FOOD: ENVIRONMENT, SECURITY AND EXPERIENCES OF STUDENTS AT THE UNIVERSITY OF THE FREE STATE

Rebecca Nokuthula Mabena

2018347688

Dissertation submitted in fulfilment of the requirement in respect of the

Magister Scientiae: Dietetics degree qualification

In the Department of Nutrition and Dietetics

Faculty of Health Science

At the University of Free State

BLOEMFONTEIN

2021

Supervisor: Dr Liska Robb

Co-Supervisor: Prof Louise Van Den Berg

DECLARATION

I, Rebecca Nokuthula Mabena, declare that this 'master's research dissertation hereby submitted by me for the MSc Dietetics degree presented to the University of the Free State is my own work and has not previously been submitted by me to another university or faculty. I further cede copyright of this research report in favour of the University of the Free State.

Signed:

Date: November 2021

ACKNOWLEDGEMENTS

I want to extend my sincere gratitude to:

Our Heavenly Father for his grace upon me, for strengthening me and guiding me throughout my studies, Proverbs 3:5 – 6; Glory to Him;

My loving husband, Jerry, my kids Njabulo, Lwazi and Mpona, for all the motivation and being my pillar of strength and support;

My supervisor, Prof VL van den Berg, I am astonished by your worth of knowledge, passion and patience;

Thank you for your support and the hard work you put into this dissertation;

My co-supervisor, Dr L Robb, for the valuable input and guidance throughout the three years;

Ms Riëtte Nel, for your advice and brilliant data analysis;

The University of the Free State for giving me a bursary for this study;

The Ethics Committee of the University of the Free State for permitting me to undertake the study;

My loving husband, Jerry, Njabulo, Lwazi and Mpona for all the motivation and being my pillar of strength;

My family, especially mother dearest (Bongs), who encouraged and supported me throughout;

My friends, who stood by me every step of the way; and your unwavering support;

My colleagues at Rahima Moosa Mother and Child Hospital, thank you for having faith in me.

SUMMARY

Background and motivation: The high influx of students from lower socio-economic backgrounds attending universities and their struggle with acquiring nutritious food have been cited as barriers to students' higher learning. Numerous studies show that students are food insecure compared to the overall population. Many student initiatives to curb hunger among students in South African Higher Education Institutions are under pressure owing to the increasing need for food assistance. This study aimed to explore how students experience the concept of 'feeding themselves' within their current food environments on and off-campus and whether these experiences are associated with food insecurity. These insights may help address students' well-being, which is vital for academic success.

Method: A quantitative cross-sectional study was conducted. A self-administered electronic survey was made available via Evasys in early May 2020 to all 42 282 registered students at the University of the Free State (UFS). The framework developed by Turner et al. (2018) was used to create questions related to the personal domain of the food environment that students were exposed to while studying at the UFS, which entails four separate constructs, namely accessibility, affordability, convenience and desirability of food. The United States Department of Agriculture (USDA) 10-item tool included in the questionnaire to assess students' prevalence and severity of food insecurity at the UFS during the reference period as described above. Descriptive statistics were expressed as frequencies and percentages for categorical data, and medians and interquartile ranges for numerical data. Associations were investigated by crosstabulation and chi-square, Fisher's exact and Wilcoxon rank tests as applicable.

Results: A total of 1 387 participants provided consent and participated in the study. Most students (80.9%) were single, and approximately half were first-generation students (54.1%). According to institutional statistics, 68.2% of participants received National Student Financial Aid Scheme (NSFAS) to fund their studies. The majority of participants (79.2%) indicated receiving a stipend for food and living expenses. Overall, 8% and 17.1% of participants were classified as having high and marginal food security levels, respectively; and together, these participants were classified as

food secure (25.1%). Conversely, 23.4% and 51.5% of participants were classified as having low and very low food security, respectively, and these two categories combined constituted the food insecure students (74.8%). Black, African males and first-generation students, had the highest percentages of food insecurity. Food insecurity was significantly ($p<.05$) associated with gender ($p<.0001$), race ($p<.0001$), relationship status ($p=.001$), level of study ($p=.0002$), campus ($p<0.0001$), faculty ($p<.0001$), and family history of graduates ($p<.0001$). Students who received NSFAS were significantly more likely to be food insecure than those who did not.

Price, convenience and familiarity of food were identified as the most important factors in guiding food purchases, significantly more so for the most insecure students ($p<.0001$). Almost three-quarters of participants (70.1%) reported buying ready-to-eat food from street vendors and these students were significantly more likely to do so compared to food insecure students ($p<.0001$). Less than half of the participants (40.7%) ate breakfast before class. Students classified as very food insecure were least likely to eat breakfast ($p<0001$). The most food insecure students relied fully on public transport for shopping and indicated that food was expensive, and that shopping was very time consuming when they would rather study. Most indicated that they go shopping for groceries and ingredients only once (59.3%) or twice (18.0%) per month. A quarter (24.5%) carried their shopping home over fairly long distances on foot, while another 31.2% paid for private cabs or shuttle services. The most food-insecure participants were more likely to buy their food from street vendors and Shoprite ($p<.0001$). Students were reluctant to pool resources for buying and preparing meals in groups, mostly because of not being able to contribute equally. Most participants, particularly the very food insecure students, kept their groceries and produce in their bedroom cupboards and most only had access to very limited fridge and freezer space, if at all. Access to cooking facilities and utensils, as well as lack of confidence in their own cooking skills, and lack of skills to budget and plan ahead for food shopping, emerged as themes that contributed to food insecurity.

Conclusion: The study showed that students face numerous obstacles to obtaining food during the academic term. Cross-tabulation of students' food security with food environment factors revealed that students with very low food security were

statistically significantly ($p<.05$) disadvantaged on multiple counts when compared to their food secure peers. It may be driving vulnerable students further down the food insecurity continuum towards hunger by not paying attention to their campus food surroundings, which may significantly impact their physical and mental health and academic progress.

TABLE OF CONTENTS

LIST OF FIGURES

Page

LIST OF TABLES

Page

LIST OF ABBREVIATIONS

AFSSM:	Adult Food Security Survey Module
AIDS:	Acquired immunodeficiency syndrome
CFS:	Committee on World Food Security
COVID-19:	Coronavirus disease
DIRAP:	Directorate for Institutional Research and Academic Planning
ERS:	Economic Research Service
FI:	Food-insecurity
FSP:	Food Security Programme
GI:	Glycemic Index
GPA:	Grade Point Average
HFSSM:	Household Food Security Survey Module
HIV:	Human immunodeficiency virus
HLPE:	High-level panel of experts
HSREC:	Health Sciences Research Ethics Committee
kJ:	Kilojoule
NCD:	Noncommunicable disease(s)
NSFAS:	National Student Financial Aid Scheme
NSH:	No Student Hunger Programme (bursary scheme)
OFD:	Online Food Delivery
RDP:	Reconstruction and Development Programme
SA:	South Africa
SASSE:	Survey of Student Engagement
SDG:	Sustainable Development Goals

SNAP:	Supplemental Nutrition Assistance Programme
SNAPP:	Student Nutrition and Progress Programme
SHN:	Stop Hunger Now
TB:	Tuberculosis
UK:	United Kingdom
UCLA:	University of California Los Angeles
UFS:	University of the Free State
UKZN:	University of Kwazulu Natal
UJ:	University of Johannesburg
US:	United States
USDA:	United States Department of Agriculture
UWC:	University of the Western Cape
VAT:	Value Added Tax
WHO:	World Health Organisation
Wits:	University of the Witwatersrand

CHAPTER 1: ORIENTATION TO THE STUDY AND MOTIVATION

1.1 Introduction

The South African government has paid significant attention to education as the critical element of economic development since the inception of the constitutional democracy in 1994. The underlying principle is that when there is a rise in academic progression, graduates will be absorbed into the labour market, positively impacting economic growth (Sabi et al., 2018). Towards this ideal, the government has made higher education more accessible to all South Africans over the last three decades. However, over the last decade, very low levels of food security amongst students in higher education in South Africa have become evident (Van den Berg & Raubenheimer, 2015; Sabi et al., 2018).

Food security is defined as when people have physical and economic access to adequate, safe, culturally preferred and nutritious food that meets dietary needs to promote good health. On the other hand, food insecurity is defined as the "limited or uncertain availability of nutritionally adequate, safe foods, or the inability to acquire personally acceptable food in socially acceptable ways'' (Rychetnik et al., 2003). Many argue that food security is a fundamental human right (Cardenas et al., 2019; Wegerif & Adeniya, 2019; Holben & Marshall, 2017) and finding food insecurity in institutions of higher learning poses a serious barrier to achieving upliftment through higher education. Living with the uncertainty of where the next meal will come from is one of life's most significant stresses (Bruening, Brennhofer, van Woerden, Todd, & Laska, 2016) and a large body of empirical evidence indicates that food insecurity negatively affects academic performance (Weaver et al., 2020; Martinez et al., 2020; Farahbakhsh et al., 2017a; Belachew et al., 2011; Hoyland et al., 2009).

Food insecurity among students in higher education is not unique to South Africa. Food struggles amongst students have become a recognised threat to student success (Bruening et al., 2017) in higher-income countries, including the United States (US), Canada, Australia and Poland (Lee et al., 2018). The rising food insecurity on campuses was at first linked to the aftermath of the global recession in 2008 and the worldwide drive to increase access to higher education for previously excluded groups.

Following the Covid-19 epidemic, however, the problem of food insecurity amongst students is predicted only to worsen (Xhoza, & du Plessis, 2020; Owens et al., 2020).

In South Africa, however, very little research has been published on student food insecurity in the higher education sector, with just a handful of published studies (Sabi et al., 2019; Dominguez-Whitehead, 2015; Van den Berg & Raubenheimer, 2015; Gwacela, 2013; Munro & Simpson, 2013; Kassier & Veldman, 2013), Nigeria (Ukegbu et al., 2019) and Ecuador (Eche, 2018). Although it is not extensively researched, the problem does not go unnoticed in the South African context.

The *#feesmustfall* movement that swept over South African tertiary institutions in 2015 shed light on student hunger and how students struggle to meet their basic needs. From the 13th to the 14th of August 2018, the Dullah Omar Institute hosted a two-day colloquium where Professor Pamela Dube, the Deputy Vice-Chancellor responsible for Student Development and Support University of the Western Cape, stated that South Africa is one of "*the most unequal*" societies in the world. She further noted: "*Food security among university students in South Africa, throughout numerous campuses, is palpable and very tragic*." (Wegerif & Adeniya, 2019).

Like other South African universities, the UFS has struggled with student hunger. A university-wide survey in 2013 identified 60.0% of the students as food insecure "with hunger" (with very low food security), and 26.0% as food insecure "without hunger" (with marginal to low food security). The highest prevalence of food insecurity was among Black and Coloured (mixed-race) students. Food insecurity was significantly associated with the following characteristics: being male, being undergraduate, being a first-generation student and being unmarried, unemployed, and relying on loans or bursaries (Van den Berg & Raubenheimer, 2015). Using questions extracted from the food insecurity scale used by Van den Berg & Raubenheimer (2015), the 2016 South African Survey of Student Engagement Report found that 69% of students ran out of food and had no funds to purchase more food. Of them, 32% were black South Africans; 29% were first-generation students, who ran out of food most days of the week or daily, and 20% experienced a double burden of purchasing food as well as an 11 hour per week travel to and from classes (University of the Free State: Center for Teaching and Learning, 2016). Even though the issue has been discussed on national platforms in South Africa, little progress has been made in finding any long-term solutions.

Some universities, including the UFS, have responded with food banks and food bursary schemes, while others, like the University of Johannesburg and the University of the Witwatersrand, have feeding programmes. Overall, although having some positive impacts, these interventions have been *ad hoc* and generally dependent on food and financial donations from third parties, all of which are not necessarily sustainable or scalable to the size of the actual need (Wegerif & Adeniya, 2019). Worse, these “charitable" interventions are often shunned by students due to the stigma attached to being seen as impoverished, hungry and having to depend on handouts (Van den Berg & Raubenheimer, 2015).

High food insecurity may not be entirely related to financial struggles but might worsen these young adults' lack of essential life skills (Van den Berg & Raubenheimer, 2015). Upon examining the prevalence of food insecurity and associations with health outcomes among first-year college students at a South-Western university in the US (Bruening, Brennhofer, van Woerden, Todd & Laska, 2016), numerous students reported that they lacked essential skills to navigate and survive the environment with their health intact. These include financial skills and the expertise to create a shopping list and cook for themselves. Low socioeconomic status contributed to further budget constraints leading students to consume more reasonably priced but unhealthy foods (Bruening, Brennhofer, van Woerden, Todd & Laska, 2016). Notably, national and international studies attest to the poor quality of the students' diets.

Student diets typically fall short of many nutritional guidelines for health, including high intakes of fat and added sugars, with inadequate intakes of fruits, vegetables and dairy as well as crucial nutrients like omega-3 fatty acids, vitamins, minerals and protective phytochemicals (Burrows et al., 2017; Plotnikoff et al., 2015). At this vulnerable age, typically westernised dietary patterns, also documented amongst South African students, including at the UFS (Van den Berg et al., 2013), are of grave concern as they present well-recognised risk factors for the future development of noncommunicable diseases (NCD), like cardiovascular diseases, type 2 diabetes, cancer and mental illnesses (Steyn & Mchiza, 2014). According to the World Health Organisation (WHO), NCDs are forecasted to increase by 15% globally between 2008 and 2030, while in Africa, South-East Asia and the Eastern Mediterranean areas, it is projected to increase by 20% (Steyn & Mchiza, 2014). International research efforts to

stem the upsurge of NCDs increasingly stress the need to address the food environments that individuals have to negotiate to feed themselves, as important determinants of health behaviour, particularly in low- and middle-income countries (Turner et al., 2018).

As a research framework, the food environment is built on social and economic factors. It focuses on how the human species relate or interact with their environment and determine how they select and consume the acquired food. Turner et al. (2018) recently developed a global framework for food environmental research (Figure 1.1).

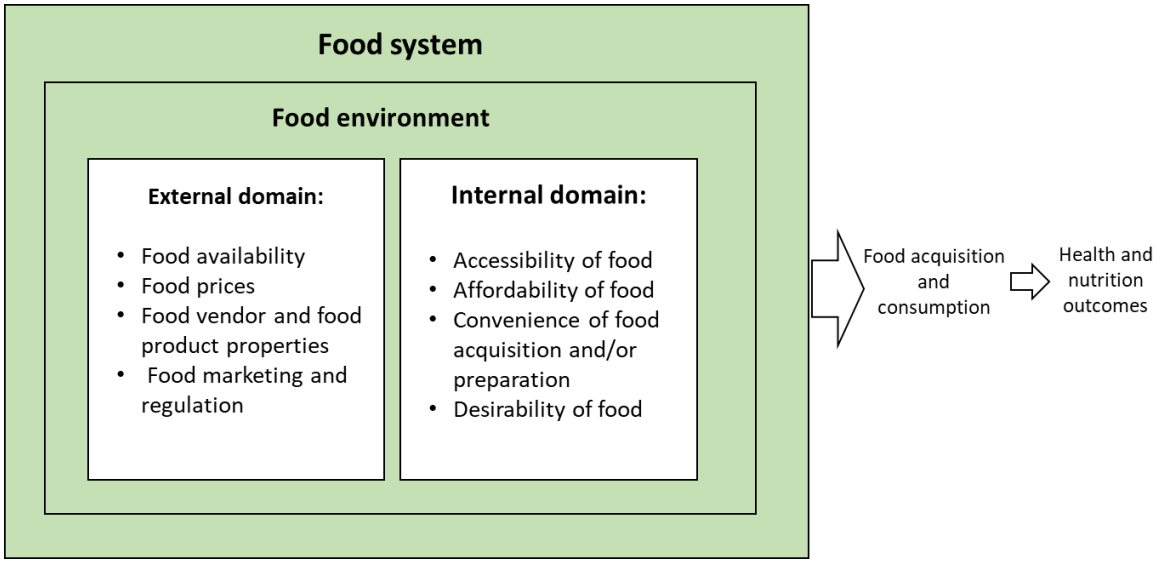

Figure 1.1: Conceptual framework depicting the food environment as the interface within the wider food system (Turner et al., 2018)

This framework describes how food environments interface into the broader food system, and it identifies two domains of a given food environment (Figure 1.1). The external domain is associated with availability, prices, suppliers, quality, shelf life, product property, and promotional information related to food in a given food environment. The personal domain, in turn, represents the accessibility, affordability, convenience and desirability of food as experienced by individuals functioning within a specific food environment which often determines the foods they select to eat. The external domain represents which foods are available to students in their given environment, while the personal domain represents the factors that guide their food choices.

A healthy food environment is defined as providing equitable access to healthy foods, including fresh fruits and vegetables and whole grains (Rideout et al., 2015). These should be made available at retail foodservice outlets in prepared and pre-packaged options that are more convenient for students. A healthy food environment creates an opportunity for food production, food distribution networks and community programmes (Rideout et al., 2015)

In 2013, a study on the main campus of UFS assessed the foods on offer at the six food vendors that, at the time, was approved for students on the UFS food bursary scheme (No Student Hunger), consisting of one tuck shop, a restaurant, two take away shops and three cafeterias. The findings revealed that only 1.0% of the food offered could be classified as dairy, 4.8% as fruit and 5.7% as vegetables. In comparison, 29.2% of the available foods were high in sugar, refined carbohydrates and saturated fat (Meko & Jordaan, 2016). These offerings are typical of an obesity-promoting food environment, promoting diet-related NCDs (Turner et al., 2018). The food environment lacked health-promoting foods, such as grains, legumes, vegetables and fruit (Meko & Jordaan, 2016).

Studies at campuses in the US have identified barriers to healthy and adequate eating in both the external (Rajshri Roy et al., 2015; Horacek et al., 2013) and personal domains (Flores et al., 2019; Rajshri Roy et al., 2015) of their students' food environments. Notably, factors in these domains, like food availability, prices, accessibility and affordability, also play a role in determining the level of food security in a given population. Therefore, the specific food environment that students are exposed to on and off-campus during the academic year may also contribute to their level of food security. However, thus far, there is very little research to explore the food environment in South African tertiary institutions.

1.2 Problem statement

Among factors emerging as barriers for students to succeed at tertiary institutions, the decline in the South African economy, the high influx of students from low socio-economic backgrounds accessing universities, and the struggle of food acquisition have been identified in the South African higher education sector. Numerous studies at various institutions have shown higher food insecurity levels among South African students than in the general South African population (Van den Berg & Raubenheimer,

2015). Thus, in South African universities, various student support initiatives are under numerous pressures, with models addressing growing needs for food support. In the plight, little attention has been paid to the food environments that students need to navigate and to what extent these environments may be contributing to the high levels of food insecurity amongst South African students while predisposing them to NCDs.

The study aimed to explore how students at the UFS experience the concept of “feeding themselves" within their current food environments on and off-campus and whether these experiences are associated with food insecurity. To the best of the researchers' knowledge, this would be the first South African study to investigate food insecurity among students in the context of their food environment. To this end, the framework developed by Turner et al. (2018) to examine the personal domain of the students' food environment was applied to gain novel insights into the role of the students’ food environment at the UFS and other universities with similar socio-demographic indices and food security levels. These insights may assist in informing strategic planning to address students' well-being, vital for students' academic success.

1.3 Aim

This study aimed to describe the experience of their food environment among students at the University of the Free State during the academic term, in relation to their level of food security.

1.4 Objectives

The research objectives were to determine the following from the participants:

1. Socio-demographic profile;
2. Level of food security;
3. Associations between security level and socio-demographics;
4. Awareness and utilisation of food assistance programmes;
5. Students' experiences of the food environment that they are exposed to while studying at the UFS, with regards to:
    i. Accessibility of food-related to transport, distance and time spent accessing food;
    ii. Affordability of food and personal purchasing power;

iii. Convenience relative to time and effort preparing and consuming food;
iv. The desirability of food related to preferences, acceptability, tastes, desires, attitudes, culture, and food-related knowledge and skills (including cooking self-efficacy score);

1.5 Structure of the dissertation

This dissertation is divided into six chapters:

Chapter 1:

The chapter outlines the background, motivation, problem statement, aim, and objectives of the study.

Chapter 2:

This chapter is an in-depth literature review related to the research topic.

Chapter 3:

This chapter summarised the study design, sampling, the variables measured, the data collection methods and analysis, and the ethical consideration for the study.

Chapter 4:

The results obtained in the study.

Chapter 5:

The results are interpreted and discussed in this chapter.

Chapter 6:

The chapter summarises the results, conclusion and recommendations of the study, structured according to the study's objectives.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

Food insecurity was recognised among students in higher education as the greatest barrier to academic progress during the last decade (Bruening, Brennhofer, van Woerden, Todd & Laska, 2016).

In 2019, Belachew et al. reported on the global chronic food crisis and further explained that the impact and extent of this crisis on young people in middle to lower-income countries are under-researched. Therefore, this chapter reviews the current food environment concerning university students and shows a link between food insecurity and diverse socioeconomic and demographic parameters. There is a shallow pool of research available around these concepts.

Food insecurity and contributing factors will be explored and expanded on, which build on the barriers to success that university students face when endeavouring to feed themselves during their academic term. The food environment will be central to this text and probed as the critical focus for this study.

2.2 Higher education to break the poverty cycle in South Africa

The disparity between poor and middle-class communities is growing in South Africa, widening rapidly due to poverty. The poverty cycle is characterised by widespread unemployment, despite the disbursement of social grants and the Reconstruction and Development Programme (RDP) initiated in 1994 by President Nelson Mandela's government. Most South Africans receive monthly incomes below the poverty line. At the same time, infectious diseases, Human Immunodeficiency Virus (HIV)/Acquired Immunodeficiency Syndrome (AIDS), tuberculosis, alcohol abuse, domestic violence, soaring crime, women and child abuse, gang-related activities, teenage pregnancy and the growing number of single mothers and child-headed households struggling to make ends meet contribute to poverty (Adeniyi & Durojaye, 2019).

Secondary to the high burden of poverty, 28% of some families are food insecure (FI), with household food insecurity reaching 40% or higher in some regions, even though SA is food secure at a national level. Therefore, many households have to resort to

inadequate dietary intake or a monotonous diet that fails to meet their nutritional demands. Poor dietary intake among pregnant women, infants and children, leads to widespread malnutrition. Moreover, impacted children are susceptible to obesity, insulin resistance and NCDs later in life. Poverty has proved to have intergenerational repercussions. Consequently, poverty and its associated sociopolitical challenges have negative consequences (Labadarios et al., 2011).

One of the South African government's poverty alleviation initiatives is to assist students who have completed grade 12 and want to further their studies at higher education institutions. NSFAS helps students with tuition, study materials, housing and living expenses. The ultimate objective is for these students to succeed at university and graduate, thereby boosting the country's intellectual capital, increasing skills levels and expanding the job market, all of which will help increase the size of the middle class and have a beneficial impact on the gross domestic product, one of the most important indicators for assessing a country's economic performance (Adeniyi & Durojaye, 2019).

However, Adeniyi & Durojaye (2019) argue that inefficiency and poor coordination in the administration of NSFAS result in significant delays in delivering cash to qualifying students, while the amounts distributed as student allowances are also insufficient as they do not account for compounding variables such as inflation, Value Added Tax (VAT) hikes and transportation expenses, which affect the cost of food for students. NSFAS payments also may not adequately accommodate international students, who may not be eligible for financial aid depending on their unique circumstances (as displaced persons). Moreover, with the rising costs of higher education and overall living costs in South Africa, the so-called "missing middle" who are too poor to pay for their studies yet are too affluent to qualify for NSFAS funding are left struggling.

Hunger remains a fundamental factor contributing to high dropout rates and academic non-achievement among South African tertiary students. Most students affected by hunger on campus come from historically disadvantaged backgrounds, suggesting that food insecurity follows ethnicity and primarily affects African and Coloured students (Labadarios et al., 2011; Adeniyi & Durojaye, 2019).

2.3 Student food security level

Given the impact of university student food insecurity, it is crucial to understand food security. The Centre for Public Health Nutrition (2003) refers to food security as a fundamental human right and defines it as when people have physical and economic access to adequate, safe, culturally preferred, and nutritious food that meets dietary needs to promote good health and way of life (Rychetnik et al., 2003). On the other hand, according to the internationally accepted definition of food insecurity, access to sufficient and culturally appropriate food may be limited and unattainable due to socio-economic conditions (Rychetnik et al., 2003).

Research reveals that students require access to safe, adequate and nutritious food to succeed. Under the National School Nutrition Programme (South Africa's school-feeding system), underprivileged learners are provided with daily meals from the pre-school level right through to high school. However, this does not apply to students in higher education institutions. Consequently, pupils who benefited from the school-feeding programme are left hungry when they reach university (Adeniyi & Durojaye, 2019). Food insecurity and poverty have a direct correlation. As a result, academic performance and achieving a degree are negatively impacted (Labadarios et al., 2011).

Food insecurity among students in higher education is not unique to South Africa. Over the past decade, food struggles have become a recognised threat to student success (Bruening et al., 2017) in higher-income countries, including the US, Canada, Australia and Poland (Lee et al., 2018). The increasing prevalence of food insecurity on campuses has been linked to the global recession in 2008 and the worldwide drive to increase access to higher education for previously excluded groups. Like other South African universities, the UFS has been contending with the challenge of hungry students. However, there has been a paucity of studies on student food insecurity in higher education in low to middle-income countries in the Global South, with only a few publications from South Africa (Sabi et al., 2019;Dominguez-Whitehead, 2015; Van den Berg & Raubenheimer, 2015; Gwacela, 2013; Munro et al., 2013; Kassier, S. & Veldman, 2013), Nigeria (Ukegbu et al., 2019) and Ecuador (Eche, 2018). Though not adequately researched, the problem does not go unnoticed in the South African context.

