Americans of local food stores in Pittsburgh using focus groups, GIS and surveys. The study area incorporated three primary supermarket locations labeled A, B and C.

Store A is located on the border of a predominately White neighborhood and a predominately black neighborhood. Store B is the flagship branch of a supermarket chain, located in a predominately white, higher income area and Store C is an African American owned store located furthest from the other two. Kumar et al (2011) reported that African Americans perceived that only two of the stores (A and C) served the black community. Participants also perceived that the better chain store located in a predominately white, upper income area offered the best variety of food options. Participants reported poor quality food selections in the stores that serviced the Black community (A and C). Prices were noted to be the same at the stores; however participants reported that at Store A there were no sales or specials offered, like at the other branches. Perception is important. Understanding how residents view their food environment can add to the food environment discourse by revealing how people view available food retail options. At the same time, those participating in focus groups are consumers that
retailers rely on for business, so understanding consumer perceptions can be important to increase demand.

2.4 Supermarket Retail

The lack of supermarkets in low income urban neighborhoods can only be understood in relation to the history of retail stereotypes and redlining during the migration to the suburbs by middle and upper class white Americans. As presented earlier, many studies show that supermarkets are more concentrated in affluent, suburban, predominately white neighborhoods than in low-income and black and Hispanic neighborhoods. Eisenhauer (2001) argued that these inequalities resulted in part from the process of “supermarket redlining”. Supermarket redlining is the set of processes that led to the migration of supermarkets from urban centers to the suburban outskirts during the 1970s, 80s and 90s. The departure of supermarkets from urban centers resulted in reduction of food access and job loss for urban residents (Eisenhauer, 2001). Needing large tracts of land for stores and parking lots, and viewing urban locations as less profitable than suburban sites, supermarkets fled to the suburbs leaving urban residents with little food retail opportunities. Negative stereotypes and discriminatory perceptions of urban neighborhoods by food retailers also contributed to the continuing decline of supermarkets in urban neighborhoods (Eisenhauer, 2001). Regarding access, the author expressed the importance of having the physical presence of supermarkets in poor urban neighborhoods,
“A supermarket can make an important contribution, enhancing quality of life by expanding the options available to individuals and families, while decreasing the perception (and, often, the reality) of isolation from the city and from the larger society...enjoy additional benefits as a result of access to a nearby supermarket.”

(Eisenhauer, 2001)

Many studies emphasize the role of economic factors in the development of urban food deserts. In a report to Congress addressing food deserts, the United States Department of Agriculture used economic theory and an economic framework to address the problem of limited access to supermarkets in low-income urban neighborhoods. The USDA reported the “differences in fixed or variable costs across areas could impact the types of stores and products available” (Ploeg et al., 2009, p. 84). Urban areas are more dense thus may have higher land prices and zoning laws. The report stated that fixed costs are higher in low-income areas if they are underserved (Ploeg et al., 2009). Supply and demand in market competition contribute to the lack of supermarkets in low-income areas (Ploeg et al., 2009). However, the economic theory of market competition also suggests that retailers would locate in areas with less competition, such as underserved, usually minority areas. Relating to supermarket “redlining”, it would be the reasonable choice to locate in such areas, unless the retail firm itself decides to engage in discriminatory practices (Ploeg et al., 2009).
Smith and Sanchez (2003) compared estimated potential business at food retail sites using numerous variables. The variables included demographic characteristics of local populations, store characteristics, and competitive characteristics. The authors found that sales growth was lower in highly concentrated Hispanic areas, and in areas with a high percentage of poverty and low housing values (Smith & Sanchez, 2003). The findings from Smith and Sanchez (2009), Eisenhauer (2001) and Ploeg et al (2009) insinuate that demographic characteristics are an important factor in the location of supermarket retail stores.

2.5 What does this mean?

This review of the large literatures on access to healthy foods reveals that various factors contribute to observed inequalities in food environments and food deserts. These factors come from historical practices of discrimination (i.e. redlining, stereotyping, institutionalized racism) that have led certain groups to be marginalized. Marginalized or disadvantaged populations in urban areas live in underserved locations that are stigmatized for being low-income, high-crime areas. The neighborhoods in which these populations live, their social and physical characteristics, can and do determine which resources are available in those areas. Demographic characteristics influence retailers’ decisions to locate in an area and their decisions about what foods to offer in what types of store. Although some researchers have investigated inequalities in
food prices and offerings, these studies have not considered the whole complex of retail
decisions that affect consumers’ food access and shopping experiences. The food retail firm or
management has the power, as seen from Kumar et al (2011), to offer quality produce and
services or not, which can and often does limit access for specific groups of consumers. The
food environment is in the hands of the retailer when disadvantaged populations are involved.
The lack of supermarkets means that the few stores that exist in the neighborhood can take
advantage of that situation. Consumers do not get the full benefit from having a supermarket in
the area.
Chapter 3

QUANTITATIVE ANALYSIS OF CORNER STORES AND SUPERMARKETS

The quantitative analysis presented in this chapter provides a general overview of grocery stores and supermarket distributions throughout the city of Philadelphia. Supermarkets are defined as large, self-service retail stores that offer a wide range of produce, and grocery stores/corner stores are defined as smaller, self-service retail stores that offer a more limited range of food and household items. For this thesis, the terms grocery stores and corner stores will be used interchangeably. The overall goal is to analyze inequalities in supermarket and grocery store locations across the city and to determine if the inequalities are associated with socioeconomic and racial population characteristics. Convenience stores were not used in this study due to their limited supply of food and household items.

Many studies have investigated inequalities in the availability of supermarkets and the associations with social and economic disparities, as discussed in Chapter 2. Most studies indicate that supermarkets that offer a wide variety of food items and fresh produce are less available in low-income areas and areas with high concentrations of minority population. These food deserts have been linked to low consumption of fresh fruits and vegetables and to high rates of obesity. Based on the literature on food deserts and the food environment I hypothesize there
is a positive relationship between the availability of grocery stores and supermarkets and income and a negative relationship with high racial/ethnic minority populations.

3.1 Data and Methodology

3.1.1 Data

Three geographic data sets were used in the analysis: 1) food retail stores (supermarkets and grocery stores), 2) road network data and 3) census data from the 2010 Census. The food retail store addresses were gathered using two business directories: OneSource Global Business Brower and LexisNexis® Academic, acquired through the University of Illinois Library site. The retail store name, address, city, state, zip code, and postal code were gathered. A total of 2637 addresses were obtained from both directories. The food retail code 445110 for supermarkets/grocery stores without convenience stores from the North American Industry Classification System (NAICS) was used to generate the list of stores from the directories.

Philadelphia boundary maps were taken from the U.S. Census Bureau’s TIGER/Line at the census tract level. Road networks from 2010 were also obtained from the TIGER/Line website. Population data by race and ethnicity came from the recent 2010 Census at the census tract level for Philadelphia. Median household income data was based on the American Community Survey 2005-2009, 5-year estimates at the census tract level. A neighborhood boundary shapefile
of Philadelphia was used to identify particular neighborhoods, courtesy of the NIS (Neighborhood Information Systems) from University of Pennsylvania’s Cartographic Modeling Lab. Food Stamps data was also received from the 2010 Census data. The Food Stamps data will serve a proxy for low-income households.

