The contribution of the local food environment to the food choices of black urban adults in Mamelodi, Pretoria

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DISSERTATION

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by

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Dedication

This dissertation is dedicated to my loving husband for his wonderful support, my parents for my upbringing and belief in this endeavour.

Lastly, to my beautiful children, Oliver and Sophia, I dedicate this to you;

I love you all.

Declaration

I, Christelle Vogel, declare that the dissertation which I hereby submit for the Masters in Consumer Science (Food Management) at the University of Pretoria is my own work and has not previously been submitted by me for a degree at this or any other tertiary institution and that all reference material used in this study has been duly acknowledged.

Christelle Vogel
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Abstract

Exploration of the contribution of the local food environment to the food choices of black urban adults in Mamelodi, Pretoria

by

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The local food environment of black urban adults residing in Mamelodi West is explored and described. The study focused on the extent of the contribution of the food access dimensions (availability, accessibility, affordability, acceptability and accommodation) to healthy food choices within the local food environment of Mamelodi West, considering both the formal food environment, including supermarkets, and the informal food environment, including street vendors and spaza shops.

Major changes in the societal, economic and cultural environment in South Africa due to migration, urbanisation, economic advancement and modernisation have accelerated the movement from traditional to Western-orientated food choices. These Western-orientated food choices often include food choices associated with risk factors such as obesity and overweight which could potentially lead to non-communicable. Intervention strategies aimed at changing consumer food behaviour often fail to recognise the complexities associated with the local food environment and access dimensions to healthy food choices. As there is limited information on the influence of the local food environment and related access dimensions on food choices of urban adults, this study fills that gap. The explorative and descriptive cross-sectional study followed a positivistic orientation and was empirical in nature. Density and proximity of food retail outlets were explored through the mapping of food retail outlets in the predetermined residential areas of Mamelodi West. A convenience sampling, non-probability technique was followed using a sample of 288 urban black adults residing in Mamelodi West. A pretested, self-administered survey questionnaire, consisting of closed and open-ended questions, was developed. Focus group discussions were also conducted. Information gathered concerned the

local food environment, usual eating patterns, and the influence of availability, accessibility, affordability, acceptability and accommodation on their food choice and practices.

Results indicated that the informal food retail outlets, which include street vendors and spaza shops, were most accessible to the study group and they were frequented daily in most instances. They were also the preferred choice for smaller, convenience purchases. Supermarkets were visited less frequently, less than three times per month and were less accessible. The supermarkets were the preferred food outlet for larger bulk purchases. Availability of food options were found to be more limited at spaza shops and street vendors, particularly on foods that are typically considered as healthier such as low-fat milk, brown rice or lean minced beef. These options were also considered more expensive. It was also found that the food choices of the study group reflected a diet low in vegetable intake and a frequent intake of refined carbohydrates and sugars. This is typical to a transitional or Western-orientated diet.

The spaza shops lacked a range of healthy food options; the basic staple foods that they did sell where typically more expensive than supermarkets; and there is limited access to larger supermarkets. Therefore accessibility and affordability appeared to be two of the major barriers experienced by individuals wanting to make healthier food choices in their current environment.

Recommendations from the results of this study suggest that the impact of accessibility and affordability of healthy foods need to be taken into account when using the food-based dietary guidelines in consumer education to ensure that the guidelines are realistic and practical by considering the local food environment of urban black adults residing in townships. This implies that the guidelines provided should consider what foodstuffs are available in a local food environment and consider the impact of affordability on the known typical food choices of urban black adults. Based on the results of this study it is also recommended that consumer facilitators and educators ensure consumers are adequately informed about how healthy or unhealthy their prevailing food choices are. Lastly, it is recommended that retailers consider these results in their development of corporate social responsibility (CSR) programmes that involve health. Such programmes can encourage healthier food choices by providing nutrition education to the public or local community, it can also influence the variety; or lack thereof; of healthy foods sold at these outlets.

Key words: urban black adults, food choice, eating patterns, access dimensions, food habit, access to healthy food, informal food sector, local food environment

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Chapter 1

The study in perspective

1.1 BACKGROUND AND INTRODUCTION

South Africa saw the end of the apartheid-led government in 1994. The momentous transition that followed brought large-scale changes for the South African population. During apartheid, the migration of black people to urban areas was discouraged and restricted. Once the stringent apartheid laws were relaxed with the fall of apartheid, and eventually repealed, (Turok, 2012), South Africa experienced drastic societal, economic and cultural change resulting from urbanisation, migration, modernisation and economic advancement (Temple & Steyn, 2011; Vorster, Venter, Wissing & Margetts, 2005). The dominant driver of rural-urban migration was economic opportunity. Because of its higher level of economic activity, cities were perceived as a hub of high-paying job opportunities.

At the same time, these changes have accelerated the movement from traditional to more Western-orientated food choices. Nutrition transition is a term commonly used to explain the changes that take place in dietary behaviour when communities or populations convert from traditional food choices to those commonly known as “Western-orientated” food choices (Steyn & Mchiza, 2014; Popkin, 2006). Foods in this group are characteristically sweetened beverages and convenience meals containing cheap, edible fats and oils with little or no essential nutrients, such as vitamins and minerals (Popkin, Adair & Ng, 2012). According to Popkin (2006), the combination of urbanisation, increased access to supermarkets and the decrease in food prices all drive the nutrition transition. “Western-orientated” food choices are often considered to be low in fibre and high in energy, saturated fat, sodium and sugar. In comparison, many of the traditional food choices are considerably lower in sugar and fat. This leads to an increased risk of non-communicable diseases such as hypertension, strokes, type 2 diabetes, heart disease and certain cancers (Popkin *et al.*, 2012; Mayosi, Flisher, Lalloo, Sitas, Tollman & Bradshaw, 2009).

Evidence of this nutrition transition can be illustrated by generally rising overweight and obesity statistics in South Africa. The recent 2013 South African National Health and Nutrition Examination Survey (SANHANES-1) found that urban adults were heavier than those in rural areas. It reports that obesity rates increased from 27% to 39.2% among females since 2003 when a similar study was done. It also noted is that the mean Body Mass Index (BMI) of South Africans too has risen across most demographic categories in South Africa. In 2014, a total of

65.1% females and 31.2% males were identified as being overweight and obese in South Africa (Shisana, Labadarios, Rehle *et al.,* 2013). The South African Demographic and Health Survey conducted in 2016 (Statistics South Africa, 2017), confirms this trend revealing even higher numbers for women, 68% and also 31% for men. Supporting information about this shift to increased consumption of Western-orientated food is also documented in various studies (Mchiza, Steyn, Hill, Kruger, Schönfeldt, Nel & Wentzel-Viljoen, 2015; Temple & Steyn, 2011; Vorster *et al.,* 2005; Bourne, Lambert & Steyn, 2002).

In response to the increasing prevalence of overweight and obesity, and their association with non-communicable diseases, various public health intervention strategies are being developed (Antin & Hunt, 2012; Larson & Story, 2009; Rothman, Gillespie & Johnson-Askew, 2009). This is happening in South Africa and the rest of the world with a focus on encouraging people to change their present eating patterns and behaviour. Suggestions range from sugar taxation, sodium restrictions, increasing the availability of fresh foods, nutrition labelling of food products in supermarkets and on restaurant menus, to legislation concerning the trans-fat and sodium content of processed foods (Antin & Hunt, 2012, National Department of Health, Not dated). Intervention strategies aiming to change consumer behaviour, such as the food-based dietary guidelines, recommend that plenty of fruit and vegetables should be consumed each day (Naudé, 2013). However, they do not consider the complex influences of the local food environment,[1] and specifically the contribution of access dimensions[2] to healthy food choices.

People live in places located in diverse environments. When they are confronted with public health interventions, like recommendations to include eating plenty of fruit and vegetables each day, such diversity comes into play. This phenomenon implies that a variety of other factors, apart from their health status, will shape their food choices. If the location they live in does not have a supermarket, or any other food store where reasonably priced, quality fresh fruit and vegetables can be purchased, implementing this guideline is difficult. Additionally, and concurrently, other related factors too become part of the equation. Examples are: the availability of storage and food preparation facilities at home, together with food preparation skills and food preferences. Hence it becomes clear that a complex variety of factors affect the successful implementation of this important food-based dietary guideline.

[1] The local food environment is comprised the number, type, location and accessibility of food outlets, as well as what consumers encounter and experience in and around them and at home (Caspi, Sorensen, Subramanian & Kawachi, 2012; Larson & Story 2009; Story, Kaphingst, Robinson-O'Brien & Glanz, 2008).

[2]The food choice process in the food environment is guided by, and dependent on, the different dimensions of food access; namely, availability, accessibility, affordability, acceptability and accommodation, (Antin & Hunt, 2012; Caspi *et al.,* 2012).

From literature consulted, the complexity and multi-dimensionality of the food choice process, together with consideration being given to the contribution the local food environment makes, became evident. Aspects such as access to food retail stores and restaurants, availability and affordability of food are often neglected when recommendations to change food-related behaviours are made (Antin & Hunt, 2012; Krukowski, McSweeney, Sparks & West, 2012; Larson & Story, 2009).

Research regarding the relationship between accessibility to healthy food options within the local food environment has recently received much attention in many countries elsewhere (Antin & Hunt, 2012; Caspi *et al.,* 2012; Williams, Thorton, Ball & Crawford, 2011; Walker, Keane & Burke, 2010; Larson & Story, 2009; Freedman & Bell, 2009; Story, *et al.,* 2008). Several studies report on the positive relationship between access to retail food outlets that offer healthy foods, and healthy food choices (Yan, Bastian & Griffin, 2015; Glanz, Bader & Iyer, 2012; Williams *et al.,* 2011; Freedman & Bell, 2009; Larson & Story, 2009; Story *et al.,* 2008; Glanz & Yaroch, 2004). It is clear that these outlets could play a crucial role in the prevention of non-communicable diseases (Glanz *et al.,* 2012). Internationally the influence and contribution of the local food environment to the food choices of individuals and groups is recognised as an emerging field of study (Caspi *et al.,* 2012; Larson & Story 2009; Story *et al.,* 2008). To date, only two South African studies by Roos, Ruthven, Lombard and McLachlan (2013) and Temple, Steyn, Fourie and De Villiers (2011) are known to have investigated the local food environment, the availability of healthy food choices and their associated cost. Battersby and Peyton (2014) also explored the effect of supermarket expansion and food access. They concluded that supermarkets in low-income urban areas typically stock less healthy foods than those in wealthier areas and, as a result, the supermarkets do not increase access to healthy foods and may, in fact, accelerate the nutrition transition.

Very little is known about food purchasing behaviour of adults in informal urban areas, commonly referred to as “townships” in South Africa. Defined as underdeveloped, residential areas, they also exist in some rural areas. Townships were developed during the apartheid era and were areas reserved for non-white population groups (Africans, Coloureds and Asians) as residential areas for those who worked in ‘white only’ areas (Pernegger & Godehart, 2007). Mamelodi is one such township. It is situated on the north-eastern outskirts of the South African administrative capital city, Pretoria, City of Tshwane. As a capital of South Africa, Tshwane is also its largest municipality, as measured in land area. It is home to the Union Buildings and plays an important role in the local economy. Interestingly, there are over 130 embassies in the city, representing the second largest concentration after Washington D.C. in the US (Tshwane Economic Development Agency, 2015). No known formal research has been done in Mamelodi

as a study area which is seen as a local urban food environment. This study investigates the impact access dimensions make on the food choices of people living there.

1.2 PROBLEM STATEMENT

In recent decades, developing countries across the globe have been experiencing increasing prevalence of non-communicable diseases (WHO, 2015; Popkin *et al.,* 2012). Some of the reasons for this rise are attributed to rapid urbanisation, globalisation and unhealthy lifestyles amongst other issues. Unhealthy food choices cause risk factors that might develop from a lifestyle that affects an individual's health negatively. High blood pressure, increased blood glucose levels, elevated blood lipids and diseases associated with being overweight or obese can result (WHO; 2015). South Africa's black urban population group is significantly at risk and prone to developing non-communicable diseases (Temple *et al.,* 2011, Vorster *et al.,* 2005). Moreover, these chronic diseases are particularly susceptible to the environmental aspects of dietary intake, thus are a key consideration (Krukowski *et al.,* 2012).

Unfortunately, preventative intervention strategies often only offer basic advice related to the concept of "e*at less and move more", "consume plenty of fresh fruits and vegetables" or "limit salt intake"*. Such strategies often ignore, or pay scant attention to the complexity of the food choice process, and specifically the contribution of the local food environment. Internationally the rise in overweight and obesity prevalence has increased interest in the food environment as a possible causal factor. Potentially, it influences food consumption behaviour, and ultimately weight and health outcomes (Antin & Hunt, 2012; McKinnon, Reedy, Morrisette, Lytle & Yaroch, 2009). Further to this, healthy food choices can only be made within the limitations of what is accessible, available and affordable. Thus, the local food environment can either hinder or promote healthy food choices that individuals choose to make (Caspi *et al.,* 2012; Larson & Story, 2009; McKinnon *et al.,* 2009; Glanz, Sallis, Saelens, Lawrence & Frank, 2005).

1.3 JUSTIFICATION

Research is needed to understand the local food environment better, and its influence on food choice and food-related behaviour. In exploring the local food environment this study contributes to the limited body of knowledge available on this topic in South Africa. The purpose of the study was to explore and describe the local food environments consisting of the physical, economic, social and home environments of urban black adults in Mamelodi West. Understanding their influence, and how they contribute to the food choices of this specific group

of people, could clarify this known concern. Initially, it was not certain to what extent these situations influence food choices.

Results from this study could be used to promote healthy food choices through motivating food retailers and regulators to pay more attention to making healthy foods more available, affordable and accessible. By understanding and closing the information gap that currently exists regarding local food environments and its influence on food choice and food-related behaviour, role players can appropriately adjust intervention strategies to overcome access barriers. This will further promote healthier food choices.

Effective and efficient intervention strategies will ultimately, over time, lead to a decrease in obesity and the occurrence of non-communicable diseases.

1.4 STUDY AREA

Mamelodi is a large township with an area of 45.19 km² (Statistics South Africa, 2011). It not only covers a large area but is also densely populated with informal settlements occupying much of its available land. It is situated on the north-eastern outskirts of a South African capital city, the City of Tshwane (Pretoria) and shares a similar struggle history with townships such as Alexandra and Soweto, also in Gauteng (Gauteng Tourism Authority, 2016). It started with a mere 16 houses in 1953 and is now home to 334 577 people (Statistics South Africa, 2011). The population comprises mostly (98.9%) black Africans of whom many (42.35%) speak Sepedi as a first language (Statistics South Africa, 2011).

Since Mamelodi is so densely populated and is so large, only a section of Mamelodi could be studied because of time and financial constraints. Mamelodi West was selected as the study area as various food retail outlets were identified within chosen parameters. In general, Mamelodi West has more formal dwellings and is more accessible than other areas within its boundaries.

The final study unit selected consisted of a sample of urban black adults who reside in Mamelodi West, more specifically, Wards 6, 28 and 38 in Mamelodi, forming part of the Greater Metropolitan Area of Tshwane.

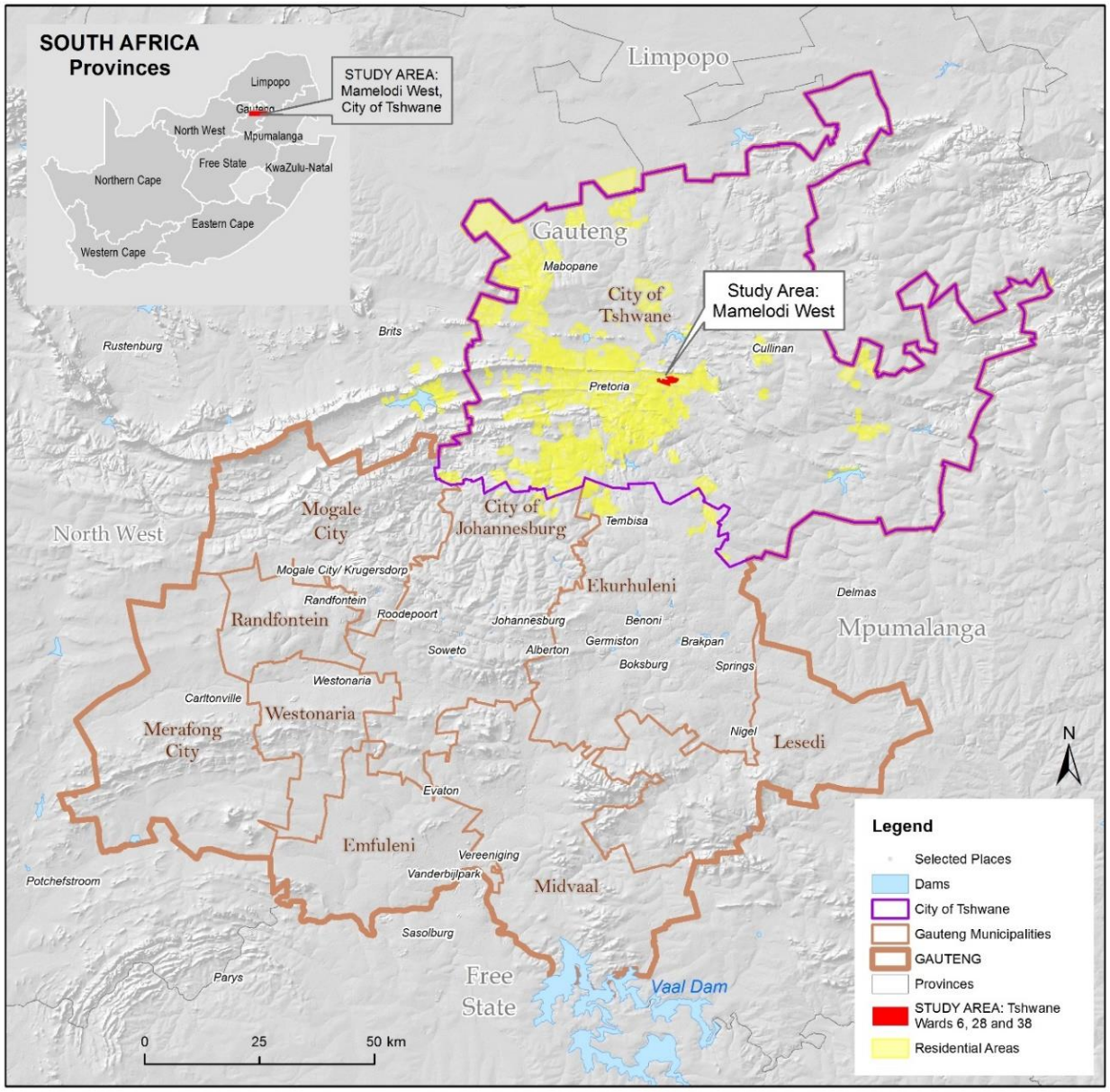

FIGURE 1.1: MAP ILLUSTRATING THE LOCATION OF THE STUDY AREA

1.5 RESEARCH AIMS AND OBJECTIVES

The aim of the study was to explore and describe the local food environment of black urban adults residing in Mamelodi West (henceforth referred to as the study group). It sought to determine the contribution food access dimensions make to healthy food availability, accessibility, affordability, acceptability and accommodation. Assessing the local food environment concerned identifying the study group's perceptions of it and how it relates and contributes to their food choices.

The following objectives were set:

1. To explore and describe the broader physical environment of Mamelodi West and its community setting
2. To explore and describe the local food environment of the study group
3. To determine and describe the access dimensions to healthy food of the study group
4. To determine and describe the study group's perceptions of the access dimensions to food
5. To determine and describe the food choices of the study group
6. To determine and describe the relationship between the local food environment and the food choices of the study group.

1.6 RESEARCH DESIGN AND METHODOLOGY

The research done was explorative and descriptive, empirical in nature and cross-sectional. It followed a mixed methodological approach. Qualitative techniques were used after first doing a quantitative analysis of collected information that was also used to explain and elaborate on the study's research results.

The study proceeded in three phases. First, an observation phase to identify, describe and map all the food retail outlets observed in Mamelodi West. The quantitative second phase utilised a survey questionnaire to collect data on the study group's socio-demographic profile, usual food consumption patterns, frequency of food consumption and food choices. Lastly, the third qualitative phase gathered in-depth information from focus group discussions held about the study group's perceptions of access dimensions to food.

1.7 DELIMITATION OF THE STUDY

The study was confined to urban black adults residing in Wards 6, 28 and 38 of Mamelodi, commonly referred to as Mamelodi West, which forms part of the Greater Metropolitan Area of Tshwane.

1.8 OUTLINE OF THE REPORT

Chapter 1 provides the background and introduction to the study, the problem statement, a justification for conducting the research, states its aim and objectives and includes an outline report.

Chapter 2 deals with the human ecological perspective as the chosen theoretical perspective along with the assumptions associated with this point of view. It links the perspective to relevant literature and explains food choice as a process that is influenced by the external and internal environments with access being noted as an important factor too. A local South African urban residential setting is described as an example of a local food environment.

Chapter 3 describes the research methodology used and covers the research design, states the aims and objectives of the study and links these to the conceptual framework. The operationalisation of the main concepts of the study is described, as is the study area, the unit of analysis and the sample and sampling techniques. Measuring instruments, methods of data collection, data analysis techniques and the measures taken to combat error are discussed. The code of ethics adhered to when doing this study is detailed.

Chapter 4 presents interprets and discusses the results obtained from the research procedure followed.

Chapter 5 conveys the major conclusions drawn from the study and also offers recommendations and suggestions for future studies.

1.9 CONCLUSION

This chapter provided a background to the study and outlined its content that discusses the implications of the nutrition transition in a typical South African community. It includes a statement of the problem, the research objectives, the methodology and delimits the scope of the study. The next chapter discusses the theoretical perspective and relevant literature which explores the external environment, internal environment and the food choice process, considering the access dimensions to food.

Chapter 2

Literature review

2.1 INTRODUCTION

This chapter discusses the chosen theoretical perspective and its assumptions. It also explains the food choice process according to the different external and internal environments, as well as relevant access dimensions. Urbanisation, the economic and political climate and the local urban food environment are explored, and provide insight into the study area, Mamelodi, as a local urban food environment.

2.2 THEORETICAL PERSPECTIVE AND ASSUMPTIONS

Various external and internal influences affect food choice. The food choice process can be described as complex and multi-dimensional. Many scholars have endeavoured to explain food choice using different theoretical and methodological approaches. Some studies use an anthropological or cultural perspective, whilst others adopt either an economic or biological approach (Rozin, 2006:29; Sobal, Bisogni, Devine & Jastran, 2006:1; Schifferstein, Frewer, & Risvik, 2001:3-7). There are also studies that favour a psychological perspective when considering attitudes, values and beliefs that shape food choice (Sobal *et al.*, 2006:1; Furst, Connors, Bisogni, Sobal & Falk, 1996; Rozin, 2006:27). The human ecological perspective offers a holistic approach to explain the different environmental influences that contribute to the food choices an individual or a group make (Story *et al.,* 2008; Krondl, 1990:13). A holistic view would consider the individual in its entirety comprising various interacting environments, namely, the physical, economic and political, the socio-cultural as well as the individual personal environments (Story *et al.,* 2008; Bryant, DeWalt, Courtney, Schwartz & Dewait, 2003:11). The human ecological perspective was chosen as the theoretical perspective for this study.

The human ecological perspective recognises that a tightly knit co-existence between individuals and their various environments exists and therefore they cannot be studied in isolation of each other (Larson & Story, 2009; Story *et al.,* 2008; Sims & Smicilas-Wright, 1978). Environments are interrelated, interdependent and dynamic. A single factor that is changed in one of the environmental levels, thus influences and has consequences or implications for all the other environmental levels (Larson & Story, 2009; Story *et al.,* 2008; Bryant *et al.,* 2003:10; Pelto, Goodman & Durfour, 2000).

Bubolz & Sontag (1993:425-426) describe various assumptions of the human ecological perspective and these were used to guide this study:

1. ***All the environments are interrelated and interdependent and directly influence each other.*** None of the environments function in isolation. The external environments that comprise the physical, economic, political and socio-cultural environments all influence the internal or individual environment (Sobal & Bisogni, 2009; Bubolz & Sontag, 1993:425; Sims & Smiciklas-Wright; 1978).

   Example: If for, example, extreme weather conditions, such as a drought, cause major crop damage, the yield of maize, as part of the bio-physical environment, decreases and limits maize availability. Consequently the price of maize could increase thereby affecting the economic environment. This, in turn, would alter the socio-cultural environment as the demand for the commodity could decrease with a price increase. Since maize is a common staple food in South Africa, it would possibly change from being a food that was previously regularly consumed to one consumed less frequently or only on special occasions.

2. ***Humans interact with multiple environments.*** *An individual is constantly interacting with all* the environments simultaneously.

   Example: As an example, when a consumer is confronted with a need to purchase vegetables, only those that are available and accessible can be considered. They would have been produced in a specific physical environment. The economic and political environment would have determined the price of the vegetables, hence established its affordability for an individual consumer. The socio-cultural environment and individual environment determines the acceptability of these vegetables for consumption. Thus, the consumer is confronted with situations all these environments create simultaneously.

3. ***These environments are dynamic and ever-changing*; *humans adapt and modify environments***. A mechanism of survival for humans is the ability to adapt. Not only can humans adapt to inevitable changes in their environment but they can also modify their immediate environments.

   Example: Urbanisation illustrates this phenomenon. If a rural family no longer has the economic means needed to survive in their current setting, they could respond by making certain changes within their own environment. Should the decision be to relocate from a rural settlement to a large city to find employment, they would have a new physical

environment. From a political economy perspective this could mean an increased income with possible accompanying increased living and higher transportation costs, increased rent and higher food costs.

Furthermore, these changes in their physical, political and economic environments will affect their socio-cultural environment. They may find new social groups to belong to or the higher cost of food and lack of time may force them to consider other more convenient options. Humans will respond to such changes by adapting and changing. As they change they might have to adopt modern technologies to cope in their new environment. This, in turn, would lead to individuals changing or adapting some or all aspects of their former ideological value and belief systems and attitudes in their new surroundings.

4. ***Environments do not determine human behaviour, but, when applied to food choices, they pose certain limitations, opportunities and barriers***.

Example: an individual with chronic heart disease (individual environment) can be told by a medical practitioner to make different food choices by avoiding highly processed foods and including more "healthy" fats in their diet. The environment of this individual could, however, pose certain barriers to this instruction. First, these dietary changes might not be typical of a traditional diet, making it difficult for the person to function in their socio-cultural environment as the family may choose to continue with their traditional food choices. Second, the healthy food choices could mean increased costs, involving the economic and political environments. The cost of bread and maize meal may be lower than that of brown rice, as an example substitute. Third, the food the health practitioner recommended could possibly only be available in large supermarkets to which the individual has limited access due to transport limitations. This illustrates how each environment can pose certain barriers or opportunities in the food choice process.

The food choice process will now be explained.

2.3 FOOD CHOICE PROCESS

The food choice process is multi-dimensional and complex. It is affected by a range of factors from various external and internal environmental situations (Antin & Hunt, 2012; Bryant *et al.,* 2003:2). It is therefore important that individuals be viewed within the context of their environments as factors from each of the environments play a role in influencing the *why, what, when* and *where* people eat as they do (Story *et al.,* 2008; Bryant *et al.,* 2003:2). The food

choice process is influenced by two main groups of environments (Figure 2.1), namely, the external and internal environments (Larson & Story, 2009). The external environment includes the physical, economic and political and socio-cultural environments. The internal environment on the other hand focuses on the individual.

A theoretical model helps to provide a structure within which the various influences on food choice can be studied, which means that it helps to simplify the complexity of the food choice process (Story *et al.,* 2008; Krondl, 1990:13). Figure 2.1 illustrates where each of the environments fit into the food choice process.

FIGURE 2.1: ENVIRONMENTAL LEVELS CONTRIBUTING TO THE FOOD CHOICE PROCESS (adapted from Viljoen (2009:23))

It is essential for these environments to be viewed as dynamic, interrelated and interdependent, which implies that one cannot consider the environments in isolation. Moreover, individuals interact with all these environments simultaneously (Larson & Story, 2009; Story *et al.,* 2008; Bryant *et al.,* 2003:10; Pelto *et al.,* 2000). A discussion on each of these environments follows.

2.4 FACTORS INFLUENCING FOOD CHOICE

The two main groups of environments, the external and internal environments that influence the food choice process are dealt with in detail in this section.

2.4.1 External environment

A consumer has limited control over the influences found in the external environment. These influences come from the physical, economic and political and socio-cultural environments.

2.4.1.1 Physical environment

The physical environment includes the natural environment, as well as the human-built environment (Bryant *et al., 2003:11;* Story *et al.,* 2008; Sims & Smiciklas-Wright; 1978). The human-built environment is the infrastructure comprising roads, houses, hospitals, shopping malls, just to name a few (Story *et al.,* 2008; Story, Neumark-Sztainer & French, 2002; Bubolz & Sontag, 1993:420). Food choice can only exist if a range of foodstuffs are available and accessible for the individual. Food is distributed to the urban consumer through outlets such as retailers, wholesalers and markets (Sobal, Khan & Bisogni; 1998). These outlets can further be defined as formal food retail outlets such as supermarkets, convenience stores, fast food outlets and informal food retail outlets such as a spaza shops or street vendors. A spaza shop is described as a typically South African small, informal, convenience point of sale usually run from home or a semi-permanent structure such as a shipping container (Sustainable Livelihoods Foundation, 2016). The physical environment plays a key role in food choice as it is a determinant of what food is available and accessible for consumption (Caspi *et al.,* 2012; Story *et al.,* 2008; Story *et al.,* 2002).