Globally, over the past decade, food struggles among students have become an impediment to student success. The large body of empirical evidence further states that food insecurity is associated with adverse outcomes during a persons' lifespan, including substandard academic achievements, inadequate intake of critical nutrients, a predisposition to chronic disease development and poor psychological and cognitive functioning Negative consequences of food insecurity in higher education (Hoyland et al., 2009; Belachew, Hadley et al., 2011; Farahbakhsh et al., 2017a; Farahbakhsh et al., 2017b; Weaver et al., 2020)

2.4 Negative consequences of food insecurity in higher education

According to Maslow, physiological needs are the most basic human survival requirementsl. All the other needs are secondary. Food is a fundamental human right and an essential component of good health. Students must eat to maintain a healthy lifestyle (WHO-UNICEF, 1978).

However, many students report skipping meals and eating less healthy items to avoid being hungry. Side-effects include fatigue, energy loss, irregular sleep patterns, irritability, depression, headaches, and weight gain (Sabi et al., 2018).

Elevated concentrations of hunger among students threaten the aspirations of higher education, which include acquiring a degree as a means of breaking free from poverty. However, food insecurity can have negative consequences on students' economic and social development prospects. Sustainable development goals (SDG) 1 and 2 are based on eradicating poverty and hunger (Kuruvilla et al., 2018;Ukegbu et al., 2017). Food insecurity adversely affects academic achievement as hunger contributes to ill health and negatively influences students' capacity to study and complete their degrees. Some students enter tertiary education with the burden of food insecurity that stems from their households. The prevalent estimates of student food insecurity in high-income countries, including the US, Canada, Australia and Poland, ranges between 9-89%, depending on the setting and the instrument utilised (Lee et al., 2018).

On the contrary, the challenge of food insecurity in higher education in low and middle-income countries has received relatively little attention and limited research. South Africa, Nigeria and South America are the only countries in Africa and South America

that have published some, if not limited, research on student food poverty in higher education (Dominguez-Whitehead, 2015; Munro & Simpson, 2013; Gwacela, 2013; Sabi et al., 2018). Limited research on food insecurity among South African higher education learners has been carried out. The first South African study published in 2013 (Van den Berg & Raubenheimer, 2015) identified 60% of the UFS as food insecure. A study found an association between food insecurity and psychological well-being. Poor mental health may cause students to work fewer hours, lowering their income and raising their risk of food poverty. More study is needed to establish food insecurity's driving forces and causality and strategies that concurrently reduce food insecurity and enhance mental health (Meza et al., 2018).

Hunger remains a fundamental factor contributing to high dropout rates and academic non-achievement among South African tertiary students. Most students affected by hunger on campus come from historically disadvantaged backgrounds, suggesting that food insecurity follows ethnicity, affecting African and Coloured students (Adeniyi & Durojaye, 2019 Labadarios et al., 2011;Van den Berg & Raubenheimer, 2015).

2.4.1 Associations of food security with student academic performance

Student success is defined as their retention, advancement, and throughput (Cele, 2021). According to the 2019 South African Department of Education and Training (DHET) cohort, analyses report 71% of the student cohort that enrolled for three-year degrees in 2015 failed to graduate in minimum time (Department of Higher Education and Training, 2019), and it is speculated that student food insecurity could have played a major role. A large body of empirical evidence shows that students need access to safe, adequate, and nutritious food to succeed (Farahbakhsh et al., 2017b). Munro et al. (2013) found that food-insecure students worry about the next meal rather than focus on academic success. Students who experience food insecurity were more likely to fail or drop out (Munro et al., 2013; Kassier & Veldman, 2013). For this reason, students' capacity to perform academically is highly dependent on a healthy balanced diet (Ukegbu et al., 2019). Several studies in high-income (Weaver et al., 2020; Raskind et al., 2019; Burrows, Whatnall, Patterson, & Hutchesson, 2017) and one South African study to date (Wagner et al., 2021) have shown a significant association between being food secure and achieving academic success. The lack of access to

nutritious food among college students may negatively influence their overall academic performance (Camelo & Elliott, 2019).

2.4.2 Associations of food security with student health and wellness

Educational achievement is a critical social indicator of health, and greater academic achievement, particularly a university degree, is associated with a wide variety of health and social benefits throughout one's life span (Wolfson et al., 2021). However, insufficient macro-and micronutrients have been shown to impair school learners' ability to focus, reducing their academic performance (Stuber, 2014). Several studies in the US have focused on university students' fruit and vegetable intake since these are essential components of a healthy diet and found it mostly inadequate. In some of these studies, cost and availability were identified as the most significant obstacles to adequate fruit and vegetable intake. Most students on tight budgets were restricted in purchasing a range of fruits and vegetables (Otto, 2016). Convenient takeaway meals were found to be more readily available and affordable. Thus, students' diets lacked vital vitamins and minerals, placing their health at risk due to a lack of nutritional variety (Otto, 2016).

Furthermore, well-being is defined as the absence of negative emotions (depression and anxiety), being happy and positive, and maintaining a good level of life satisfaction (Ahmad, Sulaiman, & Sabri, 2021). Students' food insecurity has been linked to increased anxiety, frustration (Maynard et al., 2019; Gwacela, 2013) and depression, and poorer psychosocial health (Raskind et al., 2019). Rates of depression and anxiety were three times as high among food-insecure first-year students at a large urban college in the US (Bruening et al., 2016.) Inability to deal with financial, academic, and nutritional challenges may be the fundamental cause of depression. Research shows that depression reduces productivity due to its effects on the brain (Gwacela, 2013).

2.5 Challenges related to food assistance in higher education

Numerous research studies in the South African and international context have observed difficulties connected to food insecurity and social stigma. Food aid is viewed as a “disgrace, shame, embarrassing”, and the application process intimidates students (Sabi et al., 2019; El Zein, Mathews, House & Shelnutt, 2018; Dubick et al.,

2016). The South African interventions have been met with reluctance from the students who require the service. Some students are apprehensive due to perceived social stigmatisation, humiliation, marginalisation and fear of being judged (Weaver et al., 2020; Sabi et al., 2018). According to a 2013 study conducted at the University of the Free State, some students were hesitant to apply for the 'No Student Hungry Programme' because they feared being labelled poor and their food insecurity status being exposed on campus, which could lead to stigmatisation (Van den Berg & Raubenheimer, 2015).

Furthermore, compared to the magnitude of food insecurity among South African students, these measures are insufficient and mainly focus on addressing acute hunger through largely unsustainable and unscalable programmes that are predominantly funded through donations. Initiatives like food gardens are a step in the right direction and provide valuable learning experiences for students involved. However, seasonality, lack of cold storage space, and overall small scale compared to the magnitude of food insecurity at universities limit its effectiveness in addressing hunger among students. Moreover, the onus is placed mainly on the government to address food insecurity amongst students in South Africa. A more sustainable approach may be for universities to create food environments conducive to food security and health, which can help the little money that students have available for food go further.

2.6 Student food environments

The food environment in which people live and work is progressively recognised as a significant factor in dietary intake. Therefore, the food environment as a research framework is premised on socio-ecological theory, and interconnected human and environmental factors influence health-related activities such as eating (Turner et al., 2018).

Rideout et al. (2015) define food environments as the physical, social, economic, cultural and political factors created by the human, social settings that impact the accessibility, availability, and adequacy of food within a community or region. Additionally, geographic access to food in a community or neighbourhood, consumer experiences inside food outlets, services and infrastructure in institutional settings or

the information available about nutrition may also be used to define food environments (Rideout et al., 2015)

Healthy food environments guarantee that everyone has equal access to nutritious foods like fresh fruit and vegetables and whole foods prepared and pre-packaged and available in various retail and foodservice outlets. In addition, healthy food environments enable opportunities for food production and distribution networks, community programmes and infrastructure to support a healthy eating lifestyle (Rideout et al., 2015; High-Level Panel of Experts on Food Security and Nutrition, 2017). The influence of food shopping behaviour and the potential modification of bad eating habits, such as skipping breakfast, increased snacking, and a low intake of fruits and vegetables, can be carried into adulthood and increase the risk of weight gain and other cardiovascular disorders. However, from a nutritional point of view, fruits and vegetables are highly recommended for their health-promoting characteristics. They contain antioxidants, anti-inflammatories, phytoestrogens, and other preventative mechanisms. Fresh produce is high in dietary fibre, linked to a lowering the risk of obesity and obesity-related diseases (Slavin & Lloyd, 2012;Vorster et al., 2013).

Turner et al. (2018) classify key environmental characteristics into two domains that interact to shape what people (students) eat (figure 1).

The external domain dimensions are food availability, prices, vendor and product properties, and marketing and regulation. The personal domain relates to a set of individual-level and household-level measurements and factors. This domain's influencers are food accessibility, affordability, convenience, and desirability (Turner et al.,2018). With the consideration of the continuous and complex interactions between the domains and dimensions to shape people's food acquisition and consumption, Turner et al. (2018) propose this definition for the food environment:

> *"The food environment is the interface that mediates people's food acquisition and consumption within the wider food system. It encompasses external dimensions such as the availability, prices, vendor and product properties, promotional information; and personal dimensions such as the accessibility, affordability, convenience and desirability of food sources and products."*

Figure 2.1 summarises the framework and describes the dimensions or influencers included when denoting the food environment. Turner et al. (2018) explained that this

framework denotes the interrelatedness of the two domains through their dimensions. A thorough look at the two domains and the dimensions they explore is necessary to understand this framework's properties and its relation to the food environment.

The approach would take a two-hybrid method, the "demand technique" (attracting new consumers by increasing the availability of nutritious food) and a formalised supply approach (a wider variety of healthy foods were insufficient in the past).

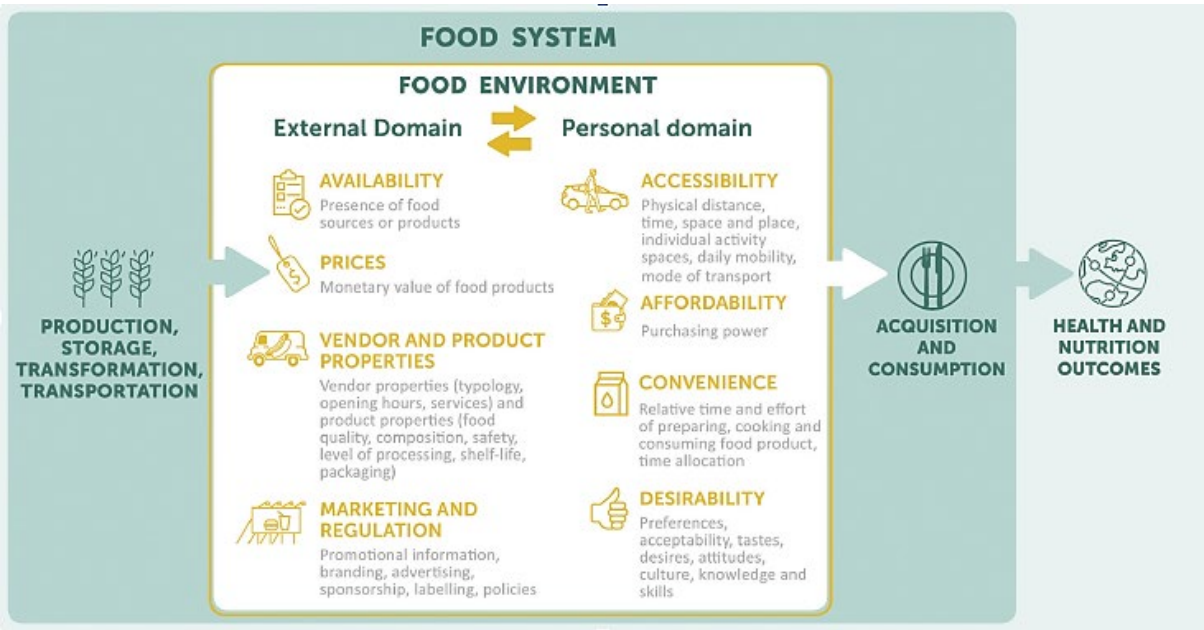

Figure 2.1 Detailed conceptual framework depicting the food environment as the interface within the wider food system. (Turner et al., 2018)

2.6.1 External domain

According to the framework by Turner et al (2018), an in-depth analysis of the food environment's external domain can be summarised as follows.

2.6.1.1 Food availability

This dimension is commonly used in conjunction with food accessibility, and a distinction between the two is key to understanding how the two domains in the framework interact. Turner et al. (2018) distinguish the two elements by describing food availability as to whether food is present or not, while food accessibility is more complex in that it is dynamic depending on different distance and time-based aspects, which will be further explored in the personal domain .

Food availability is informed by the food markets accessible to consumers in a given context. Different food markets and vendors have various quality and types of foods, depending on their target consumers (Raza et al., 2020). Raza et al. noted that foods commonly available to children and adolescents in the school environment in the US lack nutrition, are energy-dense and do not support good health. These foods include carbonated soft drinks, chips, fries, and other snacks available at retail food outlets accessible to students (Raza et al., 2020).

A substantial amount of empirical evidence supports that when portions of unhealthy foods are reduced and healthy food options are made available at affordable prices to students, it can encourage healthier eating habits. Reducing the portion size of french fries made available to students at canteens and dining halls in the US and Europe significantly reduced students' intake of saturated fats (Stroebele et al., 2009; Freedman et al., 2010; Lachat et al., 2009; Roy et al., 2015). Children and adolescents who stayed closer to fast-food outlets with unhealthy food options were more obese than those who stayed closer to outlets that sold healthy foods (Raza et al., 2020).

Children and adolescents will adopt meal preparation skills that they learn from home at a young age. These meal preparation skills are highly influenced by foods that are available at home. Families that buy unhealthy ingredients and nutritionally inadequate ready-to-eat food items prepare those foods for their children and influence unwholesome meal preparation outcomes. The availability of healthier foods at home can improve these children's meal preparation attitudes when they become independent adults, such as when they go to university (Raza et al., 2020). Fruits and vegetables are widely recommended for their health-promoting properties. Furthermore, phytochemicals and bioactive components in plant-based foods act as antioxidants, anti-inflammatories, phytoestrogens, and other protective mechanisms. Additionally, produce is a good source of dietary fibre, linked to a decreased incidence of obesity and obesity-related diseases (Slavin & Lloyd, 2012).

2.6.1.2 The price of food

Food prices depend on food vendors and retailers responsible for setting food prices (Raza et al., 2020). It is noteworthy that healthy, nutritious food is often overpriced and unattainable to children and adolescents from low-income groups (Raza et al., 2020). Thus, they opt for foods deficient in nutrients but provide better satiety at affordable

prices (Raza et al., 2020). A study conducted at a Canadian university focused on undergraduate students who received full meals. An excellent example of this was noted when the cost of fresh fruit and vegetable portions was higher than the price of sweetened yoghurt and pretzels at a student cafeteria (Roy et al., 2015).

A 2015 systematic literature review conducted in Australia investigated how nutritional interventions aimed at university students could change behaviour (Roy et al., 2015). Since energy-dense foods are usually priced lower than nutritious foods, students tend to opt for these low budget foods that provide satiety at a lower price. Roy et al. (2015) demonstrated that when healthy food prices decreased and the cost of unhealthy food increased, student diets' nutritional value improved significantly. Reducing nutritious food prices was more effective than nutrition and health education, encouraging students to choose healthier food (Roy et al., 2015). It is important to note that affordability in the personal domain is closely linked to price because prices significantly impact how personal views are affordable (Turner et al.,2018).

2.6.1.3 Vendors and product properties

The type of food suppliers, their opening hours, and the general qualities of food vendors are all descriptors of vendor properties (Turner et al., 2018). The retail stores' environment significantly impacted consumers' food selection and purchasing behaviour (Sanchez-Flack et al., 2019). Locally and internationally, changes made around the retail food environment could encourage healthy eating. An example of this was seen in the UK, where fast food vendors were prohibited near schools (Wilkins et al., 2018). The type of food store also impacts customers' food choices, where customers were more likely to be interested in buying healthier food in big retail stores than small convenient shops (Caspi et al., 2017). Sanchez-Flack et al. (2019) conveyed that when the exposure of in-store promotional material displaying healthy meals expands, sales of fruits and vegetables may improve. Furthermore, placing fruits and vegetables at the storefront was linked to a rise in sales of these healthier options (Sanchez-Flack et al., 2019).

Product properties include quality and safety and how the food was processed, packaged, labelled and stored (Turner et al.,2018). Raza et al. (2020) found that young people fall prey to unhealthy foods high in energy, sugar, salt, and unhealthy fats because the packaging and flavours are appealing. Sensory qualities of the food, such

as visual appeal, aroma, are some of the qualities that will influence an individual to obtain nutritious food. It is a behaviour in which vision plays a significant role, mediated by perception, pleasure, and resource allocation. It should come as no surprise; therefore, food's visual appeal significantly impacts the total pleasure of the meal and taste. A recent review on consumers' perception regarding food quality found that consumers differ in their perceptions of the meaning of food quality (Sadelek, 2019). Common descriptors seem to be mostly sensory, such as taste, visual appeal, freshness and brand, while consumers are also inclined to buy food produced in their native area as they trust these local brands more. Similarly, food labels influence customers and give them information about the food they are about to purchase (Sadelek, 2019).

2.6.2 Marketing and regulation

Turner et al. (2018) described that marketing and regulation in the food environment "include promotional information, branding, advertising, sponsorship, labelling, and policy regulations about the sale of food". Canteen menus in schools use colourful branding and labelling to coax children into ordering unhealthy foods (Raza et al., 2020). There are two sides to food labels: the bright side provides crucial nutritional information and warnings about allergens included on labels. Still, companies may use food labels as an outlet for various misleading claims that can help them increase sales of that food (Raza et al., 2020). Some regulations guard food companies' integrity as they market themselves to vulnerable groups such as children and teenagers (Truman & Elliott, 2019).

2.6.3 Personal domain

Consumers bring the personal elements to the food environment on an individual level, such as purchasing power, access, convenience, and desirability, and ascertain why individuals prefer the foods they choose. In international literature, it is well recognised that taste dominates young adults' food purchasing decisions, followed by convenience, affordability, and health (Boek et al., 2012; Hebden et al., 2015). Furthermore, Hebden et al. (2105) findings are pertinent for planning interventions to improve the food environment in higher education. The authors reiterate that the interventions should safeguard students' access to delicious and healthy foods at an

affordable price. Nutrition labels on foods were also considered crucial. Healthy food labels or food labelling with nutrition or health statements could be successful strategies for inspiring healthier food selection in student populations. A systematic review that evaluated food environment interventions targeting dietary behaviour in young adults in tertiary education settings found that education at the point of purchase improved students' and staffs' shopping behaviour and was associated with making healthier food choices (Roy et al., 2015).

2.6.3.1 Food accessibility

Availability always precedes accessibility. If the food item is not available, it cannot be accessible. Accessibility is a subjective term. Distance, as well as other factors, can affect accessibility. The mode of transport, distance to food outlets, travel time to food outlets, and money spent on transport are all factors to consider. Navigating the food environments is considerably easier when individuals have access to suitable and safe means of transportation, such as reliable public transport systems, the safety of walking to the nearest outlet, and personal vehicles (Raza et al., 2020; Turner et al., 2018; Turner et al., 2017).

2.6.3.2 Affordability

The individual purchasing power determines affordability in the personal food environment domain. Prices and affordability are extensively researched aspects in food environment study. Prices and affordability are affected by changes in food supply and accessibility (Turner et al., 2017; Turner et al., 2018).

2.6.3.3 Convenience

Dietary preferences are also shaped by convenience. Students are responsible for procurement, food preparation and cooking. Students have time constraints due to academic workload. Therefore, they have limited time to obtain and prepare food. As a result, convenience meals are frequently chosen and include shopping at closer and more convenient food outlets, despite the compromised food quality. It also impacts the choice of meals that save time, preparation and cooking. Students tend to consume ready-to-eat foods, snacks, pre-cooked foods, etc. Some of these meals,

particularly those that are ultra-processed, might jeopardise the nutrition and well-being of students (HLPE, 2017).

The Committee on World Food Security (CFS) commissioned the HLPE on Food Security and Nutrition based in Rome. The HLPE were tasked to submit a Nutrition and Food Systems report for its 44th session in October 2017, where evidence-based policy convergence in CFS across governments and worldwide multi-stakeholder groups. The SDGss, the implementation Rome Declaration on Nutrition of 2014, the following Decade of Action for Nutrition, and the realisation of the right to enough food declared as highly significant to this challenge (High-Level Panel of Experts on Food Security and Nutrition, 2017).

Findings related to the mixed food system, defined as a higher number of people living in peri-urban, urban regions and better earnings, are exposed to highly processed meals that are more readily available and popular, people consume more saturated and trans fat and sugar. There has also been a growth in animal source food consumption as a protein and saturated fat source. Some dietary modifications contribute to the increase in obesity in these systems the upsurge in the prevalence and morbidity of NCDs, including cardiovascular disease and diabetes. While life expectancy rises when infectious illnesses decline, morbidity rises as NCDs rise. In India, the food environment is becoming increasingly urbanised; processed meals are more readily available, and people consume more saturated and trans fats and high sugar intake. While life expectancy rises when infectious illnesses decline, morbidity rises as NCDs rise. In India, the food environment is becoming more urbanised. The food environment is characterised by expanded choices in India's cities, including increased availability of processed, packaged, and ready-to-eat energy-dense foodstuffs. Food is mainly acquired from “mom and pops” businesses (e.g. corner stores), street stalls and kiosks, wet markets, and unchained fast-food restaurants, including street vendors. Consumers prefer these outlets as they are more widespread, convenient, and reasonable than supermarkets and fast-food restaurants (Buscher et al., 2001; Raza et al., 2020; High-Level Panel of Experts on Food Security and Nutrition, 2017).

2.6.3.4 Desirability

Food acceptance, desirability, and taste preferences are some of the most significant determinants of food choice, especially among adolescents. Food acceptance is frequently connected to social and cultural standards. Marketing and advertising in the external food environment significantly impact them. Peers and older siblings, caretakers, and other role models within or outside the home might affect them. Peers impact the dietary preferences of older teenagers (Turner et al., 2018).

2.6.4 Potential link between students' food environments and food security levels

Several studies have hinted that food security levels may not just be linked to lack of funds but may be worsened by other factors related to the personal domain of the food environment, as proposed by Turner et al. (2018).

A recent study (Watson et al., 2017) at an American university revealed some of the complexities of finding appropriate foods on campus. In this study, the students often perceived the inexpensive food and "filling foods" available on campus, as unhealthy and of inferior quality. As a result, many students packed food from home, acquired less desirable food, searched for free food, or omitted meals, while many students preferred going to shops outside the campus in search of inexpensive and culturally appropriate meals (e.g., Asian markets, discount stores) (Watson et al., 2017). These struggles to find appropriate foods could contribute to food insecurity.

According to the 2012 South African National Health and Nutrition Survey (Shisana et al., 2013), South Africans' overall nutrition knowledge is low, notably in the Eastern Cape, Free State, and North West provinces. Factors that impact knowledge levels vary according to socioeconomic characteristics and availability, and essential nutritional knowledge. Although nutrition education may not be sufficient to maintain a healthy diet, it can positively impact perceptions and promote improved food consumption behaviours (HSRC and MRC, 2013).

A substantial proportion of students at the UFS live off-campus, either live alone or share with other students, whilst individuals living on-campus must purchase or cook their own meals in the residences. According to research at the University of Florida, the frequency of food insecurity was highest in unmarried students and those sharing

accommodation with other students, and lowest in students living with their parents or relatives, which might represent the impact on students of not having someone else to take care of food shopping and meal preparation. Most students reported they cooked their meals, although half of them said they were hesitant about their own culinary capabilities, males in particular (Van den Berg & Raubenheimer, 2015).

The only study that has assessed some aspects of the UFS food environment was done in 2013. This study, by Meko et al. (2016) aimed to assess the eternal domain of the food environment available to students participating in the UFS food aid programme, the “No Student Hungry (NSH) programme” (a bursary system that students with good marks can apply for and assists 50-80 students per year). In 2013, there were six permitted vendors on the main campus where campaign participants could spend their daily food allocation (loaded as a credit on their student cards) - one tuck shop and one restaurant, two take-away food outlets, and three cafeterias. The audit found that only 1% of the accessible food products could be categorised as dairy, 4.8% as fruit, and 5.7% as vegetables, which are three essential components of a healthy diet (Meko & Jordaan, 2016). Most of the food available to the students in the NSH were high in refined sugar, refined carbohydrates and fat. Notably, these foods accounted for approximately a third (29.2%) of all food products available on the main campus for students on the bursary scheme (Meko & Jordaan, 2016).

Grocery establishments that provide a range of fresh, healthy foods and affordable whole foods are associated with healthier weights. In contrast, convenience stores that sell less healthy packaged foods are associated with higher rates of obesity and overweight (Krukowski et al., 2010).

Where policies and programmes that support healthy food environments exist, they impact healthy eating. Community kitchens and school gardens are examples of programmes that help individuals learn about healthy meals, acquire and improve food skills, alter their tastes toward more nutritious foods, and contribute to mental and social health and well-being (Rideout et al., 2015).

Roy et al. (2015) performed a cross-sectional observation of a food environment and a survey of food purchasing preferences, behaviours, and opinions of students and staff at a large urban university in New Zealand. The researchers assessed current views and examined drivers that influence staff and student food purchases. The data

show that a relatively high percentage of energy-dense, nutrient-poor food, beverage items high in sugar were made available, were easily accessible and marketed across all food outlets compared to healthy food and beverage goods (Roy et al., 2019). An interesting finding was that 80.8% of the participants had sound nutritional knowledge. Because students and staff spend a significant amount of time on campus, the food environment in tertiary education settings may significantly impact their eating habits (Story et al., 2008). As a result, these environments have significant responsibility for providing a food environment that encourages young adults to make better eating choices (Roy et al., 2019). The author noted that most staff and students purchased food or beverages on campus in agreement with previous literature. Moreover, these participants insisted on fresher, healthier, more diverse, and affordable food (Tam et al., 2016).