3.1.2 Methods

3.1.2.1 Geocoding

Addresses from the two food retail store databases were merged into one spreadsheet and filtered. The initial set of 2637 addresses was reduced to 1990 after removing duplicate addresses. After the removal of the duplicate addresses, the file was cleaned again to remove any stores that were not classified as supermarket or grocery store (e.g. WaWa, 7-Eleven, law firms, etc.). The removal of such items decreased the number of food retailers to 1925. An address locator was then created in ArcCatalog using the Philadelphia road network database. The addresses were geocoded using ArcGIS, with a 96% match rate and 4% unmatched. Unmatched addresses were manually geocoded using Google map as a reference. At the end, there was a 98% match rate and 2% unmatched. The unmatched addresses resulted from numerous reasons including missing or incorrect addresses, incorrect zip codes or P.O.Boxes listed as the address. The total number of geocoded addresses was 1892. Large supermarkets were then separated from the overall sample so that supermarkets could be analyzed separately.
3.1.2.2 Kernel Density Estimation

Once the geocoded addresses were complete, kernel density estimation was performed to calculate the density of both supermarkets and smaller grocery/(corner) stores across Philadelphia. Kernel estimation is a spatial analysis method used to represent the uneven density of points in a study area as a continuous surface. Peaks on the surface represent places with a high density of points and valleys represent places with low point densities. Density is calculated within a circular window, at a series of densely spaced grid cells that cover the study area. Points are weighted based on their distance from the center of the grid cell; points far from the center receive less weight than those nearby. The radius of the window – the bandwidth – is a key parameter that determines the degree of smoothing in estimating density. A small bandwidth results in a ‘spiky’ density surface, while a larger bandwidth results in a smoother surface with more gradual transitions between high and low density areas. The formula for kernel estimation is presented below where $s$ is the grid cell, $s_i$ is the $i^{th}$ point of observation (food store in this case), $\tau$ is the bandwidth or search radius, and $k$ is the kernel weight (Bailey and Gatrell 1995).

$$\lambda(s) = \sum_{i=1}^{n} \frac{1}{\tau^2} k \left( \frac{s - s_i}{\tau} \right)$$
Kernels were calculated for both food stores and population. A 1 kilometer bandwidth was used for all kernels. Weighted centroids from 384 census tracts were used for the population kernels. A 1 kilometer bandwidth was used because it worked well for visualizing geographic variation. When using a higher bandwidth there was a tendency of oversmoothing, making it difficult to visualize distinctions between neighborhoods with high and low densities of stores. The use of a smaller bandwidth led to spotting or undersmoothing of clusters. The 1 kilometer radius was in the middle. Kernel values were extracted at the census tract centroid from the supermarket, grocery store, median household income and population kernel surfaces and entered into a spreadsheet. A kernel ratio of stores (supermarket; grocers) to population was also created to measure the local density of stores in relation to population density.

3.1.2.3 Correlation Coefficients

A correlation analysis was used to confirm any associations between race, income and the location of major supermarket chains and smaller independent grocery stores. The formula for Pearson’s $r$ is presented below,

$$r = \frac{\sum Z_X Z_Y}{N}$$
where \( Z_X \) is the Z-score of variable X and \( Z_Y \) is the Z-score of variable Y. The numerator \( \sum Z_X Z_Y \), is the sum of products of the Z-scores and \( N \) is the number of observations. Kernel values by census tract were imported into SPSS and correlated with the census variables: median household income, black population and white population to analyze economic and racial disparities in supermarket and grocery store availability. The population data was used in raw numbers, because the food store densities were also calculated based on absolute numbers of stores.

*Local Indicators of Spatial Association—LISA*

A univariate LISA statistic was performed to evaluate spatial clustering of racial segregation in the city of Philadelphia. The LISA spatial autocorrelation method was executed in GeoDa using a Queen Contiguity weight for the variables black population and white population. Racial segregation has negative implications in the outcome of health and result in many inequities. The LISA statistic provides visuals of high clusters and low clustering.

3.2 Results

*Kernels*
The kernel map of grocery stores in the city indicates how dispersed and/or clustered these stores are across the city. Although grocery stores (corner stores) are widespread in Philadelphia, some areas that have a greater concentration of these stores than others (Figure 1). This density map reveals clusters in the city center, as well as a high density of clusters. As prevalent as grocery stores are in inner-city neighborhoods, they are still concentrated in specific spatial locations. In contrast, supermarkets are not as prevalent in the inner city. They are more dispersed and less concentrated than grocery stores (Figure 2). The supermarket density map does reveal that supermarkets are located in areas where grocery stores are not as commonplace.

The Philadelphia population density map also reveals highly dense areas towards the southeastern part of the city (Figure 3). This map shows a similar pattern to the grocery store and supermarket density maps in which there were greater concentrations in the inner city area. Visually, the population density map seems to correspond better to the map of grocery store density than to the supermarket map. Philadelphia also shows a distinct racial geography. Simplified by race, the city’s black and white populations are highly segregated (Figures 4 and 5). The high density of white populations to the northeastern and southeastern sections of the city is a complete contrast to the high concentrations of the black population in the western and northwestern areas of the city. The white population density pattern also reflects the overall population, grocery store and supermarket density in the southeast.
The 5-year estimate of median household income revealed high density of high income in the same areas where there is a high concentration of supermarkets and white population (Figure 6). Households with Food Stamps were used as a proxy for low-income neighborhoods and populations with high needs for healthful foods. The map indicates a high concentration of households on Food Stamps in areas that were shown to be predominately black and low-income (Figure 7).

Maps of grocery store-to-population ratios and supermarkets-to-population ratios also reflect the previous maps and findings. The grocery store to overall population ratio shows a high density of stores to population, particularly around the center of the city and in the south and west areas (Figure 8). The supermarkets to population ratio did not change drastically over the entire city and were almost evenly distributed (Figure 9). The ratio is low near the city center and in West Philadelphia where there are few supermarkets. This is a low-income area with a high concentration of black population.

Pearson’sr

Pearson’s r correlation coefficients were calculated to assess the linear relationships between the density of grocery stores or supermarkets and social and economic characteristics of census tract populations. Table 1 displays a matrix of the variables and their correlations. The
density of supermarkets was significantly and positively correlated with total populations, $r = .252$, p-value = .01. Total population and grocery store density have a very strong and significant, positive correlation with $r = .738$. This relationship indicates that grocery stores are more prevalent in areas with large populations. Supermarket density is also positively correlated with the density of grocery stores, $r= .152$; white population, $r=.302$; and median household income, $r= .213$. However, there was no statistically significant correlation between the density of supermarkets and the black population, $r= - .093$. These findings indicate that more supermarkets are available in high-income areas and areas with large white populations. Grocery stores show a different pattern of correlation. The density of grocery stores is positively correlated with black population, $r=.427$; white population $r=.209$; and median household income, $r=.246$. The fact that the density of grocery stores is most strongly correlated with black population indicates that grocery stores (corner stores) are more available in areas with large black populations. The variable BLKPop is negatively correlated with WHTPop, $r= - .523$ which reveals the strong racial segregation of the neighborhoods in the city. Median income is positively correlated with white population ($r=0.321$) but not associated with black population ($r=0.032$).