Considering the crucial role the physical environment plays in the production and distribution of healthy foodstuff, it is capable of either hindering or promoting healthy eating (Story *et al.,* 2008). Individuals can only procure what is available as the physical environment can disrupt availability and accessibility to certain foods, hence a lack of expected food limits a consumer's food choice. Access to healthy food, such as fresh vegetables, can also be hindered if individuals cannot get to food retail outlets because of poor roads or lack of transport. On the contrary, and at the same time, the physical environment can also promote healthy food choices. For example, if a supermarket with a selection of fresh vegetables is easily accessible for an individual, a supply for purchasing would be available.

2.4.1.2 Economic and political environment

This environment refers to the way humans are organised and stratified within communities and groups (Bryant *et al.,* 2003:13). The economic and political environment affects the production and exchange of products including foods. Although the economic and political environment can be described as having an indirect role on a consumer's food choice, it does remain a powerful influencing factor (Bryant *et al.,* 2003:13).

Economic

The term "economics" describes the process of the creation and consumption of products or services and the transfer of wealth to produce and obtain those products or services. In other words, it is the process in which products, such as food is produced, sold and bought (Blaug; 2017; Crush & Frayne; 2011). The link between income and consumption has been widely researched and an income-generating consumer is heavily dependent on the economic environment of a country (Du Plessis & Rousseau, 2003:415). The economic environment operates on both a macro- and micro-economic level. Macroeconomic contributions consider the effect of inflation, employment levels, economic growth, currency influences and the redistribution of income. Poor consumer confidence may lead to sluggish and negative economic growth at a national level. This could be due to high unemployment levels, a decline in employment opportunities, low levels of accumulated savings and high levels of household debt. Being part of a global economy may also influence inflation levels. Sluggish and negative economic growth will directly influence the micro-economic environment within which the consumer operates (Du Plessis & Rousseau, 2003:417).

Microeconomic contributions focus on the price of individual items, the price of related or substitute items, the individual's income as well as typical individual expenditures (Du Plessis & Rousseau, 2003:417). On a personal level, factors such as price, income, promotion and consumer demand all form part of the economic environment, which will determine the individual's specific purchasing power capabilities (Crush & Frayne, 2016; Story *et al.,* 2008).

The information given here confirms that humans should adapt and possibly change dietary habits to suit changes in their economic environment (Bryant *et al.,* 2003:13).

Political

The political environment, on the other hand, refers to elements such as government policies, laws, health care systems and initiatives and the political climate of a country (Story *et al.,* 2008; Bryant *et al.,* 2003:13). Trade is controlled between countries by certain food policies and laws; and food is controlled within a country by laws such as those related to how food must be manufactured, labelled or sold.

Ultimately the economic and political environments contribute to determining what is available to purchase and their selling prices. Plenty of food might be available but individuals may not necessarily have the economic means to purchase what is on offer.

2.4.1.3 Socio-cultural environment

Socio-cultural describes two closely-knit concepts that are interdependent and inseparable, namely, the cultural and social environments. People use their socio-cultural environment to frame what they consider acceptable and preferable (Bryant *et al.,* 2003:190).

Social Environment

Social refers to society. When a group of people interact in common territory and they have a common culture it can be referred to as a social environment (Heron, Penny, Paine, Sheath & Pederson, 2001:24). A great deal of eating happens in the presence of others. Thus, food choice is not only up to people themselves as an individual but also to those around them, such as family, friends and co-workers (Sobal & Bisogne, 2009). These relationships can either encourage or hinder a person's healthy food choices.

Cultural Environment

Culture can be defined as "a set of norms, beliefs, values and other conventional understandings shared by a specific identifiable social group such as an ethnic group, class, professional organisation, corporation or discipline." (Bryant *et al.,* 2003:86). Bryant *et al.*, (2003:12) explain it further as a shared understanding which distinguishes and characterises a group of people. Cultural constructs are typically about language, cultural norms and values as the shared understanding of a group of individuals that sets them apart from other groups (Bubolz & Sontag, 1993:420-426). Culture has a dynamic influence, and will adapt, evolve and respond to social and structural changes like urbanisation, modernisation or migration (Larson & Story, 2009; Kittler, Sucher & Nelms 2011:11). The manifestation of culture conveys information about a specific culture but it does not directly explain the reasons for dietary behaviour. It is therefore difficult to measure culture and its attributes concerning human behaviour, including the food choice process (Bryant *et al.,* 2003:12). Culture can be broken up into three main components: social organisation, ideology and technology.

Social organisation

Social organisation takes place when members within a culture divide themselves into smaller groups such as communities, families or social strata. Organisations can develop for several reasons, such as religious differences, political views or even age differences (Carter, 1997). Social organisation can influence a consumer's food choice as they help to shape the ideology, consisting of a group's beliefs, values and attitudes. They can determine the meaning of certain

foods, which implies that ethnic identity can be expressed via food choice (Bryant *et al.,* 2003:190). This means that by choosing certain foods one projects a personal identity that is communicated to others (Antin & Hunt, 2012).

Ideology

Ideology can be defined as "the sum of attitudes, beliefs and customs and taboos affecting the diet of a given group" (Fieldhouse 1995:30). Bryant *et al* (2003:13) also refer to the *symbolic meanings* and *values* a group of people have about food in their definition of ideology. Ideology thus centres on a group's beliefs, values and attitudes. Beliefs are conceptions of reality and can sometimes even stem from religious and medical beliefs (Bryant *et al.,* 2003:93). Rokeach (1973: 1-13) describes belief as "a simple proposition, conscious or unconscious, inferred from what a person says or does". A person's beliefs about health, for example, may influence their food choices.

Values have been defined as the enduring beliefs that are centrally located within a person's total belief system (Rockeach, 1973:1-13). Values define what is desirable and what is not, or what is right and what is wrong. Values consist of norms and standards. Values guide behaviour and influence attitude formation (Botonaki & Mattas, 2010). The social desirability or acceptability of certain foods will be determined by one's values (Parraga, 1990). Values and symbolic meanings are often attached to food and food choices. Certain food types and meal times can have a specific connotation, for example, how soft porridge is seen primarily as a breakfast food (Bryant *et al.,* 2003:13).

A close link exists between values and attitudes as values are responsible for shaping attitudes (Hauser, Jonas & Riemann, 2011). Botonaki and Mattas (2010) describe attitudes as an enduring organisation of beliefs around an object like food, for instance. Attitudes towards some food items can be imposed on someone in either a concrete or abstract way. Whether or not someone eats pork or not is a common, observable and accepted general social practice. Incorporating meat in their diet is a habit that can be normal for some groups or individuals while others would view such dietary practice as ethically wrong.

Technology

Technology refers to the practices and tools that have helped individuals cope and navigate their physical environment (Bryant *et al.,* 2003:12). To produce, obtain and preserve food, humans rely on knowledge, practices, techniques and tools. Thus familiar technology on hand will determine where suitable food can be obtained. Within cultures, certain technologies that are common and acceptable have helped to shape characteristic eating practice. Canned or

frozen foods have become popular in many cultures and have made vegetables more available and accessible throughout the year (Rozin, 2006:8).

Other examples of modern daily food provision tools are microwave ovens, deep-freeze facilities, refrigerators and advanced processing methods, such as the addition of food additives for emulsification, stability or preservation. Tools such as refrigerators or microwave ovens may not always be available to those who cannot afford them or for those who live in areas without electricity or running water.

Knowledge is a critical component of technology. Preparation techniques of food, for example, illustrate this relationship. Advances in processing techniques have made food such as canned products reasonably inexpensive and palatable (Rozin, 2006:8). Food choice is therefore heavily influenced by the technology available to the individual as well as the type of technology used in specific cultural regions. Culture does not exist without people's participation in its functioning. Thus, culture cannot be separated from society.

2.4.2 Internal environment

Although external environments play a critical role in the food choice process, it remains the responsibility of the individual who ultimately makes the decision regarding their own food choices (Bryant *et al.,* 2003). The internal environment describes the individual, or as sometimes referred to, the personal environment.

2.4.2.1 Individual environment

The individual environment comprises an individual's skills, lifestyle and demographics that describe age, ethnicity, gender, nationality and religion, their behaviour, cognition as attitudes, believes, values and knowledge, and their perceived self-concept (Story *et al.,* 2008; Sobal *et al.,* 2006:2). The way an individual chooses to react to a choice can also change over minutes, hours, days and even years (Sobal *et al.,* 2014). The people's actions in their personal, individual environment too have to be considered.

Variation in individual needs and interests take shape as a person grows and gains new skills, finding solutions for coping with environmental change (Bubolz & Sontag; 1993:420-426). Demographic factors such as their age, will determine how people respond to their own environments. A teenager might choose to eat very differently from an elderly person. Also, individuals may have definite preferences that develop as they grow up or that are an inherited tradition. Cultural backgrounds and past experiences also shape an individual's cognitive development (Sobal *et al.,* 2006:5). Importantly, there can still be differences between

individuals even if they are from different social groups especially those who have the same cultural traits. Social organisation in cultural context provides a necessary framework for personal growth and decision-making skills development (Sobal *et al.,* 2006:5; Bryant *et al.,* 2003).

The way individuals choose to react to the food choices they face is also a reflection of their personal ideology in that ideology has shaped through beliefs, values, norms, standards and attitudes. Personal beliefs are conceptions an individual has about certain foods based and can stem from religious or medical beliefs (Bryant *et al.,* 2003:93). Age, weight, physical appearance and emotional needs are also perceived beliefs. Personal values distinguish the good from the bad and norms are the standards and rules a person believes finds them acceptable to live by (Bryant *et al.,* 2003:92). Closely linked, attitudes are shaped by value systems (Hauser *et al.,* 2011). For example, some people design their diets to achieve food sustainability as they focus on vegetarianism, organic or free-range food products as a reflection of one's personal values and attitudes (De Boer, Hoogland & Boersema, 2007).

Equally important are personal preferences. Sensory perceptions such as taste, appearance and texture will guide food preferences too (Peltzer & Pengpid, 2010; Richards & Smith, 2007; Eertmans, Baeyens & Van Den Bergh, 2001). Although the benefits of fruit and vegetables are well established and known, it remains the individual's personal preference that will determine acceptability decisions (Peltzer & Pengpid, 2010).

It becomes evident that the food choice process is affected by a range of external and internal environmental factors. The importance of access dimensions and their influence on the food choice process is discussed in the next section.

2.4.2.2 Access dimensions

Penchansky and Thomas (1981) identified access as an important concept and defined it in terms of a taxonomy of dimensions, described as availability, accessibility, affordability, acceptability and accommodation. Many of the barriers to healthy foods an individual faces with the different functioning environments relate to these dimensions (Caspi *et al.,*2012; Penchansky & Thomas, 1981). Each of these dimensions are defined and briefly discussed to illustrate how they relate to the food choice process and this study.

Availability is often used in conjunction with the concept of accessibility and refers to the adequacy of supply of a product. It compares the number and types of services and products provided to meet an individual's needs. It represents the number of locations available to people who need to procure food as well as the types of products on offer in these places (Lee, 2012;

Caspi *et al.,* 2012; Penchansky & Thomas, 1981). Food availability can differ depending on the type of store. Convenience stores, for example, might have limited shelf space, so they stock a limited range of healthy food products for their customers. A limited range of healthy foods can, in turn, affect the kind of food chosen.

Accessibility refers to the ease of access or a person's ability to reach a local food setting. First, the geographic location in the natural environment involves the effect of distance between the source of supply and the location of the individual requiring the product. Second, transportation options are a consideration, such as the availability of public transport to and from a food outlet. In the third place, the resources required to reach the food outlet are important. An example of this could be the taxi fare or cost of fuel, to reach the location of supply. Lastly and fourth, it also implies allowing time to reach the location (Caspi *et al.,* 2012; Penchansky & Thomas, 1981).

Affordability relates to the concept of price, people's perceptions of worth and their willingness to pay (Caspi *et al.,* 2012; Penchansky & Thomas, 1981). Research suggests that the price of products is an important variable as to where people buy and what they buy (Lin, Ver Ploeg, Kasteridis & Yen, 2014). Sensory preferences and health motives are secondary when purchasing power from available income is limited. Individuals must sometimes base their food choice not only on the price of the product but also consider the cost of other necessities such as clothing and transport.

Acceptability is also determined by an individual's attitudes and personal values and standards (Caspi *et al.,* 2012). Product acceptability is a personal decision, but can be guided by quality and price too. Some food retail outlets will stock fresher, higher quality products at a higher price and other retail outlets might choose to sell products that have a lower quality grade, class or size at cheaper prices.

Accommodation refers to the efforts the source of supply makes to meet their customers' needs. An example of this would be extended shopping hours, a variety of goods and a range of products on offer as well as allowing customers more convenient options of payment (Caspi *et al.,*2012; Penchansky & Thomas, 1981).

In this section, the food choice process was considered and all relevant environments as well as the access dimensions to food explained and discussed. The concept of healthy food choices including the guidelines on how to achieve these are briefly addressed in the following section.

2.5 HEALTHY FOOD CHOICES

Sobal and colleagues (1998) defined healthy foods as foods that promote growth and development, provide energy, maintain and repair and provide a certain amount of resistance to pathogens and biological and physical causes of injury that generate diseases. Similarly the World Health Organisation (2015) indicated that a healthy diet throughout the life course helps prevent malnutrition in all its forms as well as a range of non-communicable diseases and conditions. They have however, also indicated that the rise in production of processed food, rapid urbanisation and changing lifestyles have led to a shift in dietary patterns. These changes have influenced the food choices made by consumers.

Unhealthy food choices such as the consumption of foods high in energy, fats, free sugars or salt/sodium, and decreased consumption of fruit, vegetables and dietary fibre such as whole grains is on the rise (WHO, 2015; Popkin *et al.,* 2012; Mayosi *et al.,* 2009)

In an effort to encourage healthy food choices, the food-based dietary guidelines can provide guidance to the public on food and lifestyle choices that will promote health. The food-based dietary guidelines can be described as 'brief, positive dietary recommendation messages that are used to inform consumers how to choose food and beverage combinations that will lead to a diet that is adequate, that meets nutrient need and that is, at the same time, prudent, for example, which lowers the risk of non-communicable diseases' (Vorster *et al.,* 2013). These guidelines aim to take into account affordability, availability, cultural sensitivity, and sustainability and environmental impact of the food items (Love, Maunder, Green, Ross, Smale-Lovely & Charlton, 2001). More evidence however, is needed as to whether this is a meaningful educational tool and whether it has had any significant influence on food choices made in South Africa (Claasen, van der Hoeven and Covic, 2016).

The first set of food based dietary guidelines specific to South Africa was published in 2003 and revised and updated in 2012 (Vorster *et al.,* 2013). The revised food-based dietary guidelines publicised for South Africans (Vorster, Badham & Venter, 2013) in 2012 are:

- Enjoy a variety of foods
- Make starchy foods part of most meals
- Eat plenty of vegetables and fruit every day
- Eat dry beans, split peas, lentils and soya regularly
- Have milk, maas or yoghurt every day
- Fish, chicken, lean meat or eggs can be eaten daily
- Drink lots of clean, safe water
- Use fats sparingly. Choose vegetable oils, rather than hard fats

- Use sugar and foods and drinks high in sugar sparingly
- Use salt and food high in salt sparingly.

The next section explores the concepts of urbanisation in South Africa and South Africa as a local food environment.

2.6 URBANISATION IN SOUTH AFRICA

Several factors shape the local food environment, of which urbanisation has played a key role. Urbanisation will first be explored to contextualise the concept of a township, seen in this dissertation as a local food environment and as applied to Mamelodi, the study area.

Kok and Collinson (2006) define urbanisation as "the increase in the urban population of a country or area according to the following components of urban population growth:

(a) urban natural increase;
(b) urban net migration and
(c) the reclassification of parts of the rural population into the category "urban".

Globally, significant migration from smaller towns or rural areas to cities continues. In 2014, 53% of the world's population lived in urban areas. This is a considerably higher than the 1950 statistics show when only 30% were urban dwellers. It is predicted that, by 2050, the urban population will be 66% of the total word population (United Nations, 2014). Urban living seems attractive to many as it is often perceived as offering a better quality of life with better health care and social services, more opportunities for political and cultural participation and higher levels of education and literacy (United Nations, 2014).

Over recent decades South Africa has experienced a similar migration trend. Initially, during South Africa's time of apartheid rule, migration to urban areas was discouraged and restricted (Turok, 2012). Once these stringent apartheid laws were relaxed and eventually repealed with the fall of apartheid in 1994, South Africa experienced drastic societal, economic and cultural changes because of urbanisation, migration, modernisation and economic advancement (Temple & Steyn, 2011; Vorster *et al.,* 2005). Currently, nearly two-thirds of the South African population live in urban areas (Bakker, Parsons & Rauch, 2015; Turok, 2012). The predominant driver of rural-urban migration is economic opportunity. Due to more economic and business activities, cities are perceived as a hub for high- paying job opportunities (Bakker *et al.,* 2015; Turok, 2012).

As a common trend in society today, the economic and political environments determine what is available price-wise and thus affordable in a situation (Bryant *et al.,* 2003:10). In 2015, over 30.4 million South Africans were known to be living in poverty. This translates to 55.5% of the population living below the upper-bound poverty line which equates to R992.00 per person per month (Statistics South Africa, 2017). South Africa has also experienced low economic growth, continuing high unemployment levels, high consumer prices, especially for energy and food, low commodity prices, lower investment levels and greater household dependency on credit (Statistics South Africa, 2017). Regarding income distribution, traditionally white people have always earned considerably more than black people, with income differences being obvious when categorised along racial lines. In recent years this has been changing rapidly and markedly. The gap between income earned according to population groups is narrowing but inequality in South Africa remains significant. These vast inequalities can be attributed to a rise in unemployment and the observation that many more black adults are being employed in the formal sector than in these post-apartheid times (Du Plessis & Rousseau, 2003:418) This is shown in recent official total income data for the country's population.

The South African National Health and Nutrition Examination Survey (SANHANES-1, 2013) study showed that 39% of the 5 972 households who participated in the study did not have the funds for food and clothes, which are considered basic items. As for luxury goods only 18% had funds for the basic goods but few luxury goods. Most of the households who had limited funds were from urban informal and rural informal settlements. A total of 29% of the participants from Gauteng indicated that they did not have enough money for basic items such as clothes and food. Also reported is that males rather than females are responsible for most of the household income needed. In many cases, households were reliant on pensions, grants and unemployment insurance fund (UIF) allocations. Income was typically earned by participants between the ages of 18 and 54 years. The older participants depended on pensions, grants and UIF (SANHANES, 2013). Some of the common sources of income on which poorer households in South Africa depend are piecework, casual labour, the sale of foodstuffs, pensions and grants. Crush & Frayne (2011) found in their research that the poorer the household, the larger the portion of generated income that is spent on food.

2.7 THE SOUTH AFRICAN LOCAL URBAN FOOD ENVIRONMENT

The mining boom experienced in South Africa began in the 1930s led to initial industrialisation and urbanisation (Turok, 2012). Although segregation was not a new phenomenon then, apartheid laws were only written for implementation in the post-war years of the 1940 decade. Racial segregation was an integral part of apartheid and this led to the developing separate housing areas and suburbs only for non-whites on the outskirts of cities and towns. These areas

are now usually known as townships. Townships are defined as underdeveloped residential areas and are common in urban areas, but are also found in rural areas (Pernegger & Godehart, 2007).

The local food environment, also referred to as the neighbourhood food environment, is multi-level and complex. It encompasses various environmental levels and access dimensions (Story *et al.,* 2008, Sims and Smiciklas-Wright, 1978). In turn, these environments firstly determine the number, type, location and accessibility to food retail outlets; and secondly, what consumers encounter in and around these outlets and at home (Caspi *et al.,* 2012).

Urbanisation has largely shaped the local urban food environment in townships. Due to the rapid expansion of urban areas, formal and informal structures such as supermarkets, may be scarce (Roos *et al.,* 2013). Acknowledging this, the original urban planning during the apartheid era typically did not make provision for a variety of food retail outlets from which to purchase food (Crush & Frayne, 2011). This resulted in rapid growth of the informal food retail outlets. Informal outlets are spaza shops, street vendors and food markets while formal outlets include supermarkets, fast food chains and convenience stores.

2.7.1 Informal food retail environment

Informal food retail outlets are typically privately-owned ventures which do not operate within formal or corporate structures (Nielsen, 2016).

Street vendors

Street vendors operate from temporary structures such as a table, a stand, a cart or kiosk, located directly on the pavement or street (Steyn, Labadorios & Nel; 2011). Street vendors typically operate in busy areas like train and bus stations, business or industrial areas, where there are limited food options for those working in the factories or warehouses nearby. Street vendors are likely to sell fruit, vegetables, sweets, cold drinks and cooked lunches. They have become very popular and are often operated by women for whom it has become a good economic opportunity. In 2000, there were already some 500 000 street vendors in South Africa and this number is estimated to be much higher since then (Crush & Frayne, 2011; International Labour Organisation, 2003)

Spaza shops

Spaza shops are informal, independently owned permanent structures. They are small convenience shops usually run from home or as a semi-permanent structure like a shipping container (Sustainable Livelihoods Foundation, 2016). Spaza shops are typically scattered throughout residential areas and are generally within walking distance from people's homes which is very convenient (Roos *et al.,* 2013). Customers are served from counters. Spaza shops

typically only offer a few basic items such as bread, coffee, tea, sugar, condiments, toiletries and cleaning aids, and are usually open seven days a week with extended trading hours (Nielsen; 2016). In most instances, the range of fruit and vegetables sold is very limited (Roos *et al.*, 2013). Spaza shops generally operate from early morning until about 10 pm and trade seven days a week (Sustainable Livelihoods Foundation, 2016). Nielsen (2016) found that shoppers visit spaza shops four times a week on average and that these outlets are the preferred choice for top-up and short-term purchases. Spaza shops have gained great traction in recent years and it is believed that their competitive pricing, value alternatives, growing product ranges, efficient service and accessibility have all contributed to their growing success.

2.7.2 Formal food retail environment

Larger food retail businesses form part of the formal sector that is part of larger corporate or franchise organisations, supermarkets, fast food outlets and convenience stores.

Supermarkets

Supermarkets are an integral part of the formal food retail environment in South Africa. According to McLachlan and Landman (2013), there are more than 1 300 supermarkets in South Africa with an estimated retail market share of 50-60%. The four major South African retail giants, Shoprite Checkers, Pick n Pay, Spar and Woolworths account for 97% of the market share within this sector (Pereira, 2014). Prices are typically lower at the larger supermarkets compared to the smaller community supermarkets or spaza shops (Roos *et al.*, 2013). Formal food retail outlets are frequented more often than informal food retail outlets. The 2016 Nielsen report indicated that a sizeable proportion (51%) of poor urban households only frequent supermarkets once a month. The bulk purchase of staples items is only done at supermarkets once or twice a month but during the week informal food retail outlets food are used for the procurement of foodstuffs needed for immediate use or as an unplanned commodity (Nielsen, 2016; Crush & Frayne, 2011).

Fast food outlets

Fast food outlets are freely available in South Africa. The food menu items at these outlets are generally characterised as being high in simple sugars and salt, are energy dense and low in fibre and micronutrients (Feeley, Kahn, Twine & Norris, 2011). A 2010 study documented the presence of over 8 500 fast food outlets in South Africa (Igumbor, Sanders, Puoane, Tsolekile, Schwarz, Purdy, Swart, Durão & Hawkes, 2012).

Convenience stores

Convenience stores are a smaller food retail option often found at petrol stations, or as an expansion of a supermarket. Examples are stores like Pick n Pay Express shops found at BP petrol stations and Woolworths Food stores found at Engen petrol stations in South Africa. These stores generally have longer operating hours than traditional food retailers, and are an easy access option at convenient hours.

2.7.3 Home food environment

The home food environment is a broad term used to explain the general norms and overall availability of certain food types in the home and represents what is available and accessible in a home (van Ansem, Schrijver, Rodenburg & van de Mheen, 2013). Individuals tend to eat more of items that are available at home than those accessed from elsewhere. This is especially true for fruit and vegetable consumption in children (van Ansem *et al.,* 2013). Similarly, the availability of unhealthy food which is high in sodium and fat at home has been associated with an increasing number of overweight children (Emond, Gilbert-Diamond, Ma, Grewal & Ailawadi, 2015).

All these urban food environments give meaning to food, in that they include how and what food is produced, how it is distributed and ultimately how it is consumed (Story *et al.,* 2008 & Bryant *et al.,* 2003:10). The local food environment can thus either promote or hinder healthy food choices, which means that a supportive food environment is essential in the promotion of healthier food choices (Story *et al.,* 2008). The local food environment essentially contributes to the *what, where, when* and *how* people procure food. Food access thus plays a crucial role in the food choice process (Caspi *et al.,* 2012).

2.7.4 Mamelodi as a local urban food environment

Limited information about Mamelodi as a local urban food environment is available as seen after reviewing written literature sources. However, in a blog, Julian and Ena Hewitt recorded valuable observations (Hewitt, 2013). In August 2013 their family conducted an informal social experiment. They decided to temporarily relocate to a *shack* (a small dwelling in a South African township) in Mamelodi for one month and use the same kind of resources as those available to their new neighbours. The initiative aimed to replicate the usual and normal experiences of township residents in South Africa.

The family allocated a budget of R3 000.00 for the month for all living expenses. This money was intended to be representative of what most people living in the area had available and

would need. The figure was based on the median individual income of R2 167.00 per month for the South African black population used as the baseline figure for official data in the 2010 Statistics South Africa report. The family found that 47% of their disposable income was spent on transport and 35% on food. Their diet consisted mainly of lentils, pilchards, oats and beans. Spaza shops were in close proximity to their home. The remainder was covered rent, toiletries and cleaning chemicals and equipment. They described keeping within this budget as challenging as it did not allow for any expenditure on furniture and fixture costs; school fees and uniforms; cell phones; out-of-town travel; sending money home to their family living elsewhere. Costs associated with supporting a large extended family during this month were also excluded.

They described how they needed to wake up from 3:40 am so that they could reach work on time. To get to work the husband had to walk 4 km to the nearest Metrorail train station at Mamelodi Gardens. The train trip cost R6.00 and it took 20 minutes to reach the Hatfield Metrorail station which is across the road from the Gautrain station. From here he had to take another train to Sandton, Johannesburg which meant an additional 34 minutes. Trains were often delayed or broken in which case, the travel time was extended. They concluded that the median black individual income of R2 167.00 per month was insufficient to support any extra or luxury food products or goods. Moreover, transport to and from work was not only expensive, but also very time consuming. They reported that these conditions and experiences were common for township residents in South Africa.

2.7.5 Food practices of urban black South African adults

The South African black population is the largest population group in South Africa, and they have also been described as the most impoverished (Statistics South Africa, 2017). Within this group are two distinct types of typical eating patterns. The rural population generally still follows a traditional two meals per day pattern, and the urban population increasingly has a three meals per day pattern (Steyn & Mchiza, 2014; Vorster, Kruger & Margetts, 2011; Bourne *et al.,* 2002). Mchiza *et al.* (2015) note how micronutrient deficiencies vary from very low in informal settlements to very high in urban settings, with dairy, fruit and vegetables being the most commonly deficient food groups.

According to Popkin (2006), the combination of urbanisation, increased access to supermarkets and the decrease in certain food prices are all drivers of the nutrition transition. Western-orientated food choices are often low in fibre content and high in energy, saturated fat, sodium and sugar. In comparison, many of the traditional food items are considerably lower in sugar and fat. This leads to an increased risk of non-communicable diseases such as hypertension, strokes, Type 2 diabetes mellitus, heart disease and certain cancers (Popkin *et al.,* 2012;

Mayosi *et al.,* 2009). An example of this is the substitution of complex carbohydrates for more refined, convenient options such as bread, pasta and rice (Hansford, 2010). Fast food, sweets, chocolates, pre-packet processed foods and soft drinks are just some examples of food choices that are now much easier to obtain than ever before.

Urbanisation (Section 2.5), in the context of this study, has far-reaching consequences for preserving and shaping socio-cultural practices. The symbols and values associated with certain dietary choices have undergone meaningful change especially since 1994 when South Africans accepted democratic rather than apartheid governance. Traditionally, a person's body shape and size were associated with socio-economic status. Puoane, Matwa, Bradley & Hughes (2006) suggest that men feel that their body shape and family size is a reflection of their success and ability to care for their own families. Although this is not entirely true for many societies today, it is still a perceived belief for some people. Another viewpoint some people have is that the consumption of a traditional rural diet is the result of poverty. For example, there are social groups that associate servings of samp, beans and root plants with poverty. A modern trend, especially in urban areas, is that individuals, especially in group context, modify their diets to allow for the inclusion of popular food choices from fast food services, sweetened beverages and items that lead to increased protein intake. Although traditional food may initially be abandoned when a person's circumstances or living environment changes, Puoane *et al.*. (2006) assert that it remains a popular option when individuals need to stretch their income.

2.8 CONCLUSION

This chapter explored the multidimensionality of food choice. It explained the theoretical perspective that guided the study and referred to applicable assumptions. It also analysed the contribution of the different environments within the local food environment. The food choice process too was discussed. To gain further insight into Mamelodi as a local urban food environment, urbanisation and the local urban South African food environment have been reviewed. The next chapter explains the methodology adopted for this study.

Chapter 3

Research methodology

3.1 INTRODUCTION

This chapter outlines the research methodology that was followed to carry research out for this dissertation. The research design details the procedures adopted. The stated aims and objectives reflect the conceptual framework, its conceptualisation and the operationalisation process. Discussion on measuring instruments, the study area, the unit of analysis, the sample and sampling techniques, data collection, data analysis, measures to combat error and ethics follow.