Adulthood is also a critical period for forming long-term health habits (Otto, 2016). A large body of evidence states that food insecurity is linked with students consuming inadequate nutrients, low intakes of fruits, vegetables, and dairy and high sugar, refined starch, and fat. For this reason, research demonstrates that focusing on students' food environments can enhance healthy purchasing behaviour.

CHAPTER 3: METHODOLOGY

3.1 Introduction

This study assessed the socio-demographics, participants' experiences of the food environment, the level of food security, awareness, and utilisation of food assistance programmes, lastly, the associations between the level of food security and aspect related to the food environment. This chapter summarises the study's methodology regarding the approval and ethical considerations, study design, study population, validity, reliability of collected measures and statistical analysis.

3.2 Study design

A descriptive cross-sectional study was conducted.

3.3 Population and sampling

3.3.1 Population

The study population comprised all students enrolled at the University of Free State during the second term of the first semester of 2020. In 2020, the total number of students enrolled at the university was 42 828, 35 246 were undergraduates, 6488 were postgraduates, and 548 were occasional students.

3.3.2 Sample

All students who met the inclusion criteria were eligible to participate in the study.

3.4 Inclusion criteria

- Students registered at the University of Free State in 2020 with a valid student number; and,
- Students on the main campus,
- Qwa-Qwa and South campuses
- Distance learners.

3.5 Measurements

3.5.1 Socio-demographic background

Assessed socio-demographic variables included age, gender, the campus where the participant attended classes, participants' level of study and relationship status, whether the students were first-generation. The funding source for their studies, the stipend received, earmarked for food.

3.5.2 Level of food security

To assess the level of food insecurity, the 10-item Adult Food Security Survey Module (AFSSM) 2008 was used (Table 4.2) (Cafiero et al., 2018). The item measures were adapted to reflect the latter part of the first semester of 2020. The data only reflects the participants' experiences while studying at the UFS, not that of semester holidays when the circumstances around their feeding situation may or may not differ.

The AFSSM identifies four levels of food security, namely high food security (no food access problems), marginal food security (anxiety over household food shortages), low food security (reduced diet quality and variety) and very low food security (reduced food intake and/or disrupted eating patterns). The level of food security scored as indicated in Table 3.2, under the Guide to Measuring Household Food Security and classified as per the recommendations by the USDA Economic Research Service (ERS) (Gaines et al., 2014). The definitions for each food security category and corresponding scores are indicated in Table 3.2.

Table 3-1 Adult Food Security Survey Module Item (Gaines et al., 2014)

Item	Potential response	Score
Evaluate the following three statements for the first semester of 2020 while studying at the UFS:		
'I worried whether my food would run out before I got money to buy more.'	Often true	1
	Sometimes true	1
	Never true	0
'The food that I bought just didn't last, and I didn't have money to get more.'	Often true	1
	Sometimes true	1
	Never true	0
'I couldn't afford to eat balanced meals.'	Often true	1
	Sometimes true	1
	Never true	0
In the first semester of 2020, while studying at the UFS:		
Did you ever cut the size of your meals or skip meals because there wasn't enough money for food?	Yes	1
	No	0
(If yes) How often did this happen?	Almost every month	1
	Some months, but not every month	1
	Only 1 or 2 months	0
Did you ever eat less than you felt you should because there wasn't enough money for food?	Yes	1
	No	0
Were you very hungry but didn't eat because there wasn't enough money for food?	Yes	1
	No	0
Did you lose weight because there wasn't enough money for food?	Yes	1
	No	0
Did you ever not eat for a whole day because there wasn't enough money for food?	Yes	1
	No	0
(If yes) How often did this happen?	Almost every month	1
	Some months, but not every month	1
	Only 1 or 2 months	0

Table 3-2: Classification of food security (Gaines et al., 2014)

Food security status	Score	United States Department of Agriculture Definition
High food security	0	No food access problems or limitations
Marginal food security	1-2	No food access problems or limitations; Anxiety over food sufficiency or shortage of food in the house, with little or no indication of changes in food intake
Low food security	3-5	Reduced quality, variety or desirability of diet
Very low food security	>5	Disrupted eating patterns and reduced food intake

3.5.3 Awareness and utilisation of food assistance programmes

For this study, information was gathered related to whether participants were aware of and used the food assistance that the UFS provided in the form of food parcels and the No Student Hungry food bursary scheme and whether they had other forms of food assistance that they utilised.

3.5.4 Students' experience of the food environment

An objective was to gauge students' experience of their food environment. The four components related to the food environment's personal domain, as indicated by the framework of Turner et al. (2018) was used:

3.5.4.1 Accessibility of food

For this study, information concerning the mode of transport, distance to food outlets, travel time to food outlets, and money spent on transport was collected.

3.5.4.2 Affordability of food and personal purchasing power

Information related to affordability of food. Purchasing power included the amount of money spent on food, how long the food lasts, the possibility of clubbing together with peers/creating 'stokvels,' to buy and prepare the food, and whether students looked for specials on food products and bought food in bulk, if a stipend was received for food, and the monthly amount of money usually available for food. "Stokvels are invitation-only clubs serving as rotating credit unions or saving schemes in South Africa where members contribute fixed sums of money to a central fund on a weekly, fortnightly or monthly basis." (Anon, 2012).

3.5.4.3 Convenience relative to time and effort preparing and consuming food

Additionally, information was gathered about purchasing raw or ready prepared food, time spent preparing the food, how and how often students cook meals, and perceived barriers to fresh food preparation.

3.5.5 The desirability of food regarding preferences, acceptability, tastes, desires, attitudes, culture, knowledge and skills

Information gathered related to food preferences and availability of culturally acceptabile foods, skills to prepare a healthy meal, knowledge related to healthy vs unhealthy foods, awareness of lifestyle diseases, and attitudes towards traditionally healthy and unhealthy foods regarding acceptability and desirability.

Four previously validated items from Clifford et al., (2009) were included for students to rate their confidence in their abilities to follow a recipe, cook a nutritious meal, cook

a meal in a short amount of time, and cook a healthy meal without spending much money.

3.6 Techniques

3.6.1 Development of the questionnaire

A self-administered online questionnaire was developed to include the variables mentioned above. Questions indicated the reference period "during the first semester of 2020 while studying at the UFS" to reflect students' experiences prior to the 2020 national lockdown that resulted from the Covid-19 pandemic.

The framework developed by Turner et al. (2018) was used to create questions related to the personal domain of the food environment that students were exposed to while studying at the UFS, which entails four separate constructs, namely accessibility, affordability, convenience and desirability of food.

The USDA 10-item tool included in the question to assess students' prevalence and severity of food insecurity at the UFS during the reference period as described above.

The questionnaire was developed in English, as English was the official language of instruction at the UFS at the time of the survey. The questionnaire was developed with *Evasys* Software® made available in an electronic format on the intranet to all the registered students at the University of Free State.

The members of the UFS task team received the questionnaire designed for the study. Furthermore, an independent Nutrition Consultant, Carol Brown (Carol Brown Consultancy, S.A.), assisted the task team in 2019 to conduct extensive conversations with all stakeholders regarding the UFS campus food environment's external domain. They gave valuable input to tailor the questionnaire to gather the most relevant information to help the UFS understand how to help students improve food security while also addressing health-related issues.

3.6.2 Data collection process

Before data collection commenced, ethics approval was obtained from the Health Sciences Research Ethics Committee of the UFS. A pilot study was performed, and the questionnaire was adapted based on the pilot study's feedback. The electronic

survey was made available via *Evasys* in early May 2020 to all students registered at the University of the Free State for 2020. Students were invited to participate via an email sent from the Student Success portal on Blackboard (the official electronic platform for communication and learning and teaching at the UFS to the registered email addresses of all students at the time. The email contained the link and password for completing the survey. A small incentive of ten x R250 lucky-draw cash prizes would be awarded at the end of the study (sponsored by the study supervisor).

The questionnaire's opening screen comprised a cover letter that explained the study's purpose and procedures, which represented the information document. If students agreed to participate, the questionnaire then moved to the first question. The participants were given the option to enter their email addresses if they wanted to join the lucky draw. The winners were notified privately by direct email to protect their identity as participants in the survey. After the survey closed, the prizes' winners (incentives) were determined by the biostatistician using a lucky draw/random method. The winners were informed via email. After the winners were notified, all email addresses were removed from the dataset. The inclusion criteria are based on the validity of their student number, determined by the biostatistician comparing an Excel spreadsheet (obtained from the Registrar) with all registered student numbers and the student numbers of the participants to determine if the numbers were valid. If not, the specific data entry was removed from the dataset.

3.7 Addressing potential methodology errors, validity and reliability of the study

Validity is defined as the degree that a measure accurately reflects the concept it is intended to measure. Content validity is defined as the extent to which the research questionnaire accurately addresses all aspects of the study problem (Heale & Twycross, 2015). The questions were based on an in-depth literature review of food insecurity amongst students in higher education, both locally and internationally, combined with the experiences of the members of the UFS Task Team to Transform the UFS Food Environment in dealing with student food insecurity and hunger on the UFS campuses over the last decade. The level of food security was determined using a validated scale (Gaines et al., 2014).

Reliability denotes when a test was undertaken and gave the same results when repeated (Heale & Twycross, 2015). Based on their student number's validity, this survey dataset was checked against a list of registered students provided by the UFS Directorate for Institutional Research and Academic Planning.

The survey was open to all registered UFS students. The study was a self-reported questionnaire, which was administered electronically at the participants' convenience. All self-reported questionnaires were vulnerable to possible misinterpretation of questions. Therefore, reliability in this survey was improved by:

- Assuring the questions were straightforward to understand;
- Using drop-down menus as far as possible to minimise typing errors; and
- Ensuring participants that all information and data collected were handled confidentially;
- The survey was designed as a single response, the researcher, with the help of the IT department, would block/prevent multiple entries.

3.8 Statistical analysis

The Department of Biostatistics at the University of the Free State performed data analysis. Descriptive statistics, namely frequencies and percentages for categorical data, means and standard deviations (for normally distributed data) or medians and interquartile ranges (for skewed data) for numerical data, chi-square test or Fisher's exact test for categorical data. These were utilised to assess associations between food security and critical factors that described the personal domain of the participants' food environment.

3.9 Ethical consideration

Ethics approval was obtained from the Health Sciences Research Ethics Committee (HSREC) at the University of the Free State.

When students accessed the link, a cover letter appeared on the opening screen to explain the study's purpose, participants' rights, and the researcher's contact details, supervisors, and the HSREC. The information section informed that participation in the study was voluntary. Participants could withdraw their participation by contacting the research team, and all data gathered would be used for the research and kept

confidential. Informed inferred consent by choosing to proceed to the survey and submitting the completed survey.

The information section indicated that a lucky draw would win 10 x R250 incentives from the list of participants who provided their email addresses. Participants had to provide their student numbers to verify that participants were indeed registered students at the UFS when completing the survey. The verification took place as soon as the survey closed and before the dataset was analysed. After confirmation, the lucky draw took place, and winners were contacted confidentially by the research team, using the email addresses to protect their identity as participants in the survey. The supervisor funded these gifts from her NRF-rating incentive.

3.10 Challenges encountered during the execution of the study

The abrupt cessation of contact learning and universities' closing due to COVID-19. South Africa was on lockdown due to the pandemic. The learning platform shifted to online. Therefore, some of the responses could be marred by the participants home situation. However, the questionnaire reminded students numerous times to base their responses only on the period that they were on campus and could give an account with the environment (pre-Covid-19).

CHAPTER 4: RESULTS

4.1 Introduction

This chapter summarises the results of the survey.

4.2 Response rate and power of the sample

After data cleaning and applying the inclusion and exclusion criteria of the survey, 1387 students were included in the final sample. As the total number of registered UFS students in 2020 was 42 282, this constituted 3.2% of the total number of students enrolled at the UFS in 2020. The sample of 1 387 provides a margin of error of 2.6% at a 95% confidence level and 3.4% at a 99% confidence level.

4.3 Socio-demographic information

Table 4.1 compares the participants' demographics to the UFS Directorate for Institutional Research and Academic Planning's (DIRAP) institutional data. The racial profile of the student body in 2020 was quite comparable to the sample. The percentage of students registered for study in the seven Faculties of the UFS in 2020 were likewise very well represented in the sample. Males, students in the South and QwaQwa Campuses, students in the Faculty of Education, and postgraduates may have been underrepresented in the sample, which might be a drawback of the study. Students who had received NSFAS, on the other hand, were somewhat overrepresented.

The median age of the sample was 21.3 years (P25, P75: 19.8, 23.0 years; range: 18.0 to 64.2 years), indicating that the majority of participants were in their early adulthood stage.

Table 4-1 Participants' representation of the socio-demographic profile of the UFS IN 2020

	Respondent *(self-reported)* **(N=1387)**		**2020 Student body** (*institutional statistics*) **(N=42 282)**	
	Frequency (n)	**Percentage (%)**	**Frequency (n)**	**Percentage (%)**
GENDER (n=1385)				
Female	972	70.2	26 205	62.0
Male	408	29.5	16 077	38.0
Other	5	0.4	-	-
RACE (n=1361)				
African	1072	79.0	34 167	81.0
Asian	13	1.0	471	1.1
Coloured	66	5.0	2 073	5.0
White	207	15.2	5 445	13.0
Undisclosed	3	0.2	126	0
LEVEL OF STUDY (n=1358)				
Postgraduate	97	7.1	6 488	15.3
Undergraduates	1261	92.9	35 794*	83.4
(First time undergraduates)	(366)	(26.3)		
CAMPUS (n=13)				
Bloemfontein Campus	1043	80.6	29 452	69.7
QwaQwa Campus	176	13.6	8 201	19.4
South Campus	69	5.4	4 629	10.9
FACULTY (n=1361)				
Economic and Management Sciences	219	16.0	6671	15.8
Education	299	22.0	11829	30.0
Health Sciences	111	8.2	2696	6.4
Humanities	305	22.4	9274	21.9
Law	137	10.1	4104	9.7
Natural and Agricultural Sciences	261	19.2	7206	17.0
Theology	30	2.2	502	1.2
NSFAS				
Was awarded NSFAS (DIRAP data Sept 2020)	921	68.2	23246	55.0

Table 4.2 summarises relationship status, first generation-studentship, financial information and residency data for the sample. Most participants (80.9%) were single or in a steady relationship (17.1%). Slightly more than half (54.1%) of the participants were first-generation students without any immediate family members who had obtained a tertiary qualification.

Two-thirds of participants (65.3%) reported studying with NSFAS, whereas the institutional data indicated that 68.2% of the participants were eventually awarded NSFAS. Few students funded their studies themselves (5.7%) or paid their studies by their parents/relatives/benefactor (20.0%). Overall, 12.2% studied with another type of bursary, which might be for academic or sports performance. Very few students studied with loans (5.1%). The majority (79.2%) of participants indicated that they received a stipend for food (50.1%), and a third (29.1%) were awarded an allowance for both living expenses and food.

During the academic term, around a quarter of the participants (23.7%), lived with a parent (studied from home), another quarter (25.7%), resided in university residences, and the balance of the participants lived off-campus in student homes (communes), townhouses, and flats. Two-thirds of participants lived in a commune, sharing accommodation with other students (65.6%). Those residing in communes/student houses reported living with a median of two other people (P25, P75: 5,10). A smaller group reported that they lived in a townhouse (1.3%), 0.5% in an informal settlement and 1.3% had no specific accommodation during the academic term.

Table 4-2 Self-reported relationship status and financial, living and travelling arrangements during the academic term

	Frequency (n)	Percentage (%)
RELATIONSHIP STATUS (n=1379)		
Single	1115	81.9
In a steady relationship (living/not living together)	242	17.6
Married	19	1.4
Divorced	3	0.2
FIRST GENERATION STUDENT (n=1374)		
Yes	545	40.0
No	743	54.1
Preferred not to answer	49	3.6
Did not know	37	2.7
MEANS BY WHICH STUDIES ARE PAID (n=1387) (more than one option could be selected)		
Self	79	5.7
Parents/relatives/benefactor	276	20.0
NSFAS	905	65.0
Another type of bursary	169	12.2
Bank loan	42	3.0
Another type of loan	29	2.1
Trust fund	7	0.5
Employer	2	0.1
Other	16	1.2
RECEIVING MONEY (STIPEND) EARMARKED FOR FOOD AND LIVING COSTS (n=1380)		
Yes, for food	691	50.1
Yes, for living expenses	38	2.8
Yes, for food and living expenses combined	402	29.1
Did not receive a stipend for food and/or living expenses	294	18.0
ACCOMMODATION DURING THE ACADEMIC TERM (n=1343)		
With parent(s)	325	23.7
University residence	262	25.7
Commune (student house)	668	65.6
Flat	57	5.6
Townhouse	13	1.3
Informal settlement	5	0.5
Do not have a specific place to stay	13	1.3
ROUTINELY USED MODE OF TRAVEL FROM HOME IN ACADEMIC TERM TO CLASSES (n=1349)		
Walking	815	60.4
Minibus taxi	170	12.6
Cab (private taxi)	47	3.5
Bus	94	7.0
Per car (getting a lift from someone)	57	4.2
Per car (driving self)	151	11.2

Per motorbike	5	0.4
Per bicycle / skateboard	10	0.7

Walking, (60.4%), was the most prevalent means of transportation between their residences and courses on campus throughout the academic year, followed by using a minibus cab (12.6%), driving yourself (11.2%), and riding the bus (7.0%).

4.4 Student food security level

The 8-item Household Food Security Survey Module (HFSSM), validated by the USDA, was used to assess food security for adults. The 8-item survey module was adapted to reflect the first semester of the 2020 academic year. The emphasis was on the participants' experience during the academic term before the 2020 Covid-related lockdown instead of assessing food insecurity over the last 12 months. However, the possible effect of the lockdown cannot be precluded, which might bias the outcome.

The HFSSM identifies four food security levels, namely **high food security** (no problem with food access), **marginal food security** (anxiety over food shortages), **low food security** (reduced diet quality and variety), and lastly, **very low food security** (reduced food intake and/or disrupted eating patterns).

Table 4.3 provides data related to the food security of participants. The first three questions involved food supply and doubt of sufficient money in procuring food, and more than half reported that they experienced anxiety about food running out (52.4%). A third of participants ran out of food (30.0%), while (36.0)% compromised on the quality of the meal due to inadequate funds .

More than half of participants reported reducing meal size, skipping a meal or eating less than what they would have preferred (58.1%), and more than a third affirmed that it was almost a monthly occurrence (34.2%). A quarter of participants have gone an entire day without food due to insufficient money (24.0%), and 30.0% of students have lost weight due to money and food shortages.

The level of food security was scored, defined and categorised as indicated in chapter 3, following the Guide to Measuring Household Food Security and classified by the recommendations by the US Department of Agriculture (USDA) Economic Research Service (ERS) (Gaines et al., 2014). Overall, 8% and 17.1% of participants were classified as having high and marginal food security levels, respectively; and together,

these participants were classified as food secure (25.1%). Conversely, 23.4% and 51.5% of participants were classified as having low and very low food security, respectively. Combined, these two categories constitute the food insecure students (74.8%).

Table 4-3: Food security as measured by the USDA 8-item Household Food Security Survey Module for Adults (n=1380)

ITEMS	Affirmative answers	
While studying at the UFS (before lockdown) evaluate the following three statements:	**Frequency (n)**	**Percentage (%)**
'I worried whether my food would run out before I got money to buy more.'	720	52.4
'The food that I bought just didn't last, and I didn't have money to get more.'	411	30.0
'I couldn't afford to eat balanced meals.'	494	36.0
During the first semester of 2020, I the academic term, while studying at the UFS:		
"Did you ever have to cut down on the size of your meals or skip, because there was not enough money for food?"	796	58.1
If yes, how often did this happen?		
Almost every month	271	34.2
Some months, but not every month	346	43.7
"Did you ever eat less than you should because there wasn't enough money for food?"	783	57.0
"Were you ever hungry, but didn't eat because there wasn't enough money for food?"	599	44.0
"Did you lose weight, because there wasn't enough money for food?"	404	30.0
"Did you ever not eat for a whole day, because there wasn't enough money for food?	329	24.0
If yes, how often did this happen?		
Almost every month	85	6.2
Some months, but not every month	165	11.9
FOOD SECURITY CLASSIFICATION *(Affirmative responses were summed to achieve a score)*		
High food security (score:0)	111	8.0
Marginal food security (score: 1-2)	236	17.1
Low food security (score 3-5)	323	23.4
Very low food security (score 6-9)	710	51.4
OVERALL FOOD SECURITY LEVEL		
Food secure (high and marginal food security categories combined)	**347**	**25.1**
Food insecure (Low and very low food security categories combined)	**1033**	**74.8**

4.5 Associations between food security level and socio-demographics

The food security level was significantly ($p<.05$) associated with gender ($p<.0001$), race ($p<.0001$), relationship status ($p=.001$), level of study ($p=.0002$), campus ($p<0.0001$), faculty ($p<.0001$), and family history of graduates ($p<.0001$) (Table 4.4).

Males, Black Africans, single participants, undergraduates, those studying on the QwaQwa campus, in the Faculties of Education and Theology, and first-generation students had the highest percentages of food insecurity. Senior students were slightly more likely to be food insecure than first-time first-year students ($p=.02$).

Table 4-4: Associations between food security level and financial arrangements

	n	LEVELS OF FOOD SECURITY								p-value
		High		Marginal		Low		Very low		
		n	%	n	%	n	%	n	%	
GENDER (n=1378)										
Female	967	94	9.7	192	19.9	225	23.3	456	47.2	<.0001*
Male	406	16	3.9	44	10.8	98	24.1	248	61.1	
Other	5	0	0.0	0	0.0	0	0,0	5	100.0	
ETHNICITY (n=1354)										
African	1065	39	3.7	144	13.5	255	23.9	627	58.9	<.0001*
Asian	13	3	23.1	2	15.4	4	30.8	4	30.8	
Coloured	66	2	3.3	14	21.2	18	27.3	32	48.5	
White	207	64	30.9	70	33.8	41	19.8	32	15.5	
Undisclosed	3	1	33.3	1	33.3	0	0.00	1	33.3	
LEVEL OF STUDY (n=1351)										
Undergraduate	1254	93	7.4	209	16.7	300	23.9	652	52.0	.0002*
Postgraduate	97	17	17.5	25	25.8	18	18.6	37	38.1	
FIRST TIME UNDERGRADUATE (n=1355)										
Yes (first year)	365	38	10.4	65	17.8	97	26.6	165	45.2	.02*
No (senior)	990	71	7.2	166	16.8	221	22.3	532	53.7	
CAMPUS OF STUDY (n=1283)										
Bloemfontein Campus	1038	92	8.9	184	17.7	248	23.9	514	49.5	<.0001*
South Campus	69	3	4.4	10	14.5	21	30.4	35	50.7	
QwaQwa Campus	174	1	0.6	18	10.3	33	19.0	122	70.1	
Distance learning	2	0	0.0	0	0.0	1	50.0	1	50.0	
FACULTY OF STUDY (n=1354)										
Economic & Management Sciences	217	14	6.5	38	17.5	60	27.7.9	105	48.4	<.0001*
Education	297	6	2.0	40	13.5	69	23.2	182	61.3	
Health Sciences	111	34	30.6	33	29.7	16	14.4	28	25.2	
Humanities	304	20	6.6	49	16.1	64	21.1	171	56.3	
Law	137	8	5.8	21	15.3	33	24.1	75	54.7	
Natural and Agricultural Sciences	258	26	10.1	45	17.4	70	27.1	117	45.4	
Theology	30	1	3.3	5	16.7	6	20.0	18	60.0	
FIRST-GENERATION STUDENT (n=1368)										
Yes	738	21	2.9	89	12.1	160	21.7	468	63.4	<.0001*
No	545	88	16.2	125	22.9	132	24.2	200	36.7	
Prefer not to answer	48	1	2.1	9	18.8	18	37.5	20	41.7	
Don't know	37	1	2.7	12	32.4	9	24.3	15	40.5	
RELATIONSHIP STATUS (n=1373)										
Single	1109	82	7.4	172	15.5	264	23.8	591	53.3	<.0001*
In a steady relationship	217	23	10.6	50	23.0	50	23.0	94	43.3	
Living together	25	0	0.0	11	44.0	4	16.0	10	40.0	
Married	19	4	21.1	2	10.5	4	21.1	9	47.4	
Divorced	3	1	33.3	0	0.0	0	0.0	2	66.7	

Food security status was significantly associated with financial arrangements to pay for university (Table 4.4), with those who had parents, relatives, or beneficiaries being substantially less food insecure than those who did not (p<.0001). Students who received NSFAS were significantly more likely to be food insecure than those who did not receive the bursary (p<.0001). Those who received a different type of bursary

(p.<0006) were notably less food insecure. Those who received any type of food stipend were also considerably less food insecure than those who did not (p<.0001).

The level of food security did not differ substantially (p=.09) between participants who studied from their parents' house and those who did not (Table 4.5).