The results from Table 2 indicate a strong, positive correlation between household on Food Stamps (HHFS) and the black population ($r = .623$). Also shown is a strong positive
correlation between households on Food Stamps and grocery stores \((r = .730)\). A negative correlation was revealed between HHFS and the white population variable \((r = -.144)\). There was no correlation between supermarkets and HHFS. These results indicate that grocery stores are more available in areas with large numbers of people on Food Stamps (low income areas), whereas supermarkets are not consistently available in these areas.

**Table 1 Correlation between Variables**

<table>
<thead>
<tr>
<th></th>
<th>Supermarket</th>
<th>Grocery</th>
<th>Population</th>
<th>BLKPop</th>
<th>WHTPop</th>
<th>MEDHHINC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supermarket</td>
<td>1</td>
<td>.152**</td>
<td>.252**</td>
<td>-.093</td>
<td>.302**</td>
<td>.213**</td>
</tr>
<tr>
<td>Grocery</td>
<td>.152**</td>
<td>1</td>
<td>.738*</td>
<td>.427**</td>
<td>.209**</td>
<td>.246**</td>
</tr>
<tr>
<td>Population</td>
<td>.252**</td>
<td>.738*</td>
<td>1</td>
<td>.343*</td>
<td>.507**</td>
<td>.305**</td>
</tr>
<tr>
<td>BLKPop</td>
<td>-.093</td>
<td>.427**</td>
<td>.343*</td>
<td>1</td>
<td>-.523**</td>
<td>.032</td>
</tr>
<tr>
<td>WHTPop</td>
<td>.302**</td>
<td>.209**</td>
<td>.570**</td>
<td>-.523**</td>
<td>1</td>
<td>.321**</td>
</tr>
<tr>
<td>MEDHHINC</td>
<td>.213**</td>
<td>.246**</td>
<td>.305**</td>
<td>.032</td>
<td>.321**</td>
<td>1</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).

**Table 2 Correlation of Households on Food Stamps, Supermarket Density and Grocery Store Density with Race**

<table>
<thead>
<tr>
<th></th>
<th>Black Pop</th>
<th>White Pop</th>
<th>HHFS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grocery</td>
<td>.427**</td>
<td>.209**</td>
<td>.730**</td>
</tr>
<tr>
<td>Supermarket</td>
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<tr>
<td>HHFS</td>
<td>.623**</td>
<td>-.144**</td>
<td>1</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).

LISA
The univariate LISA spatial autocorrelation for BLKPop reveals strong positive clustering of census tracts with large black populations (High-High) and few black residents (Low-Low areas), Moran’s $I = .6347$ (Figure 16). WHTPop also reveals strong positive clustering of High-High tracts and Low-Low tracts with a Moran’s $I = .5885$ (Figure 17). LISA shows high areas of black population concentration in central and western areas of Philadelphia, suggesting that Philadelphia is a highly racially segregated city. The LISA maps closely resemble the kernel density maps of the population data.

**Discussion**

The results reflect the findings of the literature discussed in the previous chapter. There are relatively strong relationships between the availability of supermarkets in predominately white, high income areas, and grocery stores are found to be more abundant in neighborhoods with large African American populations. In addition, the LISA spatial autocorrelation analysis reveals the strong spatial clustering of populations by race. The African-American and white populations live in geographically segregated neighborhoods, and these areas contain distinct densities of grocery stores and supermarkets, with supermarkets more available in neighborhoods with high concentrations of white population.
Philadelphia’s racial segregation reflects historical events that have led to the exodus of white middle class into the suburbs. Similar kinds of processes have also affected the food retail landscape, as discussed in Chapter 2. Supermarket redlining left inner city neighborhoods with few large food retail opportunities, as reflected in the low density of supermarkets observed in central and west Philadelphia neighborhoods. The disinvestment of the urban core most likely reflected the attraction of supermarkets to more affluent areas where profits were perceived to be higher. The lack of investment within disadvantaged neighborhoods may have been due not only to perceived lower profits, but also to stereotypes of the populations that live there. The non-correlation between the black population and supermarkets is consistent with these trends, revealing that supermarkets are not consistently available within predominately black, inner city neighborhoods. The findings of this analysis reflect my hypothesis that there is a relationship between the availability of grocers, supermarkets, populations and income.

**Conclusion**

The analysis revealed significant correlations between the density of supermarkets and total population and white population, and no correlation with the black population. Grocery stores are significantly correlated with the total population, and comparing racial population sub-groups, the black population has a higher positive correlation with grocery stores ($r=.427$) than
the white population \( r = .209 \). These findings are important because they reflect the food desert literature that describes inequalities in the abundance of corner stores and grocery stores in the inner-city, and also in predominately minority areas.

Some limitations with this quantitative spatial analysis included outdated information in the business directories. Some stores listed in the directories may be out of business, categorized incorrectly, and not up to date with newer supermarket listings. Also, a small percentage of the addresses could not be geocoded. Also, this analysis used very broad categories of food stores – supermarkets and grocery stores – that do not capture more subtle differences between the types, quality and prices of healthy food offerings. The next chapter presents a qualitative assessment of stores in a smaller part of Philadelphia to examine these important store characteristics and differences.
Figure 1  Density of Corner Stores in Philadelphia
Figure 2  Density of Supermarkets
Figure 3  Population Density
Figure 4  Density of Black Population

Philadelphia Black Population, 2010

Legend

- Census Tracts

per sq km

- 0 - 116
- 117 - 2,183
- 2,184 - 4,808
- 4,809 - 7,169
- 7,170 - 10,089
Figure 5  Density of White Population
Figure 6 Median Household Income

Philadelphia Median Household Income
(ACS 2005-2009 5-year Estimate)

Legend
- Philadelphia_Tract_proj per sq km
  - 0 - 18,742
  - 18,743 - 45,201
  - 45,202 - 77,172
  - 77,173 - 152,140
  - 152,141 - 261,128

0 2.25 4.5 9 Kilometers
Figure 7  Density of Households Receiving Food Stamps

Households with Food Stamps in Philadelphia, 2010

Legend
- 0 - 5
- 6 - 300
- 301 - 676
- 677 - 1,009
- 1,010 - 1,517
Figure 8  Number of Corner Stores per 100,000 Population
Figure 9  Number of Supermarkets per 100,000 Population
Figure 10 Cluster map of Philadelphia’s Black Population
Figure 11 Cluster map of Philadelphia’s White Population
Chapter 4

QUALITATIVE ANALYSIS OF CORNER STORE AND SUPERMARKET CHARACTERISTICS

This chapter presents a qualitative analysis of characteristics of a sample of corner stores and chain supermarkets in the study area. Using field survey methods, I recorded the types of healthy foods offered in the stores, food prices, store layout and appearance, and other characteristics that affect people’s access to healthy food and their shopping experiences. The first part of the chapter discusses the data and methods used in the field survey. The second section focuses on corner store descriptions and food availability. The third section focuses on the supermarket chain’s description and food offerings in stores at three different locations.