3.2 RESEARCH DESIGN

This is a cross-sectional empirical study that has a positivistic orientation. A typical cross-sectional study is explorative and descriptive (Babbie & Mouton, 2001:92). It allows for a researcher to address real-life problems (Babbie & Mouton, 2001:27,75) and to examine a situation as it is in a specific situation and at a given point in time. Exploratory research is conducted in a natural setting and collects information about people living there. Data is then analysed and interpreted to allow a researcher to understand how and why they do what they do in the place where they live. Descriptive research enables the researcher to commence the study without a specific hypothesis but rather to gain information systematically on a certain social phenomenon (Neuman, 2011:22; Leedy & Ormond; 2005:179; Babbie & Mouton, 2001:79-80). The researcher chose these approaches to be able to study people in the context of their own environment.

An explanatory sequential mixed methods approach was used. True to this, an explanatory, qualitative method followed after the quantitative method to explain and elaborate on the results that were obtained in the quantitative phase. Creswell (2013:16, 224) draws attention to the value of this research procedure. A mixed methods approach can be described as an approach where both qualitative and quantitative methods are used to complement each other (Creswell; 2013:68). Triangulation is common practice for mixed method application as it involves the use of multiple techniques of data collection to address one problem (Leedy & Ormrod; 2005). A mixed methods technique is a more complete analysis of the area of study, which leads to an in-depth understanding of the situation under review. Food choice is complex and multi-

dimensional, and a mixed methods approach seemed the most appropriate way to obtain a holistic view of the contribution the local food environment makes to the food choices of this particular study group.

The study was conducted in three phases. In Phase 1 data for a Geographic Information System (GIS) analysis and an observation check list of shops in the study area were used to identify, describe and map all the food outlets in Mamelodi West. Data collected from responses to questions respondents answered on a pre-tested, paper-based survey was analysed in Phase 2. A socio-demographic profile of the study group was compiled and information about usual food consumption frequency and food choices was categorised to facilitate interpretation. Focus group discussions with study group members were held during the third phase and provided in-depth information about their eating patterns. They also gave the researcher an opportunity to find out about their perception of factors that affect access to food products and the reasons for their food choices.

3.3 RESEARCH AIMS AND OBJECTIVES

The aim of the study was to explore and describe the local food environment of black urban adults residing in Mamelodi West (henceforth referred to as the study group) and to determine the contribution of the food access dimensions (availability, accessibility, affordability, acceptability and accommodation) to healthy food and to assess the local food environment including the study group's perceptions of the local food environment and how it relates and contributes to their food choices.

The following objectives and sub-objectives were set:

1. To explore and describe the broader physical environment of Mamelodi West and its community setting
2. To explore and describe the local food environment of the study group:
    - 2.1. To explore and describe the formal food sector (supermarkets, fast food outlets and convenience stores) of Mamelodi West, including the type of food available
    - 2.2. To explore and describe the informal food sector (street vendors, markets and spaza shops) of Mamelodi West, including the type of food available
    - 2.3. To determine and describe the home food environment of the study group
3. To determine and describe the access dimensions to healthy food of the study group
4. To determine and describe the study group's perceptions of the access dimensions to food
5. To determine and describe the food choices of the study group

6. To determine and describe the relationship between the local food environment and the food choices of the study group.

3.4 CONCEPTUAL FRAMEWORK

The key concepts of the relationships between the four environments are presented graphically in Figure 3.1.

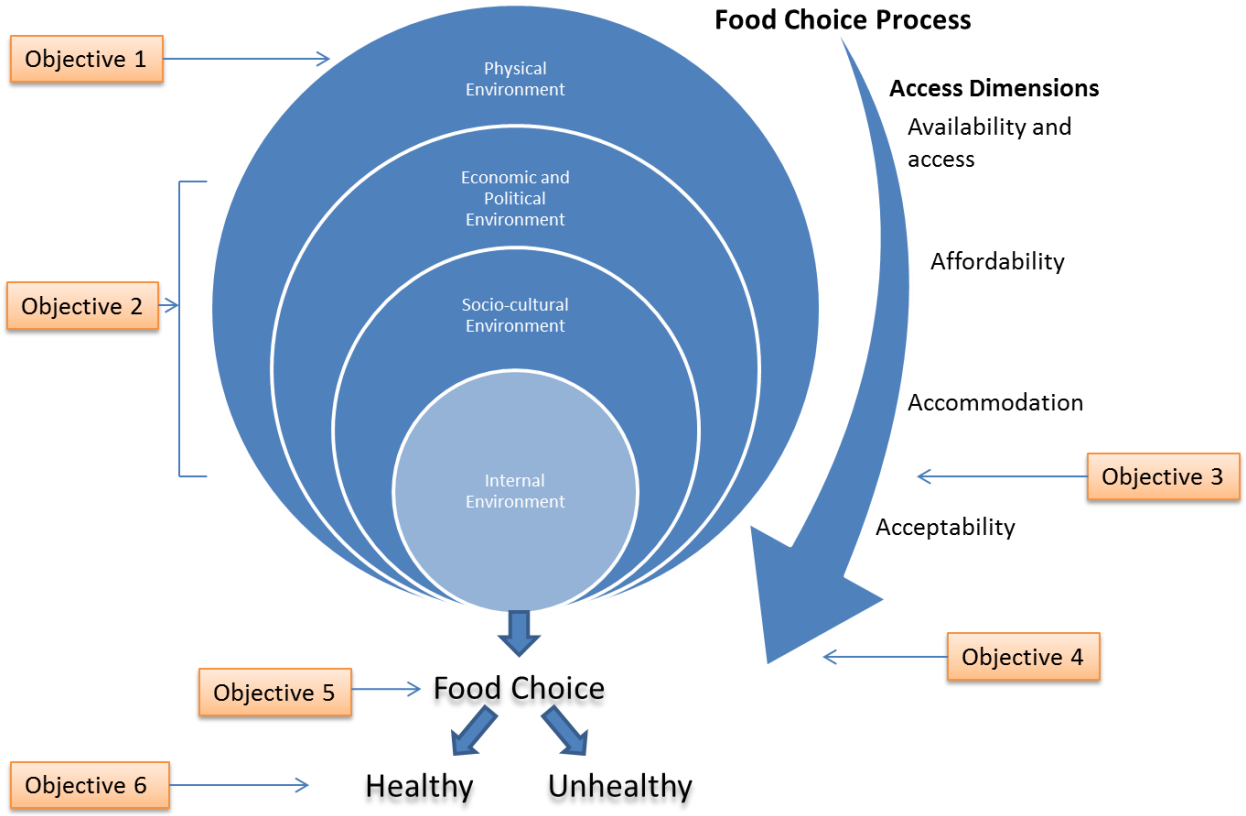

FIGURE 3.1: CONCEPTUAL FRAMEWORK (Adapted from Sobal, 2006; Viljoen, 2009:23)

The conceptual framework is based on the human ecological approach and guided the research to obtain a holistic understanding of how the various environments contribute to the food choices of the members of this study group. It illustrates the various external and internal environments and how the access dimensions are linked through the food choice process. The physical environment, economic and political environment, the socio-cultural environment as well as the individual environment are all interrelated, interdependent and dynamic.

3.5 CONCEPTUALISATION

The following concepts are defined as they apply to the study:

Local Food Environment: is composed of the number, type, location and accessibility to food retail outlets as well as what consumers encounter and experience in and around these food outlets and at home (Caspi *et al.,* 2012).

Food Accessibility: broadly refers to the food products consumers can access within their local food environment. Food access is guided by five dimensions, namely, availability, accessibility, affordability, accommodation and acceptability (Lin *et al.,* 2014; Caspi *et al.*, 2012; Penchansky & Thomas, 1981):

1. **Availability:** the adequacy of supply of food products
2. **Accessibility**: the ease and ability to reach a food retail outlet
3. **Affordability**: the concept of price and a consumer's perception of worth and their willingness to pay
4. **Accommodation**: the effort a food retail outlet makes to meet consumer needs and preferences
5. **Acceptability:** a consumer's personal attitudes, values and standards about certain foods and their retail outlets.

Food Choice Process: explains why, what, when and where people eat as they do. It comprises the conscious and unconscious decisions at the point of purchase, the point of consumption or any point in between (Sobal *et al.,* 2006:1; Hamilton, Mcilveen, & Strugnell, 2000). It is a complex process influenced by both external and internal environmental influences and is guided and dependent on the different dimensions of food access (availability, accessibility, affordability, acceptability and accommodation) (Antin & Hunt, 2012; Caspi *et al.*, 2012; Bryant *et al.*, 2003:2; Story *et al.*, 2008; Bryant *et al.*, 2003:2).

Formal Food Retail Environment: the retail food outlets available to the consumer in their local food environment, which are either privately or corporately owned and are medium to large in size. They are the typically traditional brick and mortar food retail outlets and include supermarkets, fast food outlets and convenience stores (Pereira, Cuneo & Twine, 2014; Roos *et al.,* 2013; Crush & Frayne, 2011). Supermarkets stock both food and beverages and non-food household items like toiletries, detergents and household appliances. Fast food outlets offer a very limited menu with precooked or quickly prepared food items such as hamburgers,

fried potato chips, pizza, chicken or fish. Convenience stores are typically based at petrol stations and sell predominantly food products and a small range toiletries or household items.

Informal Food Retail Environment: retail outlets that are typically small privately owned ventures that do not operate in formal or corporate structures (Nielsen, 2016). They can be operated from temporary structures such as a table top, piece of tarp or permanent structures such as a room next to a house. These outlets provide a service to residents in the immediate vicinity of the outlet, which could be a single street or an entire immediate neighbourhood (Sustainable Livelihoods Foundation, 2016). These small convenience-orientated retail outlets typically sell a limited range of foods and in some instances toiletries and household goods. These retail outlets include spaza stores, street vendors and food markets (Nielsen; 2016; Roos *et al.*, 2013; Crush & Frayne, 2011).

Home Food Environment: The home food environment is a broad term used to explain the general norms and overall availability of certain food types in the home environment and what is available and accessible at home (van Ansem *et al.,*, 2013). Individuals are prone to eat more of the foods that are available at home; this has been shown especially true for healthy foods such as fruits and vegetables (van Ansem *et al.,* 2013).

Healthy food choices: promote growth and development, provide energy, maintain and repair and provide a certain amount of resistance to pathogens and biological and physical causes of injury that generate diseases (Sobal *et al.,*; 1998). Food-based dietary guidelines provide guidelines for the public to practise healthy food choices. The revised general food-based dietary guidelines publicised for South Africans (Vorster *et al.*, 2013) in 2012 are:

- Enjoy a variety of foods
-
- Make starchy foods part of most meals
- Eat plenty of vegetables and fruit every day
- Eat dry beans, split peas, lentils and soya regularly
- Have milk, maas or yoghurt every day
- Fish, chicken, lean meat or eggs can be eaten daily
- Drink lots of clean, safe water
- Use fats sparingly. Choose vegetable oils, rather than hard fats
- Use sugar and foods and drinks high in sugar sparingly
- Use salt and food high in salt sparingly.

3.6 OPERATIONALISATION

Operationalisation can be described as the measurements used to measure the concepts in the study. The objectives, sub-objectives, concepts, dimensions, indicators, and measuring instruments used are illustrated in Table 3.1.

TABLE 3.1: OPERATIONALISATION TABLE

Objectives and sub-objectives	Concept	Dimensions	Indicators	Data collection method
1. To explore and describe the broader physical environment (community setting) of Mamelodi West	Physical environment	Geospatial location of wards 6, 28 and 38, Mamelodi		
		Diversity	Number and types of food outlets (formal & informal)	Focus Group Discussion GIS Observations
		Proximity	Store density and distance	Food Store Observations
2. To explore and describe the local food environment of the study group				
2.1 To explore and describe the formal food retail environment (supermarkets, fast food outlets and convenience stores) in Mamelodi West, including the type of food available	Formal food retail environment (Supermarkets, food food outlets and convenience stores)	Diversity Proximity Variety	Number and types of food outlets Store density Type of foods sold	Food Store Observations
2.2 To explore and describe the informal food sector (street vendors, markets, *spaza* shops) in Mamelodi West, including the type of food available	Informal food retail environment (Street vendors, markets and *Spaza* shops)	Diversity Proximity Variety	Number and types of food outlets Store density Type of foods sold	Focus Group Discussion Food Store Observations
2.3 To determine and describe the home food environment of the study group	Home food environment	Structure Infrastructure Availability	Household Size Breadwinner occupation Appliances and equipment available Type food Frequency of food available	Questionnaire (Section A2-A9) Questionnaire (C5 & C9)
3. To determine and describe the access dimensions to healthy food of the study group	Access dimensions	Availability Accessibility Affordability Acceptability	Outlets used to buy different foods Frequency of visits to different outlets Price of food Attitudes Values Special efforts made to accommodate	Questionnaire (B2) Questionnaire (B1) Market basket Focus Group Discussion

Objectives and sub-objectives	Concept	Dimensions	Indicators	Data collection method
		Accommodation	needs Payment options Operating hours (hours open)	Food Store Observations
4. To determine and describe the study groups' perceptions of the access dimensions to food choice	Perceptions of food access dimensions	Availability Accessibility Affordability Acceptability Accommodation	Foods available Distance to store Access to healthy food Variety of food Price of food Preference Quality Range (variety) of food products Payment options Operating hours (hours open)	Questionnaire (B3) Focus Group Discussion
5. To determine and describe the food choices of the study group	Food choice	Food consumption patterns	No. of meals Meal pattern & composition Frequency of consumption	Questionnaire (C1 to C12) Focus group discussion
6. To describe the relationship between the local food environment and the food choices	Local food environment Food Choice	Access dimensions Food consumption patterns	Healthy food choices Unhealthy food choices	Food store observation GIS Observation Questionnaire Focus group discussion

3.7 MEASURING INSTRUMENTS

This section describes the measuring instruments that were used to obtain the data needed to meet the aim and objectives of the study in each of the three phases of the study.

3.7.1 Phase 1: GIS mapping and store observation

Geographic Information Systems (GIS) software and tools were used to obtain the geospatial information required regarding food retail outlets in Mamelodi West. The most common GIS approach followed in the consulted literature is the buffer approach (Charreire, Casey, Salze, Simon, Chaix, Banos, Badariotti, Weber & Oppert, 2010; Freedman & Bell, 2009).

Store observation followed Freedman and Bell's (2009) observation checklist (Addendum A) that had two outcomes. Firstly, it serves to map the position of the different food sections in a food outlet. These sections typically include the fresh produce, bakery, butchery, frozen foods and general ambient pre-packaged food sections. Secondly, it is a way to know what foods are available in food retail outlets in the study area. From a market basket analysis, the affordability of certain foods could be measured. McKinnon *et al.* (2009) describe a market basket as a predetermined list of indicator foods to determine the availability and affordability of certain foods at the local formal and informal food retail outlets. Roos *et al.* (2013) compiled a food market basket list that had been specially adapted for the South African market was and it was used to gather data for this study. The National Agricultural Marketing Council (NAMC) provides a balanced diet that includes 23 items from all food categories.

3.7.2 Phase 2: Survey questionnaire

A survey questionnaire was compiled to determine and describe aspects related to the respondents' food consumption practices (Addendum D). Apart from questions regarding the socio-demographics of the respondents, sections were included that concerned their food consumption patterns using a mealtime and its composition to describe it, its frequency and food preferences. Questions used by other researchers to identify aspects of the food environment were considered when compiling the questionnaire for inclusion. These had been adapted to South African circumstances as recommended by other practising researchers in the field (Caspi *et al.,* 2012; Freedman & Bell, 2009; McKinnon *et al.,* 2009; Bryant & Stevens, 2006). Both open-ended and closed questions were used to measure the identified variables.

The survey questionnaire consists of the following sections:

Section A: Socio-Demographic Information
Section B: Usual Shopping Patterns
Section C: Usual Eating Behaviour

Section A: Socio-demographic Information

A series of closed and open-ended questions provided information for producing a demographic profile of the respondents. First, age, gender and location of the household were established and then the employment status and occupation of the breadwinner were documented. Household data concerned its size, structure and household appliances available.

Section B: Usual Shopping Patterns

Section B consisted of closed questions only. It gave the typical frequency each respondent visited food retail outlets. The response led into a question about where certain foods were usually procured. A 5-point Likert-type scale was used to determine the degree of satisfaction participants felt with the range of available food retail outlets for them, the quality of the food products sold, their affordability and how their needs were accommodated. Methods of food transportation were also investigated.

Section C: Usual Eating Behaviour

Section C had both closed and open-ended questions to capture information on the respondents general eating behaviour habits. To determine and describe the food choices of the study group, respondents were asked to indicate how frequently they consumed certain foods. The foods were grouped into 17 broader categories. The list of foods and broader categories was based on a model used by Viljoen (2009:97-104). The number of meals consumed in a typical day was recorded. A 5-point Likert-type scale was used to determine the degree of availability of certain foods in the home and the frequency of consumption of different food groups. To capture detail on the food and beverages respondents consumed the previous day, a 24-hour food recall question was included.

3.7.3 Phase 3: Focus group discussion

Specific discussion topics were identified and used to probe the participants' responses. The aim was to scrutinise, uncover and understand the reasons for certain food choices and get information about their food purchasing behaviour within the context of their local food environment. Discussion topics were those of Freedman and Bell (2009) (Addendum E).

3.8 PILOTING THE QUESTIONNAIRE AND FIELDWORKER TRAINING

A questionnaire should be piloted before commencing with data collection to ensure comprehension and readability (Neuman, 2011:80; De Vos, Strydom, Fouche & Delport, 2005:206, Creswell, 2013:161). The questionnaire was piloted with a group of ten chosen fieldworkers as it is important to conduct a pilot study on a group that has the same characteristics as the study group population. The fieldworkers met the same criteria as those that applied to the participants so including them was a convenient option. Criteria for inclusion in the study included that participants reside in Mamelodi West and that they were able to understand and read in English. The researcher explained the purpose of the study to the fieldworkers as well as what would be expected of them. Verbal consent was then given by each of the fieldworkers before commencing with the meeting. The researcher met with the fieldworkers in a spare empty classroom at Phelandi-Nakene Primary School, situated in Mamelodi West. During this meeting, fieldworkers were asked to complete the questionnaire and a discussion was held to clarify any uncertainties. During this discussion the researcher carefully explained each of the sections of the questionnaire to the fieldworks so they understood what was required. Fieldworkers were also given the opportunity to ask questions. Participant consent, a participant's rights and fieldworker correct conduct were explained to the fieldworkers as part of their training. The time taken to complete the questionnaire was noted as approximately 30 minutes. Minor adjustments and changes were made to the questionnaire as certain phrases and words were not well understood. These were either rephrased or explained in more detail.

3.9 STUDY AREA AND POPULATION

In 1951, Mamelodi, previously known as Vlakfontein; was established as a residential area for the black South African population group. Mamelodi is located on the eastern borders of Pretoria and 16km east of Church Square in Pretoria in the city centre of (SAHO, 2011). Mamelodi is a large township with an area of 45.19 km² (Statistics South Africa, 2011). Since Mamelodi is so densely populated and is so large, only a section of Mamelodi could be studied because of time and financial constraints. The researcher contacted a missionary group working in Mamelodi who was willing to introduce the researcher to some of the local adult people and arranged for a venue at Phelandi-Nakene Primary School, situated in Mamelodi West where meetings for fieldworkers and focus groups could be held. A classroom was made available and participating study group respondents were familiar with it. It was used for Bible study sessions

for adults in the area and some of them were interested in becoming data collection fieldworkers.

3.10 SAMPLE AND SAMPLING TECHNIQUE

The unit of analysis consisted of urban black adults, who resided in Wards 6, 28 and 38 in Mamelodi, commonly referred to as Mamelodi West. A non-probability convenience sampling technique was used for the quantitative phase. This method selects respondents based on their availability and convenience. Although this method did not make provision for each individual in the total population to have an equal chance of being selected, it was a suitable technique to use in this study due to financial and time limitations. This decision concurs with documented work of others like Zikmund & Babin (2010) and Creswell (2013:156). Participant criteria for inclusion in the study were explained to fieldworkers during the training session. This meant that fieldworkers were able to identify potential participants in their community. The sample size was set as 300-400 respondents aged 18 and older, both male and female genders. The sample size was determined in consultation with the statistician from the Department of Statistics (University of Pretoria) who was appointed to assist. The selected sample size was based on considerations such as other data collection techniques that would also be utilised, the length of the questionnaire and the available funds.

A purposive sampling technique was used to recruit participants for the focus group sessions in Phase 3. Fieldworkers were requested to inform questionnaire respondents of the focus group. Interested respondents were then given further information regarding the time, date and purpose of the focus groups. Participants were therefore recruited from the pool of respondents who completed the questionnaire. Both males and females over the age of 18 participated in them. A further prerequisite for inclusion was that individual participants should be able to express themselves in English.

3.11 DATA COLLECTION

Data was collected in three phases, namely, mapping and store observations, survey questionnaires and focus group discussions.

3.11.1 Phase 1: Mapping and store observation

The density and proximity of food retail outlets were explored by mapping the food retail outlets in the predetermined residential area of Mamelodi West to obtain an objective view of these

neighbourhoods. This approach was ideal to determine the walkable distances in each local food environment in relation to their accessibility and availability of foodstuff.

The City of Tshwane's official website provides GIS data and maps. One of the maps (Figure 4.1) was utilised to create a map with a perimeter of the predetermined study area using ward borders. Formal food retail outlets were identified and mapped using Google maps, the food retail websites' store locator tools and from physical observation. Informal outlets were not formally mapped because of the large number of informal food retail outlets and the time and monetary limitations of doing this exercise. Therefore, a block by block evaluation was not possible. Some studies use municipal or census data or refer to registries such as the yellow pages for listing outlets (Krukowski, Sparks, DiCarlo, McSweeney & West, 2013; Walker *et al.,* 2010). This procedure was not possible for these informal outlets as their existence is not generally formally recorded. Another method is to rely on the knowledge of the local residents using surveys or focus groups (Walker *et al.,* 2010). Focus groups (Section 3.11.3), were a chosen method for investigating the proximity and density of informal outlets in this study area.
Both the identified formal food retail outlets were visited by an appointed fieldworker to conduct the food store observation surveys, which were based on a checklist Freedman and Bell (2009) developed. The layout of the outlets was mapped according to their different food sections, and the presence or absence of predetermined foods was indicated. For the informal food retail outlets, three of the fieldworkers were asked to visit the spaza shops closest to their homes. The fieldworkers had to indicate the presence or absence of the predetermined foods as per the checklist adapted from Freedman and Bell (2009) and to take photographs where possible. Similarly, these three fieldworkers were asked to record the presence and price of foodstuff sold by street vendors they normally pass using this same list. A predetermined market basket, adapted from Roos *et al.,* (2013) was used to record whether these specific food items were available as well as their price. This survey guided the researcher in making observations to determine what types of foods are available in the formal and informal food retail outlets as well as their price.

3.11.2 Phase 2: Survey questionnaire

The self-administered paper-based survey questionnaires were handed to respondents who gave their informed consent to participate in the study. Salkind (2009:142) recommends a *drop-off* and *collect later* method as this allows respondents to complete the questionnaire in their own time without the interference or intervention of a fieldworker or a researcher. These trained fieldworkers had been instructed to give and collect a copy of a questionnaire from eligible Mamelodi West residents. A total of 350 survey questionnaires were distributed among the ten fieldworkers and 301 copies were completed and returned by the fieldworkers. Respondents

had the option to either participate or not and to withdraw at any time. A cover letter was attached to the front of the questionnaire and provided information about the purpose of the study to gain consent from the participant (Addendum C). Confidentiality and anonymity was ensured in this way.

3.11.3 Phase 3: Focus group discussion

Focus group participants met at a venue the Phelandi-Nakene Primary School offered and this arrangement gave the researcher easy access to the study group. The school had an available classroom which was normally used for bible study by the missionary group. The researcher obtained permission from both the principal of the school and the head of the missionary group to utilise this venue. Two focus group sessions were held. There were twelve participants in the first session; ten females and two males; and eleven participants; nine female and two male; in the second session. The researcher acted as moderator and steered the discussion in a specific direction according to the identified topics and probing techniques (Addendum E). All discussions were audio tape-recorded with the informed consent of the participants as Freedman & Bell (2009) recommend. At the start of the session the researcher informed all participants of the intention to record the session; the researcher explained the participants' rights and purpose of the study. Informed consent was given verbally by the participants. Any participants that were not comfortable had the opportunity leave during any stage of the discussion.

3.12 DATA ANALYSIS

Once the data was collected, the data analysis of the three phases proceeded. The method of analysis used in each of the phases is briefly explained.

3.12.1 Phase 1: Mapping and store observation

Data from store observations were captured in Microsoft Excel and proximity was assessed using Google Earth Pro. The store observations included the two formal food retail outlets that fell within the study area. This means that the minimum distance which residents have to walk from their home to the closest food retail outlet was recorded to determine the relationship between the local environment and availability. The prices and presence or absence of the predetermined foodstuff from the different outlets were compared to provide information of affordability and availability. The difference in the pricing of specific brands and packaging sizes for food items was considered by comparing identical brands and sizes during study analysis. Based on feedback from the three fieldworkers, at least ten spaza shops and more than fifteen

street vendors were observed. Results were analysed and presented according to maps and tables.

3.12.2 Phase 2: Survey questionnaire

Of the 350 survey questionnaires given to fieldworkers, 301 were completed by respondents. The completed survey questionnaires were scrutinised and it was found that only 288 survey questionnaires were considered usable based on inclusion and exclusion criteria such as area of residence and age. Data from the questionnaires were coded and captured in Microsoft Excel. The data was then reviewed to ensure that there were no coding errors. A Statistical Analysis Software package (SAS), version 9.3 was used process the data. This statistical analysis was used to visually illustrate frequencies and tendencies. To summarise the data, descriptive statistics were applied. Examples thereof include frequencies, percentages, means, median and mode values and standard deviation (Zikmund & Babin, 2010). The appropriate statistical methods for this study were employed in consultation with the appointed statistician. Organisation and summaries were necessary to put results in a more comprehensive format, a method Mouton (1996) recommends. Graphs and illustrations accompanied the numerical data analysis of Phase 2.

3.12.3 Phase 3: Focus group discussions

Data was analysed for the two focus group sessions which were held. These focus group sessions included twelve participants in the first session and eleven participants in the second. The audio tape-recorded focus group discussions were transcribed verbatim. The transcription was then carefully read through and certain words, phrases or sentences were labelled to identify themes and subthemes according to the study's stated objectives. Association of characteristics were systematically assigned according to codes and analysed.

3.13 MEASURES TO COMBAT ERROR

To add credibility to the study certain measures were taken to minimise and prevent errors. This is important as reliability and validity are essential as they determine the quality of the study (De Vos *et al.,* 2005:160).

3.13.1 Validity

Validity is obtained when measuring instruments measure and describe what it is supposed to accurately (Leedy & Ormrod, 2005).

3.13.2 Theoretical and construct validity

Both theoretical and construct validity consider the importance of conducting a thorough literature review. To validate the theory supporting the measuring instruments a logical relationship must exist between the variables of the underpinned dimensions (De Vos *et al.,* 2005:162). Theoretical and construct validity was achieved through an extensive literature review. This information was used to design the methodology, support findings and assist with the interpretation of the findings

3.13.3 Content validity

Content validity is required to ensure that measuring instruments measure what they were intended to measure (De Vos *et al.,* 2005:161). Content validity was achieved by having the questionnaire checked by a statistician and subject experts to ensure that the questions were correctly formulated. Measured constructs are important in research. In this study piloting the questionnaire enhanced validity.

3.13.4 Face validity

Face value implies superficial appearance, research done must be seen to cover the relevant constructs of the study (De Vos *et al.,* 2005:161). Face validity was achieved by adapting measuring instruments from previous studies that dealt with food choice.

3.13.5 Reliability

Reliability describes the consistency of the measuring instruments so that the same results would to be obtained should the study be repeated (Babbie & Mouton, 2001:119; Leedy & Ormrod, 2005). When this is achieved, data can be viewed as dependable (De Vos *et al.,* 2005:162). Data collection reliability is the key criteria for validity (Mouton, 1996:144). To ensure reliability, constructs used for this study were identified and clearly defined, according to relevant theories. Aspects identified were measured using multiple indicators. Lastly, the questionnaire was piloted and all possible problem questions were eliminated. To further accommodate reliability, measuring tools were adapted from similar studies.

3.14 ETHICS

Confidentiality and anonymity for participants were considered throughout the study. Access to the completed questionnaires was restricted and the names of respondents remained anonymous in the final research project. The respondents also had the option to withdraw from the study at any time if they wished to do so. Participation in the study was voluntary and participants had to first give their informed consent prior to completing the questionnaire or participating in a focus group. A consent form detailing the purpose of the study as well as important and necessary information about the participants' rights, anonymity and confidentiality was attached to the questionnaire. Respondents were required to sign this form. Verbal consent was required from participants in the focus groups. Before giving verbal consent, the potential participants were also informed about the objectives related to the study. For the store observations permission was obtained from the branch managers or shop owners and operators. The research proposal was submitted to the Ethics Committee of the Faculty of Natural and Agricultural Sciences of the University of Pretoria for ethical clearance before data collection commenced. Ethical clearance was granted and the following number was issued: EC14003-022 (Addendum B).

3.15 CONCLUSION

This chapter outlined the research methodology. The research design gave an overview of the procedures the study employed. Aims and objectives were given, followed by the conceptual framework, its conceptualisation and operationalisation. Thereafter, measuring instruments, the study area, the unit of analysis, the sample and sampling techniques, data collection and data analysis were explained. Measures taken to combat possible error and ethical issues were addressed. The next chapter discusses and presents the results obtained from the applied methodology.