Table 4-5: Associations between food security level, living, and travel arrangements

	n	LEVELS OF FOOD SECURITY								p-value
		High		Marginal		Low		Very low		
		n	%	n	%	n	%	n	%	
STUDYING FROM PARENT'S HOME (n=1369)										
Yes	323	35	10.8	52	16.1	68	21.1	168	52.0	0.09
No	1046	71	6.8	183	17.5	253	24.2	539	51.5	
OTHER LIVING ARRANGEMENTS (n=1002)										
UFS Residences	261	15	5.8	51	19.5	71	27.2	124	47.5	.002*
Communes (houses/flats, etc)	667	51	7.7	121	18.1	151	22.6	344	51.6	
Informal settlement	56	1	1.8	5	8.9	12	21.4	38	67.9	
Had no specific place to live	13	0	0.0	0	0.0	1	7.7	12	92.3	
Other (diverse)	5	0	0.0	0	0.0	1	20.0	4	80.0	
ROUTINE MODE OF TRAVEL FROM HOME TO CAMPUS (n=1343)										
Walk	811	49	6.0	131	16.2	196	24.2	435	53.6	<.0001*
Minibus taxi	169	6	3.6	18	10.7	33	19.5	112	66.3	
Cab	47	0	0.0	4	8.5	8	17.0	35	74.5	
Bus	93	2	2.2	8	8.6	23	24.7	60	64.5	
Lift in a car	57	6	10.5	12	21.1	15	26.3	24	42.1	
Drive own car	151	47	31.1	53	35.1	28	18.5	23	15.2	
Motor cycle	5	0	0.0	1	20.0	3	60.0	1	20.0	
Bicycle/skateboard	10	0	0.0	3	30.0	5	50.0	2	20.0	

Living (p=.002) and travel arrangements (p.0001) are shown to be strongly associated with food security (Table 4.4). The association between food security and socio-economic status was highlighted because the highest percentage of very food insecure participants occurred among those who lived in informal settlements and those who were essentially homeless (who reported not having a specific place to stay during the academic term). Similarly, those driving their own cars to campus had the highest level of food security. Conversely, food-insecure students were most likely to use public transport to get to campus.

4.5.1 Opinions and experiences regarding food assistance offered by the UFS

Participants were asked if they would apply for the No Students Hunger Bursary or food parcels from the UFS (Table 4.6). Just more than half of the participants (55.9%) answered "yes".

Table 4-6: Use of food assistance offered by the UFS

	Frequency (n)	Percentage (%)
Would you apply for food assistance from the UFS (No Student Hungry bursary / food parcels)? (n=1359)		
Yes	759	55.9
No	600	44.2
If no; why not? (n=592)		
I don't need it	353	59.6
I need it, but I am too shy to apply	29	4.9
I need it, but I am scared of being stigmatised	28	4.7
I need it, but I do not know how or where to apply for assistance	49	8.3
Other reasons (suggested by participants)	**133**	**22.5**
Other students need it more	77	13.0
I don't qualify for NHS because of having a loan/bursary	40	6.8
I only need better budgeting skills	6	1.0

Asked to motivate why they answered "no", 592 reacted; 59.6% of these participants indicated that they did not need it, 4.9% indicated that they were too shy to apply, and 4.7% that they were afraid of being stigmatised, and 8.3% indicated that they did not know how or where to apply. A total of 22.5% (n=133) indicated that they had other reasons, and 123 left free-text comments to explain these reasons; 13.0% (n=77) suggested that other students needed food assistance more than they did, for example (R=respondent number in the survey).

"There (are) people who need it more than I do, and I already get an allowance. It's just sometimes not enough." (R22)

"I believe that some students need it more than me, especially those ones who stay with their unemployed parents." (R190)

"I just feel that other people could benefit from such a scheme more than I can. Even though we sometimes barely make it through the month with our money, I feel that I can take care of myself, no matter how adverse the situation is." (R475)

"Because I know of people who need it more, so I don't want to take away from them as they need it more. I have only went without food for a day or so but not longer, so. Students have gone up to a week, so I'd rather they have the food." (R579)

"It's true that I sometimes don't have food, but I never go a day without eating because my roommate helps and sometimes my mentor. But I believe that there are other students who require the assistance more than I do and I don't want to be on the way of that." (R646)

"I believe there are students that are more poor than me on my campus, and I would be selfish since I receive food allowance from NSFAS, even though it's late." (R1190)

"I would love assistance, but I think I am in a position where some students need it a lot more urgently than I do, and these students should get preferred help." (R1453)

Asked to describe, if applicable, any other form of food assistance that they have utilised whilst studying at the UFS or think that the UFS should consider, 475 participants left free-text comments. Of these 475 participants, 35% (n=165) noted that either they had not used No Studen Hungry Programme (NHS)or food parcels offered by the UFS or that they did not know of any other forms of food assistance. Overall, 14% (n=65) commented that they had used the NHS or had received food parcels from Kovsie Support Services. Eleven per cent (11%, n=52) of the comments noted other forms of food assistance that they had received from other UFS-related assistance, for example:

"Free bread given to residences." (R17)

"Foodbank at our residence." (R114)

"When NSFAS was late on our first food allowances, the EFF school organisation offered food parcels, and I got some too." (R170)

"The food bank in my residence." (R325)

"Buying soup during the exam time at the residence." (R450)

"Breakfast at the consumer science department." (R581)

"At the residence, you can approach the RC's, and they would arrange for you to get /food/meal." (R809)

Seven per cent (7%, n=34) of the comments referred to getting assistance from friends and peers, for example:

"Getting some (food) from my roommate." (R93)

"I got help from a certain student; I used to crash at his place." (R207)

"My friend at res used to give me bread that was delivered to their residence and sometimes help me from their food bank." (R271) (student on NSFAS, who lived in a commune)

"I would sometimes go drink coffee just to keep me full, or I would ask my friends if they do not have any food that we could share." (R565)

"My fellow students donated food for me." (R823)

"I get help from my friends if the meal allowance has not come through." (R1132)

"My colleagues often get takeout from Vishuis, and they gladly leave me their leftovers, e.g. some potatoes and veggies that they did not manage to finish and sometimes also pieces of meat which I very much appreciate as Vishuis food is usually very tasty." (R1453)

Two per cent (2%, n=11) of the comments mentioned assistance from family. Other comments suggested types of food assistance that they thought could help them, for example:

“Fruits.” (R141; R372)

“Vegetables.” (R1109)

"A student-run and maintained garden where we can purchase healthy fresh food." (R338)

"Working with markets/stores to give students discounts on basic needs." (R348)

"A specialised card for food purchasing, that offers discounts." (R351)

"Food vouchers." (R352; R588)

"Discount permit at cafeteria." (R499)

"A feeding scheme will really help because you will know that even if you don't have a lunch box there will be a feeding scheme on campus." (R775)

"Food drop. Some students are really afraid of going to collect food." (R819)

"Cooked food on campus for people so that even if you don't have lunch. Even if it's sandwiches." (R976)

Some comments suggested that students would consider skills training as a form of food assistance, for example:

"Healthy and affordable recipes." (R390)

"Food preserving methods." (R553)

"Workshops on how to budget for balanced diet meals." (R724)

Two comments referred to students’ own initiatives as a means of "food assistance" in response to this question:

"I planted a vegetable garden." (R617)

"I took part-time jobs so that I get extra cash." (R1190)

Some comments (5%, n=23) specifically indicated that these participants were receiving NSFAS as a means of food assistance, and also noted related challenges, for example:

"NSFAS provide me with enough money to buy my healthy food." (R187)

"I am currently using NSFAS, but it's a different story from person to person because some of us have to pay rent, buy food and feed our families back home, so we end up seeing the allowances as being little." (R329)

"The food allowance I get from NSFAS I used to pay rent with as my Private Accommodation Allowance was not approved. So, I sacrificed my food allowance instead of buying enough food." (R436)

"Using NSFAS money to buy food, but again I am helping my granny pay the debts we made when I was coming to UFS." (R593)

Some comments made suggestions on what should (could) be in the food parcel, for example:

"It should have, can(ned food), fish oil, white star (maise meal), tea bag(s), milk or powder milk, toiletries and others." (R1024)

"Meat, vegetables, porridge." (R1061)

"Tinned food, fresh milk, vegetables." (R1294)

"Basic foods: pap, beans, tinned food, veggies and fruits." (R1327)

Two comments, while not directly answering the question posed in the survey, gave other perspectives:

"I would actually like to help other kids. I know what it's like not to have anything. Help me get started, please." (R1299)

"I wanted to say I don't meet the criteria of the NSH, I'm part of the missing middle & it's generally hard for me to prove I'm going hungry since my mom's salary is seen as 'enough'." (R1343)

4.6 Students' experiences of their food environment

The 2020 Food Environment Survey also aimed to explore how students interact with and experience their food environment.

4.6.1 Association between food security level and financial arrangements

Concerning financial arrangements for paying for university (**Table 4.7**), food security status was significantly associated with financial arrangements to pay for studies, with those who had parents, relatives or beneficiaries being significantly less food insecure than those who did not (p<.0001). Similarly, those receiving another type of bursary (p<.0006) were significantly less food insecure than those who did not. Conversely, those that were receiving NSFAS were significantly more food insecure (p<.0001) than those that who were not. Similarly, those that were receiving any form of food stipend were significantly less food insecure than those who were not ((p<.0001).

The food security level did not differ significantly between respondents who studied from their parents' home and those that did not (p=.09) (**Table 4.7**). The high level of very low food insecurity among students studying from home may reflect the high level of food insecurity in the general South African population (Shisana et al., 2013) ..

Table 4-7 Associations between food security level and financial arrangements

CONTRIBUTORS TO STUDY FEES (n=1380)	N	%	LEVELS OF FOOD SECURITY								p-value
			High		Marginal		Low		Very low		
			n	(%)	n	(%)	n	(%)	n	(%)	
Self											
Yes	79	5.7	7	8.9	14	17.7	17	21.5	41	51.9	.97
No	1301	94.3	104	8.0	222	17.1	306	23.5	669	51.4	
Parents											
Yes	276	20.0	56	20.3	66	23.9	68	24.6	86	31.2	<.0001*
No	1104	80.0	55	5.0	170	15.4	255	23.1	624	56.5	
NSFAS											
Yes	900	65.2	32	3.6	130	14.4	221	24.6	517	57.4	<.0001*
No	480	34.8	79	16.5	106	22.1	102	21.3	193	40.2	
Other bursaries											
Yes	168	12.2	22	13.1	42	25.0	33	19.6	71	42.3	.0006*
No	1212	87.8	89	7.3	194	16.0	290	23.9	639	52.7	
Bank loan											
Yes	42	3.0	7	16.7	7	16.7	8	19.1	20	47.6	0.21
No	1338	97.0	104	7.8	229	17.1	315	23.5	690	51.6	
Receiving stipend (n=1374)											
Yes	1126	82.0	87	6.3	196	14.3	281	20.5	562	40.9	<.0001*
No	248	18.0	23	9.3	39	15.7	41	16.5	145	58.5	

4.7 Opinions and experiences regarding food assistance offered by the UFS

Participants were asked if they would apply for the No Students Hunger Bursary or food parcels from the UFS (Table 4.9).

Table 4-8 Use of UFS food assistance

	Frequency (n)	Percentage (%)
Would you apply for food assistance from the UFS (No Student Hungry bursary/food parcels)? (n=1359)		
Yes	759	55.9
No	600	44.2
If no, why not? (n=592)		
I don't need it	353	59.6
I need it, but I am too shy to apply	29	4.9
I need it, but I am scared of being stigmatized	28	4.7
I need it, but I do not know how or where to apply for assistance	49	8.3
Other reasons (suggested by participants)	133	22.5
Other students need it more	77	13.0
I don't qualify for NHS because of having a loan/bursary	40	6.8
I only need better budgeting skills	6	1.0

Slightly more than half of the participants (55.9%) answered "yes". Asked to motivate why they answered "no", 592 reacted; 59.6% of these participants indicated that they did not need it, 4.9% indicated that they were too shy to apply, and 4.7% were afraid of being stigmatised, and 8.3% indicated that they did not know how or where to apply. A total of 22.5% (n=133) indicated that they had other reasons, and 123 left free-text comments to explain these reasons, 13.0% (n=77) suggested that other students needed food assistance more than they did, for example (R=respondent number in the survey):

"There (are) people who need it more than I do, and I already get an allowance. It's just sometimes not enough." (R22)

"I believe that some students need it more than me, especially those ones who stay with their unemployed parents." (R190)

"I just feel that other people could benefit from such a scheme more than I can. Even though we sometimes barely make it through the month with our money, I feel that I can take care of myself, no matter how adverse the situation is." (R475)

"Because I know of people who need it more, so I don't want to take away from them as they need it more. I have only went without food for a day or so but not longer, so. Students have gone up to a week, so I'd rather they have the food." (R579)

"It's true that I sometimes don't have food, but I never go a day without eating because my roommate helps and sometimes my mentor. But I believe that there are other students who require the assistance more than I do and I don't want to be on the way of that." (R646)

"I believe there are students that are more poor than me on my campus, and I would be selfish since I receive food allowance from NSFAS, even though it's late." (R1190)

"I would love assistance, but I think I am in a position where some students need it a lot more urgently than I do, and these students should get preferred help." (R1453)

Asked to describe, if applicable, any other form of food assistance that they have utilised whilst studying at the UFS or think that the UFS should consider, 475 participants left free-text comments. Of these 475 participants, 34.7% (n=165) noted that either they had not used NHS or food parcels offered by the UFS or that they did not know of any other forms of food assistance. Overall, 13.6% (n=65) commented that they had used the NHS or had received food parcels from Kovsie Support Services. Eleven per cent (10.9%, n=52) of the comments noted other forms of food assistance that they had received from other UFS-related assistance, for example:

"Free bread given to residences." (R17)

"Foodbank at our residence." (R114)

"When NSFAS was late on our first food allowances, the EFF school organisation offered food parcels, and I got some too." (R170)

"The food bank in my residence." (R325)

"Buying soup during the exam time at the residence." (R450)

"Breakfast at the consumer science department." (R581)

"At the residence, you can approach the RC's, and they would arrange for you to get /food/meal." (R809)

Seven per cent (7.1%, n=34) of the comments referred to getting assistance from friends and peers, for example:

"Getting some (food) from my roommate." (R93)

"I got help from a certain student; I used to crash at his place." (R207)

"My friend at res used to give me bread that was delivered to their residence and sometimes help me from their food bank." (R271) (student on NSFAS, who lived in a commune)

"I would sometimes go drink coffee just to keep me full, or I would ask my friends if they do not have any food that we could share." (R565)

"My fellow students donated food for me." (R823)

"I get help from my friends if the meal allowance has not come through." (R1132)

"My colleagues often get takeout from Vishuis, and they gladly leave me their leftovers, e.g. some potatoes and veggies that they did not manage to finish and sometimes also pieces of meat which I very much appreciate as Vishuis food is usually very tasty." (R1453)

Two per cent (2.3%, n=11) of the comments mentioned assistance from family. Other comments suggested types of food assistance that they thought could help them, for example:

“Fruits.” (R141; R372)

“Vegetables.” (R1109)

"A student-run and maintained garden where we can purchase healthy fresh food." (R338)

"Working with markets/stores to give students discounts on basic needs." (R348)

"A specialised card for food purchasing, that offers discounts." (R351)

"Food vouchers." (R352; R588)

"Discount permit at cafeteria." (R499)

"A feeding scheme will really help because you will know that even if you don't have a lunch box there will be a feeding scheme on campus." (R775)

"Food drop. Some students are really afraid of going to collect food." (R819)

"Cooked food on campus for people so that even if you don't have lunch. Even if it's sandwiches." (R976)

Some comments suggested that students would consider skills training as a form of food assistance, for example:

"Healthy and affordable recipes." (R390)

"Food preserving methods." (R553)

"Workshops on how to budget for balanced diet meals." (R724)

Two comments referred to students’ own initiatives as a means of "food assistance" in response to this question:

"I planted a vegetable garden." (R617)

"I took part-time jobs so that I get extra cash." (R1190)

Some comments (4.8%, n=23) specifically indicated that these participants were receiving NSFAS as a means of food assistance, and also noted related challenges, for example:

"NSFAS provide me with enough money to buy my healthy food." (R187)

"I am currently using NSFAS, but it's a different story from person to person because some of us have to pay rent, buy food and feed our families back home, so we end up seeing the allowances as being little." (R329)

"The food allowance I get from NSFAS I used to pay rent with as my Private Accommodation Allowance was not approved. So, I sacrificed my food allowance instead of buying enough food." (R436)

"Using NSFAS money to buy food, but again I am helping my granny pay the debts we made when I was coming to UFS." (R593)

Some comments made suggestions on what should (could) be in the food parcel, for example:

"It should have, can(ned food), fish oil, white star (maise meal), tea bag(s), milk or powder milk, toiletries and others." (R1024)

"Meat, vegetables, porridge." (R1061)

"Tinned food, fresh milk, vegetables." (R1294)

"Basic foods: pap, beans, tinned food, veggies and fruits." (R1327)

Two comments, while not directly answering the question posed in the survey, gave other perspectives:

"I would actually like to help other kids. I know what it's like not to have anything. Help me get started, please." (R1299)

"I wanted to say I don't meet the criteria of the NSH, I'm part of the missing middle & it's generally hard for me to prove I'm going hungry since my mom's salary is seen as 'enough'." (R1343)

4.8 Students' experience of their food environment

The questionnaire was designed to guide the participants through a logical flow of questions about ready to eat food/take-aways/prepared meals, followed by questions about food preparation. The results are summarised accordingly.

The tables and corresponding figures below represent the different variables influencing the participants' food choices during the academic term. It can be gleaned that price had the most sizeable influence at 73.3% (Figure 4.1). Other factors such as convenience, the familiarity of food (represented by foods that participants have tried before), the food they are used to at home and religion, were seen as important in guiding food purchases, with many reporting (ranging from 40-43%) that it influenced them greatly. The variables with a negligible influence on food choices were peer pressure and culture. Overall, 35.7% of participants replied that they very often make food choices based on the need to satisfy hunger rather than worrying about the nutritional quality of the food and only 31.4% indicating that they sometimes consider the nutritional quality of food.

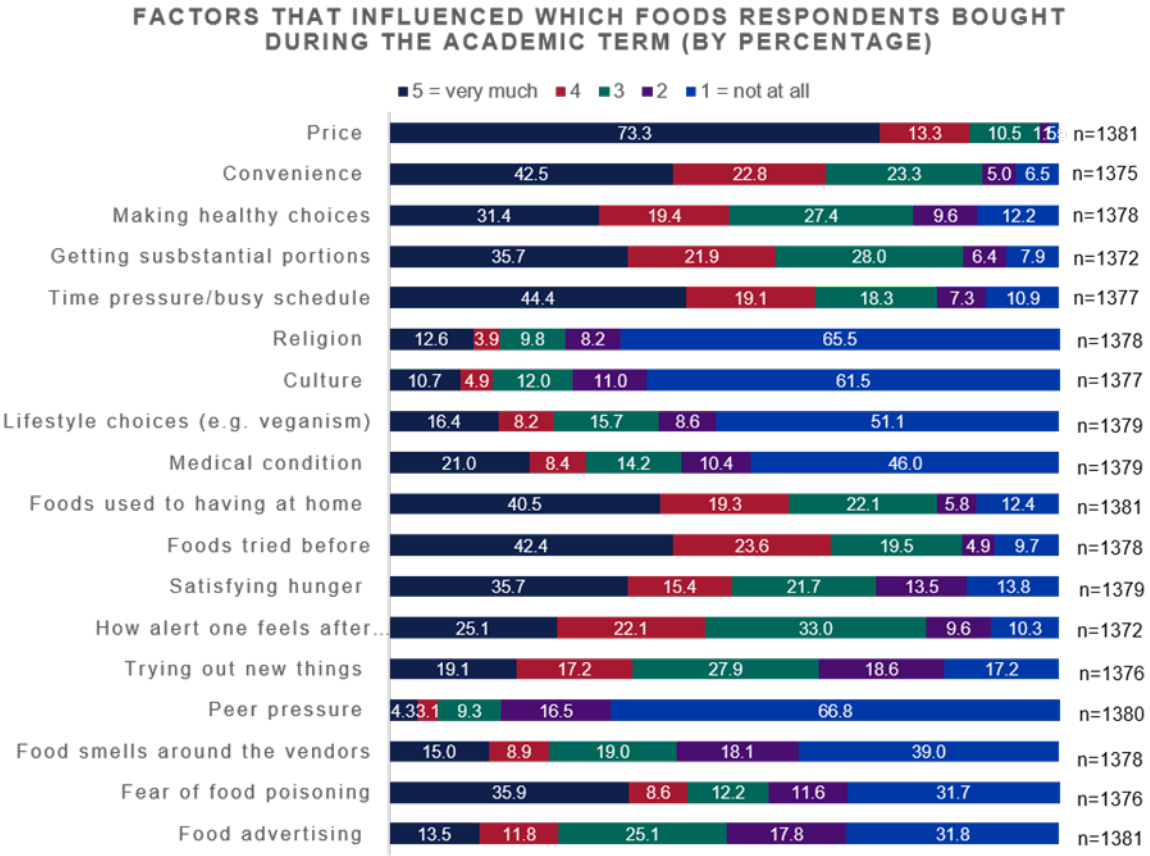

Figure 4.1 Factors that influence the food purchasing behaviours of students at the UFS

Table 4.9 provides the association between food security and factors that influence decisions related to food purchases. The level of food security was significantly associated with the influence of price (p<.0001), convenience (p<.0001), time schedule/busy schedule (p=.0005), religion (p<.0001), culture (p<.004), medical

conditions (p=.0008), having food similar to home (p=.002), foods tried before (p<.0001), satisfying hunger (p<.0001), level of alertness after eating (p<.0001), fear of food poisoning (p<.0001), and food advertising (p=.001) on food purchasing behaviour, being rated the highest by participants who were most food insecure. Conversely, food security level was significantly associated with the influence of getting substantial portions (p<.0001), making healthy choices (p<.0001), lifestyle choices (p=.03) and trying new things (p<.0001) on food purchasing behaviour. These elements had a lower rating by food-insecure participants.

Table 4-9: Associations of food insecurity with factors that influence decisions on food participants bought during the academic term

Variable	LEVELS OF FOOD SECURITY								p-value
	High		Marginal		Low		Very low		
	n	(%)	n	(%)	N	(%)	n	(%)	
1. Price (n= 1375)									
Level 4 – influences very much	50	45.1	144	61.0	224	69.8	590	83.5	<.0001*
Level 3	28	25.23	49	26.8	52	28.4	54	29.5	
Level 2	22	19.82	37	26.7	38	26.4	47	32.6	
Level 1	8	7.2	2	10.0	3	15.0	7	35.0	
Level 0 – influences not at all	3	2.7	4	20.0	4	20.0	9	45.0	
2. Convenience (n=1369)									
Level 4 – influences very much	37	33.3	68	28.9	133	41.4	345	49.2	<.0001*
Level 3	30	27.0	61	26.0	85	26.5	135	19.2	
Level 2	26	23.4	77	32.8	72	22.4	144	20.5	
Level 1	8	7.2	17	7.2	19	6.0	25	3.6	
Level 0 – influences not at all	10	9.0	12	5.1	12	3.7	53	7.6	
3. Making healthy choices (n=1372)									
Level 4 – influences very much	30	27.0	76	32.2	92	28.7	235	33.4	<.0001*
Level 3	32	28.8	63	26.7	70	21.8	100	14.2	
Level 2	32	28.8	65	27.5	95	29.6	185	26.3	
Level 1	7	6.3	19	8.1	39	12.2	66	9.4	
Level 0 – influences not at all	10	9.0	13	5.5	25	7.8	118	16.8	
4. Getting substantial portions									
Level 4 – influences very much	38	34.6	63	26.7	113	35.4	275	39.2	<.0001
Level 3	37	33.6	71	30.1	69	21.6	123	17.6	
Level 2	22	20	76	32.2	94	29.5	189	27.0	
Level 1	8	7.3	13	5.5	23	7.2	44	6.3	
Level 0 – influences not at all	5	4.6	13	5.5	20	6.3	70	10.0	
5. Time pressures / busy schedule									
Level 4 – influences very much	41	36.9	84	35.7	122	38.1	362	51.4	.0.0005*
Level 3	27	24.3	51	21.7	67	20.9	116	16.5	
Level 2	27	24.3	50	21.2	63	19.7	121	17.2	
Level 1	11	.9	24	10.2	27	8.4	38	5.4	
Level 0 – influences not at all	15	13.5	26	11.1	41	12.8	68	9.7	
6. Religion									
Level 4 – influences very much	3	2.7	18	7.6	36	11.3	115	16.3	<.0.0001*
Level 3	3	2.7	9	2.8	9	2.8	33	4.7	
Level 2	6	5.4	20	8.5					
Level 1	9	8.1	21	8.9	28	8.8	54	7.6	
Level 0 – influences not at all	90	81.1	168	71.2	219	68.9	423	59.8	
7. Culture									
Level 4 – influences very much	5	4.5	10	4.3	33	10.3	97	13.8	0.0044*
Level 3	3	2.7	14	6.0	17	5.3	33	4.7	