4.1 Data

The data were collected from 25 store locations in two sections of Philadelphia (West and Southwest). The stores were located in three neighborhood areas (Cobbs Creek, Kingsessing and University City) in these two sections of the city. The stores consist of 22 corner store markets and 3 supermarkets. The locations of the surveyed food retail stores span across three zip codes, with the exception of one which is very close to the boundary. The zip codes in the
study area include 19104, 19139, and 19143. Zip codes 19104 and 19139 are part of the West section of the city, while 19143 is part of the Southwest area. University City corresponds with the 19104 zip code, Kingsessing with the 19143 zip code and Cobbs Creek with the 19139 zip code area. Of the stores surveyed, 7 were located in zip code 19104, 7 in 19139, and 11 in zip code 19143.

In analyzing supermarkets, the goal was to assess differences in store characteristics and food types among stores belonging to the same supermarket chain. To do this, I focused on three stores that are part of a single local chain supermarket. This supermarket chain services the Philadelphia metropolitan area with a total of 7 supermarkets. Three of the seven supermarkets are located in each of the zip codes mentioned. These stores were chosen based on the neighborhoods in which they reside. Two of the three stores are in predominately African American areas, while the other is located in more of a racially-blended area (Table 3. Taking notice of how one store in my neighborhood differed tremendously from the same chain stores in another neighborhood prompted me to investigate healthy food availability and other characteristics in these stores.
Table 3 Population Percentages by Race, Zip Code and Census Tract in Study Areas

<table>
<thead>
<tr>
<th>Census Tract STFID</th>
<th>Zip Code</th>
<th>Neighborhoods</th>
<th>Total Population</th>
<th>White Population %</th>
<th>Black Population %</th>
</tr>
</thead>
<tbody>
<tr>
<td>42101007700</td>
<td>19104</td>
<td>University City</td>
<td>2380</td>
<td>41.5</td>
<td>24.8</td>
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<tr>
<td>42101008701</td>
<td>19104</td>
<td>University City</td>
<td>4147</td>
<td>51.8</td>
<td>16.2</td>
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<tr>
<td>42101008802</td>
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<td>University City</td>
<td>6983</td>
<td>55.8</td>
<td>11.5</td>
</tr>
<tr>
<td>42101010600</td>
<td>19104</td>
<td>University City</td>
<td>1476</td>
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<tr>
<td>42101010700</td>
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<tr>
<td>42101008400</td>
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<td>94.6</td>
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<tr>
<td>42101009300</td>
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<td>Cobbs Creek</td>
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<td>1.4</td>
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<tr>
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<td>91</td>
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<td>Kingsessing</td>
<td>4924</td>
<td>0.6</td>
<td>96.4</td>
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<td>Kingsessing</td>
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</tbody>
</table>

Because corner stores are important sources of food for local residents, a sample of corner stores was also surveyed and studied. Corner stores for this paper, are defined as mini markets or grocery stores that provide food staples, household items, and other items necessary for daily life. Corner stores often have a deli within the store which offers hot and cold made to order meals and cold cuts. Corner stores are widely available in the study areas and are widely used by local residents. The corner stores were identified from two business directories and
filtered by the zip codes. The stores chosen for the study were located along major transit routes.

Not every store along the transit route was used for the study because of time and cost limitations for surveying the stores. All stores were surveyed by the author from November 2011 to January 2012. The ideal number of stores was to be 10 from each zip code with a total of 30; however the number of stores turned out to be 7 from one zip code, 7 from another and 11 from the third. Some store names differed from the ones in the directory. Some stores were no longer in service. Convenience stores such as Seven-Eleven or Wawa were not part of the store selection.

A checklist of 11 items consisting of basic fruits (n=3), vegetables (n=4), low-fat/free milk (n=1), 100% juice (n=1), and whole grain (n=1) items was created to assess the availability of healthful foods in all stores (Table 4). The basic fruits were hand fruits (apples, oranges, bananas) that could be eaten on the go; the vegetables (tomatoes, carrots, leafy greens and broccoli) were chosen as basic items that could be eaten as snacks, in salads, sandwiches or with other meals. The checklist was based on a list used by Gordon et al. (2011) in their study of corner stores and bodegas in New York City. In developing the checklist, the authors used ten items for their survey that were recommended for a healthy diet and represented high nutritional values. The checklist was used to mark if the items were present in the store and where the items were present (deli, on the shelf, etc.). If available or visible, the prices were recorded for a general comparison of all the locations to assess the affordability of similar items.
Along with the checklist, several themes were used to assess differences among the stores. These themes were based on Penchansky and Thomas (1981) “fit” model. Accommodation and acceptability were the focal topics. Under accommodation, differences in services offered, and store layout were observed. Acceptability involved the interaction between store owners or clerks and their customers. These interactions can come in the form of verbal communication, physical presences of personal items such as pictures of customers within the stores, and certain barriers that can disassociate the retailers from the community. These themes were evaluated based on location, to examine my hypothesis that stores located in different neighborhoods offer different goods and services. The checklist provides an insight on the available of certain healthy foods; while the other qualitative observations describe how the stores differ in regards to personal interactions and services offered. It is also important to note that the three neighborhoods have different histories and functionalities that may affect the results of this study. More specifically the Kingsessing and Cobbs Creek neighborhoods are comparable to each other for being predominately African American, low-income neighborhoods. However, they differ substantially from the University City neighborhood. University City is its own urban hub that draws people and business to the area, due to its central location and concentration of universities within the area. University City is also home to various medical institutions. Also within this space are museums, art galleries, and ethnic/cultural restaurants that are not found in the other
areas. Kingsessing and Cobbs Creek are predominately residential neighborhoods and not areas of innovation centered on education, science and medicine that attract large numbers of people from outside the neighborhood.
Table 4 Availability of foods on the Healthy Food Checklist at sample stores

<table>
<thead>
<tr>
<th>Stores</th>
<th>Apples</th>
<th>Orange</th>
<th>Bananas</th>
<th>Skim/Lowfat Milk</th>
<th>Water</th>
<th>Tomatoes</th>
<th>Carrots</th>
<th>Leafy Greens</th>
<th>Whole Gr/Wheat Carbs</th>
<th>Broccoli</th>
<th>100% Juice</th>
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4.2 Findings

4.2.1 Overall Availability of Healthy Foods

The findings regarding availability of healthy foods in the stores were similar to those in the literature. Few items on the checklist were always present or almost always present within each of the stores (Table 4). Water and 100% juices were available in every store in the forms of individual bottles, and sometimes cases. The bottled waters came in various sizes from 1 liter to 24 ounces and also came in different flavors. The brands of bottled water included Dasani, Aquafina, Fiji and Smart water. The 100% fruit juices found in all stores included apple, orange, cranberry and grape juices.

The next most commonly available items in the stores were tomatoes (22 of 25 stores), leafy greens (22 of 25 stores), and whole-grain/whole wheat breads (20 of 25 stores). In most corner stores, the tomatoes and leafy greens (usually iceberg lettuce) were only found in the deli. Thus, these items were not available for direct purchase because they were located within the deli of the store where they were used in sandwiches. In some corner stores, wheat bread was only available as a sandwich option, while in other stores it was available for direct purchase. However the breads for direct purchase were not always 100% whole grain or wheat. The common type of wheat bread discovered in some stores was the split-top wheat.