Chapter 4

Results and discussion

4.1 INTRODUCTION

This chapter presents and discusses the results of the study through an interpretation based on the study's stated objectives. A demographic profile of the sample, compiled from collected data, was used as the point of departure to contextualise the study.

4.2 THE SAMPLE AND DEMOGRAPHIC PROFILE

As part of the methodology for this study, demographic information about the black adults residing in Mamelodi West was gathered using the survey questionnaire. Information about their gender and age was collected to have a representative sample from which a demographic profile could be generated from a total of 288 useable questionnaires provided as the data collection requirement for the research methodology.

4.2.1 Demographic profile of the respondents

Most of the respondents were female (66%) and the age distribution of the study group ranged from 18 to 51 years old and older. The 18 to 25 years group consisted of 19.1% (n = 55) and the smallest group (16%; n = 46) represented were 26-30 year-olds. The two groups 31 to 40 and 41 to 50 were equally represented (21.2%, n = 61). The fourth group, 51 years and older was the largest, 22.6% (n = 65) of the total sample. Table 4.1 gives a breakdown of the age and gender distribution of the respondents.

TABLE 4.1: DEMOGRAPHIC PROFILE OF RESPONDENTS (n = 288)

Characteristics	n	%
Gender		
Male	97	33.7
Female	190	66.0
Not indicated	1	0.3
Age (years)		
18 to 25	55	19.1
26 to 30	46	16.0
31 to 40	61	21.2
41 to 50	61	21.2
51 and older	65	22.6

The two sections that follow deal with the study's results as related to each objective's main theme. First, the broader physical environment of the study area, stated as Objective 1, then then the food environment.

4.3 MAMELODI WEST AS A PHYSICAL ENVIRONMENT

The first objective deals with was to explore and describe the broader physical environment of Mamelodi West. and its community setting.

The physical environment, as referred to in the literature (Section 2.4.1) includes the human built environment with its infrastructure comprising roads, houses, hospitals and shopping malls just to name a few (Story *et al.,* 2008; Story *et al.,* 2002; Bubolz & Sontag, 1993:420). Food choice can only exist if a range of foods are available and accessible for an individual. The physical environment therefore plays a significant role in food choice as it is a determinant of what food is available and accessible for consumption (Story *et al.,* 2008; Story *et al.,* 2002, Caspi *et al.,*2012).

The map of Mamelodi West (Figure 4.1) shows where the formal food retail shops in the study area are found. Strictly speaking, only two supermarkets fall within the study area, which was confined to wards 6, 28 and 38. Nonetheless, residents living to the east of Mamelodi West do occasionally visit the supermarkets within the area delimited for this survey. The location of the venue where the focus group session was held, namely the Pheladi Nakene Primary School, is also indicated to provide its locational context as part of the methodological approach adopted.

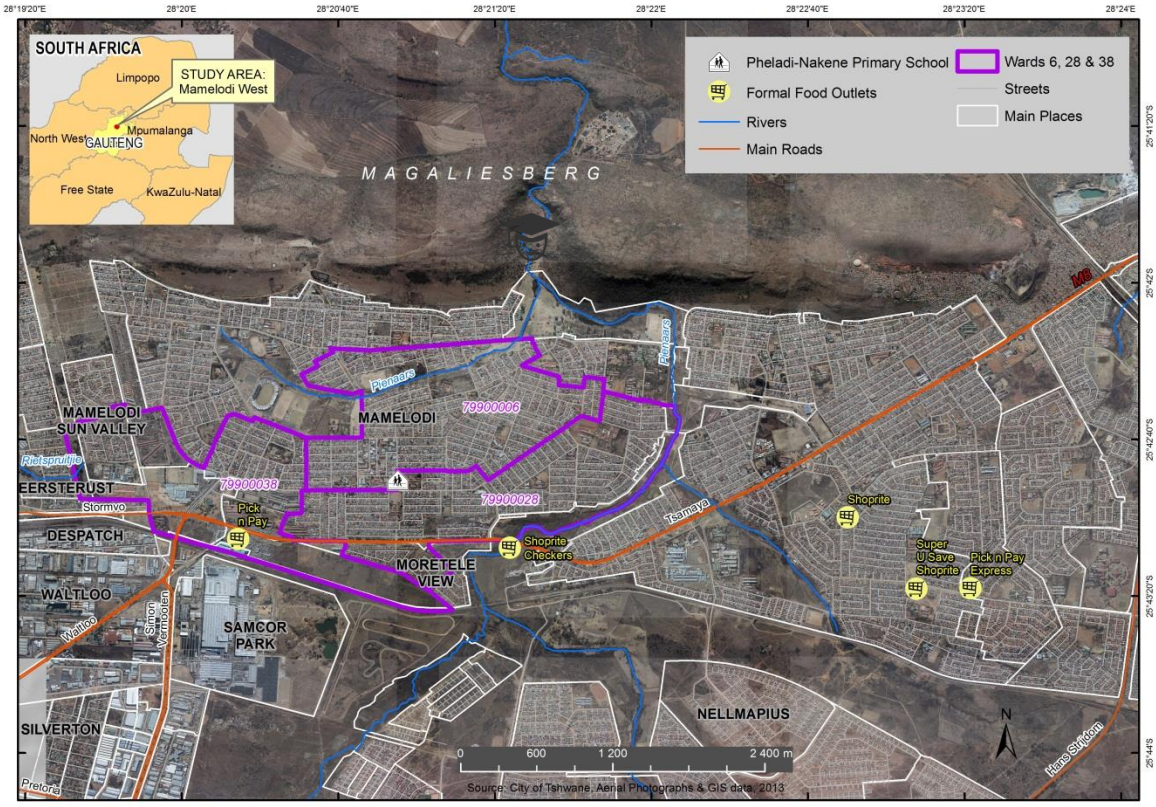

FIGURE 4.1: THE FORMAL FOOD RETAIL OUTLETS SERVING MAMELODI WEST

From the results of the focus group discussions, mapping the position of the stores and general visual observation it became apparent that there are a large number of informal outlets within the selected study area. In the residential areas within this perimeter there was at least one of these outlets per block. A participant in a focus group discussion mentioned that one can expect to find between two or three spaza shops within a two-block radius. This statement was then confirmed by various other members of the focus group. Another participant remarked that spaza shops could typically be found within a two-minute walk from home. These findings concur with other South African study results that informal food retail outlets are usually within walking distance of homes (Nielsen, 2016; Sustainable Livelihoods Foundation, 2016; Roos *et al.,* 2013; Crush & Frayne, 2011).

Mamelodi West has a combination of tarred and dirt roads. The N4 Highway connects Mamelodi to the larger nearby Tshwane Metropolitan area as well to Johannesburg that can be reached within an hour's drive. There were various schools, a police station and at least two shopping centres within the study area. The University of Pretoria's Mamelodi campus fell just outside this study area but was readily accessible to those living in Mamelodi West. The housing structures consisted of a combination of formal and informal structures. Figure 4.2 depicts typical street scenes found in Mamelodi West. Although most streets are tarred, the smaller streets towards the outskirts are not all tarred. Most houses have small gardens, and

many dwellers have expanded onto their houses with smaller informal structures. Fruit and vegetable patches and be seen in front of some of the houses, a familiar sight. Spaza shops are scattered throughout the residential areas and street vendors generally concentrate on being in the commercial areas or alongside the larger roads.

FIGURE 4.2: STREET VIEWS OF MAMELODI WEST (Source: Google Maps, 2017)

The next section explores the outlets available in the study area.

4.4 THE LOCAL FOOD ENVIRONMENT IN MAMELODI (OBJECTIVE 2)

The aim of the second objective sought to investigate and describe the local food environment. This objective was divided into three sub-objectives. First, the formal food retail environment comprising supermarkets, fast food outlets and convenience shops Second, the informal food retail environment (street vendors, markets, spaza shops) and third, the home food environment within the study group members' lifestyles is determined.

4.4.1 Formal food retail environment (sub-objective 2.1)

The township of Mamelodi is situated on the eastern outskirts of the City of Pretoria, in northern Gauteng. Based on GIS information available from Google Maps, and participation in the focus group discussion it was determined that the formal retail environment includes a Shoprite and a Pick n Pay located on the extreme eastern end of the township (Figure 4.1). Mamelodi Shoprite is situated in a shopping centre called Mamelodi Crossing. Mamelodi Crossing Shopping Centre

(known as Denlyn) is at the entrance to Mamelodi on Maphalla Drive. Shoprite is an anchor tenant of the centre. Within this centre there are five fast food outlets namely Chicken Licken, King Pie, KFC, Real Fish & Chips and Royal Pie. The Denneboom Pick n Pay can be found within a kilometre of Mamelodi Crossing. The shop is situated next to the Denneboom train station and there are structured trade stalls in front of the shop for street vendors selling predominantly fruits and vegetables. Waltloo Meat & Chicken is a retailer of fresh and frozen meat and chicken products, although this retailer technically falls just outside the borders of the study area, it is still frequented by residents of Mamelodi West. The shop offers a variety of different cuts of meat, chicken and fish as well as groceries and dairy products. There were also various other wholesalers and supermarkets outside the study area but close by but due to time limitations these were not considered.

To gather information regarding the range of products sold by these food retail outlets, a fieldworker was tasked to record basic shop layouts on drawings and where possible photographs for the two retail food outlets and observations were made regarding the presence of certain foods as per an observation checklist (Addendum A). These observations are described below.

4.4.1.1 Fruit and vegetable section

The Shoprite and Pick n Pay have similar offerings of goods and services like both outlets have a fresh fruit and vegetable section. Salad ingredients such as lettuce and cucumbers are found in the refrigerators, with a large section of refrigeration space allocated to Swiss chard and carrots. Large wooden crates display cabbages and carrots in the Shoprite store.

4.4.1.2 Bakery section

The bakery section in both shops offers a variety of sweet and savoury fresh breads, baked goods and confectionery such as *vetkoek* (fat cakes), cakes, biscuits and doughnuts. In both cases, both freshly baked breads as well as pre-packed breads such as Albany and Sasko brands are available. Figure 4.3 is a photograph of so-called “health bread” taken at Shoprite.

FIGURE 4.3: PHOTOGRAPH OF "HEALTH BREAD" ON DISPLAY

4.4.1.3 Delicatessen section

Both shops' delicatessen counters, commonly referred to as deli sections, have ready-made meals consisting of a variation of a protein source such as a sausage or piece of fish and a starch source, such as chips or *pap* (maize meal porridge).

4.4.1.4 Frozen food section

The frozen food sections offer a range of frozen vegetables such as peas, corn and carrots either individually packed or in a combination known as a "stew mix". The range of frozen fish includes hake fillets, fish fingers, fish cakes and fish nuggets. A notable amount of space is dedicated to individually quick frozen (IQF) chicken. Pick n Pay and Shoprite both also offer a relatively smaller range of frozen burger patties, pies, potato chips and frozen pizza bases when compared to the available frozen vegetables and chicken.

4.4.1.5 Fresh meat section

The butchery or fresh meat sections also have similar offering which include whole chickens, chicken pieces, chicken feet and livers, beef organ meats, beef chuck, pork and braai packs. Lean minced meat or skinless chicken portions were not observed in either stores. These options would be considered lower in fat and healthier. Figure 4.4 is a photograph taken in Shoprite and depicts some of the meats available for sale such as chicken necks, chicken livers, chicken hearts and chicken gizzards.

FIGURE 4.4: DISPLAY OF MEAT AND CHICKEN AVAILABLE

4.4.1.6 Fresh dairy section

Refrigerators dedicated to dairy products offer fresh milk, fermented milk, cream, yoghurt, cheese, butter and margarine. Low fat milk was available in both stores, but skim or fat free milk was only observed in Pick n Pay. The cheese section in Shoprite offered bulk options for gouda and cheddar cheese. These cheeses where packed at the shop and are sold according to weight. The range of cheese spreads, soft and hard cheeses and reduced fat cheeses were limited. Mozzarella was observed at the Shoprite, but not at the Pick n Pay.

4.4.1.7 Pre-packed, ambient food section

The pre-packed, ambient food shelves typically offered two to three brand variations per product and had house-brand variants for most of the popular items such as milk, maize, sugar, eggs, cold drinks, tea and coffee, amongst others. Tinned food sections were notably large and included tinned fish such as pilchards and tuna, tinned meats such as corned meat and tinned vegetables such as corn and peas. A large amount of shelf space was dedicated to tinned baked beans. Starch sources such as rice and maize flour were available in large bags of 10 kg each. It was noted that brown rice could not be found at either of these shops. This is significant because brown rice is higher in fibre, selenium, magnesium and manganese and can therefore be considered a healthier option (USDA, 2017). A broad range of breakfast cereals were available. The range of breakfast cereals and porridges in both these outlets included oats, maize flour porridge, *mabela* (sorghum) porridge, corn flakes, bran flakes, chocolate or

strawberry flavoured cereals, extruded grain puffs and other fortified instant porridges from grains such as Morvite and Epap. Legumes and pulses were also available in both shops. The range included beans, chickpeas, lentils, split peas and *samp* (dried and chopped corn) combinations. Figure 4.5 illustrates some of the pre-packed ambient food products discussed in this paragraph. The photograph was taken at Shoprite.

FIGURE 4.5: DISPLAYS OF DRY, AMBIENT FOOD AVAILABLE

4.4.1.8 Sweets, chips and beverage section

The supply of potato crisps and sweet sections was extensive in both shops. The carbonated beverages sections stocked popular beverages such as Coke Cola, Sprite, Sparletta, Stoney Ginger Beer, Fanta as well as own brand variations on these products. A broad range of sweetened juice concentrates were also available. No sugar free sweets could be seen and the range of sugar free carbonated beverages was limited. Figure 4.6 depicts a portion of the range of sweetened juice concentrates available at Shoprite.

FIGURE 4.6: DISPLAYS OF FRUIT JUICE CONCENTRATES AVAILABLE

It was therefore concluded that the formal food retail outlets offered a broad range of foods in general. Although they did stock some healthy food options, the range was limited. Battersby and Peyton (2014) also explored the effect of supermarket expansion and food access. They concluded that supermarkets in low-income urban areas typically stock less healthy foods than those in wealthier areas and, as a result, the supermarkets do not increase access to healthy foods.

4.4.2 Informal food retail environment (sub-objective 2.2)

The informal retail environment consists of street vendors, spaza shops and other forms of informal convenience shops scattered throughout the township. The items sold in informal shops vary, owing to the haphazard makeup of these retail operations and the area-specific demand that is catered for (Steyn & Labadorios; 2011). These informal food retail outlets aim to provide convenience items to the customer and carry a very limited range of products in comparison to the supermarkets (Nielsen; 2016; Sustainable Livelihoods Foundation, 2016). Three fieldworkers were tasked to gather observational data on the informal food retail environment.

4.4.2.1 Street vendors

The majority of street vendors observed sold fruit and vegetables such as apples, bananas, oranges, peaches, butternuts, potatoes, tomatoes, onions, cabbage and bunches of carrots and Swiss chard. Fruit is mostly sold as an individual item. In some instances, tomatoes, potatoes or onions were sold in a transparent bag containing four or five items.

Some street vendors also sold meats such as raw whole chickens, chicken feet and heads, chicken livers, offal products and braai packs. Sweets, carbonated soft drinks and *vetkoek* (fat cakes) were also commonly sold by street vendors. Street vendors could either be found displaying their goods in a shaded market area at a pre-constructed, concrete table or on makeshift tables or tarp sheets on the streets. Some street vendors had even attempted to set semi-permanent structures up using fencing to protect and demarcate the space they would place their wares. A collection of photographs illustrates the trading conditions of the street vendors (Figures 4.7 to 4.9).

FIGURE 4.7: VARIOUS STREET VENDOR ACTIVITIES

FIGURE 4.8: DISPLAY OF SWISS CHARD TYPES SOLD BY A STREET VENDOR

FIGURE 4.9: A STREET VENDOR'S TABLE WITH FRUIT AND VEGETABLES

4.4.2.2 Spaza shops

The spaza shops keep a larger range of food than the street vendors, but their stock is more limited than what is sold in the supermarkets. In many instances, the counters in the spaza shops were behind a secured metal barrier. Observed in this study is that some of the spaza shops kept all their products behind this counter and sold to the consumers in a “tuck shop” style. Other spaza shops merchandised some products in front of the counter and kept their more expensive items such as cigarettes behind the secured counter. The Nielsen (2016) report titled *South Africa’s not so traditional, traditional trade* confirmed this result.

The range of products, fresh fruit and vegetables the street vendors offered appeared to be the same when compared to those in the supermarkets, but with less variety. Roos and colleagues (2013) reported similar findings. In many instances, the spaza shops also had refrigerators. The facility contained fresh milk, cheese, as individual pre-packet slices, and meat such as whole chicken, chicken livers, chicken legs, beef organ meat, beef chuck and braai packs. Bread, rice, samp, maize meal and macaroni were common spaza shop products, as were tinned beans and tinned pilchards. Most spaza shops offered a range of pre-packed ready to eat meals which include fried potato chips, fried fish, sausages and *vetkoek* (fatcakes). Particularly popular carbonated soft drinks, packets of chips and single sweets were well represented products.

Brands familiar to the public as staple foods, like bread, rice and maize were generally kept, but among the more luxury items, sweets and cold drinks, less familiar brands were common. They were brands that had copied the market leaders, such as cola variations. Examples of branded staple products found at the spaza shops generally included: Tastic rice, Super Sun maize meal, Black Cat peanut butter, Five Roses tea and Blue Ribbon bread. However, unbranded versions were also available. Interestingly, no low fat or fat free milk or cheese options, brown rice, sugar free sweets, sugar free or reduced sugar soft drinks or lean meats were found at the spaza shops. These foods are commonly considered as healthier food options. This points to limited availability of healthy foods in the spaza shops. Figures 4.10 to 4.13 depicts images from inside a spaza shop.

FIGURE 4.10: LARGE BAGS OF MAIZE MEAL AND RICE AVAILABLE IN A SPAZA SHOP

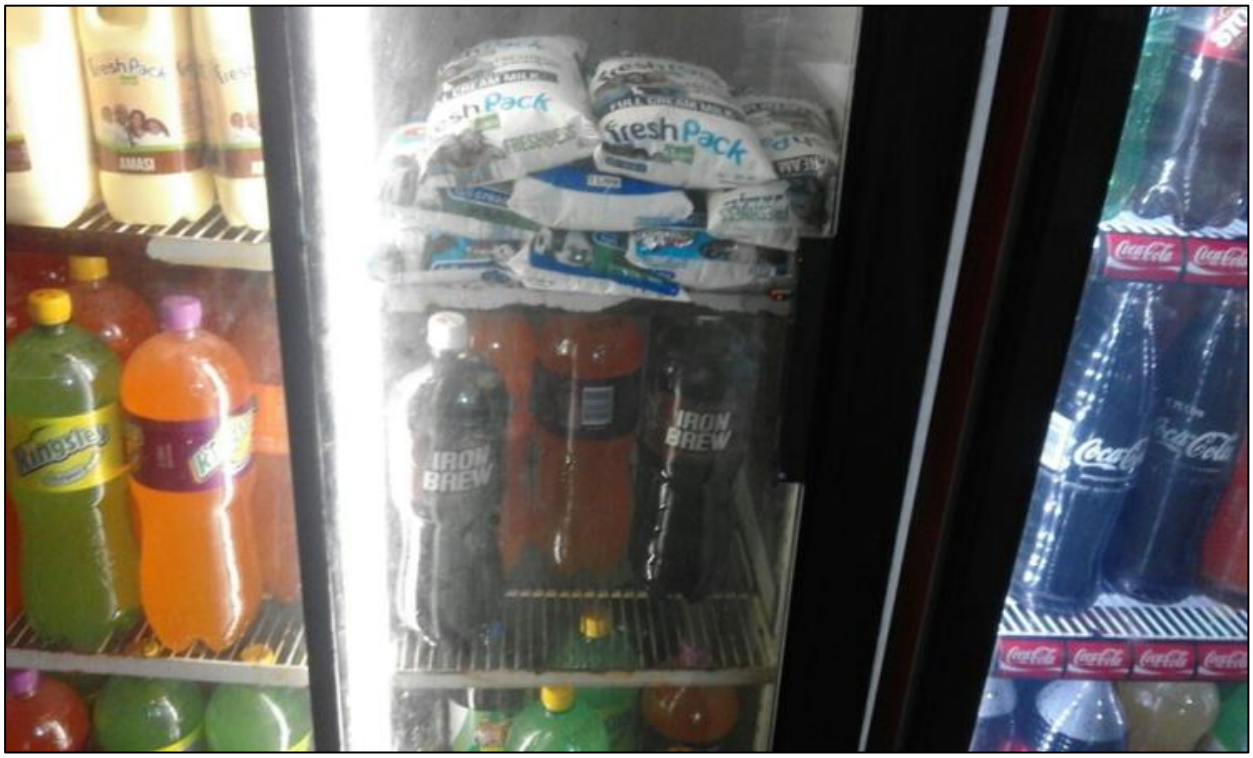

FIGURE 4.11: COLD DRINKS, MILK AND SOUR MILK REFRIGERATOR IN A SPAZA SHOP

FIGURE 4.12: RICE AND FLOUR PACKAGES IN A SPAZA SHOP

FIGURE 4.13: SPAZA SHOP DISPLAYS POPULAR PURCHASES (Soup Powders, Stock, Vinegar, Salt, Sugar, Legumes and Pulses)

4.4.3 Home food environment (sub-objective 2.3)

The home food environment is a broad term used to explain what is available and accessible at home (van Ansem *et al.,* 2013). A description of the home food environment of the respondents who resided in the study area selected for this South African study, namely Mamelodi West, could be determined from their answers to some of the related questions and instructions given in the questionnaire designed for the data collection phase. The sections that follow consider some relevant aspects.

4.4.3.1 Household size and structure

Information about the household size and structure (Table 4.2) the respondents provided showed a predominantly family structure with most of the households having more than four members. Only 12.5% (n = 36) of households had one to three persons living together; 42.7% (n = 123) four to five persons; and 44.4% (n = 128) six or more. The assumption can therefore be made that meal consumption and preparation was predominantly in the presence of others. Household size and structure would therefore be a significant element of the food environment in this locality.

TABLE 4.2: HOUSEHOLD SIZE AND STRUCTURE (n = 288)

Characteristics	n	%
Household size		
1 to 3 people	36	12.5
4 to 5 people	123	42.7
6 and more people	128	44.4
No response	1	0.3
TOTAL	288	100
Household structure		
Nuclear family (both parents and children)	84	29.3
Extended family (parents, children and other family members)	79	27.5
Living with other family members (not parents or children)	36	12.5
Single parent family (farther or mother and children)	57	19.9
Living on my own	17	5.9
Living with friends/partners	6	2.1
Other	9	3.1
TOTAL	**288**	**100**

Table 4.2 also gives the results relating to the role it family members played. The majority of the respondents lived as a family either in a nuclear (28.7%, n = 84) or extended (28%, n = 79) family. A nuclear family is one that has both parents living in the home as well as their children (Bryant *et al.,* 2003:191; Amoateng, Richter, Makiwane & Rama, 2004). An extended family consists of the nuclear family with additional family members such as grandparents, uncles or aunts (Bryant *et al.,* 2003:192) residing with them. Some of the respondents (12.5%, n = 36) indicated that they lived with other family members who were neither parents or children. Close to twenty per cent (19.9%) of the sample were single parent households, and a small the

minority (5.9%, n = 17) lived alone or with friend or partner (2.1%, n = 6). Some (3.1%, n = 9) had another form of family structure. Wittenberg and Collinson (2007) report similar findings and concluded that nuclear or even simpler household types, such as single person households are becoming less common in South Africa.

4.4.3.2 Socio-economic status

Data on the main breadwinner's employment situation (Table 4.3) reveal results that show that only 13.5% (n = 39) of the breadwinners were unemployed; 17.4% (n = 50) were pensioners and the majority (68.8%, n = 198) were employed. It is important to be mindful of the fact that this study did not differentiate between those who were wilfully unemployed or not economically active for some reason, or those who were in the process of looking for work. In South Africa the unemployment rate averaged 25.27% from 2000 until 2015 and then rose to 25.5% at the beginning of 2016 (Statistics South Africa, 2017). Although a variety of occupations were selected as options, manual labour was chosen most frequently (18.5%, n = 53). Occupations such as domestic work and building fell in the manual labour category.

TABLE 4.3: EMPLOYMENT STATUS OF MAIN BREADWINNER (n = 288)

Characteristics	n	%
Unemployed	**39**	**13.5**
Pensioner	**50**	**17.4**
Employed	**198**	**68.8**
Manual labour	*53*	*18.5*
Other	*34*	*11.8*
Retail	*23*	*8.0*
Administration	*20*	*7.0*
Education	*17*	*5.9*
Health	*13*	*4.5*
Security and law enforcement	*13*	*4.5*
Engineer	*6*	*2.1*
Home Economics	*6*	*2.1*
Humanities	*5*	*1.7*
Art	*3*	*1.0*
Computer	*2*	*0.7*
Law	*2*	*0.7*
Agriculture	*1*	*0.3*
No Response	**1**	**0.3**

Ownership of household appliances was seen as a measure that could describe a household's affluence. Respondents were asked to indicate which household appliances and some other items were used in their homes. Results are given in table 4.4. The household affluence scale developed by Boyce, Torsheim, Currie & Zambon (2006) was used and provided further information related to a household's socio-economic status and an overall impression of the study group's economic status.

TABLE 4.4: AVAILABLE APPLIANCES IN HOUSEHOLD

Appliance	n	%
Stove	273	94.8
Cell phone	254	88.2
Television	251	87.2
Refrigerator	240	83.3
Microwave oven	190	66.0
Radio	179	62.2
Washing machine	156	54.2
Deep freezer	107	37.2
Computer	84	29.2
Internet connection	58	20.1

Many of the households indicated having stoves (94.8%, n = 273), cell phones (88.2%, n = 254), television sets (87.2%, n = 251) and refrigerators (83.3%, n = 240). This suggests that cooking and preparation of food on a stove is an option available to most. The availability of refrigerators also suggests that it would be possible for many of the households to preserve their food to a greater or lesser extent. Some households had microwave ovens (66%, n = 190), radios (62.2%, n = 179) and washing machines (54.2%, n = 156). Although not as frequently available as stoves, microwaves were still in common use which could indicate that some modernisation of food preparation techniques was taking place. In comparison to the other listed appliances, deep freezers (37.2%, n = 107), computers (29.2%, n = 84) and internet connections (20.1%, n = 58) were clearly in the minority. Since some refrigerators that are now available commonly come with a small freezer area or a deep freezer attached, purchasing a separate freezer is possibly considered as a less necessary expense.

From the survey undertaken, results related to the availability of selected appliances suggest that the cooking and preparation of food on a stove is a fairly regular practice. The significant number of refrigerators also suggests that almost all the households can preserve their food under colder conditions, at least to some extent. On the day a participant recorded their response to complete the questionnaire, the finalised results for the total sample do seem to show that most breadwinners in the households were employed at the time. Another observation is that most of the households in the study group had basic appliances such as stoves, cell phones, televisions and refrigerators. It can therefore be assumed that most of the study group participants had an income available to purchase food and owned basic appliances to be able to preserve and prepare food for household needs.

4.4.3.3 Food available in the home and its preparation

Respondents were asked to indicate who in their household is responsible for meal preparation. Results are given in table 4.5.

TABLE 4.5: PERSON PREDOMINANTLY RESPONSIBLE FOR MEAL PREPARATION IN THE HOUSEHOLD (n = 288)

Person responsible for meal preparation	n	%
You	154	53.5
Your Mother	64	22.2
Your Father	5	1.7
A Sibling	17	5.9
A Grandparent	10	3.5
Your Child	11	3.8
A Partner or Spouse	19	6.6
Other	8	2.8
Total	**288**	**100**

In most instances (53.5%, n = 154), the respondents themselves were responsible for this function. The respondents' mother also prepared meals in 22.2% (n = 64) of the households. In the remainder of the households it was a sibling (5.9%, n = 17), grandparent (3.5%, n = 10), a child (3.8%, n = 11), partner or spouse (6.6%, n = 19), the father (1.7%, n = 5) or someone else (2.8%, n = 8).

Respondents were also asked to indicate how often certain food items were available in their homes. A recent and common development in food matters is to differentiate between foods that are considered as either being healthy, such as vegetables; or unhealthy, among which chocolates are the most frequently cited item in this category. However, several other environments also contribute to ultimately determining what foods are available and how they are served and consumed in the home food environment. It certainly cannot be ignored as it plays a critical role in food choices. Hence many factors and their own specific effects combine and create multiple situations of many kinds in social groups and for people in their daily lives. Van Ansem *et al.* (2013) found that individuals are prone to eating more of items that are available at home, showing that this is especially true for fruit and vegetable consumption in children.

In this study, fruit and vegetables were available in the home most days of the week (Figure 4.14). Respondents agreeing (46%, n=132) or strongly agreed (25%, n=72) with this statement formed a clear majority. However, 23% (n=66) did not agree with this statement, which raises a concern that the dietary intake of fruit and vegetables was inadequate for almost a quarter of the representative participating respondents. Regarding the question that suggested that vegetables were to be served with most meals, a two-thirds majority either agreed (49%, n=141) or strongly agreed (19%, n=55). It is noteworthy that 21% (n=60) of the respondents did not agree with this statement. The South African Food-based Dietary Guidelines advises that at least five portions of fruit and vegetables should be consumed in a day (Naudé, 2013). Shisana and colleagues (2013) reported that a low intake of vegetables can be due to poor household food security because of poverty.