Level 2	11	9.9	30	12.8	32	10.0	91	12.9	
Level 1	17	15.3	29	12.3	34	10.6	70	9.9	
Level 0 – influences not at all	75	67.6	152	64.7	204	63.8	414	58.7	
8. Lifestyle choices									
Level 4 – influences very much	15	13.5	37	15.7	48	15	125	17.7	0.0254*
Level 3	8	7.2	26	11.0	22	6.9	56	7.9	
Level 2	9	8.1	46	19.5	56	17.5	105	14.9	
Level 1	7	6.3	27	11.4	28	8.8	55	7.8	
Level 0 – influences not at all	72	64.9	100	42.4	166	51.9	365	51.7	
9. Medical condition									
Level 4 – influences very much	12	10.9	35	14.9	63	19.6	176	24.9	0.0008*
Level 3	3	2.7	25	10.6	34	10.6	54	7.6	
Level 2	17	15.5	34	14.5	49	15.3	96	13.6	
Level 1	9	8.2	30	12.8	35	10.9	67	9.5	
Level 0 – influences not at all	69	62.7	111	47.2	140	43.6	314	44.4	
10. Selecting foods used to at home									
Level 4 – influences very much	38	34.6	74	31.4	127	39.6	317	44.8	0.0022*
Level 3	28	25.5	59	25.0	67	20.9	110	15.5	
Level 2	20	18.2	61	25.9	77	24.0	147	20.8	
Level 1	11	10.0	16	6.8	15	4.7	38	5.4	
Level 0 – influences not at all	13	11.8	26	11.0	35	10.9	96	13.6	
11. Selecting foods tried before									
Level 4 – influences very much	40	36.0	85	36.3	141	43.9	316	44.8	<.0.0001*
Level 3	36	32.4	79	33.8	85	26.5	124	17.6	
Level 2	22	19.8	44	18.8	60	18.7	141	20.0	
Level 1	6	5.4	12	5.13	11	3.4	38	5.4	
Level 0 – influences not at all	7	6.3	14	6.0	24	7.5	87	12.3	
12. Satisfying hunger rather than worry about nutrition/food quality									
Level 4 – influences very much	12	10.8	45	19.1	104	32.4	327	46.4	<.0.0001*
Level 3	14	162.6	43	18.2	63	19.6	91	12.9	
Level 2	35	31.5	59	25.0	70	21.8	134	19.0	
Level 1	28	25.2	48	20.3	45	14.0	65	9.2	
Level 0 – influences not at all	22	19.8	41	17.4	39	12.2	88	12.5	
13. How alert a person feels after eating it									
Level 4 – influences very much	13	11.82	39	16.7	80	25.2	209	29.7	<.0.0001*
Level 3	25	22.7	62	26.6	80	25.2	135	19.2	
Level 2	42	38.2	82	35.2	104	32.7	224	31.8	
Level 1	9	8.2	29	12.5	31	9.8	62	8.8	
Level 0 – influences not at all	21	19.1	21	9.0	23	7.2	75	10.6	
14. Trying out new things									
Level 4 – influences very much	15	13.5	36	15.3	67	2.1	143	20.3	<.0.0001*
Level 3	26	23.42	57	24.3	55	17.3	97	13.7	
Level 2	34	30.6	74	31.5	89	28.0	186	26.4	
Level 1	25	22.5	40	17.0	62	19.5	129	18.3	
Level 0 – influences not at all	11	9.9	28	11.9	45	14.2	151	21.4	
15. Peer pressure									
Level 4 – influences very much	2	1.8	6	2.5	10	3.1	41	5.8	0.1946
Level 3	3	2.7	8	3.4	8	2.5	24	3.4	
Level 2	8	7.2	16	6.8	34	10.6	67	9.5	
Level 1	13	11.7	43	18.2	57	17.8	114	16.2	
Level 0 – influences not at all	85	76.6	163	69.1	212	66.0	460	65.2	
16. Food smells around the vendors									
Level 4 – influences very much	12	10.8	20	8.5	48	15.0	126	17.9	0.0103
Level 3	17	15.3	26	11.0	27	8.4	53	7.5	
Level 2	13	11.7	48	20.3	65	20.3	134	19.0	
Level 1	23	20.7	49	20.8	51	15.9	126	17.9	
Level 0 – influences not at all	46	41.4	93	39.4	129	40.3	266	37.7	
17. Fear of food poisoning									
Level 4 – influences very much	24	21.6	65	27.9	104	32.4	297	42.1	<.0.0001*
Level 3	6	5.4	19	8.2	36	11.2	57	8.1	

Level 2	14	12.6	30	12.9	34	10.6	89	12.6	
Level 1	13	11.7	36	15.5	40	12.5	71	10.1	
Level 0 – influences not at all	54	48.7	83	35.6	107	33.3	191	27.1	
18. Food advertising									
Level 4 – influences very much	9	8.1	18	7.6	44	13.7	116	16.4	0.0011*
Level 3	16	14.4	24	10.2	42	13.1	78	11.0	
Level 2	21	18.9	64	27.1	80	24.9	181	25.6	
Level 1	26	23.4	61	25.9	56	17.5	103	14.6	
Level 0 – influences not at all	39	35.1	69	29.2	99	30.8	229	32.4	

4.8.1 Practices and opinions regarding ready-to-eat food/take-away/prepared meals sold on campuses

Because convenience and time pressures are essential drivers of food-purchasing behaviour, participants were asked how often they bought ready-to-eat food, take-away and/or prepared meals during the academic term on or near the campuses and their opinions on what was available.

4.8.1.1 Choice of outlets for ready-to-eat food/take-away/prepared meals

Almost three-quarters of participants (70.1%) reported "always" (41.9%) or "often" (28.2%) to questions regarding the frequency of buying ready-to-eat food from street vendors (Figure 4.2). Generally, on sale items are inexpensive sweets, crisps, cold beverages, and warm foods like "vetkoek" (deep-fried dough), energy-dense food, foods high in saturated fat with a low nutrient value. Cafeterias and food halls serve ready-to-eat meals, with 62.3% of participants reporting that they "always" or "often" bought ready-to-eat food at these vendors.

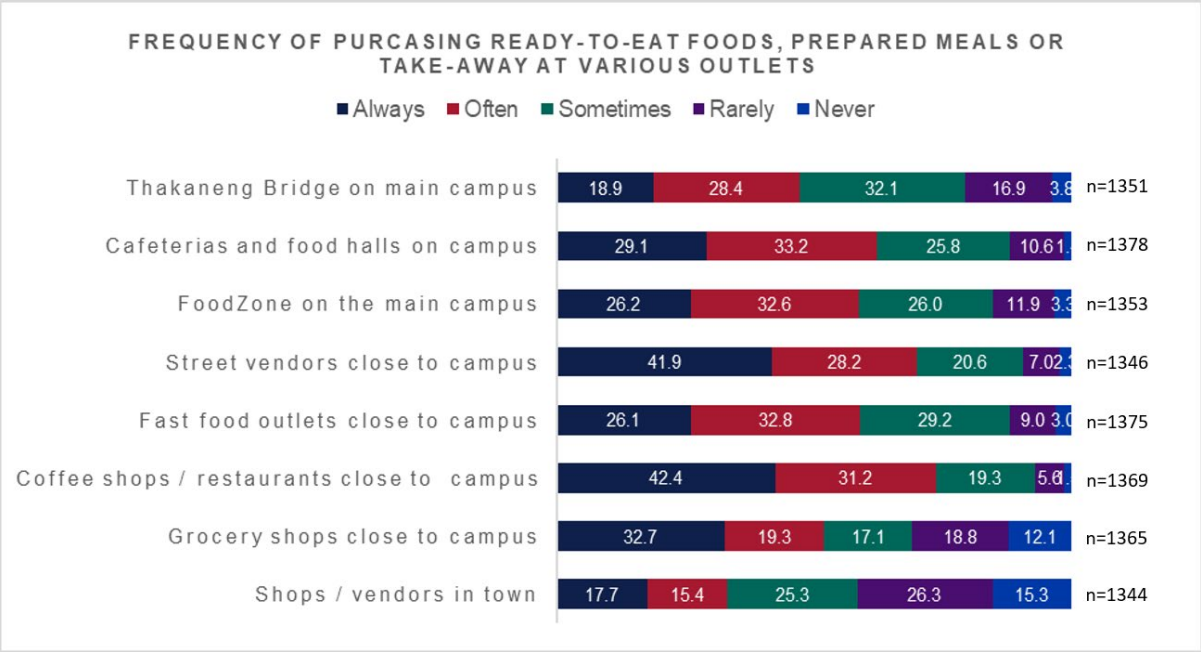

Figure 4.2: Purchasing of ready-to-eat foods, prepared meals and take-away

Table 4.10 provides information related to associations of food insecurity with the choice of outlets for ready-to-eat food/take-away/prepared meals. Food insecure participants were marginally more likely to buy ready-to-eat foods, fast food and prepared meals from the Food Zone (a small grocery store) on the main campus (p=.0004), street vendors close to campus (p<.0001) and shops and vendors in town (p=.0009) than food-secure participants. Food secure participants were slightly more likely to buy these foods at cafeterias and food halls on the main campus than food insecure participants (p=.04). They were also significantly more likely to eat at coffee shops and restaurants close to campus than food insecure participants (p=.0009).

Table 4-10: Associations of food insecurity with choice of outlets for ready-to-eat food/take-away/prepared meals

Variable	LEVELS OF FOOD SECURITY								p-value
	High		Marginal		Low		Very low		
	n	(%)	n	(%)	n	(%)	n	(%)	
Thakaneng Bridge on main campus (n= 1345)									
Never	27	24.3	43	18.9	40	12.7	143	20.7	0.10
Rarely	34	30.6	72	31.6	98	31.6	178	25.8	
Sometimes	28	25.2	71	31.1	101	31.1	233	33.7	
Often	88	16.2	33	14.5	64	14.5	111	16.1	
Always	4	3.6	9	3.9	12	4.0	26	3.8	
Cafeterias and food halls on campus (n= 1372)									
Never	43	38.7	68	28.8	88	27.4	201	28.6	.04
Rarely	28	25.2	71	30.1	107	33.3	248	35.2	
Sometimes	20	18.0	62	26.3	92	28.7	180	25.6	
Often	17	15.3	33	14.0	32	10.0	63	9.0	

Always	3	2.7	2	0.9	2	0.6	12	1.7	
***FoodZone* on the main campus (n= 1347)**									
Never	48	43.64	68	30.0	79	25.0	157	22.7	0.004
Rarely	31	28.2	70	30.4	113	35.8	225	32.6	
Sometimes	21	19.1	63	27.4	77	24.4	191	27.6	
Often	6	5.5	25	10.9	42	13.3	86	12.5	
Always	4	3.6	4	1.7	5	1.6	32	4.6	
Street vendors close to campus (n= 1372)									
Never	85	77.3	142	60.7	131	40.9	217	30.7	<.0001
Rarely	15	13.6	59	25.2	90	28.1	223	31.5.	
Sometimes	8	7.3	24	10.3	73	22.8	176	24.9	
Often	1	0.9	7	3.0	21	6.6	68	9.6	
Always	1	0.9	2	0.9	5	1.6	24	3.4	
Fast food outlets close to campus (n= 1369)									
Never	30	27.3	62	26.5	75	23.4	190	27.0	.005*
Rarely	34	30.9	72	30.8	109	34.1	235	33.3	
Sometimes	31	28.2	67	28.6	102	31.9	201	28.5	
Often	12	10.9	26	11.1	30	9.4	53	7.5	
Always	3	2.7	7	3.0	4	1.3	26	3.7	
Coffee shops/ restaurants close to campus (n= 1354)									
Never	28	25.5	81	34.8	139	40.4	341	48.6	<.0001
Rarely	28	25.5	77	33.1	101	31.7	219	31.7	
Sometimes	43	39.1	53	22.8	66	20.7	102	20.7	
Often	10	9.1	21	9.0	18	5.6	27	5.6	
Always	1	0.9	1	0.4	5	1.6	13	1.6	
Grocery shops close to campus (n= 1359)									
Never	33	29.7	76	33.0	101	31.6	233	33.4	0.34
Rarely	23	20.7	44	19.1	50	15.6	144	20.6	
Sometimes	20	18.0	31	13.5	72	22.5	111	15.9	
Often	19	17.1	50	21.7	58	18.1	129	18.5	
Always	16	14.4	29	12.6	39	12.2	81	11.6	
Shops/ vendors in town (n= 1338)									
Never	35	32.4	45	19.4	65	21.2	92	13.3	.0009
Rarely	17	15.7	33	14.2	48	15.6	108	15.6	
Sometimes	26	24.1	60	25.9	74	24.1	178	25.8	
Often	17	15.7	64	27.6	77	25.1	194	28.1	
Always	13	12.0	30	13.0	43	14.0	119	17.2	

4.8.1.2 Opinions regarding the ready-to-eat food, take away food and prepared meals sold on campuses

A total of 939 participants made recommendations on ready-to-eat food sold on campus, and various themes were noted. Convenience was one of the main themes indicated, for example:

"Those meals are very helpful for students who maybe were late for class and didn't have time to eat in their place of stay." (R75)

"I only buy ready-to-eat food (as) my budget for the month allows, or when I am really busy and have no or little time to cook." (R148)

"They are very much convenient since as students, we mostly have a busy schedule and don't have time to cook." (Respondent (R)915)

"The food is helpful since sometimes I don't have time to cook." (R1031)

Some comments indicated that participants were happy with what available food was sold on campus, for example:

"The meals on campus are always delicious" (R31)

"They are perfect." (R36)

"I think they prepare very tasty food and should keep up their good work." (R585)

"Food has been amazing at South campus so far, variety every day and always fresh." (R698) (student that indicated that he/she pays for their own studies)

"(During the) week I prefer to eat at Foodzone; there (are) veggies and fruits and affordable groceries to buy." (R979) (student on NSFAS)

Almost half of the comments (46.0%, n=436) regarded the lack of healthy options on campuses. Many pointed out that the healthier options that were available were more expensive than the "junk food" sold at the fast-food franchises on campus, while many asked that fresh fruits, vegetables and salads, and foods prepared with less fat be made available at reasonable prices on campus, for example:

"There are no fruit stalls." (R515)

"Very delicious and unhealthy." (R518)

"' There isn't much of advocacy for healthy living and eating healthy bottom food outlets on campus which sometimes forces one to buy unhealthy food on campus just to satisfy hunger and go on with the academic day.' (R721)

"(Sell) inexpensive salads with fresh ingredients/vegetable that have not been fried. The majority of the food sold at the bridge is unhealthy and healthy options are expensive" (R760)

"Rather selling frozen food parcels that is more healthy than pizza or pies and the availability to warm it up." (R764)

"A fruit and veg store would be nice." (R869)

"What I think they can do on campus is that whenever they sell food, they should also supply us with fruits or vegetables on the side." (R1187)

"Healthy food is usually expensive, and it comes in very small portions. Unhealthy food fills the stomach quickly, it's cheaper, and it has a lot of varieties compared to healthy

food sold. If shops could sell fruits, prepared veggies, smoothies (more healthy food in general) at a reasonable amount." (R1372)

"I think there are excessive amounts of fried food and would love to see more healthy options." (R1387)

"The restaurants or fast food stores should have more healthy meals or snacks rather than more junk or fatty foods." (R1402)

Over a third of the comments (35.9%, n=336) highlighted that food sold on campus was costly, for example:

"It very expensive in such a way that I don't come close to on-campus shops, as I don't qualify to buy (from) them." (R103)

"I can't afford them; they cost too much." (R589)

"They should highly consider the price and check if it really suits the product since we come from poor backgrounds and our parents can't afford to give us pocket money to buy as they wish." (R1020)

"The food is very nice, but the price is too high." (R1157)

"They are good, just that I can't afford them." (R1304)

Several comments commended the excellent value for money and healthier meals that the food halls and cafeterias offer compared to the fast-food outlets, for example:

"Vishuis (food hall) makes great and healthy food, and I love the fact that it's affordable." (R12)

"The cafeteria meals are well prepared and priced well." (R221)

"The cafeterias are a better choice in terms of price and variety of food. They offer healthy and filling meals." (R853)

"Well, Abraham Fisher cafeteria food is amazing; they get 5 stars from me." (R1260)

(Sell) "less fatty food around Thakaneng Bridge and more home-cooked meals like (the) cafeteria at (the) medical building." (R1361)

Several comments mentioned the lack of variety and limited choices on the QwaQwa and South campuses, for example:

"Can there be more ready to eat food on South Campus." (R496)

"South Campus is far away from a lot of shops or restaurants, the closest ones being right on the other side through a dangerous neighbourhood; we need food prices that are more affordable for a daily consumer and shops that stay open longer, (for) example until six or seven pm." (R914)

"We need more cafeterias in QwaQwa campus." (R391)

"We only have one outlet (on QwaQwa Campus) so...there's not much of a choice available." (R627)

"We don't have much restaurants or even shops to rely on around the campus. We have to take a cap and go to town, which is very dangerous at times to some students, considering the number of crimes in QwaQwa." (R772)

There were several comments (2.7%, n=25) complaining about long queues and long waiting times, for example:

"The lines are always too long, and that is the reason I don't buy food on campus." (R55)

"We need more ready to eat places on campus because the one's we have are always full, and we don't have time to stand in line in-between classes." (R1132)

"They have to add (to) their staff in order to make sure we aren't falling (into) lines for (a) long time because we usually (end up) giving up and go(ing) to classes with an empty stomach." (R1305)

A total of 4.2% (n=39) reported on stale food and poor hygiene practices that participants had experienced at some of the fast-food outlets on campus, for example:

"(Outlets need to apply) better hygiene in general." (R119)

"Don't sell yesterday's foods." (R831)

"At some stores, the owners don't cover their heads when preparing our food. I see this all the time. If they can't cover their hair and hands, they should stay away from food." (R1234)

Several comments (6.1%, n=57) stated that the food outlets on the various campuses do not offer religious menus, medical or lifestyle dietary requirements, including halaal food, and vegetarian, vegan and gluten-free options or that traditional or cultural-specific foods are not available, for example:

"There aren't enough options available for vegetarians that aren't too pricey." (R53)

"Have more vegetarian options available, that is not only fries or a cheese sandwich." (R54)

"Offer more vegan friendly options that are appealing and not just a salad of leaves or a sandwich with leaves and tomatoes." (R96)

"They at least (should sell) heavy meals like pap and meat." (R102)

"They (should) not just sell junk food. (There should be) outlets on campus that sell healthy food and there are food for specific cultures." (R565)

"They should consider selling pap and meat." (R689)

"(Sell) more traditional African food and less English meals, the population is dominated by black people after all." (R1057)

A separate item in the questionnaire asked participants whether an on-campus outlet should sell healthy and filling, ready-to-eat meals at a reasonable but realistic price (Table 4.11). Most participants (61.8%) indicated that they would frequently buy healthy foods on sale, while 29.2% indicated that they would instead prepare their own meals. Less than ten percent confirmed that they would still buy junk foods, like chips and hamburgers from the campus outlets (6.4%) and "kota" and "vetkoek" from street vendors (2.1%).

Table 4-11: Participants' potential interest in purchasing healthy meals and fresh produce if these could be made available on campuses

	Frequency (n)	Percentage (%)
In all honesty, if you had access to an outlet on campus that sold healthy, filling, ready-to-eat meals at a low, but realistic price, would you: (n=1373)		
Buy this healthy meal regularly	848	61.8
Prefer to buy chips/hamburgers/pizza at the campus fast food outlets	88	6.4
Prefer to buy vetkoek / kwota at street vendors	29	2.1
Prefer to cook for yourself	408	29.7
Would you be interested to buy fresh produce or healthy snacks from mobile/street vendors if the university could allow such vendors on campus? (n=1373)		
Yes	843	61.9
No	268	19.7
I don't know	252	18.5

Most participants affirmed (61.9%, n=843) when asked about acquiring fresh produce or healthy snacks from mobile/street suppliers. A total of 633 participants recommended a free messenger-text service/platform available to all the UFS students. Half of the participants suggested fresh fruits (50%, n=315) and vegetables (16.7%, n=106) and healthy snacks (12.0%; n=76) should be sold at reasonable prices on campus, for example:

“In season fruits and variety of vegetables.” (R8)

“Fresh fruits & vegetables.” (R80)

“Healthy snacks.” (R 93)

“Sell fruits and vegs at low price.” (R1092)

“Fruits, vegetables and healthy snacks.” (R1291)

“Fruit combo.” (R1458)

There were various comments (3.2%; n=20) with regards to convenience, for example:

"…also the vendor must be available throughout the week." (R803)

"A walking (vendor, or) a mobile stall that goes around passing all residences" (R1244)

Many comments (23.4%, n=148), however, were related of operation procedures with regards to hygiene, quality and freshness, for example:

"Hygiene is important, right priced foods, fresh fruits and vegetables or healthy snacks." (R109)

"Fruit and vegetables need to be fresh and clean." (R163)

"The university to check on them and their products they are selling." (R408)

"Clean environment around the vendor. Fresh foods." (R530)

"Safe and good quality, but still affordable" (R636)

"The product should be fresh and sold at reasonable prices". (R940)

4.8.2 Breakfast and lunch boxes

Participants were asked if they ate breakfast before class and whether they prepared food from home to bring to campus.

4.8.2.1 Breakfast consumption

Less than half (40.7%) participants stated the regular (‘always of ‘often’) consumption of breakfast before class (Figure 4.3).

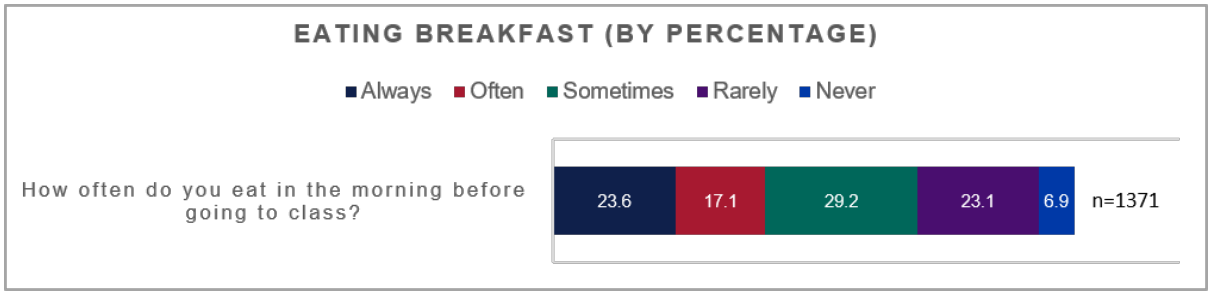

Figure 4.3 Breakfast eating practices

Food security was significantly associated with the frequency of eating breakfast before attending classes (p<.0001); conversely, food-insecure participants were less likely to consume breakfast as opposed to secure food participants (Table 4.12).

Table 4-12 Associations between food security and eating breakfast

	LEVELS OF FOOD SECURITY								p-value
	High		Marginal		Low		Very low		
	n	%	n	%	n	%	n	%	
Eat breakfast at home before going to class (n= 1366)									
Never	4	3.6	13	5.6	17	5.3	61	8.7	<.0001*
Rarely	14	12.6	48	20.6	64	20.0	189	26.9	
Sometimes	23	20.7	51	21.9	90	28.1	235	33.4	
Often	23	20.7	44	18.9	64	20.0	104	14.8	
Always	47	42.3	77	33.0	85	26.6	113	16.1	

4.8.2.2 Practices and opinions about bringing food to campus

Asked about their practices and opinions regarding bringing their own food to eat on campus (Figure 4.4), about a third (35.2%, n=484) of the participants reported regularly (“always” or “often”) taking a lunchbox to campus while a quarter (24.2%, n=333) indicated they never did. The food security level (Table 4.13) was significantly associated with taking a lunchbox to campus, with food-insecure participants more likely to do so (p=.005).

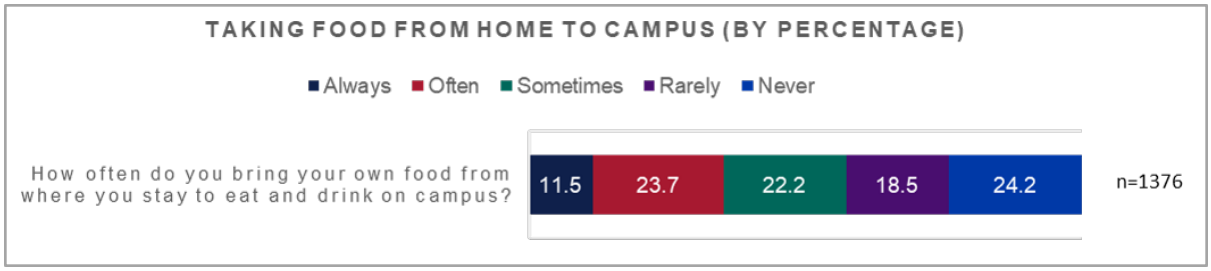

Figure 4.4 Lunchbox practices

Table 4-13: Associations of food insecurity with packing lunch for campus

	LEVELS OF FOOD SECURITY								p-value
	High		Marginal		Low		Very low		
	n	%	n	%	n	%	n	%	
Packing lunch from home (n= 1356)									
Never	13	11.8	53	23.0	88	27.8	173	24.7	.005*
Rarely	22	20..0	42	18.3	42	13.3	145	20.7	
Sometimes	27	24.6	42	18.3	77	24.3	155	22.2	
Often	27	24.6	62	27.0	79	24.3	154	22.0	
Always	21	19.1	31	13.5	31	9.8	72	10.3	

The barriers or difficulties experienced prevented participants from bringing their own food to campus. Seven hundred eighty-three participants responded, 5.4% lived in the university residences and went back to the residence to eat. Just under a quarter (21.7%) had no problems bringing their own food to campus. Some indicated that a packed lunch from home was cost-effective and healthy:

"This saves me a lot of money and helps to stay active and healthy." (R883)

"Bringing my own prepared meal helps me save money and also become healthy." (R1272)

The recurrent difficulties, evident from 16.7% of the time pressure, was the reason given for not packing a lunch box, while others alluded to insufficient time to enjoy the food between classes, for example:

"The only thing that stops me from bringing food to campus is time." (R12)

"I don't always have time to prepare my meal because I have to catch an early bus in the morning and can't make time in the afternoon when I get back due to my hectic schedule." (346)

"Early classes or having no time to prepare the meal." (R386)

"It take(s) too much time to prepare a meal in the morning to bring to school, so I decide not to do it." (R455)

"Sometimes I am late and don't have enough time to make a lunchbox." (R1211)

"I do not have time to eat at campus." (1092)

The second most common comment (11.5%; n=90) was not having access to microwaves to heat food. Many students would like to bring leftovers from cooked meals, but they do not have the means to keep it cool and fresh (7.2%, n=56) to avoid spoilage, and that they would prefer to eat it heated up. For example:

During summer, my food go bad very fast." (R385)

"The food gets spoilt." (R465)

"It's cold by the time I have to eat or hot if it's a beverage." (R662)

"Microwaves must be available around campus because sometimes the food needs to be warmed up." (R754)

"The challenge is to warm up the food." (R825)

"The food gets cold and I often find myself wishing for a microwave to heat it up." (R1013)

"There are no places to warm up our home-cooked food" (R1365)

Three participants stated the convenience of having a microwave in the department(s), for example:

"I am very lucky, as I can warm my food in the microwave at the Department where I am studying. It would be nice to have more microwaves may be available for undergrad students" (R1453)

Overall, 9.4% were unable to afford to pack a lunchbox to campus. A few participants said they went through the day without food due to the lack of money.