Skim/fat-free and low-fat milk (1% & 2%) milk was found in 15 of the 25 stores, with 2% milk being the most common. The sizes of the milk cartons differed by location. Supermarkets had a much larger selection compared to corner stores. Corner stores offered skim milk and low-fat milk in either the quart or half gallon sizes. The prices of the milk differed by
type. Whole milk overall was more expensive than the low-fat and skim milk options. Whole milk could be found in the gallon size more often than the other selections.

The rest of the items on the list were not generally available in the corner stores but were present in the supermarkets and one hybrid store that was smaller than the supermarkets but larger than the typical corner store. Fresh fruits (apple, oranges and bananas) were not available in any of the sampled corner stores. However, a variety of fresh fruit could be found in the supermarkets and fruits on the checklist were found at the hybrid store. The fresh vegetables (carrots and broccoli) were also absent from the corner stores, but present in the supermarkets and one hybrid store. Figure 12 displays a map of the stores that were observed in gradient depending on the number of items on the check list (1= items ≤ 5; 2= items ≥ 5≤8; and 3= items ≥8).

In summary, although the supermarkets and hybrid store offer the full range of healthy foods included on the survey, the sampled corner stores offered few healthy food options. Additionally, the few healthy foods offered at corner stores, including tomatoes and lettuce, were generally offered only in the deli counter, as items to be included in sandwiches. Although many corner stores offered milk and whole grain bread, only few types and sizes of items were available. The limited availability of healthful foods in the sampled corner stores is consistent with the findings of other studies that compare food availability in different types of stores.
4.2.2 Corner Stores

The characteristics of corner stores reflect their roles as mini markets that provide food staples, household items, and other items necessary for daily life. As noted earlier, corner stores often have a deli within the store that offers hot and cold made to order meals and cold cuts. This section discusses the locations and characteristics of corner stores.
Corner stores were more readily available than supermarkets on the periphery of the University City neighborhood and in areas with high concentrations of African Americans (Kingsessing, Cobbs Creek). The University City neighborhood has a higher concentration of whites compared to the other neighborhoods, and fewer corner stores. Invisible boundaries and transition lines, discussed later, are the words I use to describe the transitioning of more concentrated black areas into areas with more white residents. The transition from one area into another can be seen within the same zip code and also in the same neighborhood and can be seen in the changing presence of corner stores.

Overall, the corner stores were small in size and were usually located at the end of a residential street or block. The clerks were usually of Asian or Hispanic origin; none of the stores that I surveyed was operated by an African American person. Many of stores had plexiglass counters that either shielded the clerk behind the counter completely or partially.

The plexiglass barriers varied in size and characteristics. Some stores had barriers that completely separate the customers from the clerks and merchandise. A corner store in my neighborhood (Kingsessing) provides a good example. This was just a corner store that sold non-perishable foods and lottery tickets before it decided to cash in on Chinese take-out food. Inside the store is a wall of bullet proof plexiglass that separates the owners and products from customers. There is a walkway large enough to contain an ATM and for customers to wait inside to play the lottery. Exchange of items and money takes place on a small, revolving plexiglass window in which the customer places their money in one side as the owner places the item in on the other side.

Other stores such as Store A and Store B have partial plexiglass barriers. These stores are fairly recent arrivals to the Kingsessing neighborhood and to the site at which they are located.
During the 4-6 years they have been at that location, the owners of these stores have established some connections with the patrons who frequently visit the stores. These two stores are run by Hispanics. The patrons of the stores often refer to the male clerks as “Papi.” Interaction such as this offer a sense of community and familiarity to customers and shopkeepers alike. In Store B, pictures of customers and neighborhood residents can be seen lining the inside of the plexiglass counter. The pictures range from high school prom pictures, graduation pictures, and photos of new born infants to obituaries and newspaper articles. This display manifests a community connection between the retailer and the patrons. In another corner store owned and operated by Hispanics, I was introduced by a family member who frequents the shop, and the shopkeepers greeted me back. It wasn’t a necessary action, but it brought me, an outsider, into a familiar circle.

In contrast to the Hispanic shop owners, the Asian shopkeepers appear to have a more distant relationship with their customers. Visits to Asian-owned stores revealed little personal conversation or word exchange beyond a business transaction. Language may be a barrier to initiating more intimate conversations. The wall of plexiglass mentioned earlier was found in a store operated by Asian-Americans, and the wall creates a division between customers and owners. Although this one store had a plexiglass wall, such a large (floor to ceiling) wall was not common in other corner stores, but it was common in Chinese take-out restaurants. The wall conveys a message, such as: we want your business but not your problems. However, other Asian-American operated stores did not have plexiglass barriers. For example, an Asian-owned store on Chester Ave has the same counter set up as the Hispanic owned stores mentioned previously. The cashier area is covered but the remainder of the store is free for browsing.
The stores were located within Philadelphia neighborhoods that have varying socioeconomic and racial/ethnic characteristics. Within and between each neighborhood there are invisible yet visible boundaries that residents and locals notice when crossing from one territory to the next. Travelling from one neighborhood to another, you can see subtle changes in the properties, stores, and aesthetics. The corner stores located within more rundown parts of the study area were larger than those in more affluent sections. The larger size may allow the store to offer more products, reflecting the fact that corner stores are often the only food stores in the low-income parts of the study area.

As the environment and demographics change from one area to another, the variety and types of stores also change. Where the neighborhoods transition from low-income, predominately black population to a more high-income racially-mixed population you see new kinds of retail stores such as a bank, a farmer’s market, a bicycle shop, a park and an internet café. These services are not present in low-income, minority areas.

Baltimore Avenue, a main road, crosses the invisible boundary between socio-geographic areas. The social divisions moving along Baltimore Ave. are visible in the changing ridership of the Baltimore Ave. trolley. During the trolley ride, there is a change in demographics of the riders at each stop. At stops in southwest Philadelphia, a, majority of the passengers already on board are black. As the trolley moves towards the University City area, the new riders become majority white passengers. As the transition continues, there are no more discount stores, bars or liquor stores; instead, more cafés are visible, along with a diverse range of restaurants, including Indian, Vietnamese, Mediterranean, and African cuisines. A corner store located within this latter area offers non-traditional food items, including made-to-order meals, and the store is vegetarian.
friendly. These items were not present in corner stores in the predominately black
neighborhoods of Kingsessing and Cobbs Creek.

4.2.3 Characteristics of Supermarkets

This research compared three supermarkets located in the study area, and all
supermarkets belonged to the same retail chain. The chain consists of food retail stores located
in socially-diverse neighborhoods including low-income, minority concentrated areas. In this
respect, the chain is not typical of other supermarket retailers who generally locate at suburban
sites. Three of the studied chain’s several stores in the Greater Philadelphia area were observed
and studied. The supermarkets are located in the three different zip codes that make up the study
area. As mentioned earlier, the zip codes have different neighborhood characteristics that may
influence the retail management’s decision making on the supermarkets selling stock.
Supermarket A is located in the University City neighborhood. Stores B and C are located in
lower income areas with predominately black populations. Store C is newer than Store B.