Milk is a good source of nutrients and can be considered a healthy food (Griffiths, 2016). Respondents were therefore asked to indicate whether milk is generally available in their homes. The majority either agreed (43%, n=124) or strongly agreed (34%, n=98) that milk was available in their homes. A relatively frequent consumption of milk can therefore be assumed. However, there was still a minority (13%, n=37) that did not agree with this statement.

Fruit juice is known to be high in natural sugars and excessive intake is cautioned against (WHO, 2015). Respondents were asked to indicate whether fruit juice is usually available in their homes. A majority either agreed (43%, n=124) or strongly agreed (16%, n=46) that fruit juice was included as among their products kept for home use. The remaining third of the respondents either disagreed (25%, n=72) or strongly disagreed (5%, n=14), while a small group were undecided (12%, n=35) about the topic.

The results for the salty snacks such as potato chips, chocolates and sweets, soft and carbonated drinks and junk food and take-away food were similar. Between 31% (n=89) to 41% (n=118) of the respondents agreed that these snacks were typically available in their homes and 23% (n=66) to 31% (n=89) of respondents disagreed. Foods such as these are definitely high in sugar, fat and energy and low in nutrients such as vitamins and fibre (Temple *et al.,* 2011).

Detailed results can be seen as a totality in Figure 4.14. From the results it is apparent that, although healthy foods such as fruit, vegetables and milk are kept in the home, a good supply of unhealthy foods such as chips, sweets, chocolates, soft drinks and junk food is also noticed, as reported.

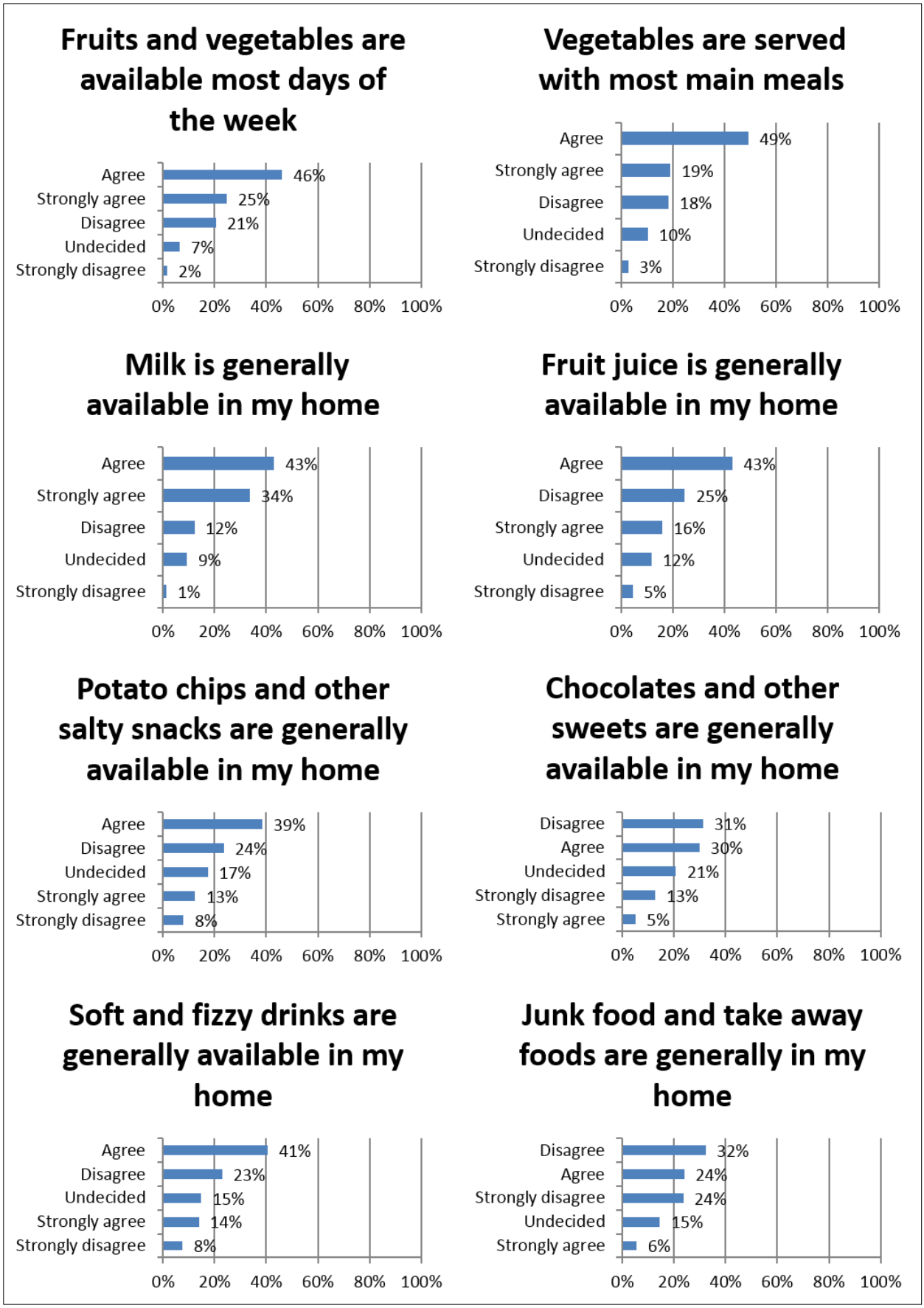

FIGURE 4.14: FOODS AVAILABLE IN THE HOME FOOD ENVIRONMENT (n=288)

The next section will determine and describe the access dimensions to healthy food choices among members of the study group.

4.5 ACCESS DIMENSIONS TO HEALTHY FOOD (OBJECTIVE 3)

The aim of the third research objective was to determine and describe the access dimensions to healthy food choices of the sample study group. According to the research process designed for this study and to achieve its stated aim, various data collection techniques were used. These included a survey questionnaire, focus group discussions, market basket analysis and store observations. With the characteristics of the study area's food environment established, this section deals with the access dimensions associated with a person's food choices that concern obtaining healthy food products. These are identified as availability, accessibility, affordability, acceptability and accommodation.

4.5.1 Availability

To determine how a resident of the delimited study area would be likely to access different foodstuffs for household needs, especially healthy food products, the survey participants were asked to respond to a given list. Selected foods were classified in eight broad categories listed as fruit, vegetables, dairy and dairy products, beverages, meat products and eggs, cereals and bread-like products, legumes and pulses and fats and oils. The respondent was requested to indicate where they normally obtain that specific item. Results are tabled according to the broad categories (Table 4.6).

TABLE 4.6: OUTLETS TYPICALLY SELECTED FOR THE PROCUREMENT OF CERTAIN FOOD ITEMS (n=288)

	I do not purchase item	Super-markets	Fast Food outlet	Convenience shop	Food Market	Street Vendor	Spaza Shop	Total
Fruit	7%	36%	0%	1%	21%	32%	2%	100%
Vegetables	6%	36%	1%	1%	15%	37%	3%	100%
Dairy and dairy products	21%	60%	3%	2%	5%	1%	8%	100%
Beverages	21%	63%	1%	1%	4%	1%	8%	100%
Meats and proteins	19%	59%	1%	3%	7%	3%	7%	100%
Cereals, bread and bread-like products	27%	54%	1%	1%	4%	5%	8%	100%
Legumes and pulses	38%	52%	1%	1%	4%	3%	1%	100%
Fats and oils	11%	80%	0%	2%	3%	0%	3%	100%

From the table (Table 4.6) it is evident that products from all the food categories were available in the supermarkets and that the supermarkets were the most commonly selected retail food outlet for the purchase of food products in general and for all fruits (36%, n=104) in general. The fruit category included bananas, apples, citrus fruit, fruits rich in vitamin A such as mangos, paw paws and pineapples; well as other fruits such as grapes pears and litchis. Although not as prominent as the supermarkets, street vendors (32%, n=92) were also a popular outlet for the sale of their fruit stock. Nevertheless, vegetables were more frequently bought from street vendors (37%, n=107) more frequently than supermarkets (36%, n=104). Within the category of vegetables, assorted items such as tomatoes, potatoes, cucumbers, lettuce, cabbage, sweet potato, spinach, green beans and pumpkins were individually listed.

Table 4.6 also shows that eggs, fish and beef, mutton, chicken, goat and pork products (59%, n=170) were mostly purchased from supermarkets in the vicinity, as were cereals, bread and bread-like products (54%, n=156). Supermarkets were also prominent outlets for the broader category comprising legumes and pulses (52%, n=150) which included beans, lentils, nuts and seeds. Fats and oils, such as sunflower oil, were definitely supermarket purchases (80%, n=230).

Dairy and dairy products such as milk, cream, sour cream and yoghurt were mostly procured from the supermarkets (60%, n=173). Beverages such as tea, coffee and fruit juice concentrates were primarily purchased from supermarkets (63%, n=181). Interestingly carbonated soft drinks, which fall within the broader category of beverages were most frequently purchased from spaza shops and not supermarkets. Gebauer and Laska (2011) and offer a possible explanation for this and suggest that the purchase of a cold drink is often an impulse buy, considered as a purchase to satisfy an unexpected and sudden need or urge and can take place during any stage of the month, whereas the larger bulk supermarket visits occur less often as seen in Table 4.7.

Although the spaza shops or food markets were not noticeably major outlets for any particular food choice, some respondents did purchase dairy products, beverages, meats and protein-rich foods, cereals and bread products from them. These findings were confirmed by the focus group discussions. During the focus group discussions, the participants did stress the point that supermarket shopping was not as convenient as obtaining food supplies from facilities close to home, they did still keep the largest range of products.

4.5.2 Accessibility

The frequency a specific retail outlet is routinely visited is also an indication of how accessible that outlet is. The data required to illustrate this trend came from questionnaire responses and the results are tabled as percentages (Table 4.7) for convenience.

TABLE 4.7: FREQUENCY OF VISITS TO SPECIFIC FOOD OUTLETS (n=288)

	Daily	3-4 times per week	1-2 times per week	Less than 3 x per month	Never	Special occasions	Total
Convenience shop	2.5%	3.5%	8.8%	6%	**63.6%**	15.5%	100%
Fast Food outlet	3.1%	4.5%	11.9%	14.7%	19.2%	**46.5%**	100%
Fresh fruit and vegetable food market	8.5%	18%	**29.9%**	18%	11.6%	14.1%	100%
Supermarket	8.7%	16.4%	23.1%	**36.4%**	1.4%	14%	100%
Spaza Shop	**53.5%**	16.8%	13.3%	4.9%	5.6%	5.9%	100%
Other	3.1%	6.2%	4.6%	3.1%	75.4%	7.7%	100%

Spaza shops had the highest frequency of visits with 53.5% (n=154) of the respondents going to a spaza shop every day. Fresh fruit and vegetable markets and street vendors were visited approximately once or twice a week (29.9%, n=86). Supermarkets were usually (36.4%, n=105) used fewer than three times a month, whereas fast food outlets seemed to be typically sought after when preparing for special occasion events (46.5%, n=134). Convenience shops were the least frequented with 63.6% (n=183) of the respondents stating that they never visit convenience shops.

These findings echo those of Crush and Frayne (2011) who report that 51% of the poor urban households in Southern African cities only go to supermarkets once a month. The data suggests that bulk purchases for staple foods are done at supermarkets once or twice a month, and then other food procurement is done as required throughout the month through the informal vendors.

Based on the frequency of visits to these outlets it can be argued that spaza shops are the most accessibility, followed by street vendors and supermarkets the least of the three types of outlets. These findings were also confirmed in the focus group discussions.

4.5.3 Affordability

A price comparison was conducted during the store observations to survey the cost of specific items in each of the selected food retail outlets. The list of products used (Table 4.8) was from the model Roos, Ruthven, Lombard and McLachlan (2013) chose for their work. It is based on the National Agricultural Marketing Council food basket which was especially adapted for the

South African market. The results from this study are tabulated (Table 4.8) and discussed in this section.

TABLE 4.8: MARKET BASKET BASED ON NATIONAL AGRICULTURAL MARKETING COUNCIL FOOD BASKET

Item	Size/ Quantity	Spaza Shop	Street Vendor	Shoprite	Pick n Pay
Apples	per/kg (various varietals)	R12.00	R12.00	R9.99	R10.95
Bananas	Per/kg	na	na	R13.99	R13.49
Beans (dried)	500 g	R14.00	na	R18.99	R17.99
Beans (canned)	410 g	R11.00	na	R6.99	R7.99
Brown bread	1 loaf (700 g)	R8.00	na	R4.99	R6.99
Cabbage	1 head	R13.50	R12.00	R12.99	R13.00
Cake flour	2.5 kg	27.99	na	R26.99	R25.99
Chicken pieces	1.5 kg	R60.00	na	R54.99	54.99
Coffee	750 g	na	na	R79.49	R78.99
Eggs	carton of 6	R13.00	R12.00	R9.99	R11.45
Maize meal	1 kg	R13.00	na	R13.79	R12.99
Margarine	500 g	na	na	R22.49	R20.99
Milk (Full cream)	1 l	R13.00	na	R11.99	R10.49
Onions	per/kg	R15.00	R13.00	R11.00	R11.99
Peanut butter	400 g	R35.00	na	R29.99	R29.49
Pilchards (canned)	425 g	R20.00	na	R16.79	R15.95
Potatoes	1 kg	R11.00	R9.00	R11.99	R13.00
Rice	1 kg	R15.00	na	R12.99	R14.99
Samp	1 kg	R10.00	na	R9.79	R11.49
Sugar	2.5 kg	R43.00	na	R41.99	R40.99
Sunflower oil	750 ml	R19.99	na	R17.99	R18.49
Tea	60 teabags	R27.99	na	R27.99	R28.49
Notes: Prices in South African Rand February 2017					
na = Product not available in identical or similar pack size at time of shop observation					
Source: Adapted from Roos, Ruthven, Lombard and McLachlan (2013)					

Pick n Pay and Shoprite were similarly priced over the total list of items with Shoprite being slightly cheaper for this specific basket. The basket total for Shoprite came to R468.19 and R471.18 for Pick n Pay. Due to the unavailability of certain foods or pack sizes at the spaza shops and street vendors, the cost of a total basket cannot be compared to the supermarkets' pricing. When considering individual items such as bread, eggs, maize meal, peanut butter, sugar and oil it appears that spaza shops are more expensive. However, there were other food products such as dried beans and potatoes that were less expensive at the spaza shops. Similarly, the street vendors were more expensive for some food such as apples, eggs and onions, but less expensive for a cabbage and potatoes. The results were in line with the feedback from the respondents and other South African studies such as those conducted by Roos and colleagues (2013).

To determine the food prices and to draw a comparison was more challenging than anticipated; caution must thus be exercised when interpreting these results. First, street vendors and spaza shops had different package sizes to the supermarkets. In most cases, the spaza shops and street vendors either sold fruit and vegetables as loose, single units or in a pre-packed clear

bag, whereas the supermarkets had standardised pre-packs or per kilogram prices. Second, the quality of meat and meat products and different varieties of fruit and vegetables differed considerably over the different outlets. Third, the prices at the street vendors and spaza shops could change at a moment's notice and sometimes even changed more than once on the same day as it progressed. This was especially true for the street vendors. It was also mentioned in the focus group discussions that prices could be negotiated with the street vendors or spaza shop owners. Where possible, items for this study were selected in such a way that their size, weight and brand were as similar and comparable as possible to eliminate bias and product preferences so that the results would be realistic and reliable.

Crush and Battersby (2016) report similar findings in their research of urban food deserts in Africa and indicate that it was challenging to draw stark price comparisons between the different outlets as spaza shops were found to be cheaper on some products and more expensive on others. They cautioned against drawing any conclusions on why a consumer would prefer one outlet to another based on a simple price comparison. They found that the supermarkets offered non-perishable staples in bulk which reduced the unit cost. This makes supermarkets a cost-effective option when doing bulk purchases at the end of the month when permanent and contracted employees are usually paid. On the other hand, however, spaza shops tend to also offer smaller quantities and credit options, which is beneficial for their customers at times when household funds might be limited.

Based on the results it can be concluded that the prices recorded from the informal food retail outlets generally appeared to be higher for many foods, but it is not necessarily the case for all foodstuff. It is also important to note that prices at the informal retail outlets were negotiable and they often changed throughout the day.

4.5.4 Acceptability

Acceptability is determined by an individual's characteristic attitudes personal values and standards (Caspi *et al.,* 2012). The aim of this sub-objective within Objective 3 was to determine and describe the dimension of acceptability with regards to the healthy food choices available to the study group. During the focus group session, participants were specifically asked to give their opinion about the acceptability of foods in their immediate surroundings. From the discussion it became apparent that a key determinant of acceptability is product quality. They concluded that they were dissatisfied with the quality of products in outlets in close proximity to where they lived, but were satisfied with the quality of products in their larger food environment. Participants felt that the quality of food was superior at the supermarkets. Since a large numbers of customers visit these shops every day, the participants believed there was good

stock rotation. They also attributed this observation to the many refrigerators used in the supermarkets that enabled their food to keep fresh and retain their quality.

The group believed that the quality of products sold at the spaza shops was inferior and that the spaza shops regularly sold expired stock. When prompted about the quality of the products from the markets and street vendors, responses led to agreement that the quality was believed to be better in the early mornings, but that it deteriorated throughout the day due to the lack of refrigeration facilities.

There is a global trend for formal food retail outlets to comply with private voluntary food safety standards (Fulponi, 2006). Fulponi (2006) further indicates that there are South African retailers which also prescribe to such systems. This is supported in an article by Fekken (2011) which indicated that there are currently five different retail standards available in South Africa, each with auditable requirements for food product testing & compliance. By subscribing to such standards, these formal food retail outlets require that suppliers deliver products of a certain standard according to predetermined specifications. Quality checks are done according to these specifications at warehouse level before the product is distributed to individual shops. Further to this, these retailers have better control over the cold chain of the product that can be maintained all the way from the supplier to the point of sale (Fekken, 2011; Fulponi, 2006). Based on feedback from the store observations conducted by the three field workers and the focus group discussions; the informal outlets usually procure their products from wholesalers and large fresh produce markets. Refrigerated transportation is typically not an available to informal food retail outlets. Some spaza shops had access to electricity and refrigerators, but these were seldom used for fruit and vegetables but rather for highly perishable items such as meat and dairy produce. The street vendors occasionally made use of temperature controlled containers, commonly known as cooler boxes, but in many instances they did not have access to electricity. A similar picture was sketched by the Nielsen (2016) and Sustainable Livelihoods Foundation (2016) reports. It was noted that there is also some concern regarding fortification or lack thereof in certain foods such as maize flour in informal food outlets such as spaza shops. Yusufali, Sunley, de Hoop and Panagides (2012) found that the level of compliance with statutory fortification requirements was low, both for bread flour and for maize meal in South Africa. Informal food retail outlets do not typically have access to the regulatory and quality assurance resources the larger outlets have, nor are they as closely monitored by regulators, there is therefore a greater risk of the availability of non-compliant foods.

It was concluded that the participants considered quality a key determinant of acceptability and were generally more satisfied with the quality of foods kept by the formal food retail outlets as opposed to the informal food retail outlets.

4.5.5 Accommodation

Accommodation refers to the efforts outlets make to meet their customers' needs. Examples (Table 4.9) could take the form of extended store hours; having a variety of goods and services available; a wide range of products on offer; and allowing customers more convenient options of payment as negotiable options (Caspi *et al.*,2012; Penchansky & Thomas, 1981). These parameters were explored during store observations and results tabulated.

TABLE 4.9: FOOD RETAIL OUTLET'S STRATEGIES TO ACCOMMODATE CUSTOMER NEEDS

	Shoprite	Pick n pay	Spaza Shops	Street Vendors
Trading hours				
Weekdays	07:00 – 19:00	07:00 – 19:00	06:00 – 22:00	Varying
Saturdays	07:00 – 17:00	07:00 – 19:00	Varying	Varying
Sundays	07:00 – 17:00	08:00 – 17:00	Varying	Varying
Variety of range	Large	Large	Small to Medium	Small
Credit options	No	No	Yes	Yes

The spaza shops were identified to have the longest trading hours (06:00 – 22:00), opening before any other shops to cater for people travelling to work using the early morning transport options. Then they only close once the regular majority of residents have returned from work. This data (Table 4.9) is in line with the research done by The Sustainable Livelihoods Foundation (2016) which considered nine South African townships. Both Shoprite and Pick n Pay have similar trading hours during the week being open from 07:00 to 19:00. The street vendors always have varying trading hours. As already mentioned (4.5.1), the variety offered in a wide range of foodstuff sold in the formal outlets was more extensive than those on offer in the spaza shops and by the street vendors. Credit options and special payment arrangements could be negotiated with certain spaza shops and street vendors.

This collected data affirms that the spaza shops accommodated the identified and specified convenience needs of the participating study group members, while the supermarkets addressed the price and product range needs.

4.6 PERCEPTIONS OF THE ACCESS DIMENSIONS (OBJECTIVE 4)

The fourth objective aimed to determine and describe the study group's perceptions of the access dimensions to food choices

4.6.1 Availability

To collect data to determine and describe the perception of availability of food, respondents were asked in the survey questionnaire to indicate whether or not they were satisfied with the healthy food provision in their environment. This point was further explored in the focus group settings arranged as part of the methodology prepared for this study. These took place after completion of the questionnaire survey. Table 4.10 summarises the results to the questionnaire statement: “Healthy foods are available in the outlets where I normally shop.”

TABLE 4.10: PERCEPTION OF AVAILABILITY OF HEALTHY FOODS IN THE OUTLETS WHERE RESPONDENTS NORMALLY SHOP (n = 288)

Healthy foods are available in the outlets where I normally shop	n	%
Strongly agree	67	23.3
Agree	154	53.5
Undecided	30	10.4
Disagree	31	10.8
Strongly disagree	6	2.1
Total	**288**	**100**

The majority (53.3%, n-154) of respondents agreed that healthy food was available at the outlets where they normally shop. Some (23.3%, n = 67) of respondents strongly agreed that healthy food was available at the food retail outlets they normally buy from. Only 2.1% (n = 6) did not agree with this statement, 11.8% (n = 31) disagreed and 10.4% (n = 30) were undecided.

In general, the focus groups participants also indicated that they were satisfied with their experience of shopping for healthy foods in the supermarkets, however, they felt that the range of healthy foods in the spaza stores could be expanded on. One participant commented that certain foods such as mozzarella cheese were not available in their neighbourhood, but that she was able to buy these items in other shops in Pretoria. Another participant also mentioned that only full cream milk was available at the spaza shops and if she wanted to buy low fat milk she would need to travel to a supermarket. Similarly Battersby and Peyton (2014) concluded that food retail outlets in low-income urban areas in Cape Town, South Africa, typically stock less healthy foods than those in wealthier areas.

It can therefore be deduced that the study group participants felt that the availability of healthy foods from the formal food retail outlets were acceptable, but that that the range of healthy foods in the informal food retail outlets can be improved on.

4.6.2 Accessibility

In the context of this study, accessibility refers to how easy it is for a householder to get to a local food outlet. A number of resources are required to do this, such as time, fuel and public transport facilities that might also include monetary costs or even another form of payment (Lin *et al.,* 2014; Caspi *et al.,* 2012; Penchansky & Thomas, 1981). Both the completion of a questionnaire and focus group discussions were used to collect data to determine and describe the study group's perceptions of the accessibility dimension related to foodstuffs. A statement was given in the survey questionnaire regarding the accessibility of foodstuffs and respondents were asked to rate the degree of agreement. The statement read: "I am satisfied with the range of outlets I have access to". A summary of the results is presented in Table 4.11.

TABLE 4.11: PERCEPTION OF SATISFACTION WITH THE RANGE OF OUTLETS ACCESSIBLE TO RESPONDENTS (n = 288)

I am satisfied with the range of outlets I have access	n	%
Strongly agree	68	23.6
Agree	153	53.1
Undecided	26	9.0
Disagree	37	12.8
Strongly disagree	4	1.4
Total	**288**	**100**

The majority (53.1%, n = 153) of the respondents agreed that they were satisfied with the range of food retail outlets to which they have access. Fewer (23.6%, n = 68) respondents strongly agreed with this statement. Only 9% (n = 26) of the respondents were undecided. Respondents did not typically disagree with this statement and only 12.8% (n = 37) of the respondents disagreed with 1.4% (n = 4) strongly disagreeing.

The participants in the focus group discussion did not seem to be as satisfied with the range of food retail outlets to which they had access. However, there was obvious consensus when someone in the group suggested that it would be nice to have another large retail shop closer to home. Although spaza shops and street vendors are within easy reach, frustration was voiced over the quality (acceptability), price (affordability) and range (availability) of products these outlets kept.

The level of ease of transporting the food from the shop to the purchaser's home is part of the accessibility dimension. In the survey questionnaire respondents were asked to indicate how they transported the food purchased to their home and five different modes were given as options (Figure 4.15) for selection. The majority (42%, n=121) of respondents took a taxi or bus and or they carried their parcels home themselves (37%, n=106). Only 15% (n=43) used a car and 6% (n=17) indicated that somebody often helped them carry their purchased items. The use

of public transport can be explained by limited private ownership of cars in this study area. Minibuses and buses are popular modes of transport for those without access to private cars (City of Tshwane Metropolitan Municipality, 2008:49)

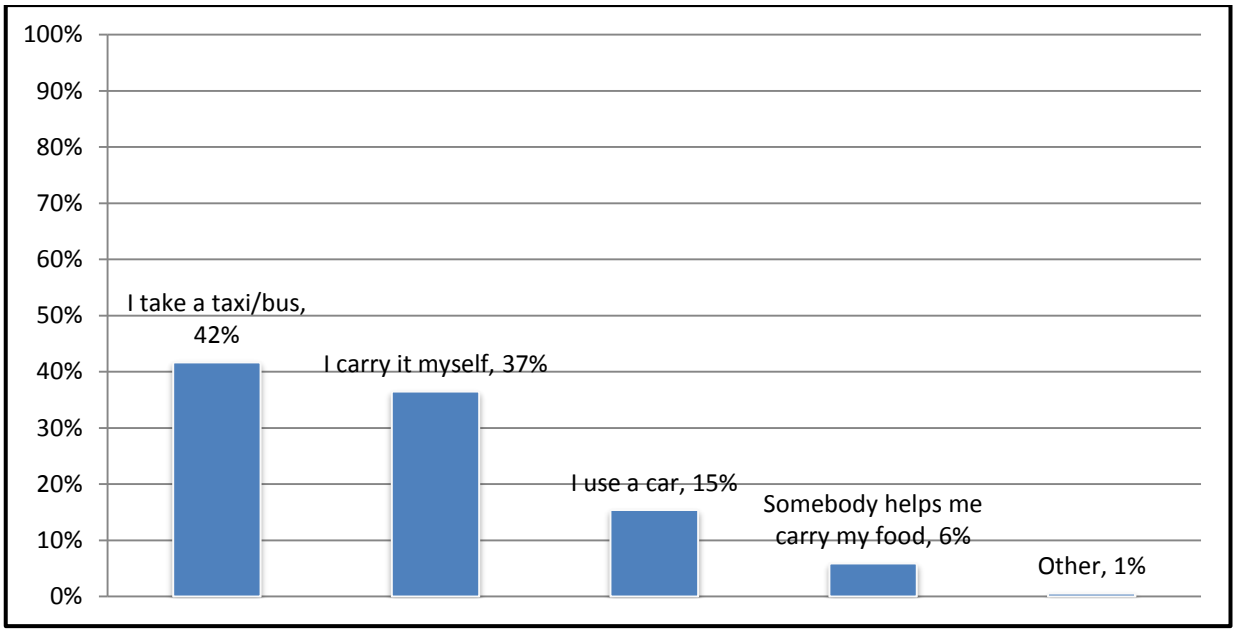

FIGURE 4.15: MODES USED TO TYPICALLY TRANSPORT PURCHASED FOOD HOME (n=288)

The challenges of, and solutions to consider for overcoming them when transporting foodstuffs purchased, was elaborated on during focus group sessions. It is common knowledge that privately owned modes of transport are very limited in this study area for a variety of reasons. In one of the focus group sessions, a participant mentioned that he had a friend who had a car and he had an arrangement with this friend to take him to one of the supermarkets once a month. He would then compensate his friend for the cost of the petrol used for the trip to and from the retail outlet. Some other participants commented that they used public transport when they shopped at the supermarkets but could walk when they needed products they knew a spaza shop or street vendors sold.

Minibus taxis are the most commonly used form of public transport in the area, but certain challenges were described about this mode of transport. First, some taxi drivers would charge an additional fee for the space the packets took in the taxi. Second, some participants indicated that they needed to take more than one taxi to get home and it was difficult to get in and out of the taxis with their parcels. Third, for some of the participants the taxi stopping points were still a considerable walking distance from their home. These challenges make it very difficult to purchase more food or groceries than one is able to carry comfortably.

Opportunist taxi drivers and individuals with access to cars have identified these issues and, for a slightly higher fee than the regular minibus charge, they provide an exclusive service for

customers who choose to have this kind of help to get their shopping purchases from the shop to their own front door. Only two participants mentioned that they used this service offering.
It is therefore finally concluded that, although the participants generally perceived access to formal food retail outlets in their local environment as satisfactory, transport to and from them was a real and definite challenge.

4.6.3 Affordability

The perception of affordability regarding the cost of food was explored using information from both the questionnaire and focus group discussions. The perception of the affordability of fruit and vegetables at the outlets usually supported from was measured using responses to the questionnaire instructions. Results given as percentages in Table 4.12.