"It is difficult to bring food of my own, since sometimes we sleep without food, me and my family." (R414)

"We sometimes run out of food at home." (R517)

"… if there is nothing at home, you can't take anything with you." (R777)

"Because I send money home, I'm often left with (R)500 to buy food, so I run out of food most of the time." (R956)

"Sometimes we don't have food because we need to sa(v)e money for transport so we only manage to buy food that we can only manage to prepare at home and eat it at home…" (R1047)

Some participants indicated lack of money or the food not being appropriate for a lunch box, for example:

"I cannot afford to buy food and also lunchbox food. If there were places to heat up homemade food, I would bring a lunchbox more often." (R916)

"Insufficiency of food and the type of groceries contained in my place is not suitable for lunchbox. In addition, When I happen to carry the leftover meal, I find it hard to consume it since students have no access to facilities such as microwaves or fridges." (R1369)

Various comments stated the additional load to carry around campus or fear of food spilling over and damaging the books and laptops.

"It's hard to keep the food fresh, and there is always the fear of it spilling on your books." (R216)

"I cycle to campus and normally carry a laptop in my bag, which takes up most of the bag space; also if I fall, having food in my bag, increase the risk of damaging the laptop should I fall." (R383)

"Lunch box does not have space inside my backpack." (R532)

"I have a lot of books to carry to campus; bringing a lunchbox will unable me to carry all required books to class." (R955)

Overall, 7.7% of the comments mentioned that participants were ashamed of eating homemade food, as it might create a stigma of being labelled poor.

"It is somewhat embarrassing for me because most of my friends bu(y) (from) the fast food shops." (R446)

"Sometimes people laugh at you for bringing your lunch box. They say you don't want to spend money." (R546)

"The food I prepared from home are mostly shunned upon, having a simple pap and spinach seems weird; therefore, I don't feel comfortable opening my lunchbox amongst people I'm uncomfortable around." (R617)

"People will look down on you because they have enough money to buy expensive food." (R831)

"Sometimes when I have to take my own food to campus, friends I have laugh at me." (R1134)

"I am ashamed to eat my own food in front of other students because the competition is too high...The majority of students they buy food on the campus, so bringing your food that is not (of) a high level, is challenging." (R1273)

Others stated the lack of inadequate tables and chairs to sit and eat lunch around campus.

"If there can be more tables and chairs around the campus to sit down and eat." (R102)

"Places to sit down and eat (are) mostly all occupied." (R130)

4.8.3 The practices regarding drinks consumed and bought on campus

Figure 4.5 indicates the participants' practices regarding drinks. While most participants (62.5%) regularly (36.5% "always" and 26.0% "often") took water to class, only 23.7% regularly (7.1% "always" and 16.6% "often") bought water on or near campus. As summarised in Table 12, food-insecure participants were less more likely to take water to class and buy water on campus (p=.03) than food-secure participants (p<.0001). About a quarter of participants regularly reported regularly buying 100% food juice (23.5%) and sugary drinks (25.1%). Food insecure participants were significantly more likely to buy sugary drinks than food-secure participants (p=.0004).

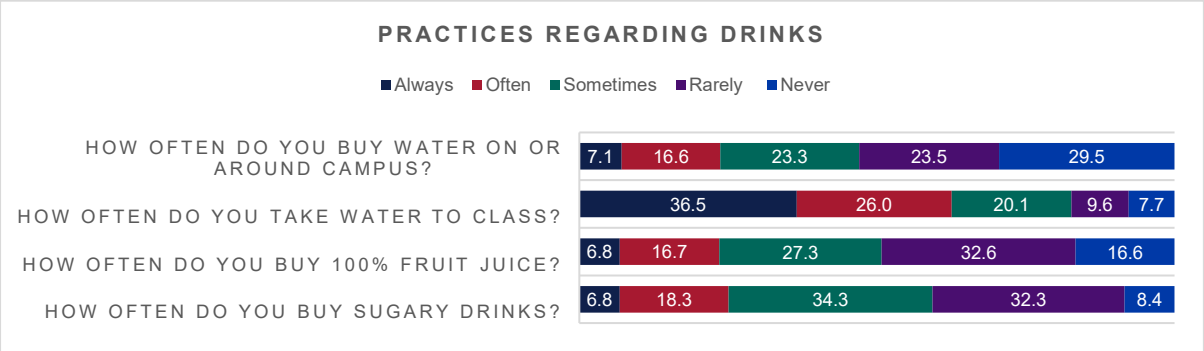

Figure 4.5 The practices of drinks consumed on campus

Table 4.14 provides information related to the association between food security and preference for drinks consumed on campus. Food secure participants were significantly more likely to take water to class (p<0.0001) and buy water on campus (p= 03) as compared to food-insecure participants. About a fifth of participants stated they frequently bought 100% fruit juice (23.5%) and sugary drinks (25.1%). Food insecure participants were significantly more likely (p=.0004) to buy sugary drinks than food-secure participants.

Table 4-14 Associations between food security and the preference of drinks on campus

Variable	LEVELS OF FOOD SECURITY								p-value
	High		Marginal		Low		Very low		
	n	%	n	%	n	%	n	%	
How often do you buy water on or around campus? (n=1371)									
Never	35	31.5	50	21.1	82	25.6	238	33.9	.03*
Rarely	26	23.4	59	25.0	74	23.0	164	23.3	
Sometimes	25	22.5	59	25.0	80	25.0	153	21.8	
Often	20	18.0	52	22.0	60	18.7	97	13.8	
Always	5	4.5	16	6.8	25	7.8	51	7.3	
How often do you take water to class? (n=1366)									
Never	6	5.4	11	4.7	27	8.4	61	8.7	<.0001*
Rarely	3	2.7	31	13.3	24	7.5	73	10.4	
Sometimes	10	9.0	39	16.7	81	25.2	146	20.9	
Often	23	20.7	57	24.4	82	25.6	182	27.4	
Always	69	62.2	96	41.0	107	33.3	228	32.6	
How often do you buy sugary drinks? (n=1364)									
Never	13	11.8	27	11.5	25	7.8	50	7.1	.0004*
Rarely	50	45.5	80	34.0	95	29.7	216	30.9	
Sometimes	22	20.0	64	27.2	115	35.9	265	37.9	
Often	13	11.8	51	21.7	67	20.9	119	17.0	
Always	12	10.9	13	5.5	187.8	5.6	49	7.0	

4.8.4 Practices and opinion regarding shopping to preparing own food during the academic term

This segment of the questionnaire surveyed participants practice of groceries acquisition and ingredients required for meal preparation. The section included multiple-choice questions and open-ended questions to elaborate on participants' struggles and experiences.

4.8.4.1 Shops, shopping and transport

Table 4.15provides information related to the associations between grocery shopping and transport and the level of food security. Most participants (86.8%, n=1194) indicated that they regularly (always or often) prepared their own food where they stayed during the academic term.

Table 4-15 Practices regarding shopping for groceries and ingredients to cook/prepare food

	Frequency (n)	Percentage (%)
Do you prepare or cook your own food where you stay during the academic term? (n=1382)		
Always	794	57.5
Often	404	29.2
Sometimes	136	9.8
Seldom	42	3.0
Never	6	0.4
How often do you buy groceries and ingredients to prepare food and cook for yourself? (n=1381)		
Several times per week	104	7.5
Once per week	189	13.7
Every second weeks	248	18.0
Once a month	819	59.3
Never	21	1.5
Where do you mostly buy groceries and ingredients for food preparation and cooking? (Select all that apply) (n=1387)		
Shoprite	635	45.8
Checkers	685	49.4
Pick-n-Pay	799	57.6
Spar	494	35.6
Foodzone on main campus	111	8.0
Street vendors (for fresh produce)	211	15.2
Wholesale (Boxer,Macro, Watloo, Econofoods, TFS,OBC, Cambridge, Roots, Jumbo	97	7.0
Food Lovers' Market	8	0.6
Farmers' Market	4	0.3
How do you mostly get your groceries and food purchases back to where you stay? (n=1375)		
Walk and carry it	337	24.5
Pay someone to push your purchases to where you stay in a trolley	53	3.9
Take it on a minibus taxi	274	19.9
Take it in a private cab or shuttle service	429	31.2
Take a bus	23	1.7
Get a lift from someone else	71	5.2
Drive myself	178	13.0
Bicycle / motorbike	4	0.3
Other	6	0.4

Most went shopping for groceries and ingredients once (59.3%, n=815) or twice (18.0%, n=248) per month. Some pointed out that this is another limitation to including fresh fruits and vegetables in the student diet.

"Because I buy once per month, it is difficult to include fresh vegetables and fruits on my shopping list." (R916)

"Difficult getting fresh produce." (R154)

Most participants indicated that they made use of private cabs or shuttle services (31.2%) and minibus taxis (20.0%) to get their grocery shopping home, while a quarter (24.5%) carried their shopping home or to the residences on foot (Table 4.16). The food security level was significantly associated with the mode of travel in this context ($p<.0001$), with food-insecure participants more likely to walk, use minibus taxis and cabs, and food secure students more likely to drive themselves or get a lift with someone (presumably free).

Table 4-16: Practices regarding shopping for groceries and ingredients to cook/prepare food

	Frequency (n)	Percentage (%)
Do you prepare or cook your own food where you stay during the academic term? (n=1382)		
Always	794	57.5
Often	404	29.2
Sometimes	136	9.8
Seldom	42	3.0
Never	6	0.4
How often do you buy groceries and ingredients to prepare food and cook for yourself? (n=1381)		
Several times per week	104	7.5
Once per week	189	13.7
Every second weeks	248	18.0
Once a month	819	59.3
Never	21	1.5
Where do you mostly buy groceries and ingredients for food preparation and cooking? (Select all that apply) (n=1387)		
Shoprite	635	45.8
Checkers	685	49.4
Pick-n-Pay	799	57.6
Spar	494	35.6
Foodzone on main campus	111	8.0
Street vendors (for fresh produce)	211	15.2
Wholesale (Boxer,Macro, Watloo, Econofoods, TFS,OBC, Cambridge, Roots, Jumbo	97	7.0
Food Lovers' Market	8	0.6
Farmers' Market	4	0.3
How do you mostly get your groceries and food purchases back to where you stay? (n=1375)		
Walk and carry it	337	24.5
Pay someone to push your purchases to where you stay in a trolley	53	3.9
Take it on a minibus taxi	274	19.9
Take it in a private cab or shuttle service	429	31.2

Take a bus	23	1.7
Get a lift from someone else	71	5.2
Drive myself	178	13.0
Bicycle / motorbike	4	0.3
Other	6	0.4

Table 4-17: Associations between food security level and practices regarding shopping for groceries and ingredients to cook/prepare food

	n	%	LEVELS OF FOOD SECURITY								p-value
			High		Marginal		Low		Very low		
			n	(%)	n	(%)	n	(%)	n	(%)	
Do you prepare or cook your own food where you stay during the academic term? (n=1376)											
Always	791	57.4	49	44.1	120	50.9	179	55.4	443	62.8	
Often	403	29.3	37	33.3	88	37.3	101	31.3	177	25.1	
Sometimes	135	9.8	15	13.5	20	8.5	34	10.5	66	9.4	0.0002
Seldom	41	3.0	8	7.2	8	4.0	9	2.8	16	2.3	
Never	6	0.4	2	1.8	0	0.0	0	0.0	4	0.6	
How often do you buy groceries and ingredients to prepare food and cook for yourself? (n=1375)											
Several times per week	102	7.4	9	8.1	20	8.5	24	7.5	49	6.9	
Once per week	189	13.7	31	27.9	49	20.8	52	16.2	57	8..1	
Every second weeks	248	18.0	27	24.3	48	20.3	54	16.8	119	16.9	<.0001
Once a month	815	59.3	37	33.3	116	49.2	190	59.0	472	66.9	
Never	21	1.5	7	6.3	3	1.3	2	0.6	9	1.3	
How do you mostly get your groceries and food purchases back to where you stay? (n=1370)											
Walk and carry it	336	24.5	13	11.9	34	14.	68	21.1	221	31.4	
Pay someone to push your purchases to where you stay in a trolley	52	3.8	1	0.9	77	3.0	13	4.0	31	4.4	
Take it on a minibus taxi	274	20.0	4	3.7	4	14.5	59	18.3	177	25.1	
Take it in a private cab or shuttle service	428	31.2	22	20.2	77	32.8	118	36.7	211	30.0	<.0001
Take a bus	22	1.6	0	0.0	4	1.7	2	0.6	16	2.3	
Get a lift from someone else	71	5.2	9	8.3	14	6.0	27	8.4	21	3.0	
Drive myself	177	12.9	57	52.3	62	26.4	33	10.3	25	3.6	
Bicycle/motorbike	4	0.3	1	0.9	1	0.4	1	0.3	1	0.1	
Other	6	0.4	2	1.8	2	0.9	1	0.3	1	0.1	

Most participants regularly shopped at Pick-a-Pay (57.7%, n=796), Checkers (49.6%, n=684), and Spar (35.7%, n=492), which have branches within walking distances of the main campus (Table 4.18). Many participants also bought from Shoprite (45.7% n=631,) although this retail group did not have branches within walking distance of the campuses at the time of the survey. The following comments may explain why many participants were travelling into town to shop for groceries and fresh produce:

"The shops near the university are expensive, and most people end up travelling to reduce food cost." (R77)

"The shops where the prices are cheap are far from where I stay, which results in me taking the whole day to do shopping." (R362)

Few students (8.0%, n=111) indicated that they bought their produce and ingredients from Foodzone, a small grocery shop situated on the main campus. Overall, 15.2% (n=211) of participants reported buying fresh produce and ingredients for food preparation from street vendors.

The most food-insecure participants were most likely to buy at Shoprite (p<.0001) and street vendors (p<.0001), whereas more food secure participants were more likely to buy at Checkers (p<.0001), Pick-n-Pay (p<.0001) and Spar (p=.0011).

Table 4.18 Associations between preferred retailer for acquiring food/ingredients and level of food security

	N (1380)	%	LEVELS OF FOOD SECURITY								p-value
			High		Marginal		Low		Very low		
			n	(%)	n	(%)	n	(%)	n	(%)	
Shoprite											
Yes	631	45.7	8	7.2	76	32.2	151	46.8	396	56.0	<.0001
No	749	54.3	103	92.8	160	67.8	172	53.3	314	44.2	
Checkers											
Yes	684	49.6	74	66.7	146	61.9	171	53.0	293	41.3	<.0001
No	696	50.4	37	33.3	90	38.1	152	47.1	417	58.7	
Pick-n-Pay											
Yes	796	57.7	78	70.3	156	66.1	202	62.5	360	50.1	<.0001
No	584	42.3	33	29.7	80	33.9	121	37.5	350	49.3	
Spar											
Yes	492	35.7	48	43.2	93	39.4	133	41.2	218	30.7	0.001
No	888	64.3	63	56.8	143	60.6	190	58.8	492	69.3	
Foodzone on main campus											
Yes	111	8.0	8	7.2	16	6.8	24	7.4	63	8.9	0.7
No	1269	92.0	103	92.8	220	93.2	299	92.6	647	91.1	
Street vendors at taxi ranks etc (fresh produce)											
Yes	211	15.3	4	3.6	18	7.6	42	13.0	147	20.7	<.0001
No	1169	84.7	107	96.4	218	92.4	281	87.0	563	79.3	

In total, 1016 comments were submitted on barriers that participants experienced concern shopping for groceries and ingredients to prepare/cook their own food. While 10.8% (n=110) of the comments indicated no experienced barriers/problems, the following comments probably summarise just how ill-prepared some students felt for the task:

"I just don't know what I should buy. I mean I've never went to town with parents or anyone for grocery." (R205)

"I don't know what to buy." (R275)

"No clue on what to buy." (R367)

"Am used to buy food with my mom; now I'm alone, I don't even know where to start." (R953)

Almost a third (28.1%, n=286) of the comments indicated that the main barrier was the high cost of food, although several mentioned lacked budgeting skills and that prices that change from month to month make budgeting difficult.

"I can often not purchase more than the necessities, so there is not much variety in what is bought each month and the meals that I cook." (R15)

"The prices are very high. I often don't get enough money to buy everything I need." (R46)

"Groceries are expensive." (R191; R248)

"Sometimes food may be expensive that I would have to limit some of the items (as) I have to stick to the budget." (R273)

"Change in the prices from the previous month." (R309)

"Expensive food; I don't have enough money to buy all that I need." (R414)

"I can't afford everything that I need because food is expensive and I only get money from my mom when gets paid from the domestic work she does." (R493) (Student waiting for NSFAS appeal at (the) time of the survey; indicating that he was "squatting at a church mate's place") (R493)

"Budgeting is usually a mission." (R712)

. "… and sometimes there's (an) unexpected emergency with my family, and I have to send money to them. This leads me to buy less food." (R856)

"Some foods are expensive, so I have to buy cheaper ones which are unhealthy to satisfy hunger." (R898)

"Is that the items are very expensive; more especially when I have to buy my toiletries." (R1249)

Overall, 7.4% (n=75) of comments identified time as a barrier to grocery shopping, for example:

"Trying to find time in a busy varsity lecture schedule." (R172)

"The time to go to a store, (as) I have a lot of classes." (R236)

"Yes. when I have to go buy food, I struggle because of the busy schedule of my academics." (R497)

"Not having enough time because of back to back lectures and tutorials and having to study." (R1102)

"I don't really find time to do it during the week. I can only do it during the weekends if I don't have to be on campus or studying. I come back from campus late and most of the time tired. I can't even try to buy groceries between classes. You have to wait for a taxi to be full and that could take at least 30 minutes." (R1216)

"I often don't have time as my academics are demanding." (R1434)

Distance to the shops, safety issues and carrying heavy loads versus incurring travelling costs were mentioned in 16% (n=221) of the comments, for example:

"Transport taxis are far from shops, so I have to pay (R)60 for a meter taxi". (R143)

"Food is expensive so only essentials are bought, and walking distance is far therefore dangerous when walking alone. Transport can be pricey." (R269)

"Sometimes I buy less than I intend because I can't carry too much, so I end up having to go multiple times a week." (R286)

"Travelling back is usually an issue because the groceries are too heavy to carry back or load in a taxi, so I have to spend money on a cab." (R521)

"Transport barriers. From (the) entrance to my room, it is far to carry heavy grocer(ies)." (R604)

"Food plastics are heavy. And cabs are expensive." (R637)

"Sometimes I buy heavy stuff, and I (live) far from the main gate, so I have to pay the driver to drop me off near my residence." (R1232)

"The malls are a distance from where I live, and I can't walk home in fear (of) being mugged, so I spend R50 for a cab even if the stuff I bought is not heavy and I could carry it home." (R1291)

"Carrying the groceries back to campus/residence." (R1293)

"Heavy plastic bags and having to buy from different shops due to comparing prices." (R1365)

Overall, 7.7% (n=78) of comments were about the shops being very busy at the time of the month when students receive their money and that this often caused the items that they wanted to buy to be out of stock. For example:

"I'd go to a grocery store, and some things won't be there because we all get money at the same time." (R260)

"You sometimes find that due to a large number of student(s) being paid during the end of the month, you end up not getting most of the essentials you need due to finished stock." (R423)

"Long till lines in Shoprite because we usually get meal allowance around the times of social grants pay-outs" (R531)

"At the end of the month, it's usually packed at the stores, so I have to stand in long queues. Certain ingredients run out of stock, and I have to come back again another day." (R598)

Several comments (9.2%, n=93) identified lack of budgeting and planning skills as barriers, for example:

"I always forgot to check expiring dates." (R141)

"Usually don't know what type of meal to put together with ingredients bought." (R293)

"Not being sure as to whether what products should I buy." (R1160)

One comment in this section expressly referred to barriers associated with *Foodzone* on the main campus:

"I wish that there were an available Spar/Pick-n-Pay on campus instead of Foodzone. Foodzone has very limited stock and it is very expensive whereas it would've been convenient to do shopping on campus to save travelling cost and also for general safety purposes. Another problem I experience is when it comes to shopping for sanitary (ware) and other hygiene essentials during the weekend. Since Foodzone is closed during weekends, I sometimes have to ask around for such items." (R71)

4.8.4.2 Buying from a shopping list or in bulk

About one in five participants (17.8%) indicated that they did not buy from a shopping list, and only about a half (50.3%) ever bought in bulk (Table 4.18). There were no significant association of these two items with food security level (Table 4.19) .

Table 4-18: Practices regarding using shopping and buying in bulk

	Frequency (n)	Percentage (%)
Do you buy from a shopping list? (n=1372)		
Yes	1127	82.1

No	245	17.9
Do you ever buy in bulk? (n=1363)		
Yes	675	49.5
No	688	50.5

Table 4-19: Associations between food security level and practices regarding using a shopping list and buying in bulk

	n	%	LEVELS OF FOOD SECURITY								p-value
			High		Marginal		Low		Very low		
			n	%	n	%	n	%	n	%	
Do you buy from a shopping list? (n=1367)											
Yes	1124	82.2	89	7.9	192	17.1	261	23.2	528	51.8	0.9
No	243	17.8	20	8.2	44	18.1	59	18.4	120	49.4	
Do you ever buy in bulk? (n=1358)											
Yes	675	49.7	48	7.1	127	18.8	157	23.3	343	50.8	0.35
No	683	50.3	62	9.1	109	16.0	161	23.6	351	51.4	

Asked what prevents them from buying in bulk, most of those who reported that they do not buy in bulk (n=688) indicated that they did not believe they would afford it (40.4%, n=279).

"Even though it is cost-effective, it is too much money at a shot. I only get R800 in total, per month." (R17)

“"I don't have enough money to do so." (R38)

"Because of limited money to spend and to try and get more (variety) of food." (R185)

"I will be short on money for other things." (R286)

"I cannot afford to buy in bulk. I can barely afford to get groceries to last half the month." (R338)

"Bulk comes in cheaper, but I cannot afford to buy too much of everything since I don't have enough money." (R489)

"Bulk buy is costly, which might take most of the money on few items, buying loose products offers a wide variety of things at a more affordable price." (R617)

"It is expensive to buy in bulk." (R772)

“"It's impossible to buy in bulk with my budget as food prices are high." (R1196)

Others indicated that they did not have the storage space (8.7%, n=60) or were scared that food would be too much from them and would go stale or spoil before it could be utilised (12.7%, n=173).

"Bulks are expensive, and I really can't afford. I avoid food to be rotten … I don't have a refrigerator so I can buy much to sustain till month end." (R136)

"I don't buy in bulk because the food will get spoiled if I don't finish it before the expiry date". (R28)

Not enough space in (the) residence to put the food. (R137)

"I always do not have enough cash for buying in bulks and have no enough space to pack groceries in bulk." (R310)

"Many things get rotten." (R846)

"There won't be enough space for my housemates to put their food because we share a fridge." (R943)

"Scared that food might go bad before using it all." (R967)

"Use commune fridge to store food; sometimes food goes missing." (R1290)

"Storage purposes. Some foods are susceptible to spoilage if not refrigerated. Other foods have expiry dates that are not feasible to be purchased if bought in bulk." (R1373)

Several pointed out that they did not have access to shops that sell in bulk as these are far from where they stay or that they did not know where to buy in bulk (6.1%).

“I don't really know places where they sell in bulk.” (R144)

“I do not know shops that are near the campus that sell in bulk. Makro is far from the campus.” (R292)

“ I don't (know a) store that sell(s) in bulk around where I stay.” (R352)

“Shops that you can buy in bulk from are too far away. Transportation is a problem. The costs are too much of those items.” (R1302)

“Makro is too far, and I don't have a car, I normally buy at places I can walk to.” (R1334)

Several mentioned that they cannot transport much shopping at a time and that buying bulk would incur extra transport costs (4.5%).

".. And the thought of carrying bulk food in a taxi is a nightmare." (R488)

"Its heavy to carry to campus, and transportation to campus is expensive." (R353)

"Buying in bulk will force me to call a cab." (R742)

“I usually buy groceries I can walk home with instead of taking a cab.” (R850)

"The bulk stuff is too heavy to carry to my place." (R917)

"Transport restricts. So I buy what I can carry, and closer shops don't really sell in bulk." (R918)

4.8.4.3 Pooling money for groceries

Only 14.5% reported that they contribute an amount of money to a communal pool to buy groceries (Table 4.20).

Table 4-20: Practice regarding pooling money for groceries

	Frequency (n)	Percentage (%)
Have you and other students ever created a "stokvel" to buy groceries and ingredients for food preparation and cooking? (n=1346)		
Yes	197	14.6
No	1149	85.4

Pooling money could enable students to buy in bulk at better prices and share the transport cost and items among them. However, the participants' comments above on why they did not buy in bulk indicated that most had not considered this possibility.