All three supermarket stores had some characteristics in common. The three
supermarkets each offered a variety of food items, including all of the items on the survey list, at
reasonable prices. An interesting discovery was the cost of low-fat/non-fat milk. In each of the
stores, the prices were much lower for those items than for whole milk products. The prices for
all items on the list did not differ significantly between each of the three stores. However, for
some of the items on the list, the variety of items offered differed depending on the location of
the store. For example, the variety of leafy greens available in Supermarket A was larger than
that at Supermarket B. The variety of leafy greens at Supermarket C was also greater than at
Supermarket B, but less than at Supermarket A. The prices of the items listed were overall
similar within the supermarkets. However, the items offered in each were different.
The stores not only differed in the types of items offered, but also in the types of services and amenities provided. Also, cleanliness, appearance, maintenance and service differed among the stores. Even though the stores were all supermarkets, and all belonged to the same retail chain, they differed greatly. The next sections discuss each store and its characteristics.

4.2.3.1 Supermarket A

Supermarket A is located in the 19104 zip code (University City area) which has a large white population and an affluent population of students, faculty and staff associated with the University of Pennsylvania and Drexel University. The store is compact and handles a large number of customers. It has narrow aisles compared to the other two sites. In my visits to the store, I observed a prepared food area, in which customers could purchase hot or cold meals either premade or made to order. The section offered sandwiches, Chinese cuisine, pizza and pasta, and Southern style food options. The store also had a sushi bar, mini café and sitting and dining area on the second floor. This store also has bakery, deli, meat and seafood counters. In the produce section there is a fairly decent selection of vegetarian products and international foods. The store offers a variety of organic items as well.

Supermarket A recently installed a wine cooler fridge, but on my last visit it was not in use. After midnight, Supermarket A offers left-over, pre-packaged, prepared food from the day at a significantly reduced price. A person can get two meals for little more than five dollars: a friend bought a 12 inch, very-packed hoagie (or sub), for $1.99. Supermarket A is open 24 hours, and students could be seen studying on the second floor, from the outside. It is safe to say this store caters to the student populations of the two nearby universities. The area surrounding Supermarket A is full of local and chain restaurants, University of Pennsylvania campus housing and facilities, and other local shops. Traveling into the periphery of the University City area, the
aesthetics decline as well as the quality of houses. However, this area is changing. Once a predominately, low-income area, the neighborhood is becoming gentrified.

4.2.3.2 Supermarket B

Supermarket B is located in the Kingsessing neighborhood of Southwest Philadelphia, zip code 19143. This neighborhood is predominately black and low-income. The location now occupied by Supermarket B was previously operated by another local supermarket chain and has undergone several changes of ownership. Supermarket B is different from Supermarket A in appearance and services. Outside the store, there are bars that separate the entrance to the store from the pedestrian sidewalk (Figure 19). The said reason for the bars is to decrease the number of shopping cart thefts. However, the bars also serve as a physical and symbolic barrier between the neighborhood and the store, limiting people’s access and suggesting that the store is separate from the neighborhood. The few shopping carts are located inside the bars outside of the store.

Upon entry into the store you are met with the window of the security station, which is located inside the supermarket. There are two automatic doors, one for entry and one for exiting. The doors are barely functioning and sometimes require a little push. Previously, if you had brought in an outside shopping bag or book bag of some sort you were required to leave it with the security guard, and he would give you a clothes pin with a number on it. You retrieved your belongings upon exiting the store. This practice is no longer done at this location and was never implemented at Supermarkets A and C. The policy of withholding bags also seemed to serve as a barrier between the neighborhood residents and the store. It raises questions of whether management assumed or perceived residents of the neighborhood to be untrustworthy. The fact that the management eliminated the policy later on suggests the assumptions about residents’ trustworthiness did not match the reality.
The supermarket has five checkout lanes but usually only 2-3 were open. The cashiers were young men and women from the local area. During various visits to the supermarket, the cashiers could be seen eating lunch at their registers with a closed sign, chatting with one another across the store, and swearing and texting in sight of customers. There was little or no oversight and management of the cashiers. This type of behavior was not present within the other supermarket locations.

Supermarket B had everything on the checklist, but the variety of healthy food items was lacking. Fruits and vegetables were located in the front on the furthest side aisle of the store. There was a lack in variety of leafy greens compared to the other two stores. The leafy greens included cabbage; iceberg lettuce, collard greens, spinach and broccoli, also present were bagged salads. Apples were lacking in variety except for the usual, Red Delicious, Gala, and Fuji varieties. Grapes were available, along with oranges, pears, plums, peaches, nectarines and bananas. Some of the fruit appeared to be fresh, others looked a little on the turning side. The items were reasonably priced. Another difference in offerings at this location compared to the others was the absence of vegan food in this section. Not to be confused with frozen vegan and vegetarian brands like Boca Burger or Morningstar Farms, the other locations offered other vegan and vegetarian items that were stocked in the fruits and vegetable aisles.

The meat was about the same price as at the other stores, and as usual, lean meat selections were more expensive than other cuts of meat and poultry. In the back of the store there was a seafood counter and deli. Like the other two stores, this supermarket also had made to order food, however this location only offered one type of cuisine known as “Soul Food”. Soul food is mostly Southern style cooking and is usually very unhealthy, high in fat, sugar and salt, though full of flavor. Due to lack of interest, the manager got rid of that station and the butcher
station and expanded the deli and seafood stations. There was no bakery in this location, nor a café or sitting area. In terms of visual appearance, variety of foods, and shopping experience, this store seems like it doesn’t belong to the same chain as the others. It leaves me with questions about whether management care about the people they serve, how management perceive the store’s local population, and their commitment to providing a nice and well-kept place to shop.

4.2.3.3 Supermarket C

Supermarket C is larger than the other two stores and is situated in the Cobbs Creek, West Philadelphia neighborhood in zip code 19139. This location is a low-income, predominately black neighborhood. On the outside in the parking lot, there is a gas station that is associated with the store. This particular store is a marrying between the services and options of Supermarket A and the neighborhood demographics of Supermarket B. Like Supermarket A, this location offers a range of cooked, prepared and made-to-order food options that consist of sandwiches, pizza, Chinese, ‘soul food’ and other food amenities.

There are more aisles in this location than in the other two due to the size of the store itself. Along the side aisle towards the end of the store are a bakery, meat and seafood station, and the deli. The variety of produce is about equal to that that of Supermarket A and is much more varied than that at Supermarket B. The cashiers were on the same working, professional level as the cashiers at the University City location. The cashiers were friendly, or at least responded with a “Hello, how are you today?” or “Did you find everything ok?” During my visit to this location, no one on duty was texting, eating or chatting loudly at their stations.

4.3 Summary and Conclusions

In summary, the three supermarkets, all belonging to the same chain, had clear similarities and differences creating differing shopping experiences for customers. All of the
three supermarkets provided produce, goods and services, at almost identical prices. The main
differences were in the variety and quantity of made-to-order, prepared food stations, the variety
of produce, and the availability of specialty foods (i.e., vegetarian, kosher, halal meats, etc.).
Also, a noticeable difference was in the aesthetics and management of the stores. Cashiers
behaved differently between the three locations, especially in the Supermarket B. location.
Supermarket B and Supermarket C both serve predominately African-American residential areas,
whereas Supermarket A location serves a more racially and socioeconomically diverse area.
Differences among the stores were not just associated with racial characteristics of the local
neighborhood, but rather reflected a combination of race and local store management. The
neglect of the some supermarkets by management can be interpreted as a disinterest in the needs
of the community in which the store is located. Having poor maintenance, unprofessional
employees, and poor services can translate into disregard for the population that the store
services.