TABLE 4.12: PERCEPTION OF AFFORDABILITY OF FRUIT AND VEGETABLES AT THE OUTLETS USUALLY BOUGHT FROM (n = 288)

Fruits and vegetables are affordable in the outlets I normally buy from	n	%
Strongly agree	58	20.1
Agree	142	49.3
Undecided	35	12.2
Disagree	44	15.3
Strongly disagree	9	3.1
Total	**288**	**100**

Respondents were asked to indicate whether they agree that fruit and vegetables are affordable where they frequently shop. Half the respondents (49.3%; n = 142) agreed and another 20.1% (n = 58) strongly agreed with this statement. Only 15.3% (n = 44) disagreed and even fewer participants strongly disagreed (3.1%, n = 9). Some (12.2%, n = 35) of the respondents were undecided. This point was also addressed in the focus group sessions.

During the focus group discussions participants provided valuable information about the research topic as experienced in their own food environment. Overall the feedback indicated that the formal food retail outlets were the most cost-effective for them and the spaza shops the most expensive. Instances of price fixing amongst vendors in the fresh produce markets and certain street vendors were also pointed out. It was explained that vendors situated close to each other would fix prices and try to prevent any vendors who tried to sell products for a lower price from trading in what considered was their space. As an example, one participant described a situation in which all the vendors at the fresh produce market would sell a cabbage for R14.00 and if one vendor sold a cabbage for R12.00 the others would intimidate that vendor. Another interesting pricing technique of the market and street vendors was that they would reduce their prices towards the end of the day to get rid of all fresh produce before closing time. This enabled them to purchase new fresh produce for the next day.

When questioned on the affordability of healthy foods, it was indicated that they believed healthy foods to be more expensive than the alternative options. As an example, a participant explained that lean minced beef is more expensive than regular minced beef. It was however also mentioned that they considered fruit and vegetables to be healthy, yet most agreed that these were affordable, especially from the street vendors. Temple and colleagues (2011) found that healthy foods are considerably more expensive than commonly consumed foods and therefore a healthy diet is unaffordable to a large part of the population.

It can therefore be concluded that the study group perceived the food sold in their local environment as affordable in general. However, it appears that they do not necessarily regard healthy foods, baring fruits and vegetables, as affordable.

4.6.4 Acceptability

The perception of acceptability of food available to the study group was explored in both the questionnaires and focus groups.

Quality was identified as a measure of acceptability of healthy food such as fruits and vegetables. Respondents in the questionnaire were therefore asked to indicate their level of satisfaction with the quality of fruits and vegetables available in the outlets they normally visit. Results can be seen in table 4.13.

TABLE 4.13: PERCEPTION OF THE QUALITY OF FRUIT AND VEGETABLES AVAILABLE IN THE OUTLETS RESPONDENTS NORMALLY SUPPORT (n = 288)

Good quality fruit and vegetable products are available in the outlets I normally shop	n	%
Strongly agree	57	19.8
Agree	163	56.6
Undecided	27	9.40
Disagree	36	12.5
Strongly disagree	5	1.7
Total	**288**	**100**

The majority (56.6%, n = 57) of respondents agreed that good quality fruit and vegetables were available at the food retail outlets that they normally buy from and 19.8% (n = 57) strongly agreed with this statement. Some (12.5%, n = 36) of the respondents disagreed with this statement and only 1.7% (n = 5) strongly disagreed that good quality fruits and vegetables were available at the food retail outlets. Only 9.4% (n = 27) were undecided on the matter.

As indicated in objective 3, section 4.5.4, participants of the focus group discussions indicated that they were dissatisfied with the quality of products in their close proximity but was satisfied

with the quality of products in their larger environment. They revealed that they believed the quality of food sold at the formal retail outlets were superior to those sold at the spaza shops or by street vendors.

It can therefore be concluded that the participants generally perceived the food products sold in their local food environment as acceptable. However, they perceived the quality of food sold by the formal retail outlets as superior to those sold by the informal retail outlets.

4.6.5 Accommodation

Accommodation can be described as the efforts outlets make to meet their customers' needs (Caspi *et al.*,2012; Penchansky & Thomas, 1981). To determine and describe the study group's perceptions of this dimension, a question regarding accommodation was included in the survey questionnaire and discussed further in a focus group meeting. The analysed results are given in Table 4.14.

TABLE 4.14: PERCEIVED ACCOMMODATION OF CUSTOMER NEEDS (n = 288)

These outlets accommodate my needs	n	%
Strongly agree	52	18.1
Agree	124	43.2
Undecided	36	12.5
Disagree	50	17.4
Strongly disagree	25	8.7
Total	**287**	**100**

The majority (43.2%, n = 124) of the respondents indicated that the food retail outlets which they generally access, do accommodate their needs, with 18.1% (n = 52) agreeing strongly with the given statement. Some participants (17.4%, n = 50) disagreed and 8.7% (n = 25) strongly disagreed with the statement while 12.5% (n = 36) were undecided. Of all the access dimensions measured, the perceived level of satisfaction was the lowest for accommodation.

This issue was further explored in some focus group settings. Some participants mentioned that one of the main frustrations with the supermarkets as retail shops was that the queues were very long. It was reported that one of the supermarkets created a queue especially for pensioners on certain days, but this had done little for the frustration associated with the usual time-consuming queues. Some of the spaza shops offer credit options for their regular customers, but the participants in the focus group were weary of creating this type of debt. Not one of the supermarkets had any initiatives or solutions in place to address the difficulties customers often had with transporting purchased food to their own homes. Respondents also revealed that the longer trading hours of the spaza shops were convenient.

It was concluded that the study group's perception was that the informal retail outlets accommodated their food provision needs better than the formal food retail outlets.

4.7 FOOD CHOICES OF THE STUDY GROUP (OBJECTIVE 5)

The fifth objective was to determine and describe the food choices of the study group. This was done using the survey questionnaire which included a question on meal patterns, 24-hour food recall and questions regarding food frequency.

4.7.1 Number of meals

Respondents were asked how many meals (Figure 4.16) they typically consume. Only a small group (2%, n=5) of the respondents consumed one meal in a day. More (23%, n=65) respondents consume two meals a day but the majority (57%, n=165) had three meals in a day. Fewer than 15% (n=42) had four meals a day, 2% (n=6) had five meals, as those who had six meals or more (2%, n=4). These results reflect a shift towards a more westernised eating pattern of three meals a day from the traditional two meals a day. A number of other studies working with different South African population groups also recognised this shift (Temple, *et al.,* 2006; Labadarios *et al.,* 2005; Viljoen*.,* 2009). The traditional two-meals-a-day diet was usually one meal at noon and one in the evening (Labadarios *et al.,* 2005; Vorster, 2005).

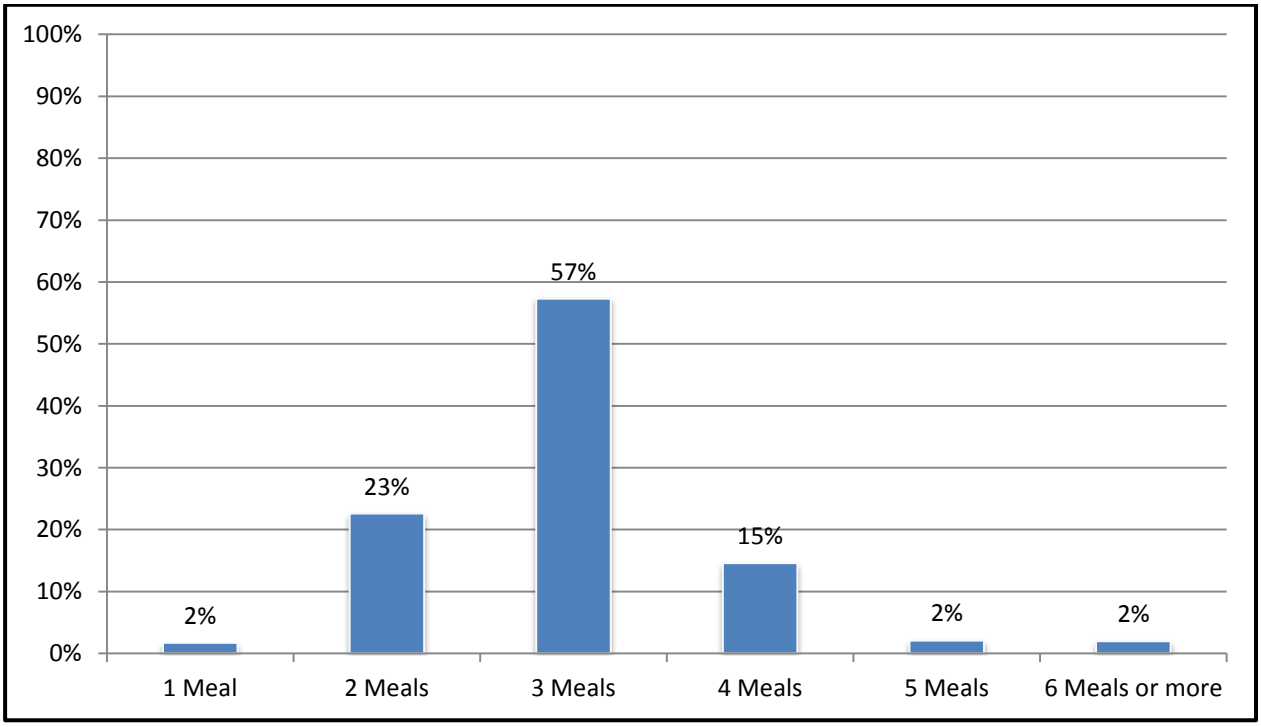

FIGURE 4.16: NUMBER OF MEALS TYPICALLY CONSUMED IN A DAY (n=288)

4.7.2 Meal patterns and composition

To obtain more information regarding current eating patterns respondents were questioned about the number of meals they consumed away from home as well as the food they had eaten the previous day. First, respondents were asked to indicate how often they had meals in places other than at home. These results are given in Figure 4.17.

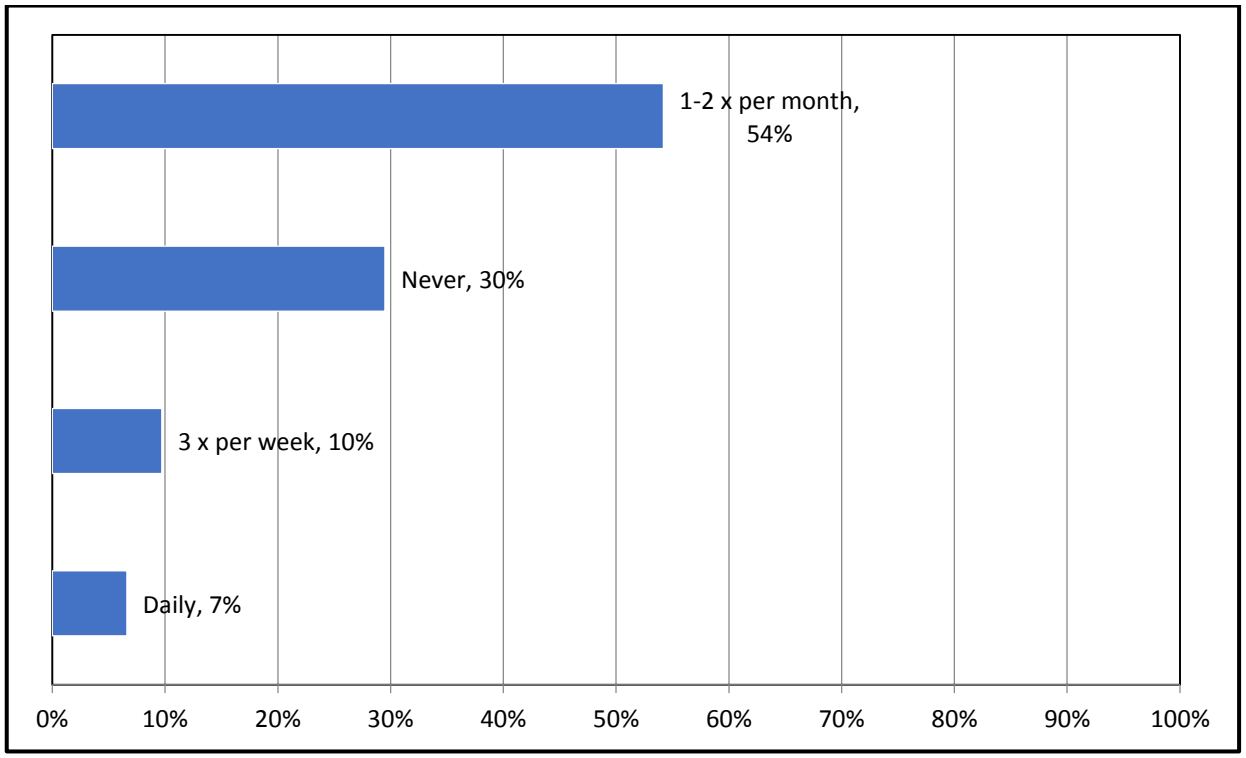

FIGURE 4.17: FREQUENCY OF MEALS CONSUMED OUTSIDE OF HOME (n=288)

The majority (54%, n=156) indicated that they only consumed meals outside the home once or twice a month and 30% (n=85) never had a meal away from home. Some (10%, n=28) of the respondents typically consumed meals outside the home three times in a week and only 7% (n=19) did so on a daily basis. A possible explanation for the low frequency of meals consumed outside of home is that nearly a third of the study group were pensioners or unemployed (Table 4.3) and they could therefore eat at home on a more regular basis. When interpreting these results, it is important to note that the question only referred to meals and not snacks, so it is unknown whether these respondents might be eating food they would consider as snacks when eating outside the home.

To identify the specific food people generally chose to eat, the sampled study group for this study, were asked to respond to a question that asked them to detail the content and time they had a meal the previous day. This result represented a technique referred to as a 24-hour food

recall response. Table 4.15 shows food and beverages consumed over the period of one day according to each of the different meal times.

TABLE 4.15: ANALYSIS OF THE NUMBER OF TIMES A FOOD WAS MENTIONED BY 288 RESPONDENTS AS CONSUMED ACCORDING TO THE DIFFERENT MEAL TIMES (n = number of times item was indicated)

Time interval		n	Time interval		n
Breakfast: Food/drink consumed	bread	151	**In between (Noon): Food/drink consumed**	fruit	76
	tea	147		bread	63
	milk	87		tea	56
	soft porridge	57		fruit juice	32
	cereal	36		cold drinks	24
	fruit	23		milk	21
	egg	22		pap	15
	coffee	19		meat	9
	cheese	13		cheese	8
	fruit juice	12		egg	7
Lunch: Food/Drink consumed	bread	70	**In between Afternoon: Food/Drink consumed**	fruit	52
	pap	66		fruit juice	28
	vegetables	47		bread	26
	fruit	40		tea	25
	chicken	40		cold drinks	19
	cold drinks	39		potato crisps	16
	fruit juice	38		milk	14
	meat	38		pap	11
	rice	32		biscuits	8
	tea	22		biltong	6
Supper: Food/Drink consumed	pap	142	**In between after supper: Food/Drink consumed**	tea	32
	meat	95		bread	8
	vegetables	81		coffee	7
	chicken	67		rusk	2
	rice	45			
	fruit	23			
	potato	23			
	cold drinks	22			
	tea	19			

4.7.2.1 Breakfast

The predominant food products and beverages consumed for breakfast were bread and tea which were indicated n=151 and n=147 times respectively. Milk (n=87), soft porridge (n=57), and processed breakfast cereals (n=36) were also popular choices at this time of day. The relatively high frequency (n=87) of milk consumption can be explained as an accompaniment to the tea, porridge or breakfast cereal. These results indicate that bread- or cereal-based breakfasts were most common, a finding that is consistent with various other South African studies (Faber, Laubscher & Laurie, 2013; Viljoen 2009; Matla, 2008:81; MacIntyre, Kruger, Venter & Vorster, 2002). The importance of breakfast has long been established as an important meal and an indicator of a healthy lifestyle (Reeves, Halsey, McMeel & Huber, 2013; Hallstrom, Vereecken, Ruiz, Patterson, Gillbert, Casara, Diaz, Gomez-Martinez, Gross, Gossrand, Hegyu, Leroux, Mouratidou, Widham, Astrom, Moremo & Sjostrom, 2011).

4.7.2.2 In between breakfast and lunch

The most prominent food consumed during the morning was fruit and was indicated n=76 times. This could be because fruit is widely available from street vendors or outlets; it is affordable and does not typically require any special storage facilities, so it is a very convenient choice. Bread and tea again feature high on the list in second (n=63) and third (n=56) places respectively, with fruit juice (n=32) and cold drinks (n=24) falling out the top five most popular choices during these hours.

4.7.2.3 Lunch

For lunch, bread (n=70) and pap (maize meal porridge) (n=66) were the most popular choices followed by vegetables (n=47), fruit (n=23) and cold drinks (n=39) that were also important. These results point to lunch being bread- and starch-based. Chicken, meat and rice also featured in this meal. The meat category included beef, goat, sheep, poultry, and pork. It is important to note that the food selections for lunch were significantly more varied than the breakfast choices.

4.7.2.4 In between lunch and supper

During the time between lunch and supper fruit was the most consumed item (n=52), followed by fruit juice (n=28). Similar to the noon timeslot, fruit consumption had a high frequency rating that can be attributed to its convenience value. Bread again features among the top five most popular food items consumed as an afternoon snack (n=26), with tea (n=25) and cold drinks (n=19) also being in the top five choices.

4.7.2.5 Supper

The dominant foods consumed for supper were pap (maize meal porridge) (n=142) and meat (n=95). Vegetables, chicken, and rice also feature often, however, this is the first time that bread is not mentioned as a meal option. Pap (maize meal porridge) is a popular traditional dish; is affordable and easy to prepare, which may explain its wide acceptance as a regular meal item at the end of the day. Meat such as stew meat is a popular accompaniment for pap. This is the only mealtime that featured rice. This could be evidence of it becoming a more popular meal accompaniment as reported in other studies (Hansford, 2010; Viljoen, 2009; Viljoen & Gericke, 2001).

4.7.2.6 After supper

Overall, the main food or beverage items the respondents consumed after supper was tea (n=32), followed by bread (n=8), coffee (n=7) and rusks (n=2). Table 4.16 shows the results from the information collected from the 24-hour food recall responses. However, the total

number of times a food was indicated as having been consumed during one full day's eating programme is not specific to each mealtime.

TABLE 4.16: ANALYSIS OF NUMBER OF TIMES A FOOD WAS MENTIONED BY 288 RESPONDENTS AS CONSUMED OVER THE COURSE OF 24 HOURS (n = number of times item was indicated)

Most mentioned foods over the day			**Most mentioned cereal and grain products**		
1	bread	330	**1**	bread	330
2	tea	301	**2**	pap	243
3	pap	243	**3**	rice	83
4	fruit	214	**4**	soft porridge	71
5	meat	155	**5**	cereal	37
6	milk	152	**Most mentioned meat or high protein sources**		
7	vegetables	142	**1**	meat	155
8	fruit juice	125	**2**	chicken	116
9	chicken	116	**3**	egg	51
10	cold drinks	111	**4**	cheese	47
Most mentioned beverages			**5**	polony	42
1	tea	330	**Most mentioned snack type foods**		
2	fruit juice	125	**1**	fruit	214
3	milk	152	**2**	potato crisps	33
4	cold drinks	111	**3**	biscuits	15
5	coffee	41	**4**	biltong	15

The food items most indicated as consumed in the previous 24 hours were bread and pap (maize meal porridge) and these featured n = 330 and n = 243 times respectively. Bread was a popular option during the day and pap (maize meal porridge) more so during the evening. These were also indicated more often than any of the other cereal or grain based food. These results are consistent with those of various other South African based studies (Pradeilles, 2015, Faber *et al.,* 2013; Viljoen 2009; Matla, 2008:81; MacIntyre *et al.,* 2002). The two most indicated high protein sources were meat and chicken, respectively indicated n = 155 and n = 116 times. Meat included beef, goat, sheep, poultry, pork. Vegetables were only indicated n = 142 times. Considering that 288 respondents only indicated vegetables n = 142 times over the course of a full day is concerning and begs to question whether the study group were adhering to the South African Food-based Dietary Guidelines which recommend that at least five portions of vegetables and fruit are consumed per day (Naudé, 2013). MacInyre and colleagues (2012) also reported on similar findings regarding the low intake of vegetables. Fruit (n = 214) appeared to be consumed a great deal more than vegetables and was a dominant choice for a meal accompaniment or snack; it was also listed as the fourth most popular food consumed in a day. These results are consistent with those of other South African studies that have reported an increase of snacking on food such as fruit (Temple *et al.,* 2006; Bourne, Langenhoven, Steyn, Jooste, Nesamvuni & Laubscher, 1994).

In terms of beverages, tea (n = 301) was indicated more frequently than fruit juice (n = 125), cold drinks (n = 111) and coffee (n = 41). The high intake of milk (n = 152) can be explained as an accompaniment for the tea. Another South African study also reported on a high tea intake (Van Zyl, Steyn & Marais, 2010).

4.7.3 Frequency of consumption

To further determine and describe the food choices of the study group, respondents were asked to indicate how frequently they consumed certain foods. The foods were grouped into 17 broader categories. The list of foods and broader categories was based on a model used by Viljoen (2009:97-104) in a study of the food practices of the people of Mmotla in South Africa. For ease of reading, these results are given in both a table (Table 4.17) and a figure (Figure 4.18) at the end of the section. Table 4.17 shows the detailed results and the Figure 4.18 provides a visual overview of the results.

TABLE 4.17: FREQUENCY OF CONSUMPTION OF SPECIFIC FOOD GROUPS IN THE HOUSEHOLD (n=288) (adapted from Viljoen (2009:97-104))

	Daily	3-4 times per week	1-2 times per week	Less than 3 x per month	Special occasions	Never	Total
Cereals: maize, rice, wheat, sorghum, millet, and any other foods made from cereals such as porridge, bread and noodles	55.7%	17.4%	17.1%	5.6%	3.1%	1.0%	100%
White roots and tubers: Potatoes, and white sweet potato	11.8%	20.2%	37.6%	8.4%	13.2%	8.7%	100%
Orange flesh vegetables: Pumpkin, carrot, butternut or sweet potato	13.2%	20.9%	40.1%	10.8%	13.6%	1.4%	100%
Dark green leafy vegetables, including wild/ indigenous vegetables	9.1%	17.8%	36.4%	10.5%	15.7%	10.5%	100%
Other vegetables: tomato, onion, green beans, gem squash, eggplant, including wild/indigenous vegetables	36.6%	22.6%	25.8%	7.7%	6.6%	0.7%	100%
Orange coloured fruit: ripe mango, apricot, cantaloupe, papaya, dried peach and 100% fruit juice made from these	12.5%	15.3%	25.1%	15.3%	22.3%	9.4%	100%
Other fruit: Oranges, banana, apple, pear including wild/indigenous fruits	29.5%	21.1%	29.8%	10.5%	6.7%	2.5%	100%
Organ meat: Liver, kidney heart or other organ meats or blood based foods	11.2%	16.1%	27.3%	15.7%	20.6%	9.1%	100%
Meat: beef, goat, sheep, poultry, pork	27.9%	23.3%	22.3%	9.8%	8.7%	8.0%	100%
Eggs from any animal	23.0%	20.9%	18.8%	8.0%	5.6%	23.7%	100%
Fish and seafood: fresh, tinned or dried and shellfish	6.6%	15.7%	25.1%	19.5%	23.0%	10.1%	100%
Dried beans, peas, lentils, nuts, seeds or foods made from these	14.0%	16.1%	24.5%	14.3%	18.9%	12.2%	100%
Milk and milk products	50.7%	16.9%	16.9%	7.0%	5.6%	2.8%	100%
Oils and fats: sunflower, margarine lard, butter added to food or used in cooking	59.6%	17.1%	13.2%	4.9%	4.2%	1.0%	100%
Sweets: sugar, honey, cold drinks, sweets, chocolates,	38.3%	16.4%	15.0%	10.1%	16.7%	3.5%	100%

cake							
Spices and condiments: salt, pepper, tomato sauce, soya sauce	56.8%	16.4%	9.1%	4.9%	9.4%	3.5%	100%
Warm beverage: coffee, tea	79.6%	8.5%	4.2%	3.2%	2.8%	1.8%	100%

The most frequently selected category of foodstuff consumed on a daily basis was the group of warm beverages, mostly coffee and tea. The majority (79.6%, n=229) of the respondents indicated that they consume warm beverages daily and only 1.8% (n=5) indicated that they never consume warm beverages. These results align with those from the 24-hour food recall responses, which showed that it was the second most consumed food item mentioned during a 24-hour period. Respondents also indicated that they consume milk and milk products frequently (50.7%, n=146) each day. In part, the frequent use of milk and milk products can be linked to the consumption of warm beverages as milk is often added to tea and coffee.

Cereal- and grain-based products were predominantly (55.7%, n=160) consumed every day. This category includes maize, rice, wheat, sorghum, millet and any other food made from cereals such as porridge, bread and noodles. The high frequency of consumption is aligned with the results from the 24-hour food recall as well as other South African studies (Faber *et al.*, 2013; Viljoen 2009; Matla, 2008:81; MacIntyre *et al.,* 2002).

The majority (24.5%, n=71) of respondents indicated that they consume dried beans, peas, lentils, nuts, seeds or food made from these once to twice per week. Only 14% (n=40) indicated that they have these foods daily and 18.9% indicated that they only consume dried beans, peas, lentils, nuts, seeds or foods made from these on special occasions.

Oils and fats were typically (59.6%, n=172) consumed daily. This category includes sunflower oil, margarine, lard, butter alone or added to food or used in cooking. These results could be expected considering the high frequency of cereal and cereal based products consumed which are often accompanied or prepared with butter or margarine. Oil is also frequently used for cooking. Similarly, the frequent use of spices and condiments can be partially explained since it is rarely used on its own, but rather forms part of the meal preparation. The category for spices and condiments includes salt, pepper, tomato sauce and soya sauce. The majority (56.8%, n=164) of respondents indicated that they use spices and condiments to flavour their food every day.

Other noteworthy findings indicate that vegetable consumption predominantly ranged from daily use to a couple of times per week. White root crops and tubers such as potatoes and white sweet potato were mainly consumed once to twice a week (37.6%, n=108). Orange flesh vegetables, for example, pumpkins, carrots, butternuts or sweet potatoes were typically eaten once or twice a week (40.1%, n=115). Dark green leafy vegetables, including wild indigenous

vegetables were typically consumed once to twice per week (36.4%, n=105). The category of “other” accommodated a range of commonly known and frequently used vegetables, wild, indigenous and cultivated, the tomato, onions, green beans and gem squash as being consumed daily by 36.6% (n=105) of respondents. This points to a low daily intake of vegetables and is aligned with the results from the 24-hour food recall.

Fruit consumption appeared to be more frequent on oranges, bananas, apples and pears than consumption of orange coloured fruits, which included ripe mangos, apricots, cantaloupe melon, papaya, dried peaches and 100% fruit juice made from them. Only 12.5% (n=36) of the respondents indicated that they consumed the latter on a daily basis compared to 29.5% (n=85) of the respondents indicating that they consume oranges, bananas, apples, pears including wild/indigenous fruits daily.

Regarding meat and protein-rich products, 73.5% (n=212) respondents consumed at least one portion of beef, sheep, pork and poultry once a week. In comparison, organ meats were consumed less frequently and only 54.6% (n=157) of the respondents indicated that they consume these in a week. Organ meats were often (20.6%, n=59) consumed on special occasions. Eggs had the highest percentage (23.7%, n=68) of products “never” consumed. However, those that did consume eggs did so on a regular basis, which accumulated to 62.7% (n=181) of respondents indicating that they have eggs at least once a week. Fish and seafood, either fresh, tinned or dried and shellfish were typically consumed less frequently than beef, sheep, pork, and poultry. Only 6.6% (n=19) of the respondents indicated that they consumed fish or seafood daily. The majority (25.1%, n=72) indicated that they consumed fish or seafood once to twice per week.

Some (38.3%, n=110) of the respondent indicated that they consume sweets such as sugar, honey, cold drinks, sweets, chocolates and cake daily. Only 3.5% (n=10) of respondents indicated that they never consume products from this category. This data should be interpreted with caution as it is unknown whether the respondents included sugar added to warm beverages as intake for this category. Coffee and tea are commonly consumed with sugar, therefore the frequency of consumption of sugar is potentially a great deal higher on a daily basis than the reported 38.3% (n=110).

Results from the food frequency analysis therefore revealed a diet high in cereal and grain based products, warm beverages, oils and fats and milk and milk products. The consumption of meat, dried beans, peas, lentils, nuts, seeds or food made from these was less frequent. Although there was frequent consumption of certain vegetables, this category of food was not being consumed at the same frequencies seen for cereal or grain products, fats and oils or even

sweets and sugar. Vegetable intake would thus be low in this case. Consumption of eggs, fish and seafood was also infrequent.

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Figure 4.18 provides a visual overview of these results.