4.8.4.4 Interest in an online store for essential foods

In another section of the survey, participants were asked if they would support an online store for basic food. In hindsight, the question should have been worded to explicitly indicate that "basic foods" were meant to refer to basic groceries and ingredients, as it is clear from the free-text suggestions that some understood it as such, whereas others thought that it referred to prepared meals. As summarised in Table 4.21, 44.2% (n=599) answered "yes" to the question, while 26.3% (n=357) were not sure that they would. Some of the 29.5% (n=400) that answered "no" did not seem to understand how such a service would work, for example:

"I have never bought things from online, so I have no idea how it works. I would have to be reassured by trusted peers that it does work and is (in) no way dodgy." (R886)

Table 4-21: Interest in a potential campus online store

	Frequency (n)	Percentage (%)
Would you be interested in buying basic food on campus from an online store? (n= 1356)		
Yes	599	44.2
No	400	29.5

I don't know	357	26.3

Those that answered “yes” were asked to suggest what they would expect or want from such a service. Of the 599 suggestions submitted, 31% (n=186) referred to convenience, on-time, accessible or at least affordable delivery, or pick-up points, as wells as some suggestions for a variety of payment options, for example:

“It has to have same day delivery.” (R106)

“Deliver directly to me.” (R186)

“…It must be easy to collect or have a delivery option.” (R370)

“…It must be quickly delivered within 1-3 days. There must be on option for cash/card/speedpoint payment.” (R545)

“There should be a pickup point on campus as I wouldn't want strangers travelling to my house. Also, debit machine purchases.” (R776)

“Relevant swiping machine.” (R1122)

Overall, 25% (n=147) of the suggestions referred to affordability, for example:

“The prices should be based on the student budget, and they need to consider that not all students can afford to buy good quality food.” (R797)

“To make deliveries and have reasonable prices.” (R1055)

Five per cent (n=29) of the suggestions indicated that the online platform should be easy to use, for example:

“Should be easy to navigate.” (R161)

“User-friendly online store.” (R1089)

“Quick access not complicated platform or user interaction and with realistic prices for students…” (R1293)

“It must be user friendly. Users must see the products they want, and it should also display similar items together.” (R1299)

“Easy to use online website.” (R1438)

Twenty per cent (n=118) of the suggestions referred to the type of products that participants would want to buy through an online shop, for example:

“Toiletries.” (R787)

“Cosmetics, breakfast products, fruits and vegetables and airtime.” (R828)

“Basic needs like cheap bread, jam, peanut butter, eggs.” (847)

“Anything from food to toiletr(ies).” (R915)

“Sell fresh vegetable and fruit combos.” (R913)

“Fruit and vegetables”. (R917; R1020, R1167, R1123)

“…sell fresh fruits and vegetable at a reasonable price i.e better than the Foodzone.” (R1054)

“Fresh vegetables and fruit and also already prepared healthy meals.” (R1056)

“Bread, milk.” (R1097)

“Everything that has basic healthy household food, especially fresh vegetables.” (1266)

“Simple and easy to order online.” (R1156)

“…selling big and heavy food like maize flour...” (R1236)

“Deliver basic needs…” (R1271)

“Fresh fruits, bread … “ (R1372)

“Fresh produce, meat and grocery and personal hygiene products.” (R1380)

“Sanitary pads must always be available.” (R1427)

“ Halal certified meat. Fresh fruits and vegetables…” (1460)

“…a variety of healthy fruits and vegetables, some meat substitutes such as the Fry's line or bean burger patties,etc.” (R96)

Other items in the survey (discussed above) already identified a self-expressed need to eat healthier food and flagged the limited access to fresh fruits and vegetables on the campuses. Even on the main campus, most students have to walk to buy fresh produce at surrounding shops, and this does not warrant the time that it would take if it had to be done too frequently. In the case of students who live in the South Campus residences, the nearest shops that sell fresh produce are far beyond walking distances.

Several comments (11%, n=53) also suggested ready-to-eat food and prepared meals, for example:

“Prepared cheap healthy filling meals.” (R77)

"…sell fresh food that are cooked well." (R519)

"Fresh vegetables and fruit and also already prepared healthy meals." (R1056)

"Healthy snacks Fresh and quick meals… " (R1372)

Seventeen per cent (n=101) of the comments referred to a need for nutritious (healthy), fresh and quality products, for example:

"They should sell fresh and good quality produce." (R797)

"Healthy, fresh, safe and cheap." (R537)

"Fresh healthy food." (R1118)

"Healthy, nutritious and high-quality foods at a reasonable price." (R1316)

"…good quality products." (R1387)

4.8.5 Food storage and preparation facilities

This section of the survey explored students' available storage for raw ingredients and preparation facilities as these influence the quantity and type of ingredients and fresh produce that they may have available for cooking. These results should be interpreted in the context of the time and travelling barriers described in the previous section.

Table 4.22 provides information related to food storage and preparation facilities, while Table 4.23 provides information related to associations between refrigeration and cooking facilities and level of food security. Most participants reported storing their food and groceries in their room where they sleep (52.5%, n=717). Food security was significantly associated with where food and groceries were stored ($p<.0001$), with food-insecure participants most likely to store it in their bedrooms and food secure participants more likely to store it in a family kitchen or their own kitchen.

Table 4-22: Food storage and preparation facilities

	Frequency (n)	Percentage (%)
Where do you store your groceries (ingredients for cooking)? (n=1371)		
In my room where I sleep	721	52.6
In a kitchen that I share with other students in a university residence	71	5.2
In a kitchen that I share with housemates	341	24.9
In a kitchen that I share with my family	140	10.2
In a kitchen for my private use	85	6.2
Other (not identified)	13	1.0
Which of the following do you have access to for cold storage of your food? (Mark all that apply to you) (n=1387)		
Fridge in my room in residence or commune	526	37.9
Shared (communal) fridge (in residence or student commune)	431	31.1

Fridge in my flat / townhouse / family home	339	24.4
I do not have access to a fridge	137	9.9
Do you have access to any of the following facilities to freeze your food? (n=1283)		
One shelf of freezer space	474	36.9
Two shelves of freeze space	312	24.3
More than two shelves of freezer space	263	20.5
Small freezer compartment in an undercounter personal fridge ("bar" fridge)	234	18.2
Have you ever had your food stolen from your storage/fridge/freezer where you live during the first semester of 2020? (n= 1366)		
Yes	266	19.5
No	1100	80.5
Which of the following appliances do you have access to for cooking your own food?		
Two plate stove (portable)	590	42.54
Full electric or gas stove	691	49.82
Microwave oven	774	55.80
Electric or gas oven	327	23.58
Electric frying pan	126	9.08
Other (induction plate, steamer, air fryer, slow cooker)	78	5.62

Overall, 37.9% (n=523) reported having a fridge in their bedroom. Most participants shared fridge space with others, while one in 10 did not have access to a fridge, and 7.5% (n=104) did not indicate having any access to freezer space. Limited storage space and limited access to cold storage limit the volume and variety of food, particularly fresh produce, that students can keep. Food insecure students (Table 4.23) were less likely than food-secure participants to have access to a fridge (p<.0001). Food insecure students were also more likely, if they had access to a fridge, to have it in their room (p=.02) or share it with others in a commune (p<.0001), while food secure participants were more likely to have access to their own fridge (p<.0001). Sharing storage space also opens up the possibility of food being stolen, and the study found that under 70% of participants who had very low security had food stolen from them (69.8%).

Table 4-23: Associations between food security level and food storage and facilities

	n	%	LEVELS OF FOOD SECURITY								p-value
			High		Marginal		Low		Very low		
			n	%	n	%	n	%	n	%	
Where do you store your groceries (ingredients for cooking)? (n=1366)											
In my room where I sleep	717	52.5	28	3.9	107	14.9	174	24.3	408	56.9	<.0001*
In a kitchen that I share with other students in a university residence	71	5.2	8	11.3	10	14.1	20	28.2	33	46.5	
In a kitchen that I share with housemates	341	25.0	30	8.8	67	19.6	80	23.5	164	48.1	
In a kitchen that I share with my family	140	10.2	28	20.0	23	16.4	26	18.6	63	45.0	
In a kitchen for my private use	84	6.1	13	15.5	27	32.1	23	21.4	26	31.0	
Other (not identified)	13	1.0	3	23.1	0	0.0	27	30.8	6	46.2	

	n	%	LEVELS OF FOOD SECURITY								p-value
			High		Marginal		Low		Very low		
			n	%	n	%	n	%	n	%	
Do you have access to any of the following facilities to freeze your food? (n=1280)											
One shelf of freezer space	473	36.9	21	4.4	71	15.0	115	24.3	266	56.2	<.0001*
Two shelves of freeze space	312	24.4	26	8.3	56	18.0	72	`23.1	158	50.6	
More than two shelves of freezer space	262	20.5	47	17.9	53	20.2	59	22.5	103	39.3	
Small freezer compartment in an undercounter personal fridge	233	18.2	16	6.9	58	19.7	58	24.9	113	48.5	
Have you ever had your food stolen from your storage/fridge/freezer where you live during the first semester of 2020? (n= 1361)											
Yes	265	19.5	5	1.9	21	7.9	54	20.4	185	69.8	<.0001*
No	1096	80.5	103	9.4	213	19.4	259	23.6	521	47.5	
Fridge in my room in residence or commune (1380)											
Yes	523	37.9	37	7.1	98	18.7	141	27.0	247	47.2	.02*
No	857	62.1	74	8.6	138	16.1	182	21.2	463	54.0	
Shared (communal) fridge (in residence or student commune) (1380)											
Yes	431	31.2	15	3.5	52	12.1	108	25.1	256	59.4	<.0001
No	949	68.8	96	10.1	184	19.4	215	22.7	454	47.8	
Fridge in my flat / townhouse/family home (1380)											
Yes	338	24.5	61	18.1	84	24.9	65	19.2	1289	37.9	<.0001*
No	1042	75.5	50	4.8	152	14.6	258	24.8	582	55.9	
I do not have access to a fridge (1380)											
Yes	136	9.9	2	1.5	8	5.9	27	19.9	99	72.8	<.0001*
No	1244	90.1	109	8.8	228	18.3	296	23.8	611	49.1	
Two plate stove (portable) (1380)											
Yes	586	42.5	27	4.6	84	14.3	113	19.3	362	61.8	<.0001*
No	794	57.5	84	10.6	152	19.1	210	26.5	348	43.8	
Full electric or gas stove (1380)											
Yes	690	29	4.2	107	15.5	142	142	20.6	412	59.7	<.0001*
No	690	82	11.9	129	18.7	181	181	26.2	298	43.2	
Microwave oven (1380)											
Yes	771	55.9	95	12.3	150	19.5	193	25.0	333	43.2	<.0001*
No	609	44.1	16	2.6	86	14.1	130	21.4	377	61.9	
Electric or gas oven (1380)											
Yes	326	56	17.2	66	20.3	77	23.6	127	39.0	56	<.0001*
No	1054	55	5.2	170	16.1	246	23.3	583	55.3	55	
Electric frying pan (1380)											
Yes	126	9.1	29	23.0	29	23.0	32	25.4	36	28.6	<.0001*
No	1254	90.9	82	6.5	207	16.5	291	23.2	674	53.8	

Food insecure participants (Table 4.23) were more likely to have had food stolen in this context than food-secure participants (p<.0001). The food security level was also significantly associated with access to freezer space (p<.0001), with those food-insecure participants that had access to freezer space being more likely to have access to only one shelf, while food secure students were more likely to have access to more shelves of freezer space.

More or less equal percentages of participants had access to a full stove, or a two-plate stove and/or a microwave (Table 4.22). This information is essential when recipes and food and nutrition skills training is planned to assist the students. Food

insecure participants (Table 4.23) were more likely to have access to a two-plate stove (p<.0001), while food secure students were more likely to have access to a full electric/gas stove (p<.0001) or oven (p<.0001), a microwave (p<.0001), an electric frying pan (p<.0001), a steamer (p=.01) or an air fryer (p<.0001).

4.8.6 Barriers to food preparation and cooking

Participants were asked to explain the barriers they had experienced cooking or preparing their own food, and 1019 free-text comments were submitted. A fifth of these comments (22%, n=220) specifically stated that no barriers were experienced.

A quarter (25%, n=252) of the comments referred to the time that preparing meals consumes and noted that this interferes with studying, for example:

"Taking too much time to cook while I was supposed to study." (R63)

"I always cook late as I come back late from campus." (R67)

"It takes a chunk load of time off my study schedule." (R71)

"Cookin(g) takes up more time and I end up wasting my study time." (R105)

"Time…man has to study." (R271)

"The cooking takes a lot of time, sometimes I cook, (when I am) having to study." (R481)

"I sometimes do not have time to prepare food." (R518)

"It minimise my time to study." (R563)

"There isn't enough time to cook, time is dedicated to studying, (and) keeping up with school work." (R697)

"Sometimes I don't have enough time because I sometimes have (a) late practical." (R726)

"When being a student it takes quite some (time) to prepare food as well as cleaning afterwards and still have to do academic work." (R764)

"There is hardly enough time to prepare my own food, my classes usually begin at 8am or 9am and end at 5pm, apart from that I have a lot of assignment to complete almost on a weekly basis." (R824)

"Not having enough time to cook all the necessary nutrients because of leadership and school commitments." (R865)

"Time…I have a lot of work to cover and I'm usually tired when I get back from classes." (R969)

“I do not have enough time as my academics are too demanding.” (R1434)

Some comments highlight the consequences of the time constraints on participants’ eating habits, for example:

“That means less studying time or preparing for the next day's lesson. But it is not an everyday occasion. I have the same meal all week.” (R723)

“Cooking is time-consuming. Therefore I cook twice a week, and if all those foods are finished, I eat takeaways.” (R916)

A fifth (20%, n=200) of the comments referred to lack of cooking skills, not knowing what to cook, burning the food, and preparing unappetising or unappealing food as barriers, for example:

“Still learning how to cook, so it takes a long time to prepare food.” (R81)

“I cannot cook so I usually undercook or overcook - compromising the foods nutritional value.” (R132)

“I'm not good in cooking.” (R192)

“I don't know what to make.” (R217)

“I don't know how to cook well.” (R359)

“I am not good in cooking.” (R403)

“I can't cook by myself. So I cook tasteless food.” (R508)

“I can't cook properly.” (R516)

“It's just that sometimes the food is not well prepared,am still trying to learn how to cook.” (R752)

“That I don’t know how to cook, thus I rely more on freezer foods.” (R785)

“(I am) not so good with cooking so I sometimes overcook and food taste bad.” (R828)

“I can't really cook, sometimes I burn the food.” (R1108)

“I'm struggling to cook good proper meals.” (R1310)

“I'm a terrible cook, but I must eat regardless.” (R1334)

“Sometimes it's hard to put mince, rice and some form of vegetable together in new ways you haven't done a hundred times before. Finding simple recipes is hard. They usually include long and complicated processes, include(ing) utensils most students don't have access to, need expensive spices or some small quantity of an ingredient you don't know what to do with once you've used the bit the recipe needs.” (R886)

Seventeen per cent (16%, n=168) comments were related to sharing of (often faulty or inadequate) stoves and kitchen spaces, for example:

"Having to wait for someone else to finish using the kitchen so that I may have my turn to prepare food as we share the kitchen." (R513)

"The only problem is the cooking appliances. The two-plate stoves break often, and it often sets us back a couple of hundred rands to replace them." (R930)

"Some also want to prepare their own food, and there are only 2 x two-plate stoves...we are 16 ..so there's no space to cook sometimes..so you have to wait." (R590)

"Sometimes I have to wait for my housemates to finish cooking, we are 6 students, and we have a 2 plate stove." (R598)

"The stoves are not enough. I have to wait till someone finishes, and sometimes I would cook late." (R723)

"Where I stay, we use the same stove, so sometimes you end up not cooking because some (others) are cooking." (R795)

"Because I stay in a commune, I may not be able to cook food at a specific time that is comfortable with me because other residents in the house are busy with the stove." (R799)

"There is not enough space in the kitchen residence, uncleanliness and the appliances are old enough to be changed." (R821)

"…I share a stovetop with two burners with five other people, so usually I cook food at times when they don't use it." (R859)

"The residence where I say don't have a(n) oven, and the oven plates only work occasionally, making it difficult to make a warm meal." (R873)

"I always have to make quick meals so that my housemates get to cook also." (R943)

"There are only 2 four plate stove in our corridor, and we are more than 20." (R979)

"The stove would be occupied by some of my housemates already, which would cause me to cook late around 10 pm." (R1004)

"We are too many in the commune and it takes time to wait for someone to finish cooking its food." (R1284)

"We have a set timetable for kitchen use. I have to cook during my allocated time or late at night when I don't use up my allocated time." (R1330)

One per cent (1%, n=14) of the comments noted that other students leaving the kitchens dirty, is a barrier, for example:

“In a corridor of about 26 pupils, we share a kitchen, and sometimes it gets full, or students leave it dirty.” (R425)

“Sharing a kitchen with more than 24 people becomes busy and unhygienic.” (R687)

“It is also difficult to motivate yourself to cook if your housemates leave everything dirty and you have to wash the counters, pots, pans etc. before you can start cooking.” (R886)

“When I have to cook, I find the stove being fully booked or packed with pots of other students and they don’t even clean after themselves… that is not healthy.” (R923)

“The kitchen would also be left dirty, and I would have to clean it up or decide not to cook because it's too messy in the kitchen.” (R1004)

“We share the kitchen at res, and people don't clean after cooking.” (R1044)

Overall, 8% (n=84) of the comments indicated a lack of fridge/freezer space or other means to preserve food as a barrier. For example:

“I don't have to cook lots of food because I can't store it in the fridge and they might rotten.” (R55)

“I sometimes have leftovers that I don’t finish so it goes to waste.” (R334)

“I only have a fridge so it's hard to warm my food.” (R467)

“Running out of storage space in the refrigerator.” (R472)

“I can't cook a lot of food since I don't have a fridge so it would get rotten.” (R559)

“I use my roommate fridge so it is hard to put a lot of things like cooking too much food and store it in her fridge so I just cook a small portion that I finish in one day.” (R570)

“A place to store the cooked food. The ants and flies always look for the prepared food.” (R661)

“Goes bad quickly. (I) don't like the food I've cooked after a few days; no variety (have to eat same food for several days) (R751)

“Not enough space in the fridge; 1 small fridge shared with 5 people.” (R834)

“The food gets spoiled if you cooked and saved it for a while.” (R917)

“I don't have a fridge so my food always gets spoiled.” (R937)

“I don't have a fridge where I can store the food that I cooked.” (R1034)

Three per cent (3%, n=26) of the comments noted lack of utensils for cooking or storing food as a barrier, for example:

“Having to cook meals that will last for several days using small pots and not having enough containers to keep the food.” (R436)

“Only one pan to use for all cooking.” (R447)

“Even the pots I use are just 2 and small.” (R766)

“No(t) enough pots.” (R843)

“(lack of) Tupperware space; also fridge space is limited.” (R939)

“I don't have enough pots.” (R969)

“Transporting my pots, ingredients etc. from the room to the kitchen and back.” (R1178)

“

Also, 8% (n=85) of the comments noted the cost of electricity, running out of prepaid electricity, and load shedding and water outages as barriers. For example:

“Electricity is expensive.” (R19)

“Electricity costs”. (R41)

“Having no electricity.” (R44)

“Electricity cutoff and water since Qwaqwa is facing water shortage.” (R564)

“Lack of electricity. Sometimes its load shedding.” (R817)

“Electricity shutdown and water unavailability. (R881)

“Also, shopping must be done with the constant power outages in mind. Sometimes the power is out the whole day. We must make other means to cook.” (R930)

“Usually we have to buy our own electricity, and we're always out of electricity. Thus the food spoil sometimes.” (R940)

“We have less electricity units, so we have to be careful when we cook.” (R1024).

“Electricity; sometime(s) I don't have money to buy it.” (R1407)

“Power outage due to the landlord not buying enough electricity.” (R1112)

Nine per cent (9%, n=90) of the comments noted a lack of food, ingredients, fresh produce or spices as a barrier.

“Lack of fruit and vegetables (very expensive in shops).” (R35)

“No(t) adequate food.” (R57)

“Not having enough ingredients.” (R365)

“(Not) enough ingredients for preparing my own food.” (R444)

“Sometimes I have run out of food, and I choose to go s(i)t by the bridge and ask people to buy me food, but I pretend as if I'm just hungry because of school work, but I actually don't have food.” (R506)

“Running out of ingredients.” (R766)

“I usually never have enough ingredients.” (R811)

“Sometimes I don't have any seasoning.” (R926)

“Sometimes I don't have food to cook, (and) if I cooked, the food spoil sometimes.” (R1107)

“When food is limited, I sometimes skip some meals to save for the following days.” (R1032)

“Not having enough ingredients…” (R1174)

“I fear running out of food before the month ends.” (R1390)

“Shortage of ingredients or some cooking essentials.” (R1409)

The following comments noted that food getting stolen is also a barrier:

“Trouble from food being stolen where I stay…” (R1153) (student stating that he/she id “renting a room at the location.”)

“My flatmates eat my food. Or remove my food from the freezer.” (R1441)

4.8.6.1 Confidence in cooking skills

A previously validated construct consisting of four questions was included in the survey to test the participants’ confidence in their own ability to prepare a meal (Figure 4.6). The findings triangulate with the lack of cooking skills that participants noted as barriers to preparing their own meals. Overall, the participants were most confident in following a recipe and least confident about cooking a nutritious meal without spending “a lot of” money. However, between 15% and 30% of participants were not confident that they had the skills mentioned in the construct.

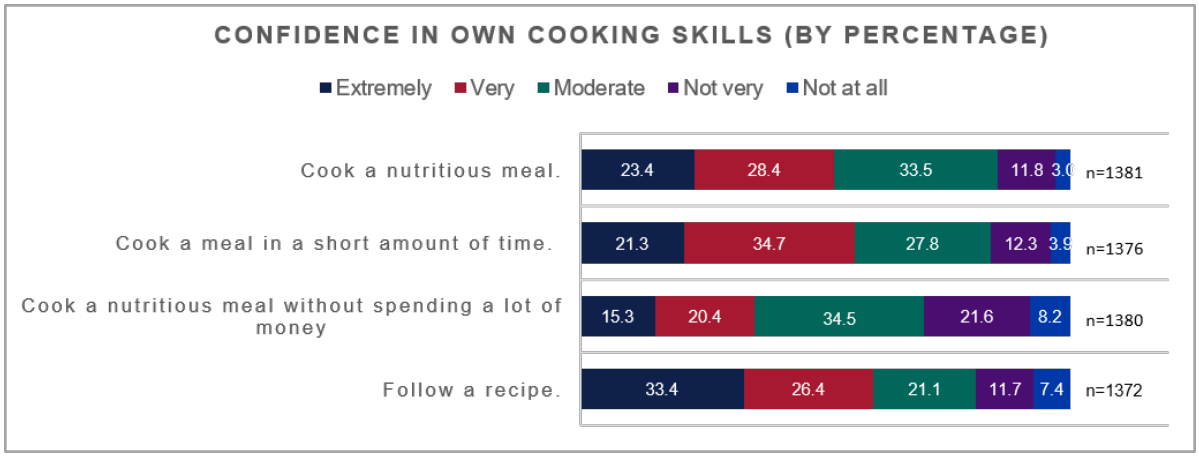

Figure 4.6 Participants' confidence in their own ability to prepare a meal

The scoring of the construct is summarised in (Table 4.24). The median score for all the participants was 10 out of 20 (50%), with 75% of the participants scoring 12 out of 20 (60%) or less.

Table 4-24: Cooking confidence score (sum of ratings out of 20)

	n	Minimum	P25	Median*	P75	Maximum
All	1382	3	8	**10**	12	20
High food security	111	8	13	**15**	18	18
Moderate food security	236	5	12	**13**	15	18
Low food security	323	4	11	**13**	14	18
Very low food security	707	4	11	**13**	14	18

Food insecure participants (Table 4.25) were more likely to score low in this construct as a whole (p<.0001). Food insecure students scored significantly lower than food-secure participants in the following items: cooking a nutritious meal (p<.0001), cooking a nutritious meal without spending "a lot of" money (p<.0001), and following a recipe (p<.0001).

Table 4-25: Associations between food security level and confidence in cooking skills

	LEVELS OF FOOD SECURITY								p-value
	High		Marginal		Low		Very low		
	n	%	n	%	n	%	n	%	
How confident are you that you can cook a nutritious meal? (n=1376)									
Extremely confident	46	41.4	54	22.9	80	24.8	142	20.1	<.0001*
Very confident	43	38.7	83	35.2	82	25.4	183	25.9	
Moderately confident	16	14.4	73	30.9	115	35.6	256	36.3	
Not very confident	3	2.7	20	8.5	37	11.5	102	14.5	
Not confident at all	3	2.7	6	2.5	9	2.8	23	3.3	
How confident are you to cook a meal in a short amount of time? (n=1371)									
Extremely confident	33	29.7	56	23.7	58	18.1	146	20.8	.14
Very confident	39	35.1	79	33.5	113	35.2	245	34.9	
Moderately confident	30	27.0	62	26.3	105	32.7	185	26.3	

	LEVELS OF FOOD SECURITY								p-value
	High		Marginal		Low		Very low		
	n	%	n	%	n	%	n	%	
Not very confident	7	6.3	28	11.9	34	10.6	98	13.9	
Not confident at all	2	1.8	11	4.7	11	3.4	29	4.1	
How confident are you to cook a nutritious meal without spending a lot of money? (n=1375)									
Extremely confident	30	27.0	32	13.6	40	12.4	109	15.5	
Very confident	25	22.5	66	28.0	59	18.3	131	18.6	
Moderately confident	37	33.3	83	35.2	124	38.4	232	32.9	<.0001*
Not very confident	17	15.3	42	17.8	74	22.9	162	23.0	
Not confident at all	2	1.8	13	5.5	26	8.1	71	10.1	
How confident are you to follow a recipe? (n=1367)									
Extremely confident	69	62.7	94	40.0	101	31.4	194	27.7	
Very confident	27	24.6	66	28.1	90	28.0	177	25.3	
Moderately confident	8	7.3	40	17.0	81	25.2	158	22.6	<.0001*
Not very confident	5	4.6	23	9.8	29	9.0	103	14.7	
Not confident at all	1	0.9	12	5.1	21	6.5	68	9.7	

4.8.6.2 Cooking for several days

Cooking enough food to last for several days could address some of the time pressure that participants noted as the main barrier to preparing their own food. The results are summarised in Figure 4.7. Overall, 45.5% (n=622) of the participants regularly ("always" or "often") cooked enough food to last for several meals; most, therefore, did not. The latter should be interpreted in the context of the lack of cooking utensils and cold storage facilities and space that were mentioned as barriers. Food insecure participants were slightly more likely to cook for several meals than food-secure participants (p=.01) (Table 4.26).