Supermarket A has a self-checkout lane that usually has a fairly long line. I found myself
a few times wishing more registers would open to accommodate the customers waiting. In
Supermarket A you can see students eagerly wishing things would speed up. In some cases we
would shake our heads in disbelief while waiting in line. The same reactions happened in
Supermarket B, where older women would complain about the long lines and how only 2-3 lanes
were open. Sometimes, customers in Supermarket B store can be heard complaining about how
“they don’t care” to others in the line. At Supermarket A, delays in the checkout line were due to
the high volume of customers, whereas in Supermarket B delays were due to poor management
and inefficient personnel. The layout of stores offers different shopping experiences.
Overall, corner stores were more prevalent in areas of highly concentrated African American populations. More stores were located on the periphery of the University City area than in the area itself. Many of the stores were operated by Hispanic or Asian American merchants. Some merchants were more connected with the customers they served than others, and these merchants were usually Hispanic owners. As neighborhoods change so do the types of stores, which reflect the demographics, those stores service. Supermarkets of the same chain, in different locations offered different services, variety of food options, and shopping experience. These differences were noticeable especially between Supermarket A and Supermarket B. Shoppers notice these differences when they express dissatisfaction in conversations with other shoppers. The observations and checklist reveal similar trends found in the literature which show that offerings of healthful foods area less present in corner stores and corner stores are more available in low-income, African-American neighborhoods. Supermarkets are less available in these neighborhoods, and in some cases the few supermarkets that exist offer a poor shopping experience for customers.
This thesis has investigated access to healthful foods in Philadelphia from two perspectives. The first presents a quantitative analysis of the locations and availability of large supermarkets that offer a wide range of healthy and un-healthy foods and smaller grocery stores (corner stores) that offer a more limited set of food items. The second section provides a more in-depth look at the characteristics of a small subset of supermarkets and corner stores in racially and economically diverse neighborhoods. The qualitative assessment suggests that within both supermarkets and corner stores there are substantial differences not only in the types of foods offered, but also in the overall shopping experience, and that these differences are partly linked to the socio-economic and racial characteristics of the neighborhoods in which stores are located.

5.1 Quantitative Analysis of Supermarket and Grocery Store Availability

The quantitative analysis results reflect the literature on food deserts, especially in revealing the associations between food store availability and neighborhood characteristics and disadvantaged populations. The correlation analysis of numerous socio-demographic variables shows strong positive correlations between households on Food Stamps, black population and density of small grocery stores. In the literature Moore and Diez-Roux (2006) found grocery stores to be more prominent in predominantly minority neighborhoods compared to white neighborhoods and supermarkets lacking. Using the variable households with Food Stamps as a low-income indicator, the results also reflect grocery stores being located in predominately low-
income areas and supermarkets being more prevalent in higher income areas (Walker et al., 2010; Moore & Diez-Roux, 2006; Morland et al, 2002).

Morland et al (2002) found that supermarkets were more prevalent in wealthier white neighborhood than predominately black neighborhoods. The positive correlation between white populations and supermarkets in the quantitative analysis reflect this. Walker et al (2010) also revealed that chain supermarkets are more likely to be located in more affluent areas and smaller stores are more likely to be located in urban low-income areas. Using household with Food Stamps as a proxy for low-income households, the strong positive correlation between HHFS and grocery stores also affirm Walker et al (2010) findings. The non-correlation between the black population and supermarkets revealed that supermarkets are not consistently available within predominately black neighborhoods. The variables in this analysis affirm the social stratifications that lead to food deserts.

Food deserts are located in disadvantaged neighborhoods that are predominately minority, low-income and most often super segregated areas. This study found that grocery stores, referred to as corner stores in this study, are located in predominately minority, African American neighborhoods while supermarkets are more prevalent in predominately white affluent neighborhoods. Due to the lack of supermarkets in low-income inner city neighborhoods, corner stores and grocery stores become more prominent places to shop because of their convenience for populations that do not have access to the supermarket. Often times these corner stores sell more processed, pre-packaged items at higher prices. The products may be of low quality as well. Also, corner stores are less likely to carry fresh produce. Ironically, the convenience of corner stores and grocery stores is really an inconvenience for low-income customers, because of the higher prices and low quality.
The results also reflect historical processes in which large supermarkets followed the exodus of white middle class into the suburbs. This research shows that some supermarkets have returned to inner city locations and that these stores reflect uneven patterns of investment that are partly linked to neighborhood socioeconomic and racial characteristics. The prevalence of supermarkets in more affluent areas and the lack of investment within certain stores in disadvantaged neighborhoods, like Supermarket B, may be due to stereotypes of the populations that live there and other social barriers (Odoms-Young et al., 2009).

5.2 Qualitative Assessment of Store Characteristics

The results of the qualitative analysis show significant differences among corner stores in store characteristics and selection of food products as well as differences among supermarkets belonging to the same chain. In general, these results reflect the literature on supermarkets and corner stores and their food offerings. Supermarkets carry a larger variety of fresh fruit and vegetables in comparison to corner stores. However, not all supermarkets of the same chain offer the same variety of produce in each location. The ways in which supermarket retailers make a decision about what to offer is an important factor when researching food deserts. The market and profitability are taken into account when supermarkets decide to locate in underserved areas (Bolen & Hecht, 2003; Nayga Jr & Weinberg, 1999). It may be supermarket retail stores will offer products they think will sell based on the store’s target market. The target market is determined by the geographic location, accessibility and demographics of the store location (Bolen & Hecht, 2003; Nayga Jr & Weinberg, 1999; Ploeg et al., 2009).

Corner stores differed greatly, even within the small study area used in this research project. The corner stores that offered very few items on the checklist were located in highly populated black areas. Corner stores become less prevalent in areas surrounding the university.
The convenience of corner stores in inner-city neighborhoods influences the prices of items sold there, and most corner stores had high prices. Corner store owners can sell items at higher prices for lower quality products as compared to supermarkets (Bolen and Hecht, 2003). Residents without any other means of transportation will shop at corner stores when no other options are available (Kumar et al, 2011; Smith et al, 2010).

The corner stores studied here did not offer healthy foods and if they were offered they were located in the deli section of the store and usually not available for purchase. Some stores had whole grain products such as rice and pasta, and also bread. However the bread most often was not labeled 100% whole grain/wheat. The prices for the breads were reasonable, but also there was not much variety within the stores. One corner store actually offered fresh produce, but this store was located at the ‘invisible boundary’ between a racially-mixed and a predominately-white populated area. Changes in housing, retail characteristics and population provided additional visual evidence of these invisible boundaries.

The corner store layouts also differed from place to place, some being smaller or larger than others. Size affects the carrying capacity of the stores which also may influence prices on the items being sold. In addition to size, the layout of the store and features inside the store can affect customers’ shopping experience. An example of customer experience would be the plexiglass checkout counters in some corner stores. These counters create a tangible barrier between store owners and customers. Customers may react negatively to these barriers, as described in research by Cannuscio et al (2010) in which customers resented having such barriers because the barriers represent “a stark symbol of economic exclusion for African American shoppers and an effective strategy for maintaining and reinforcing social distances” (Cannuscio
et al., 2010, p. 386). The merchant wants the business of the community but does not want to closely interact with the community.