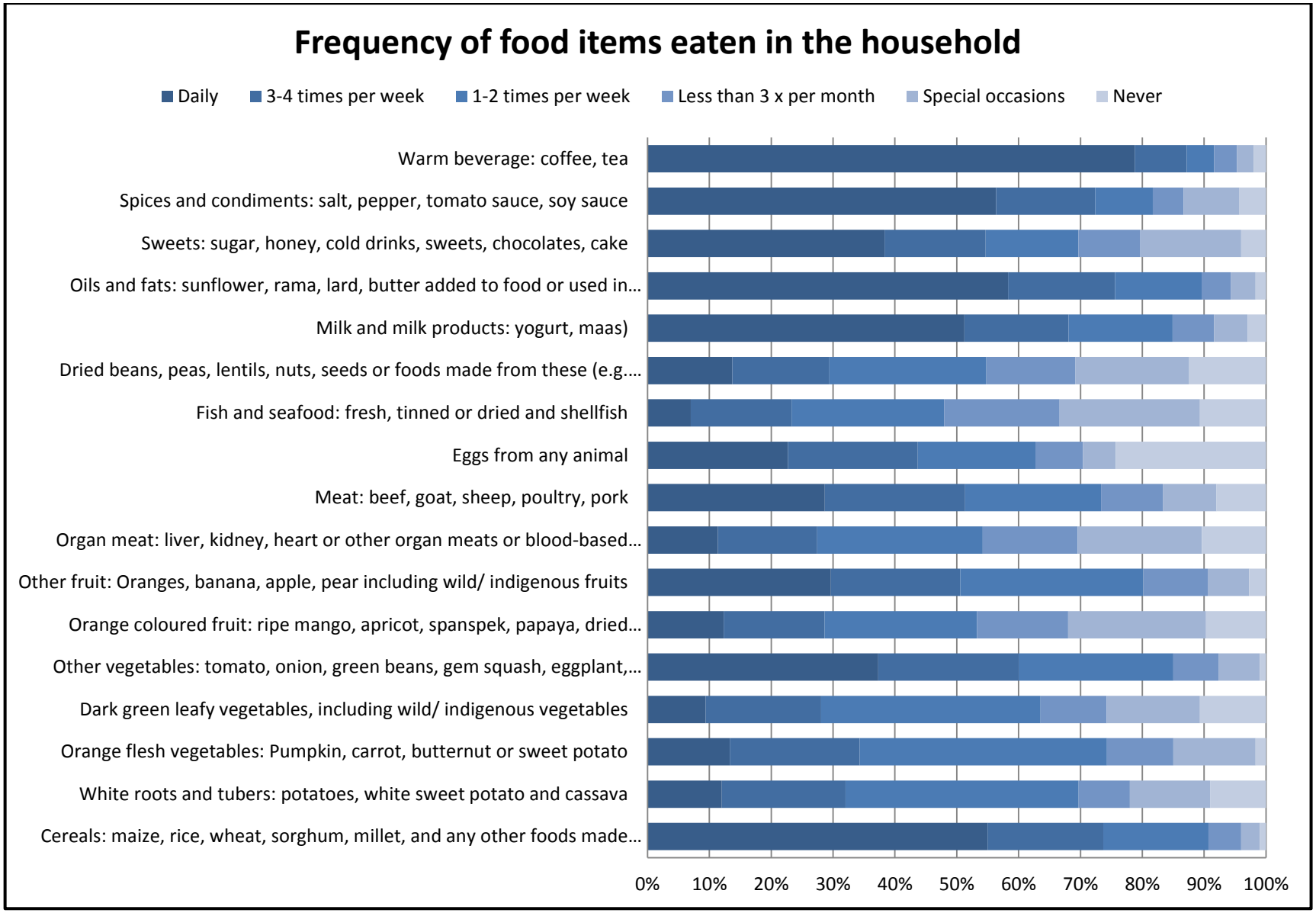

FIGURE 4.18: FREQUENCY OF CONSUMPTION OF SPECIFIC FOODS IN THE HOUSEHOLD (n=288) (adapted from Viljoen (2009:97-104))

4.7.4 Concern with healthy food choices

Linked to food choice, the questionnaire also attempted to measure the extent to which the respondents themselves, their friends and the people they live with care about eating healthy food, as this forms part of the food choices made. Figure 4.19 shows a breakdown of the results.

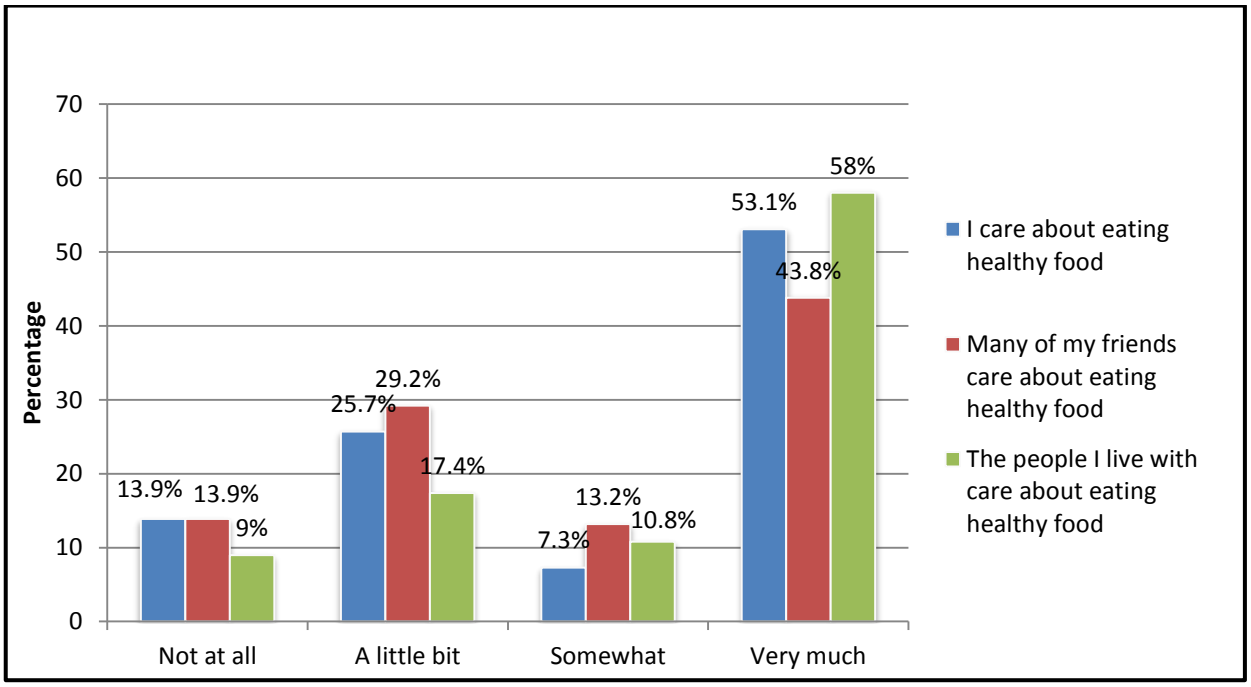

FIGURE 4.19: LEVEL OF CONCERN REGARDING THE CONSUMPTION OF HEALTHY FOOD (n=288)

It was interesting to note that many respondents indicated that they themselves (53.1%, n=153), their friends (43.8%, n=126) and the people they live with (58%, n=167) were reported to care very much about eating healthy food. Respondents were asked to indicate the degree to which they agree with the statement: “My food at home is generally prepared in a healthy manner”. The results are given in Figure 4.20.

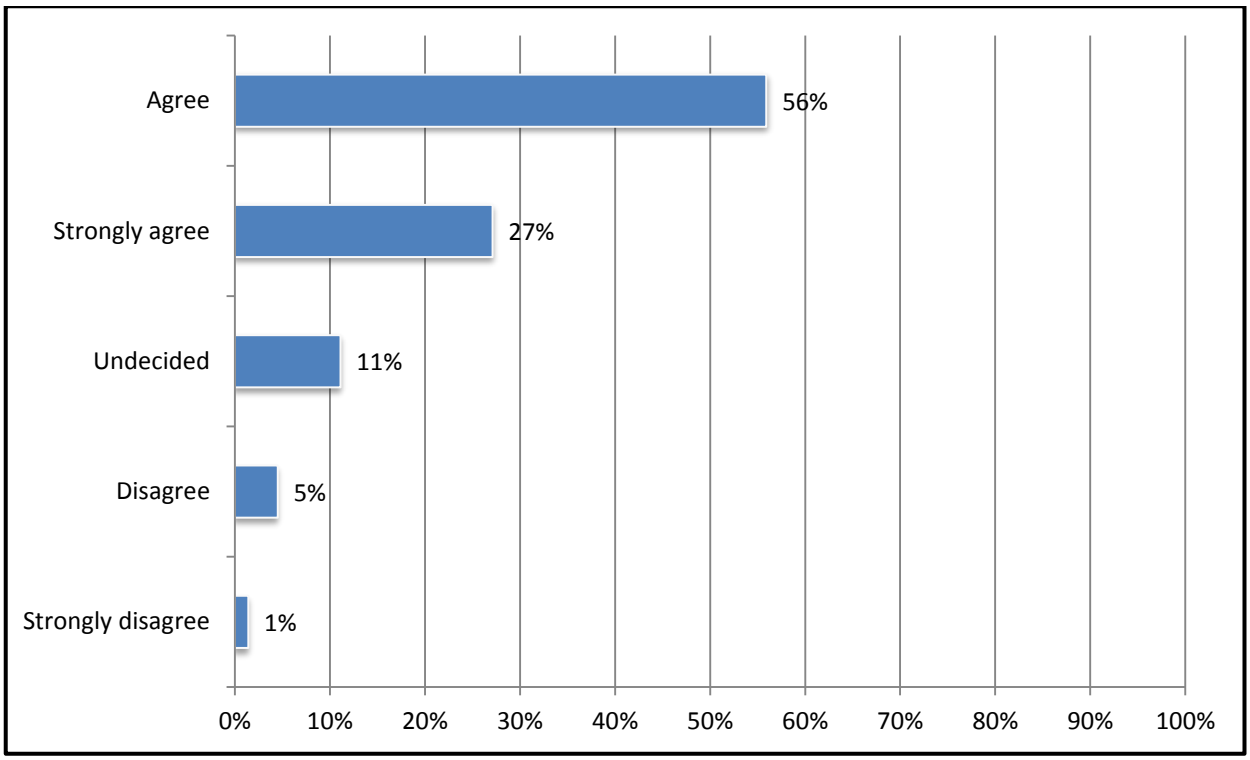

FIGURE 4.20: PERCEPTION OF HEALTHY FOOD PREPARATION (n=288)

The majority (56%, n=161) of respondents agreed with the statement that their food was prepared in a healthy manner. A further 27% (n=78) of respondents strongly agreed with this statement. Only 5% (n=13) disagreed; 1% (n=4) strongly disagreed; and 11% (n=32) were undecided. It can therefore be concluded that respondents believed that their food was prepared in a healthy manner and that they themselves and those around them cared about eating healthily. Their knowledge and perception of what "healthy" meant was, however, not measured.

Results from the questionnaire and focus group discussions revealed that the food choices the study group participants made, concur with the results of other South African studies (Faber *et al.,* 2013; Viljoen 2009; Matla, 2008:81; MacIntyre *et al.,* 2002). Typically, diets were laden with cereals or starch-based food such as bread. Although there was some intake of fruit, that of vegetables was low and seemingly not in line with the South African Food-based Dietary Guidelines. Tea, fruit juice and soft drinks were popular options as beverages and added to the high intake of sugar.

The last objective relating to the relationship between the local food environment and food choices is discussed next.

4.8 THE RELATIONSHIP BETWEEN THE LOCAL FOOD ENVIRONMENT AND FOOD CHOICES (OBJECTIVE 6)

The sixth objective was to determine and describe the relationship between the local food environment and the food choices the study group participants make. Of interest too is the relationship between the local food environment and food choices (Glanz *et al.,* 2012; Williams *et al.,* 2011; Freedman & Bell, 2009; Larson & Story, 2009; Story *et al.,* 2008; Glanz & Yaroch, 2004; Yan *et al.,* 2015). Battersby and Peyton (2014) also explored the effect of supermarket expansion and food access. They concluded that supermarkets in low-income urban areas typically stock less healthy foods than those in wealthier areas and, as a result, the supermarkets do not increase access to healthy foods and may, in fact, accelerate the nutrition transition.

A few key findings from the previous objectives are considered to determine and describe the relationships between the local food environment and food choices identified in this study. These finding are as follows:

- Although supermarkets were available to the study group, these were not as accessible as the informal retail outlets that consisted of street vendors and spaza shops. There are far more spaza shops than supermarkets. These results were consistent with other South Africa studies (Roos *et al.,* 2013; Crush & Frayne, 2011). and were reported in section 4.3.
- Due to access limitations, supermarkets were only frequented a couple of times in a month, whereas spaza shops were typically used daily or at least a couple of times in a week. The majority (53.5%, n=154) of respondents went to spaza shops daily and those that did not visit daily, visited the spaza shops at least once a week (30%, n=86). Supermarkets on the other hand, were usually (36.4%, n=105) visited fewer than three times in a month. These findings are in line with those of Crush & Frayne (2011) who report that 51% of poor urban households only frequent supermarkets once a month. It can be concluded that bulk purchases for staple foods are done at the supermarkets once or twice a month and the remainder are done more frequently at spaza shops and street vendors. These results were reported in Table 4.7.
- The range of food found in a spaza shop is limited and in many instances “healthy” alternatives to various foods are not kept. The results in section 4.5.1 and 4.6.1 showed that there were no low fat or fat free milk or cheese options, brown rice, sugar free sweets, sugar free or reduced sugar soft drinks or lean meats. The range of vegetables was also limited in comparison to supplies offered at the supermarkets. On the other hand the spaza shops and street vendors stocked an abundance of “unhealthy” food options, such as cold drinks, sweets and ready to eat meals that are nutrient poor end energy dense,

such as *vetkoek* (fat cakes). These findings are in line with those of the 2016 Nielsen report related to South African food retail outlets and Roos and colleagues (2013) reported similar findings. Further to this, it was also found that spaza shops were typically more expensive than supermarkets (refer to sections 4.5.3 and 4.6.3).

- The study group had diets very similar to those documented in various other South African studies (Faber *et al.,* 2013; Viljoen 2009; Matla, 2008:81; MacIntyre *et al.,* 2002). The diets lacked vegetables and were particularly high in refined sugars and carbohydrates (refer to table 4.16). Poor food choices such as these can lead to an increased risk of non-communicable diseases such as hypertension, strokes, type 2 diabetes, heart disease and certain cancers (Popkin *et al.,* 2012; Mayosi *et al.,* 2009). It appears that that the main reasons for selecting these product types are associated with affordability, availability and cultural norms.

Therefore, it can be concluded that, if an individual wanted to make healthier food choices, it would be difficult to do so in their current environment as the spaza shops lacked a range of healthy food options; the basic staple foods that they did sell where typically more expensive than supermarkets; and there is limited access to larger supermarkets. These finding are in line with those of Battersby and Peyton (2014) which argued that the supermarkets in low-income areas typically stock less healthy foods than those in wealthier areas and, as a result, the supermarkets do not increase access to healthy foods and may, in fact, accelerate the nutrition transition.

From the observations presented, it can then be concluded that a relationship exists between the local environment and food choices. It also appears that accessibility and affordability or two major barriers to making healthy food choices.

4.9 CONCLUSION

Chapter 4 provides the results to the study as well as an interpretation of these results. Demographic data showed that the study group consisted of 288 respondents over the age of 18 and who were predominantly female (n = 190, 66%). There were two supermarkets in the determined perimeter of the study area and numerous spaza shops and street vendors. The study group indicated that access to supermarkets was challenging and that spaza shops are thus frequented on a more regular basis. The range of food products stocked by spaza shops is limited and healthy alternatives to many food types could not be found. Food patterns of the study group revealed a diet high in refined carbohydrates and sugars and low in vegetable intake. It was concluded that a relationship does exist between the local food environment and

the food choices of the study group. It can also be concluded that if an individual did want to make healthier food choices it would be difficult to do so in their current environment due to constrains associated with accessibility and affordability.

The following chapter provides a conclusion to the study and explores the significance of the study and its limitations, recommendations derived from the study, and suggestions for future research are specified.

Chapter 5

Conclusions and recommendations

5.1 INTRODUCTION

This chapter provides the conclusions derived from this study on the contribution of the local environment to the food choices of black adults who reside in Mamelodi, Pretoria. The themes covered are the conclusions stemming from the objectives of the study; the significance of the study and its limitations; recommendations from the findings derived from the study; and suggestions for future research.

Societal, economic and cultural changes due to migration, urbanisation, economic advancement and modernisation have accelerated the movement from traditional to Western-orientated food choices in South Africa (Temple & Steyn, 2011; Vorster *et al*., 2005). Western-orientated food choices often include cheap edible fats and oils, sweetened beverages, convenience meals and meals that have excessive amounts of "empty calories" (Popkin *et al.,* 2012). This is typical of a nutrition transition associated with risk factors such as obesity and overweight, which could potentially lead to non-communicable diseases including hypertension, stroke, type 2 diabetes, heart disease and certain cancers (Popkin *et al.,* 2012; Mayosi *et al.,* 2009). Proof of this, development is evident in the South African Demographic and Health Survey conducted in 2016 (Statistics South Africa, 2017), which revealed that 68% of the women and 31% of the men surveyed are overweight or obese.

In response to the increased prevalence of people being overweight and obese, and that non-communicable diseases are associated with this condition, various intervention strategies have been developed that aim to change consumer behaviour guiding it towards healthier food choices (Naudé, 2013). These interventions however, fail to recognise the complexity associated with the local food environment, specifically the contribution that access dimensions make to healthy food choices. Currently, limited research is available on this concern as well as on the food purchasing behaviour of black adults in township areas such as Mamelodi in Pretoria. The purpose of this study was thus to explore and describe the food practices of black adults in the Mamelodi West area to describe the impact that access to healthy food has on food choices. The main conclusions derived from each formulated objective of the study are presented in the following section.

5.2 CONCLUSIONS ON THE OBJECTIVES OF THE STUDY

5.2.1 Conclusions on the broader physical environment (community setting) of Mamelodi West (Objective 1)

The focus of the first objective dealt with the physical environment and the community setting of the study group. Additional information relates to food outlets available in the study group's local environment. The formal and informal outlets in the physical environment link to the study group's food practices. Formal outlets in the area are two of the major South African supermarkets, Shoprite and Pick n Pay. Informal outlets are predominantly spaza shops and street vendors. Thus, within the delimited study area there are only two supermarkets in contrast to the large number of spaza shops and street vendors trading in various specific locations in and around the study area. Roughly two to three spaza shops and informal vendors were found within any two-block radius around a specific point in the study area. A spaza shop or street vendor was typically found within a 2-minute walk from any location in the study area. These proximity findings concur with other South African studies (Roos *et al.*, 2013; Crush & Frayne, 2011)

5.2.2 Conclusions on the local food environment of the study group (Objective 2)

The second objective included sub-objectives related to the formal food retail environment, informal food retail environment and home food environment to better understand the local food environment of the study area. As highlighted, the formal food retail environment consists predominantly of major South African supermarkets namely, Shoprite and Pick n Pay (5.2.1). The informal food retail environment consists predominantly of the numerous spaza shops and street vendors located in the study area.

5.2.2.1 Formal food retail environment

For the third sub-objective, through the formal local food environment, the researcher planned to explore, locate and describe the formal retail outlets available to the respondents in the study area. Two formal stores were found in close proximity to one side of the Township. The Shoprite supermarket is located at Mamelodi Crossing, with the Pick n Pay supermarket located at the Denneboom shopping centre. Additional formal food retail outlets were also found close to the selected study area but not within the selected boundaries, although these were not explored owing to the financial constraints of the study.

The two formal outlets were found to have a larger variety of foods available when compared to the informal food retail outlets. This included a large variety of fresh fruit and vegetables, conveniently pre-packed delicatessen foods, in-store butcheries, as well as a bakery section. The selection of ambient, pre-packed food was extensive, and included both branded and non-branded products. Overall, a large variety of food was available. Similar findings were presented by Battersby and Peyton (2014).

5.2.2.2 Informal food retail environment

For the fourth sub-objective related to the informal food retail environment, the street vendors and spaza shops scattered throughout the study area were considered. It was found that these outlets focused predominantly on convenience items. These outlets had a limited range of foods, especially when compared to the formal food retail outlets.

Street vendors typically sold fruit, vegetables, sweets, cold drinks and ready-to-eat meals such as vetkoek (fat cakes). In limited instances street vendors also sold fresh meat. Street vendors usually traded in pre-constructed areas that served as market places, or found scattered along the streets working from makeshift tables or tarp sheets.

Spaza shops generally carry a more extensive range of food than street vendors, although still significantly less than the supermarkets. In most instances spaza shops also had access to electricity and refrigerators. The range of food included fresh milk, cheese (single pre-packed slices), meat such as chicken, chicken liver, chicken feet, beef chuck, braai packs, bread, maize meals, tinned foods such as pilchards, carbonated (fizzy) soft drinks (including unfamiliar brands copying market leaders as cola variations), chips, and sweets. They also typically sold ready to eat foods such as fried potato chips and *vetkoek (*fat cakes). These findings are in line with those of the 2016 Nielsen report related to South African food retail outlets and Roos and colleagues (2013) reported similar findings.

5.2.2.3 Home food environment

Most of the respondents' households consisted of four or more people (87% of participants). The assumption can thus be made that the preparation and consumption of food was mostly done in the presence of others. Data on the employment status of the participants revealed that the majority (68.8%) of the breadwinners were employed and that most of the households in the study group had basic appliances such as stoves, cell phones, televisions and refrigerators. From the results, it was also apparent that, although healthy food such as fruits, vegetables and milk were reported as being in the home, so were unhealthy food such as chips, sweets, chocolates, soft drinks and junk food.

The results from objective two point towards various access and availability barriers to healthy foods in the study area.

5.2.3 Conclusions on the access dimensions (availability, accessibility, affordability, acceptability, and accommodation) to healthy food (Objective 3)

The aim of the third objective was to determine and describe the access dimensions to healthy food choices of the study group. These were determined according to the access dimensions of availability, accessibility, affordability, acceptability and accommodation. Each of these dimensions are discussed in the following sections.

5.2.3.1 Availability

The main conclusion with regard to the availability of healthy foods was related to the formal food retail outlets having the most extensive range of foods. This meant that they had the largest variety of healthy foods to offer as well as reliable availability. Respondents indicated that food retail outlets were their preferred choice. The wide selection allowed for choices to meet their food requirements of all kinds: fruit, dairy products, beverages, meat, cereals, bread and bread-like products, legumes and pulses, and fats and oil purchases. Street vendors were also listed as popular outlets for the purchase of vegetables and fruits. Although the spaza shops or food markets were not a major first choice for any specific food product, respondents did purchase dairy products, beverages, meats, cereal and bread products from them.

5.2.3.2 Accessibility

This dimension intended to explore the accessibility to certain food retail outlets by studying the frequency of visits to them. It was found that spaza shops had the highest number of visits. Moreover, these outlets were generally visited every day. Other informal retail outlets such as street vendors or food markets were visited once to twice a week. The respondents went to formal retail outlets such as supermarkets far less frequently, less than three times per month.

Additional outlets included in the study were fast food outlets and convenience stores and these were visited even less frequently than supermarkets and using fast food outlets was generally limited to special occasions only. In fact, the majority never went to convenience stores.

The data suggests that bulk purchase buying of staple foods was done at the supermarkets once or twice a month and outstanding food procurement needs were met by doing their buying from the informal vendors throughout the month. These findings echo those of Crush and Frayne (2011).

5.2.3.3 Affordability

Price differences between the two supermarket outlets varied very slightly and were generally lower than those of the street vendors and spaza shops on many but not all foods. As Crush and Battersby (2016) suggest it would seem that supermarkets are a cost-effective option when doing bulk buying at the end of the month, yet, spaza shops offered smaller quantities and credit options, which makes them a preferred option mid-month when limited funds are often less freely available. It is also important to note that prices at the informal retail outlets were negotiable and often changed throughout the day.

5.2.3.4 Acceptability

This dimension dealt with how acceptable the foods were that were available to the study group participants. Respondents identified product quality as the key determinant of acceptability. The concept of quality was thus further explored among the outlets considered for this study.

Participants felt that the quality of products sold at the spaza shops was inferior and that the spaza shops regularly sold expired stock. In the focus group discussion sessions, the participants indicated that they were dissatisfied with the quality of products sold at the outlets located in close proximity to them but were satisfied with the quality of products in their larger more distant vicinity within their local environment. They therefore felt that the quality of food was superior at the supermarkets.

5.2.3.5 Accommodation

This dimension refers to the efforts made by the various outlets included in the study to meet their customers' needs. Trading hours, the variety of goods sold and convenient payment options were deciding factors for shopping choices. Interestingly, it was found that the spaza shops had the most extensive hours of operation which emphasises their focus on offering a customer service that is convenient and suits their customers' needs. Trading hours for spaza shops were generally found to be from 6 am to 10 pm daily. The formal food retail outlets investigated, Shoprite and Pick n Pay, had similar trading hours of 7 am to 7 pm. The street vendors were inclined to have varying trading hours because of the kind of products they choose to sell and the physical location where they traded. This data is in line with the research done by the Sustainable Livelihoods Foundation (2016).

Regarding the variety of product ranges offered, the formal supermarket outlets were the most accommodating as far as their customers were concerned by having the largest variety of things to sell; spaza shops offered a small to medium range; and street vendors generally had only a small range of foods items. The spaza shops and street vendors accommodated their clients' payment options by being open to negotiating credit and offering alternative options.

5.2.4 Conclusions on the study group's perceptions of the access dimensions to healthy food (Objective 4)

This objective explored each of the access dimensions and the following sections describe the conclusions from each of the access dimensions the study group's perceptions of these dimensions to healthy food.

5.2.4.1 Availability

The questionnaire the study group completed included questions on the level of satisfaction with the stores and products available to the participants. In addition to this, the topic was also discussed during the focus group sessions. In general, the results from both the questionnaire as well as the focus group discussions was that the participants were satisfied with the food available for them in the food outlets, however, participants felt that the availability of healthy foods was limited at the spaza shops in comparison to the supermarkets.

5.2.4.2 Accessibility

The study group's perceptions regarding the accessibility to healthy foods via their responses to the questionnaire generally indicated a fair level of satisfaction with the range of products and outlets available. One aspect that did, however, become clear in the focus group discussions was the participants' frustration regarding the difficulty in getting products home from where they were bought. In most cases, participants had to use a taxi or bus from the formal food retail outlets to get the purchased food home. This presented significant challenges to participants, especially when large quantities of foods were purchased.

5.2.4.3 Affordability

Based on the results of the questionnaire and focus group discussions, the affordability was deemed as very important for the participants with regard to their food choice process. It was concluded that the study group perceived healthy foods to be unaffordable, but were satisfied with the affordability of the other typically consumed foods. These findings are in line with those of Temple and colleagues (2011).

5.2.4.4 Acceptability

The questionnaire and focus groups discussions on acceptability used quality as the measure of acceptability for the participants. Although, in general, a fair level of satisfaction was felt with regard to quality, a level of frustration was also voiced about the quality of fresh foodstuffs available at spaza stores, specifically vegetables and meat. This points to the earlier discussion

concerning the limited availability of refrigeration facilities at spaza shops, compared to the situation in major supermarkets available in the study area. It was therefore concluded that the participants generally perceived the food sold in their local food environment as acceptable. However, they felt that the quality of food sold by the formal retail outlets were superior to those sold at the informal retail outlets.

5.2.4.5 Accommodation

In responses to the level to which the respondents felt the various food outlet options available to them accommodated their needs, the general consensus in the group was that more could be done by the food retail outlets. Specific frustrations on this topic included the time it took to not only reach a supermarket, but also the time it took within the store to get the items they required and pay for them. This links back to the topic of accessibility, especially with regard to the major supermarkets. These findings concur with those the Sustainable Livelihoods Foundation (2016) found.

5.2.5 Conclusions on the food choices of the study group (Objective 5)

This fifth objective dealt primarily with how often and when participants in the study consumed food, as well as where the food was consumed and what types of food was consumed.

The findings were relatively consistent across the study group. It was found that participants typically consumed three meals per day, and that food was most often consumed at home. Interestingly, with regard to the level of concern about eating healthy foods as opposed to unhealthy food, the vast majority of the respondents indicated that their friends, as well as the people they live with wanted to consume healthy food. This indicates some level of recognition on the importance of eating healthy food, and the dangers related to eating unhealthy food.

Results from the food frequency analysis also revealed a diet high in cereal- and grain-based products, warm beverages, oils and fats and milk and milk products. The consumption of meat, dried beans, peas, lentils, nuts, seeds or food made from these, was less frequent. Although there was frequent consumption of certain vegetables, this category of food was not being consumed at the same frequency rate as for cereal or grain products, fats and oils or even sweets and sugar. This points to a diet low in vegetable intake. There was also infrequent consumption of eggs, fish and seafood. The study group consumed a diet consistent with various other South African studies (Faber *et al.*, 2013; Viljoen 2009; Matla, 2008:81; MacIntyre *et al.,* 2002).

5.2.6 Conclusions on the relationship between the local food environment and the food choices of the study group (Objective 6)

This sixth objective explored the local food environment and its relationship to the food choices the study group recorded. A couple of key findings were formulated from the results of this survey.

- Spaza stores were generally more accessible than supermarkets. Details of these results (Section 4.3) were consistent with other South Africa studies (Roos *et al.,* 2013; Crush & Frayne, 2011).
- Supermarkets are only frequented a couple of times during the month, whereas spaza shops are typically used either daily or a couple of times a week. These findings are in line with those of Crush and Frayne (2011).
- The range of foods found in a spaza store is generally limited and, in many instances, the so-called 'healthy' alternatives of other food types are not kept. These findings are in line with those of Roos and colleagues (2013).
- The study group consumed a diet consistent with several other South African studies (Pradeilles, 2015, Faber *et al.,* 2013; Viljoen 2009; Matla, 2008:81; MacIntyre *et al.,* 2002). Their diets generally lacked vegetables and the main foods eaten were particularly high in refined sugars and carbohydrates (refer to Table 4.17). It appears that that the main reasons for selecting these products are associated with affordability, availability and cultural norms.