One of Gittelsohn and Sharma (2009) measures of the food environment was the social aspects which included how retailers interact with their customers. Understanding merchant-customer relationships is important when analyzing food environments. Food retail merchants decide what items and services to include in their stores and these decisions are based on the numerous factors including demographic information about the neighborhood and population served by the store (Smith & Sanchez, 2003; Nayga, Jr. & Weinberg, 1999). It seems that in constructing the plexiglass barriers in corner stores, merchants perceive the residents as being untrustworthy. This in turn creates tension between customers and merchants and ultimately fuels a cycle of distrust and stereotyping. Tensions were also observed when customers perceived that the shore was not providing good service or when certain store owners avoided contact with customers. Still, a few store owners tried to reach out to the local community.

Like corner stores, supermarkets differed based on their local target markets, and these differences occurred even between stores belonging to the same chain. These differences in store characteristics based on neighborhood demographics can lead to inequalities in access because some groups do not gain the full benefit of having a supermarket nearby. What is available in one location of the chain may be absent in another, such as variety of fresh vegetables and fruits, dietary-specific foods, specialty foods, and other services. In this study, one of the three chain supermarkets, located in a low-income minority area (Supermarket B), was inferior to the other two in terms of quality of service, variety of fresh and prepared foods offered, layout and maintenance. Bars in front of the store created a barrier to the surrounding community, much like the plexiglass barriers in certain corner stores. Although supermarkets are generally
considered beneficial for providing access to healthy foods, this study indicates that supermarkets are not equally beneficial. Some supermarkets located in low-income, minority areas, such as Supermarket B, offer only a limited variety of healthful foods and a sub-par shopping experience. Supermarkets consider profitability and other expenses (construction, operation costs, etc.) when deciding to locate in certain areas (Nayga, Jr. & Weinberg, 1999). Once the location has been chosen, store managers sell items based on profitability and on what they perceive the local target market wants. Assumptions about who the supermarket serves affect what is offered (food, produce) and the level of service, maintenance, management and the appeal of the store vary depending on the neighborhood perception.

The power relations between management and customers need to be taken into consideration when analyzing access to healthful foods. Ultimately the shoppers are at the mercy of the merchant, leaving the merchant to offer what goods and services it thinks the customers will buy based on perceptions of demographics and data on previous sales. However this leaves out opportunities for customers to purchase items they would have been able to find elsewhere. Food deserts are social-relational problems that need to be addressed at different levels.

5.3 Conclusion

The food desert literature is extensive and continues to grow as we come up with new measurements of food access and ideas on how to combat the problem. The food desert literature focuses on the accessibility and physical location of food stores and it often considers the availability of fresh produce within the stores. Literature on the perceptions of food access has given a consumer point of view of how they perceive their local food environment through routine shopping experiences. However, this thesis suggests that there has not been enough
research on the social relationships between management of supermarkets/corner stores and the customers they serve.

The quantitative results presented here affirm the food deserts literature by showing that supermarkets are less available in low-income, predominately minority areas. The results also indicate high levels of racial segregation. The qualitative analysis also presents results similar to the literature in that many of the corner stores surveyed did not offer fresh produce; supermarkets offer more variety than corner stores; and many of the grocery stores were located in predominately low-income, minority areas.

The qualitative analysis also reveals more subtle inequalities in food access. Disadvantaged populations do not get the full benefit of having a supermarket in their neighborhood if the supermarket decides to sell only certain items, culturally specific items, and offer certain services (food service stations, etc.). Access to healthful foods is a relational concept, in which access is actively shaped by management of local food retail stores. Profit making comes first in the food retail business, “what sells” is all important.

5.3.1 Limitations

The quantitative analysis presented here has several limitations. The grocery stores and supermarkets may have included outdated information because the business directories were not updated regularly. Some stores listed in the directories may be out of business, categorized incorrectly, and not up to date with newer supermarket listings. Also, not all of the addresses were geocoded because the addresses were not listed in the address locator or because the addresses offered were P.O. Boxes.

The qualitative analysis also was limited in certain respects. The checklist used in this study was not a standardized measurement instrument but was based on another checklist used to
measure healthy foods. The samples of corner stores and supermarkets were limited in size. It would be good to analyze these kinds of issues for a larger sample of stores distributed across a wider range of neighborhoods. Also the observed stores were located on major transit routes and not at side-street locations. The characteristics of corner stores located away from major streets need attention. Another limitation is the use of correlation analysis instead of a regression analysis. The correlation coefficients only suggest a relationship between two variables and not causation.

5.3.2 Future Directions

The data and information from this study is a gate opener that shows the importance of studying management’s role in shaping access to healthful foods. Retail managers and owners determine which goods and services will be provided in some locations and not in others creating an uneven landscape of retail food opportunities. Future research should include getting interviews with local supermarket chain managers about how they make their decisions on what to stock in their store; how they perceive the neighborhood in which they are located and the residents of that neighborhood; and how are they connect with the community in which they operate. Equally important is to know exactly who the owners of the store are. By this I mean, if the stores are independently owned and operated by locals, or if the stores are owned by larger businesses and companies but operated by locals. The store owner is ultimately responsible for store management decisions and is the person or entity who receives the profits from the store. It would also be important to survey and interview local residents on their perception of the food environment; the supermarkets in which they shop; and any changes they would like to see in their local supermarkets and corner stores.


## APPENDIX: TABLE OF DESCRIPTIVE STATISTICS

<table>
<thead>
<tr>
<th></th>
<th>Households with Food Stamps</th>
<th>Median Household Income 5-year est.</th>
<th>Total Population</th>
<th>White Population, Non-Hispanic</th>
<th>Black or African American Population</th>
</tr>
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<tbody>
<tr>
<td>Mean</td>
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<td>37606.8</td>
<td>3974.0</td>
<td>1630.8</td>
<td>1723.5</td>
</tr>
<tr>
<td>Median</td>
<td>223.0</td>
<td>34436.0</td>
<td>3913.5</td>
<td>1231.0</td>
<td>1169.5</td>
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<tr>
<td>Mode</td>
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<td>0.0</td>
<td>0.0</td>
<td>49.0</td>
<td>128.0</td>
</tr>
<tr>
<td>StDev</td>
<td>233.6</td>
<td>19239.8</td>
<td>1709.9</td>
<td>1554.1</td>
<td>1608.0</td>
</tr>
<tr>
<td>Kurtosis</td>
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<td>1.5</td>
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<td>-0.2</td>
<td>-0.2</td>
</tr>
<tr>
<td>Skewness</td>
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<td>0.9</td>
<td>0.1</td>
<td>0.9</td>
<td>0.9</td>
</tr>
<tr>
<td>Range</td>
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<td>130139.0</td>
<td>8322.0</td>
<td>6336.0</td>
<td>6512.0</td>
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<tr>
<td>Minimum</td>
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<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Maximum</td>
<td>1418.0</td>
<td>130139.0</td>
<td>8322.0</td>
<td>6336.0</td>
<td>6512.0</td>
</tr>
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<td>1526006.0</td>
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<td>384.0</td>
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<td>384.0</td>
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