It can also be concluded that, if an individual did want to make healthier food choices it would be difficult for them to do so in their current environment. The spaza shops lack a range of healthy options and they are typically more expensive than supermarkets. Moreover, the respondents living within the boundaries of this study area investigated would have limited access to supermarkets.

Therefore there exists a relationship between the local environment and food choices. It also appears that accessibility and affordability are two major barriers to making healthy food choices.

5.3 SIGNIFICANCE OF THE STUDY

The aim of the study was to explore and describe the local food environment of black urban adults residing in Mamelodi West, and to determine the contribution of the food access dimensions, namely, availability, accessibility, affordability, acceptability and accommodation, to the study group's healthy food choices. In addition, it assessed how the local food environment related to the study group's perceptions of it and their food choices.

Although the study was limited to one specific area within a township environment, valuable insights have been realised regarding the factors which contribute to healthy food choices in this chosen local environment, specifically as it relates to access dimensions. The study thus fills a gap in the knowledge of the local food environment and its influence on food choice and food-related behaviour.

The study also provides valuable information on what is considered accessible and affordable within the township environment. It was shown that spaza shops were visited more frequently than any other food retail outlets, insights of the foods available within the spaza shops were provided, as well as the concerns related to affordability. The study is therefore particularly significant and valuable to consumer educators and can assist them in the development of intervention strategies to promote healthier food choices.

The next section deals with the limitations of the study.

5.4 LIMITATIONS OF THE STUDY

When conducting a study of this nature, limitations are often inevitable, and this study is no exception.

5.4.1 The impact of promotions on pricing at the time of the investigation

The nature of the retail industry dictates that prices fluctuate based on promotional activities. Great care was taken in measuring the price of the food available at the different outlets. In this study, the measurements were taken as a snapshot view and not as a calculated average over an extended period to negate the effect of promotional pricing.

5.4.2 Time impact of inflation on food

Food prices are generally subject to inflation-related fluctuation over time. The food prices for this study were measured during a short, fixed time period, although the possibility of variations occurring in the prices over time were not considered.

5.4.3 Standardisation of packaging sizes for pricing comparison

The packaging sizes of various of the price comparison items were standardised where possible, although it was found that the different outlets included in the study did not always sell goods at similar packaging sizes. For example, a formal food retail outlet might sell a 1 kg bag of potatoes, although a street vendor would only sell this item in 500 g packets. Where possible, prices were only compared for similarly sized packaged goods; where this practice was not possible adjustments were made to obtain a fair comparison.

5.5 RECOMMENDATIONS

The results of this study could be valuable for various members involved in the food and health industries. The following recommendations can be made based on the results of this study:

- Consumer facilitators and educators should take this research into account when educating on the general food-based dietary guidelines to ensure that they are sensitive to access dimensions and realistic when considering the local food environment of urban black adults residing in townships.

- Based on the results of this study it is also recommended that consumer facilitators and educators ensure consumers are adequately informed about how healthy or unhealthy their prevailing food choices are. For example, it was found that fruit juices and tea with a high sugar content were popular food choices amongst the respondents. Consumers should be made aware of the dangers of a high sugar intake and the benefits of healthy food choices.

- It is recommended that retailers consider these results in their development of corporate social responsibility (CSR) programs that involve health. Such programmes can encourage healthier food choices by providing nutrition education to the public or local community, it can also influence the variety; or lack thereof; of healthy foods sold at these outlets.

5.6 SUGGESTIONS FOR FUTURE RESEARCH

Suggestions for future research on the topic of the contribution access dimensions make to a specific urban food environment and how each aspect affects people's food choices, focusing on its demographic profile, as this study did for black adults residing in Mamelodi, Pretoria, as based on the results of this study. The following suggestions apply:

- The research pointed towards a diet high in cereal and grain products, such as maize meal and bread. Future research to expand on this study could include testing the levels of fortification value of the foods sold at spaza shops and by street vendors. South Africa has a highly regulated food environment, especially for the levels of the fortification of food required on foods such as this. The enforcement of these regulations is, however, less stringent in the informal food retail environment. It is unknown if the food products sold at spaza shops and street vendors complies with the fortification regulations in place.

- This study showed that there were concerns regarding the quality of food sold by the informal food retail outlets, especially regarding the lack of adequate temperature control. Future research to expand on this could explore the food safety aspects of the food sold by the informal food retail outlets.

- This study should be replicated in other regions, including rural areas, to test for comparable results and why differences, if found, do exist.

- The respondents used for this study were considered as representative of the Mamelodi West area. This study should be expanded to investigate the impact of the access dimensions and the local food environment on the food choices of South Africans in general.

5.7 CONCLUDING REMARKS

Although studies conducted in several other countries link access to healthy food to healthy food choices, there is limited research available on whether this phenomenon would be applicable to a South African situation whether stated criteria for participation in the study apply or not. The wide South African context provides complexities because of its socio-cultural and demographic diversity. The sample drawn for this study were residents of a specific area. This study focused specifically on urban black adults residing in Mamelodi West, Pretoria.

The findings of this study reveal that, although there is a link between the access dimensions related to healthy food and healthy food choices, the most significant access dimensions relate to the affordability and accessibility of the food that was purchased. An interesting aspect of this finding was that the affordability was not related to a specific outlet, such as a supermarket, spaza shop, or street vendor, but affordability in general.

The researcher expected to find a clear link between the proximity to formal food retail outlets and healthy food choices, this assumption was not established. The study group participants made similar choices irrespective of what was available close to where they stayed. In most cases, the choice of food outlet for the participants were a trade-off between the convenience offered by the spaza shops and street vendors, against the quality, price and foodstuff range supermarkets are known and proven to provide. Supermarkets are accepted as a cost-effective option when doing bulk purchases, and spaza shops and street vendors are popular choices for supplementary food purchases.

In summary, the local food environment clearly affected the food choices of the study group participants, as they could only make food choices within the constraints of the access dimensions.

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Addendum A

Supermarket observational survey

Supermarket observational survey (adapted from Freedman and Bell, 2009)

Name of store:_____

Address:_____

Codes:

X= entrance to store

1= Fresh Produce (Fruit and Vegetable section)

2 = Dairy Section (milk, cheese & butter)

3 = Meat/ Butchery Section

4 = Frozen Foods (meat, meals and vegetables)

5 = Bakery Section (bread and confectionery)

6 = Deli Section (Read to eat foods)

7 = General ambient pre-packed food (examples include tinned food, sweets, cold drinks, cereals and grains)

D					
C					
B					
A					
	1	2	3	4	5

1. Fruit and vegetables:

   Does the store offer fruits and vegetables (Fresh, Frozen or canned)?

Yes	No

If yes,

Fruits and Vegetables	Fresh	Frozen	Canned
Bananas		NA	NA
Apples			
Lettuce		NA	NA
Potatoes			NA
Carrots			
Tomatoes			
Broccoli			
Spinach			
Butternut			
Other:			

2. Dairy Section

   Does the store offer dairy based products (Fresh, Frozen or canned)?

Yes	No

If yes,

Dairy	Fresh	Canned/ boxed/ bagged
Cheese (regular)		
Cheese (reduced fat or nonfat)		
Milk (full cream)		
Milk (low fat)		
Milk (no fat)		
Amasi (Fermented Milk)		

3. Meat or butchery section

   Does the store offer a meat section or butchery section?

Yes	No

Meat	Fresh	Frozen	Canned
Beef			
Mutton			
Goat			
Pork			
Sausage			
Ground meat (mince regular)			
Lean ground meat (lean mince)			
Fish (Fresh)			
Beef tripe, intestines, liver, pancreas			
Chicken heads, feet, intestines, liver			

4. Frozen foods

   What frozen foods are kept?

_____

_____

_____

5. Bakery and confectionery

   What foods were available in the bakery section?

_____

_____

_____

   Was there brown bread or “health bread” available?

_____

_____

_____

6. Deli section

What foods were available from the deli section?

_____

_____

_____

7. General ambient pre packed foods

   Which of the following products were available?

Starch	Available (yes/no)
White Rice	
Brown Rice	
Samp	
Beans	
Maize meal flour	
Macaroni or any other dry pasta	
Processed breakfast cereals	
Oatmeal	
Cold drinks and sweets	**Available (yes/no)**
Carbonated (fizzy) beverages (regular)	
Carbonated beverages (diet or reduced sugar)	
Sweets (regular)	
Sweets (sugar free)	

8. Other

   Where there any other notable observations?

_____

_____

_____

Addendum B

Ethics approval

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

ETHICS COMMITTEE
Faculty of Natural and Agricultural Sciences

17 April 2014

Ms A Viljoen

Department of Consumer Sciences

University of Pretoria

Pretoria

0002

Dear Ms Viljoen

EC14003-022 The contribution of the local food environment to the food choices of black urban adults in Mamelodi, Pretoria

Your application conforms to the requirements of the NAS Ethics Committee

Kind regards

Prof NH Casey

Chairman: Ethics Committee

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Addendum C

Cover letter to questionnaire

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA
Faculty Natural & Agricultural Sciences
Department of Consumer Science

INFORMATION SHEET AND CONSENT FORM FOR RESPONDENTS

RESEARCH PROJECT ON THE VARIOUS ENVIRONMENTS (PHYSICAL, ECONOMIC, SOCIAL AND HOME) OF URBAN BLACK ADULTS RESIDING IN MAMELODI, TSHWANE METROPOLE AREA

INTRODUCTION

Your are invited to **volunteer as respondent** for a research project on the food practices of adults in residing in Mamelodi West, Tshwane Metropole Area. This information sheet is to help you decide if you would like to participate in this study.

The purpose of this part of the study is to understand the influence of the mentioned environments and how they contribute to the food choices of this particular group.

The current knowledge on the food practices of the South African population as a whole and specifically in Mamelodi, is limited. To be able to plan and give meaningful nutrition information and promote access to healthy foods requires that information be collected first, on why, where and when you choose certain foods.

Results from this study will be used to promote healthy food choices through motivating retailers and other role players to pay more attention to making healthy foods more available and accessible.

This leaflet is to help you decide if you would be interested to participate in the study. Before you agree to take part in this study, you should fully understand what is involved. If you have any questions, please do not hesitate to ask me. You should not agree to participate unless you are completely happy about what the study involves.

PLEASE NOTE THE FOLLOWING:

- Please give your honest opinion throughout.
- You may discontinue the process at **any time** for any reason should you wish to.
- There is **no** correct or incorrect answer.
- Please answer all questions. Circle or mark with an X in the shaded box, or by writing your answer in the provided space.
- The study deals with what young people usually eat, you will be required to give information on **what, when, how much** and **how often** you eat certain foods.
- The questionnaire will take **approximately 30 minutes** to complete.
- You will **not be identified** in the questionnaire. I will only use a number on the questionnaire for office use. The information obtained from the questionnaires will be **anonymous**.
- There is no risk involved in participating in this study. All information obtained from you will be regarded as **confidential.**

The research protocol of this study was approved by the Ethics Committee of the Faculty of Natural and Agricultural Sciences of the University of Pretoria.

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Republic of South Africa

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The results of this study will be written in a report to the University of Pretoria and will also be published in scientific Journals. You will not be identified in any way in the written report or other publications.

Your participation is entirely **voluntary** and you may withdraw / stop participation at any stage if you wish during the data collection.

I UNDERSTAND WHAT THE STUDY IS ABOUT AND I AM PREPARED TO PARTICIPATE IN THIS PROJECT ON THE VARIOUS ENVIRONMENTS (PHYSICAL, ECONOMIC, SOCIAL AND HOME) OF URBAN BLACK ADULTS RESIDING IN MAMELODI, TSHWANE METROPOLE AREA

Signature of respondent **Date**

Addendum D

Questionnaire

Questionnaire to Study the Contribution of the Local Food Environment to the Food Choices of Black Urban Adults in Mamelodi, Pretoria

Respondent number:	

Section: A Socio-demographic information

			For official Use only
A1	Please indicate which age group you fall under?		A1
	Below 18	1	
	18 to 25	2	
	26 to 30	3	
	30 to 40	4	
	40 to 50	5	
	50 and older	6	
A2	What is your gender?	Male 1 Female 2	A2
A3	In which section of Mamelodi West do you live?		A3
A4	Please indicate who is/are the breadwinner(s) in your household?		
	You	1	A4.1
	Your Mother	2	A4.2
	Your Father	3	A4.3
	A Sibling	4	A4.4
	A Grandparent	5	A4.5
	Your Child	6	A4.6
	A partner or spouse	7	A4.7
	A friend	8	A4.8
	Other, please specify:	9	A4.9
A5	What is the occupation of the breadwinner in your household?		A5
A6	How many people live in your household?		A6
A7	Indicate the structure of your household as best described. Mark only one.		
	Nuclear family (both parents and children)	1	
	Extended family (parents, children and other family members)	2	
	Living with other family members (not parents or children)	3	
	Single parent family (farther or mother and children)	4	
	Living on my own	5	
	Living with friends/ partners or others	6	
	Other (please specify)	7	A7
A8	Who is mainly responsible for preparing your meals at home?		
	You	1	
	Your Mother	2	
	Your Father	3	
	A Sibling	4	
	A Grandparent	5	
	Your Child	6	
	A partner or spouse	7	
	A friend	8	
	Other, please specify:	9	A8
A9	Indicate which of the following items you have in your household – you can select more than one item.		
	Stove	1	A9.1
	Refrigerator	2	A9.2
	Deep Freezer	3	A9.3
	Microwave oven	4	A9.4
	Washing machine	5	A9.5
	Television	6	A9.6
	Radio	7	A9.7
	Computer	8	A9.8
	Cell Phone	9	A9.9
	Internet connection (either via smart phone, WIFI or landline)	10	A9.10

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Section B: Usual Shopping patterns

B1	How often do you buy from the stores listed below							For official Use only			
	Outlet	Daily	3-4 times per week	1-2 times per week	3 x per month	Special occasions	Never				
	Grocery Store (e.g.; Shoprite, Checkers, Spar, Pick n Pay)	1	2	3	4	5	6	B1.1			
	Fast Food outlet (e.g.; KFC, McDonalds, Hungry Lion)	1	2	3	4	5	6	B1.2			
	Convenience store (e.g.; Caltex, BP Express, Shell Select, Sasol)	1	2	3	4	5	6	B1.3			
	Fresh Fruit and Vegetable Food Market	1	2	3	4	5	6	B1.4			
	Street Vendor	1	2	3	4	5	6	B1.5			
	Spaza Shop	1	2	3	4	5	6	B1.6			
	Other (Please specify)	1	2	3	4	5	6	B1.7			

B2	Please indicate which of these items you prefer to purchase from which outlet.											
	Item	I do not purchase item	Grocery Store	Fast Food outlet	Convenience store	Food Market	Street Vendor	Spaza Shop				
	Fruit (includes fresh, frozen, canned or in jar)											
	Bananas	1	2	3	4	5	6	7	B2.1			
	Apples	1	2	3	4	5	6	7	B2.2			
	Citrus fruit (oranges, lemons, naartjies)	1	2	3	4	5	6	7	B2.3			
	Vitamin A Rich (yellow peaches, mangoes, paw paw, pineapples, plums)	1	2	3	4	5	6	7	B2.4			
	Other fruit (grapes, pears, litchis)	1	2	3	4	5	6	7	B2.5			
	Vegetables (includes fresh, frozen, canned or boxed)											
	Lettuce	1	2	3	4	5	6	7	B2.6			
	Potatoes	1	2	3	4	5	6	7	B2.7			
	Carrots	1	2	3	4	5	6	7	B2.8			
	Tomatoes	1	2	3	4	5	6	7	B2.9			
	Cucumber	1	2	3	4	5	6	7	B2.10			
	Cabbage	1	2	3	4	5	6	7	B2.11			
	Spinach	1	2	3	4	5	6	7	B2.12			
	Sweet potato	1	2	3	4	5	6	7	B2.13			
	Beetroot	1	2	3	4	5	6	7	B2.14			
	Onions	1	2	3	4	5	6	7	B2.15			
	Green beans	1	2	3	4	5	6	7	B2.16			
	Pumpkin	1	2	3	4	5	6	7	B2.17			
	Butternut	1	2	3	4	5	6	7	B2.18			
	Green pepper	1	2	3	4	5	6	7	B2.19			
	Dairy and dairy products											
	Fresh milk	1	2	3	4	5	6	7	B2.20			
	Sour milk (amasi/ maas)	1	2	3	4	5	6	7	B2.21			
	Cheese	1	2	3	4	5	6	7	B2.22			
	Cottage cheese	1	2	3	4	5	6	7	B2.23			
	Yoghurt	1	2	3	4	5	6	7	B2.24			
	Yogi sip	1	2	3	4	5	6	7	B2.25			
	Dairy fruit beverages (tropica)	1	2	3	4	5	6	7	B2.26			
	Milk Shake	1	2	3	4	5	6	7	B2.27			
	Margarine	1	2	3	4	5	6	7	B2.28			

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	I do not purchase	Grocery S	Fast Food outlet	Convenie store	Food Mar	Street Ve	Spaza Sh				
Beverages											
Fresh squeezed juice	1	2	3	4	5	6	7	B2.29			
Juice concentrate	1	2	3	4	5	6	7	B2.30			
Canned juice	1	2	3	4	5	6	7	B2.31			
Boxed/ Bottled juice	1	2	3	4	5	6	7	B2.32			
Tea (Joko, Five roses)	1	2	3	4	5	6	7	B2.33			
Rooibos tea	1	2	3	4	5	6	7	B2.34			
Coffee	1	2	3	4	5	6	7	B2.35			
Mageu	1	2	3	4	5	6	7	B2.36			
Soft drinks (Coke, Fanta, sprite)	1	2	3	4	5	6	7	B2.37			
Meats and proteins											
Beef /*nama ya kgomo*	1	2	3	4	5	6	7	B2.38			
Mutton/ Lamb/ *nama ya nku*	1	2	3	4	5	6	7	B2.39			
Goat Meat/ *nama ya podi*	1	2	3	4	5	6	7	B2.40			
Chicken/ *nama ya kolobe*	1	2	3	4	5	6	7	B2.41			
Pork/ *nama ya kolobe*	1	2	3	4	5	6	7	B2.42			
Boerewors	1	2	3	4	5	6	7	B2.43			
Russian Sausage	1	2	3	4	5	6	7	B2.44			
Viena Sausage	1	2	3	4	5	6	7	B2.45			
Polony	1	2	3	4	5	6	7	B2.46			
Processed meat/ Cold cuts	1	2	3	4	5	6	7	B2.47			
Biltong/ *mogwapa*	1	2	3	4	5	6	7	B2.48			
Beef tripe, intestines, liver, pancreas/ *Mahadu, mala, sebete, lebete tsa kgomo*	1	2	3	4	5	6	7	B2.49			
Chicken heads, feet, intestines, liver/ *Hlogo, malala, maotwana, malana, sebete tsa kgogo*	1	2	3	4	5	6	7	B2.50			
Sphatlo	1	2	3	4	5	6	7	B2.51			
Eggs	1	2	3	4	5	6	7	B2.52			
Fried Fish	1	2	3	4	5	6	7	B2.53			
Canned/ tinned fish (Sardines, pilchards)	1	2	3	4	5	6	7	B2.54			

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	Item	I do not purchase item	Grocery Store	Fast Food outlet	Convenience store	Food Market	Street Vendor	Spaza Shop	For official Use only			
	Cereals, Bread and bread-like products											
	Breakfast cereal (corn flakes, weet bix, Rice crispies)	1	2	3	4	5	6	7	B2.55			
	Soft cooked porridge (oats, mabela)	1	2	3	4	5	6	7	B2.56			
	Cornflour/ Mealie-meal/ whole mielies	1	2	3	4	5	6	7	B2.57			
	Rice	1	2	3	4	5	6	7	B2.58			
	Pasta	1	2	3	4	5	6	7	B2.59			
	Samp and beans/ *umngqusho*	1	2	3	4	5	6	7	B2.60			
	White bread	1	2	3	4	5	6	7	B2.61			
	Brown bread	1	2	3	4	5	6	7	B2.62			
	Buns, bread rolls	1	2	3	4	5	6	7	B2.63			
	Fat cakes/ *vetkoek*	1	2	3	4	5	6	7	B2.64			
	Flat bread/ *sephaphati*	1	2	3	4	5	6	7	B2.65			
	Steamed bread/ *dombolo/ ledombolo*	1	2	3	4	5	6	7	B2.66			
	Scones	1	2	3	4	5	6	7	B2.67			
	Sweet buns/ *Chelsea buns*	1	2	3	4	5	6	7	B2.68			
	Crisp breads/ Crackers	1	2	3	4	5	6	7	B2.69			
	Rusks	1	2	3	4	5	6	7	B2.70			

B3	Indicate with an X to what extend these statements apply to the outlets you buy from.									
		Strongly agree	Agree	Undecided	Disagree	Strongly disagree				
	I am satisfied with the range of outlets I have access to.	1	2	3	4	5	B3.1			
	Good quality fruit and vegetable products are available in the outlets I normally shop.	1	2	3	4	5	B3.2			
	Healthy foods are available in the outlets where I normally shop.	1	2	3	4	5	B3.3			
	Fruits and vegetables are affordable (reasonable priced) in the outlets I normally buy from.	1	2	3	4	5	B3.4			
	These outlets accommodate my needs (e.g.; credit options, extended hours)	1	2	3	4	5	B3.5			

B5	How often do you eat meals in other places than your home?				
	Never	1			
	1-2 x per month	2			
	3 x per week	3			
	Daily	4	B5		

B6	How do you normally transport your purchased food home? You can select more than one option.				
	I carry it myself.	1	B6.1		
	Somebody helps me carry my food.	2	B6.2		
	I take a taxi/ bus.	3	B6.3		
	I use a car.	4	B6.4		
	Other (please specify).	5	B6.5		

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Section C: Usual Eating behaviour

			For official Use only			
C1	How many meals to you eat in a day?					
		1				
		2				
		3				
		4				
		5				
		6				
		More than 6	C1			

C2	Indicate which statement applies best to you.					
	I care about eating healthy food					
	Not at all	1				
	A little bit	2				
	Somewhat	3				
	Very much	4	C2			

C3	Indicate which statement applies best to you.					
	Many of my friends care about eating healthy food.					
	Not at all	1				
	A little bit	2				
	Somewhat	3				
	Very much	4	C3			

C4	Indicate which statement applies.					
	The people I live with care about eating healthy food.					
	Not at all	1				
	A little bit	2				
	Somewhat	3				
	Very much	4				
	Not applicable – I do not live with anybody	5	C4			

C5	Indicate with an X to what extend these statements apply to food in your home.									
		Strongly agree	Agree	Undecided	Disagree	Strongly disagree				
	Fruits and vegetables are available most days of the week in my home	1	2	3	4	5	C5.1			
	Vegetables are served with most main meals	1	2	3	4	5	C5.2			
	Milk is generally available in my home	1	2	3	4	5	C5.3			
	Fruit juice is generally available in my home	1	2	3	4	5	C5.4			
	Potato chips and other salty snacks are generally available in my home	1	2	3	4	5	C5.5			
	Chocolates and other sweets are generally available in my home	1	2	3	4	5	C5.6			
	Soft and fizzy drinks are generally available in my home	1	2	3	4	5	C5.7			
	"Junk food" and "take away foods" are generally in my home	1	2	3	4	5	C5.8			
	My food at home is generally prepared in a healthy manner	1	2	3	4	5	C5.9			

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C6	Please indicate what and how much you ate and drank yesterday during the following times given in the table below. Please use the example as a guide to completing the table. It is important to list even the spreads used on your bread.						
	Example:						
	Time	***Quantity***	***Description of food or drink consumed***				
	Breakfast (6-9am)	*2 slices*	*White bread with margarine and apricot jam*				
		1 cup	*Tea*				
		3t	*Sugar*				
		1/4 cup	*Milk*				
	In between (9-12 noon)	*1 glass*	*Fruit juice (orange)*				
		1 med	*Banana*				
	Time	**Quantity**	**Description of food or drink consumed**				
	Breakfast (6-9am)			C.6.1.1			
				C.6.1.2			
				C.6.1.3			
				C.6.1.4			
				C.6.1.5			
				C.6.1.6			
	In-between (9-12noon)			C.6.2.1			
				C.6.2.2			
				C.6.2.3			
				C.6.2.4			
				C.6.2.5			
				C.6.2.6			
	Lunch (12-3pm)			C.6.3.1			
				C.6.3.2			
				C.6.3.3			
				C.6.3.4			
				C.6.3.5			
				C.6.3.6			
	In-between (3-5pm)			C.6.4.1			
				C.6.4.2			
				C.6.4.3			
				C.6.4.4			
				C.6.4.5			
				C.6.4.6			
	Supper (5-8pm)			C.6.5.1			
				C.6.5.2			
				C.6.5.3			
				C.6.5.4			
				C.6.5.5			
				C.6.5.6			
	After supper (after 8pm)			C.6.6.1			
				C.6.6.2			
				C.6.6.3			
				C.6.6.4			
				C.6.6.5			
				C.6.6.6			

C7	Is this a good indication of how you normally eat (3-4 x per week) on a week day?						
		Yes					
		No		C7			

C8	If you answered NO to question C7, please explain how yesterday was different.						
				C8			

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C9	How often are these food groups eaten in your household										
		Daily	3-4 times per week	1-2 times per week	Less than 3 x per month	Special occasions	Never				
	Cereals: maize, rice, wheat, sorghum, millet, and any other foods made from cereals such as porridge, bread and noodles	1	2	3	4	5	6	C9.1			
	White roots and tubers: potatoes, white sweet potato and cassava	1	2	3	4	5	6	C9.2			
	Orange flesh vegetables: Pumpkin, carrot, butternut or sweet potato	1	2	3	4	5	6	C9.3			
	Dark green leafy vegetables, including wild/ indigenous vegetables	1	2	3	4	5	6	C9.4			
	Other vegetables: tomato, onion, green beans, gem squash, eggplant, including wild/ indigenous vegetables	1	2	3	4	5	6	C9.5			
	Orange coloured fruit: ripe mango, apricot, spanspek, papaya, dried peach and 100% fruit juice made from these	1	2	3	4	5	6	C9.6			
	Other fruit: Oranges, banana, apple, pear including wild/ indigenous fruits	1	2	3	4	5	6	C9.7			
	Organ meat: liver, kidney, heart or other organ meats or blood-based foods	1	2	3	4	5	6	C9.8			
	Meat: beef, goat, sheep, poultry, pork	1	2	3	4	5	6	C9.9			
	Eggs from any animal	1	2	3	4	5	6	C9.10			
	Fish and seafood: fresh, tinned or dried and shellfish	1	2	3	4	5	6	C9.11			
	Dried beans, peas, lentils, nuts, seeds or foods made from these (e.g. peanut butter)	1	2	3	4	5	6	C9.12			
	Milk and milk products: yogurt, maas)	1	2	3	4	5	6	C9.13			
	Oils and fats: sunflower, rama, lard, butter added to food or used in cooking	1	2	3	4	5	6	C9.14			
	Sweets: sugar, honey, cold drinks, sweets, chocolates, cake	1	2	3	4	5	6	C9.15			
	Spices and condiments: salt, pepper, tomato sauce, soy sauce	1	2	3	4	5	6	C9.16			
	Warm beverage: coffee, tea	1	2	3	4	5	6	C9.17			

C10	In the past 12 months, did any adult (18 and over) in your household ever go a whole day without food because of a lack of resources to get food?										
	Never	1									
	Rarely (1-2 times a month)	2									
	Sometimes (3 - 10 times a month)	3									
	Often (more than 10 times a month)	4									
	Always	5									
	Not applicable	6						C10			

C11	In the past 12 months, did any child (17 years and younger) in your household ever go a whole day without food because of a lack of resources to get food?										
	Never	1									
	Rarely (1-2 times a month)	2									
	Sometimes (3 - 10 times a month)	3									
	Often (more than 10 times a month)	4									
	Always	5									
	Not applicable	6						C11			

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C12	Did you skip any meals during the past 12 months because there was not enough food in the house?							
	Yes	1		No	2	C12.1		
	Has it happened more than 5 days in the past 30 days?							
	Yes	1		No	2	C12.2		

C13	Did you eat a smaller variety of foods during the past 12 months than you would have liked to, because there was not enough food in the house?							
	Yes	1		No	2	C13.1		
	Has it happened more than 5 days in the past 30 days?							
	Yes	1		No	2	C13.2		

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Addendum E

Focus group guide

Focus Groups Guide (Adapted from Freedman and Bell, 2009)

The purpose of this focus group discussion is to learn more about your thoughts and perspectives related to food access, this information will be used to help better understand peoples' experiences with food. It will also help us develop food-related programs in Mamelodi.

1. What have you eaten over the past 24 hours: for breakfast, lunch, dinner, snacks?
    a. Why did you eat these foods?

2. Tell me about your most recent trip to a food store.
    a. Where did you go?
    b. What did you buy?
    c. How was the quality of the food?
    d. Was the food affordable?

3. Was this a typical trip to the store? If not, how did it differ from your usual trip?

4. Tell me about food outlets in your neighbourhood/community.
    a. Where are they?
    b. What types of food are sold at these outlets?
    c. What is the quality of the food sold at these outlets?
    d. Is the food affordable?

5. How do the food stores available in your neighbourhood/community compared to food stores in other parts of Pretoria?
    a. If there are differences, why do you think these differences exist?

6. What could be done to enhance the food outlets in your neighbourhood / community?

7. Are you satisfied with the types of foods you have regular access to?
    a. If yes, why?
    b. If no, why?

8. Peoples' access to fresh, healthy foods is related to a lot of different things. What factors do you think influences your access to fresh, healthy foods most?

9. What other thoughts do you have about food and/or food access?