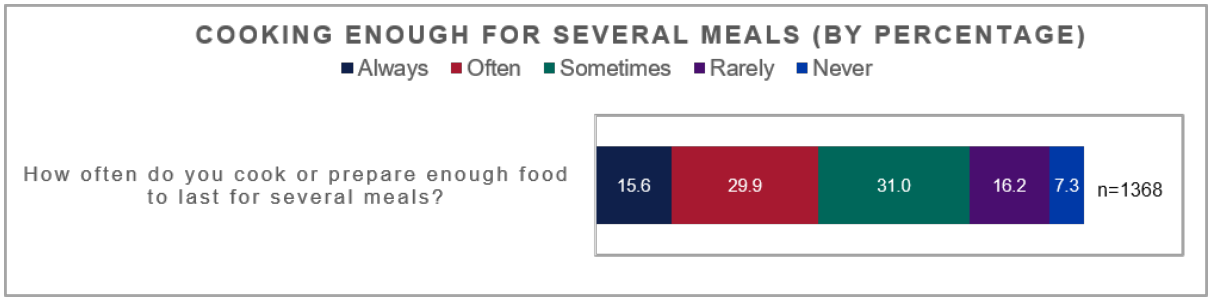

Figure 4.7 Cooking for enough to last for several meals

Table 4-26: Associations between food security level and food preparation and meal sharing practices

	LEVELS OF FOOD SECURITY								p-value
	High		Marginal		Low		Very low		
	n	%	n	%	n	%	n	%	
How often do you cook or prepare enough food to last for several days? (n=1363)									

	LEVELS OF FOOD SECURITY								p-value
	High		Marginal		Low		Very low		
	n	%	n	%	n	%	n	%	
Never	14	12.7	16	6.8	32	10.1	38	5.4	
Rarely	16	14.6	48	20.4	52	16.4	104	14.9	
Sometimes	25	22.7	71	30.2	84	26.4	243	34.7	.01*
Often	33	30.0	64	27.2	97	30.5	214	30.6	
Always	22	20.0	36	15.3	53	16.7	101	14.4	

4.8.6.3 Eating together or alone

As summarised in Figure 4.9, most participants (69.3%, n=953) indicated that they "always" or "often" ate their meals alone in their rooms. Only 28% (n=384) regularly ("always" or "often") ate at least one meal per day in the company of others. Food security level (Table 4.27) was significantly associated with this construct (p<.0001), with food-insecure participants being more likely to "often" or "always" eat alone. Conversely, food-secure participants were more likely than food insecure participants to "often" or "always" eat at least one meal per day in the company of others (p<.0001).

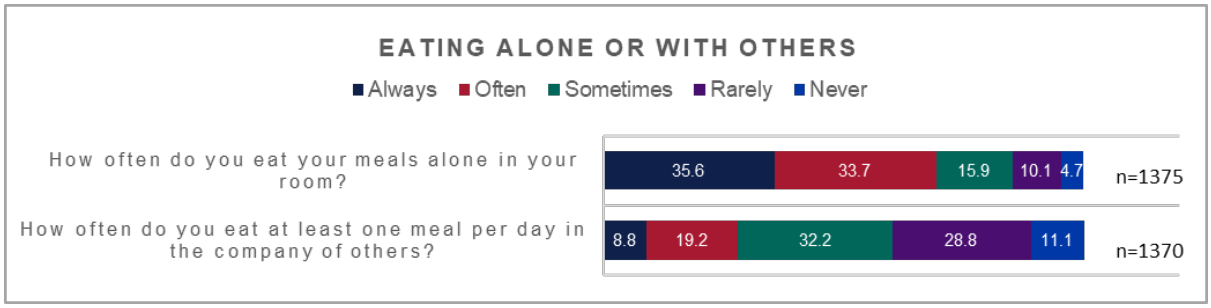

Figure 4.8: Eating alone or with others

Table 4-27: Associations between food security level and meal sharing practices

	LEVELS OF FOOD SECURITY								p-value
	High		Marginal		Low		Very low		
	n	%	n	%	n	%	n	%	
How often do you eat your meals alone in your room? (n=1370)									
Never	13	11.9	13	5.5	13	4.1	26	3.7	
Rarely	18	16.5	36	15.3	33	10.3	52	7.4	
Sometimes	26	23.9	36	15.3	63	19.6	93	13.2	<.0001*
Often	30	27.5	75	31.9	114	35.5	242	34.3	
Always	22	20.1	75	31.9	98	30.5	292	41.4	
How often do you eat at least one meal per day in the company of others? (n=1365)									
Never	5	4.5	18	7.7	33	10.3	96	13.7	
Rarely	28	25.2	56	23.9	89	28.8	219	31.3	
Sometimes	15	13.5	73	31.2	106	33.1	244	34.9	<.0001*
Often	31	27.9	61	26.1	64	20.0	107	15.3	
Always	32	28.8	26	11.1	28	8.8	34	4.9	

4.8.6.4 Preparing meals to share

Most participants (68.5%, n=935) “rarely” or “never” contributed ingredients or money towards preparing meals that a group of students could share, and 70.6% (n=960) “rarely” or “never” took turns to prepare meals that a group of students could share (Figure 4.9). Food security level (Table 4.28) was significantly associated (p<.02) with sharing ingredients or money towards preparing shared meals, with food-insecure participants being slightly more likely to do this than food-secure participants.

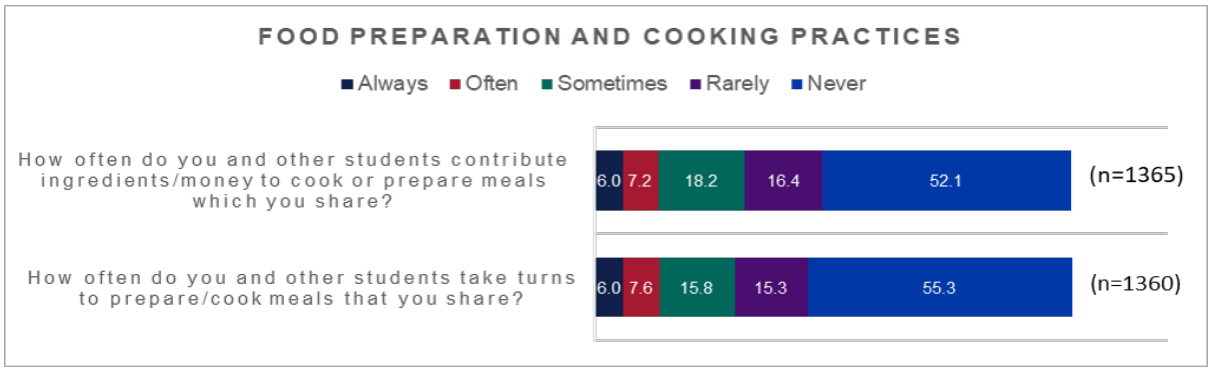

Figure 4.9 Food preparation and cooking practices

Table 4-28: Associations between food security level and practices of preparing meals to share

	LEVELS OF FOOD SECURITY								p-value
	High		Marginal		Low		Very low		
	n	%	n	%	n	%	n	%	
How often do you and other students contribute ingredients/ money to cook or prepare meals which you share? (n=1355)									
Never	67	9.5	126	54.6	151	47.3	363	52.2	
Rarely	22	9.9	28	12.1	62	19.4	111	16.0	
Sometimes	11	4.5	35	15.2	68	21.3	131	18.9	0.02*
Often	3	3.1	24	10.4	21	6.6	50	7.2	
Always	7	8.5	18	7.8	17	5.3	40	5.8	
How often do you an dother students take turns to prepare/cook meals that you share? (n=1360)									
Never	72	65.5	126	53.9	159	50.2	396	56.7	
Rarely	18	16.4	36	15.4	57	18.0	97	13.9	
Sometimes	11	10.0	34	14.5	57	18.0	113	16.2	0.26
Often	4	3.6	22	9.4	27	8.5	49	7.0	
Always	5	6.1	16	6.8	17	5.4	44	6.3	

4.8.6.4.1 Barriers to preparing meals to share

Participants were asked to share any barriers that they encountered or perceived to sharing ingredients and cooking together. Overall, 855 free-text responses were submitted.

Twenty-four per cent (24%, n=210) of these responses noted that no problems were experienced or that the question did not apply to them. However, many of these responses were from participants who lived with their families during the academic term. Some of the participants who lived in the residences or communes and elaborated on their comments indicated trust, good communication, and reciprocity as reasons for not having any problems sharing in this way. For example:

"There are no problems as we share ingredients accordingly to the 4 of us." (R1072)

"None. Its pretty fair." (R1110)

"None. My boyfriend and I are equally yoked." (R1159)

"No problem, we have an agreement that we all stick to and abide by." (R1165)

"Till today, I have not encountered any problems because my roommate and I communicate very well." (R1184)

"I don't have any because me and my roommate we are treat (each) other with decency." (R1253)

In 12% (n=103) of the free-text comments, participants just stated that they did not share without giving any further explanation. Cross-referencing with other survey items indicated that some of these comments were from participants who lived with their families or lived alone, possibly explaining why they stated that they did not share. However, some comments indicated that the respondent was in a set-up where they were living with other students, but that they or others did not share, or preferred not to share, for example:

"Not many people believe in sharing food." (R754)

"We don't share." (R10; R913)

"I(t) doesn't work for me." (R1166)

"Others, they don't want to share." (R1248)

"I don't share anything with the people I live with." (R1294)

"We do not share." (R1354)

Mentioned in 23% (n=203) of the comments, was that everyone in a potential group could not or would not contribute equally. It was evident that there were two subthemes

under this barrier. Firstly, some felt that others were not able to contribute as much as they, or that they did not have enough to be able to contribute equally, for example:

“Not everyone can contribute.” (R8)

“We have different backgrounds, so contributing the same amount of money is difficult.” (R65)

“We are all students funded by different bursaries, and it's not easy to share food as we're trying to make sure that the little we have lasts until month-end.” (R69)

“Everyone in my house receives NSFAS (but) I am the only one who does not. So I don't receive enough money to buy food, toiletries to contribute towards buying food together and cooking together. So we don't do that.” (R118)

“Some of students can't contribute the amount we agreed on.” (R406)

“Sometimes I wouldn't have ingredients to share.” (R440)

“I cannot always contribute ingredients because I sometimes don't have any to contribute.” (R490)

“Sometimes I don't have enough money to contribute as the other(s).” (R714)

“Sometimes I have to contribute less than my friend since he is using NSFAS and the bursary that I use doesn't really give food allowance.” (R940)

“I do not always have enough money to contribute.” (1056)

“We don't all receive the same allowances. Some are supported by their families. So sharing money or ingredients is unequal for us.” (R1330)

“I don't always have something to eat or money to contribute to by food.” (R1400)

The following comments evidenced the emotional impact of not being able to contribute or participate:

“Other students come from rich families, and they use expensive ingredients, so they make silly comments (about) my ingredients being cheaper. That (i)s why I prefer cooking alone.” (R375)

“Some people can afford more than others do. Something that would have lasted you a week, ends up lasting a day.” (R382)

“Financial constraints, some of the people prefer more expensive food that I can't afford.” (R824)

“Cash is usually a problem because other students want a huge amount of money to buy ingredients that we are going to share, only to find that I don't have that amount of money by that time.” (R901)

“I sometimes don't have any money to contribute, and I end up not having anything to since I didn't contribute.” (R974)

“I don't have a lot of money, so the people I share with, like eating expensive food so I can't afford it.” (R1312)

A number of the comments in this theme referred to logistical issues related to food allowances as barriers to sharing, for example:

“Sometimes, my flatmate has to wait for my NSFAS money. It becomes a problem at times because normally we get it around the 2-3rd of every month. By that time, we had run out of necessities. She gets her salary every month end.” (R1209)

“Late NSFAS allowances.” (R1260)

“I can only use my student card to buy food because I use a bursary from the Department of Education and it doesn't send money directly into my account. I, therefore, can't contribute physical money.” (R996)

“Sharing is a problem because not everyone gets money at the same time, so it doesn't really work.” (R1296)

The second subtheme under this theme of unequal sharing was that not everybody keeps their end of the agreement to contribute or share equally, for example:

“One contributing more then the other. Makes it unfair.” (R35)

“People refuse to make equal contributions.” (R50)

“Some people eat a lot of food and we end up not having food and the middle of the month.” (R55)

“A housemate using ingredients, but don't want to purchase more when they run out.” (R61)

“People do not give back what they owe (yo)u. They just say we’re sharin(g).” (R164)

“The problem with this is that people are never willing to share their own money and food but are always willing to use mine.” (R260)

“The ingredients aren’t always split evenly.” (R242)

“Fighting with other students as we don’t eat (an) equal amount of food.” (R413)

“Others tend to become stingy, and some would cook a couple of times per day, leading to consumption of more food than planned.” (R422)

“Some people fail to contribute. Always make excuses for buying food but able to buy expensive clothing and hair.” (R436)

“Sharing is difficult because you can't guarantee that everyone will get their money's worth, so I don't do it.” (R521)

“Most times other people do not want to share the amount agreed upon. Others sometimes want to cheat and skip contribution for that month.” (R545)

“Some they eat fast and are greed(y); they end up eating all the food without some getting any.” (R567)

“Sharing money and ingredients can cause conflicts because not everyone has enough money to contribute and sometimes the other person might eat much more that I eat, and that will cause conflicts.” (R704)

“It's a struggle getting the contributions on time.” (R746)

Linking to the above theme, 17% (n=150) of the comments noted distrust of others, perceived greediness of others, expectations of conflict, and perceived or experienced unequal contributions of time and effort as barriers to sharing.

“People fight eventually at the end.” (R7)

“I don't even want to start that because it will cause conflict somewhere along the line. Rather cook your own food, your own way.” (R52)

“I don't like sharing because people are untrustworthy.” (R84)

“Being robbed, slaving to cook while the other doesn't”. (R86)

“Some people sometimes do not want to cook or wash the dishes.” (R158)

“I'm always the one to cook.” (R175)

“I don’t like sharing and being around people. So I'll rather just give you what u need n leave... I don't trust easily.” (R205)

“They will use your stuff without asking then be angry when you use theirs.” (R388)

“Trust issues.” (R394)

“We don't come from the same families, and we were not raised alike; some of us prefer our own space to avoid drama.” (R409)

“Some people exploit, e.g. person does not cook when it's their turn or uses too much of the ingredients.” (R472)

“I have tried it before, and the problem was preference and laziness other people would not want to cook when it’s their turn or complain (about) the cooked food).” (R520)

“Is that some people will eat more than you, and they will steal your ingredients.’ (R563)

“Some don't contribute but want to eat.” (R590)

“Conflicts.” (R611)

“Greed and the need to avoid any fights.” (R662)

“I can't share food and/or money with anyone I'm not close to, especially people I just recently met.” (R675)

“People overeat it and never equally share”. (R711)

“Untrustworthy.” (R838)

“I prefer not to share with other people because it causes problems.” (R916)

“People are not consistent and trustworthy.” (R1005)

“People tend to take advantage.” (R1055)

“I do not trust anyone.” (R1393)

Some comments noted that their own lack of cooking skills or interest in cooking was a barrier in this context:

“I do not know how to cook.” (R1073)

“I do not normally cook, so I feel as if it won't be fair for the others.” (R1356)

Eighteen per cent (18%, n=156) of the comments indicated that having different tastes, special dietary needs, and different eating times were barriers to sharing food preparation and cooking, for example:

“My health condition requires me to have my own kind of ingredients.” (R97)

“Different diets.” (R132)

“Everyone has different taste.” (R362)

“We do not eat similar foods, and we have different ways of cooking.” (R489)

“Different cultures and backgrounds.” (R618)

“…We dont like the same type of food due to cultural differences.” (R724)

“Different cooking methods and preferences from students I share with.” (R774)

“We have different dietary requirements.” (R889)

“People do not often eat the same types of foods.” (R1126)

Some members are allergic to certain food(s).” (R1304)

“We don’t like the same food. Cultural differences.” (R1322)

“We are not home at the same time, we don't eat similar food, and some people don't like sharing food.” (R1361)

“My roommate and I eat very different types of foods, so it would not make sense for us to share.” (R1387

4.8.6.4.2 Enablers to preparing meals to share

Asked to indicate if anything that makes it easier to share cooking and food preparation, only 144 responses were received. Of these, 32% (n=46) indicated that sharing saves them money, electricity costs, time and that it allows everyone to eat, for example:

“It lets you save money.” (R106)

“There are many things we all eat and can buy large amounts of with communal money.” (R173)

“It takes less time to prepare meals if you work together.” (R259)

“With the right group of people (a very small, non-picky one at that)(it saves) time and convenience and money.” (R520)

“The fact that we can take turns to cook.” (R733)

“Yes, when we share, sometimes it means everybody can eat.” (R735)

“But it save(s) money to share ingredients because when something cost R50 you half-half to buy that ingredient.” (R810)

“We take turns in preparing the meals, which help in giving one more time to study.” (R934)

“We are able to share the food so that it lasts us for until the end of the month.” (R1181)

“Cooking together as a house saves a lot of food for us in the house. Because each of us only has to contribute in ingredients, we have more and save the ones in less amounts.: (R1216)

“I do like the variety of food and veggies we then get if we share.” (R1319)

“Sharing electricity money.” (R1383)

“Buying in bulk and cooking for more than one person saves money and resources.” (R1385)

Overall, 56% (n=81) of the comments were related to mutual trust, close relationships, equal contribution, reciprocity and social contracting as enablers, for example:

“We care about each other - of we see one batteling we offer to make a meal free of charge.” (R35)

“My housemates makes things easy because I know they will never share anything and leave me behind, and in most cases, they don't mind spending more.” (R78)

“I know if I share my ingredients this time next time if I ask, they will give it to me.” (R83)

“A housemate with a quieter schedule than us nursing students, who can prepare dinner for when we return from the clinical setting (generally after 7).” R157

“There is only three of us, and we are close friends, and we never quarrel over food.” R170

“My roommate is using NSFAS, so he's the one who buys food. I'll have to pay my contributions when my bursary pays at the end of the year.” (R224)

“To share with the students that are committed to shar(ing).” (R253)

“The fact that we're friends.” (R306)

“Yes. it is that the person I share with; its been a while we (have) been together so we friends now.” (R387)

“Yes, having a roommate that is considerate.” (R445)

“Yes, sharing with an open heart and not expecting anything in return for your good deeds help eliminate expectations which may not be met, so me and my housemates share when we feel like it not because we are forced to, this helps a lot.” (R575)

“If you don't contribute any ingredients, you have to cook.” (R590)

“The strong relationship between me and my roommates”. (R610)

“Yes, I have a reliable friend.” (R1058)

“Is to go (the) extra mile and make ends meet.” (R1101)

“Communication with my roommate.” (R1184)

“Trusted and caring friends.” (R1293)

“I live with my boyfriend, and we take turns cooking and going grocery shopping, so this is how we share. With my previous housemates, we had this nice relationship that we cooked bigger batches or bought in bulk and then just had this sharing agreement or by taking turns on who is buying the bananas (we were both big banana eaters)”. (R1543)

Five per cent (5%, n=7) of the comments referred to planning as an enabling measure to sharing cooking and food preparation, for example:

“Keeping track of grocery receipts and archiving.” (R709)

“By making a roster for all us to cook.” (R1280)

“Listing menu for the week might help because everyone will know what to expect on the day.” (1448)

Seven per cent (7%, n=10) noted that being similar, having similar tastes or not being picky enabled sharing in this context, for example:

"Everyone eats what's cooked whether you like it or not." (R670)

"Common cultural backgrounds with the people I share with." (R774)

"We eat (the) same food." (R821)

"The friend who(m) I share with occasionally is not a fussy eater; she loves everything." (R1120)

"Yes, we all eat almost the same food, I just prefer more healthy foods which I prepare on the side." (R1251)

4.8.7 Identifying topics for skills training and support

This section of the survey intended to identify food skills training and support topics and explore how students would prefer to receive training.

4.8.7.1 Topics for skills training

Table 4.29 summarises the topics that participants identified for food and nutrition training and information. They were most interested in training on eating healthy on a limited budget and budgeting skills in general.

Table 4-29: Self-identified topics for food and nutrition training

	Frequency (n)	Percentage (%)
Would you be interested in receiving guidance from the UFS on the following: (Select all that apply to you)		
Healthy diet	907	65.39
Budgeting skills	933	67.27
Healthy eating on a tight budget	975	70.30
Recipes	886	63.88
Cooking skills	697	50.25
OTHERS (suggested by the participants in response to an open question)		
Preparing quick/easy/convenient meals	29	2.09
What and how to purchase ingredients	29	2.09
Bulk cooking/food storage/safety	32	2.31
Trendy / fad diets	38	2.74
Therapeutic diets for medical conditions	10	0.72
Managing weight/ Building muscle	31	2.24
Sustained energy / mental alertness	37	2.67
Healthy lifestyles	16	1.15

4.8.7.2 Cooking specific foods and dishes

This section aimed to identify which foods and dishes students are confident or not confident in preparing (Figure 4.10).

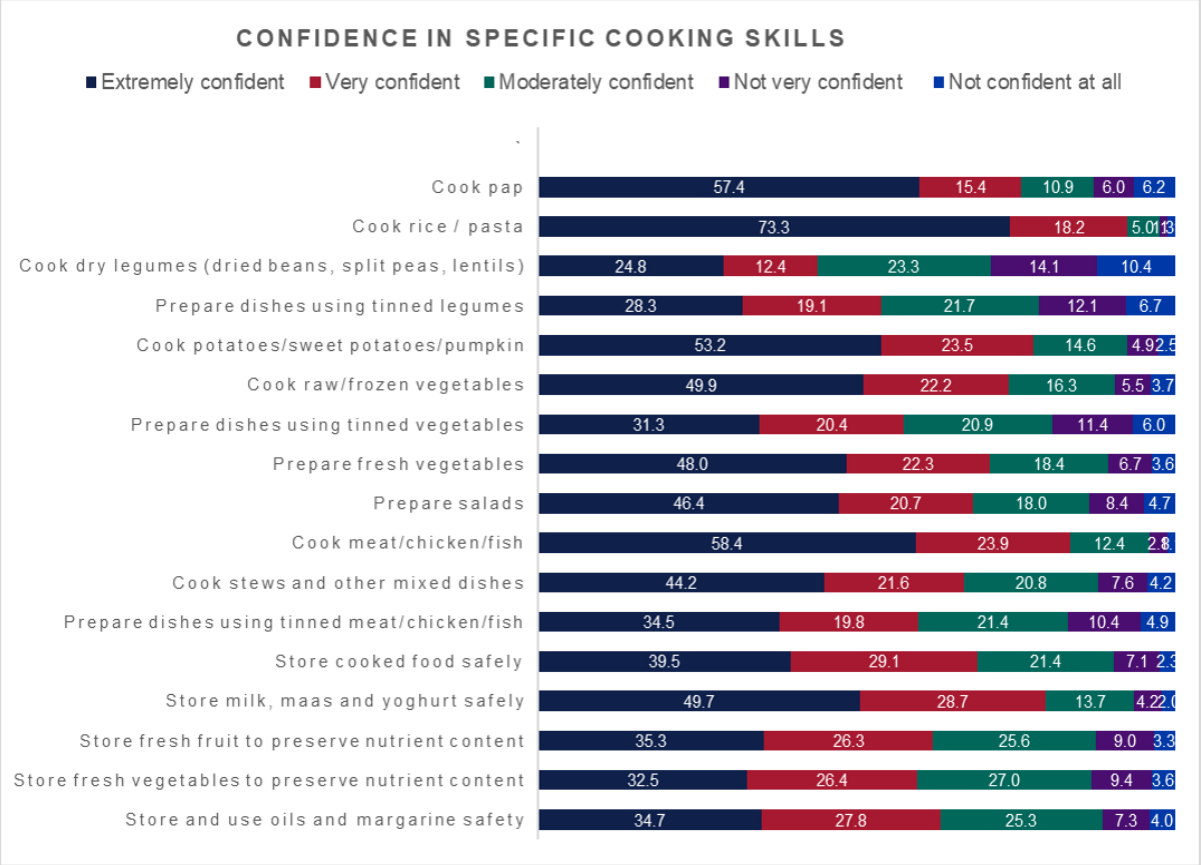

Figure 4.10 Confidence on specific cooking skills

4.8.7.3 Basic nutritional knowledge and perceptions

The following section aimed to test the students' basic knowledge and perception of specific concepts in nutrition (Table 4.30). Similar to the previous section, the Department of Nutrition and Dietetics will part of the training programme for the students. Food insecure participants (Table 4.31) were significantly more likely to think that healthy foods are more expensive (p=.002) (not necessarily true), that frozen vegetables are less healthy than fresh vegetables (p=.0009), that energy drinks help you study (p<.0001), and that coffee creamer are dairy products (p=.02).

Table 4-30: Knowledge and perceptions basic nutrition concepts

	Frequency (n)	Percentage (%)
Healthy food is generally more expensive		
True	920	66.6
False (*not necessarily)	357	25.8
I don't know	105	7.6
Frozen vegetables are healthy		
True*	660	47.9
False	254	18.4
I don't know	465	33.7
Starchy foods are fattening		
True	792	57.4
False (*not necessarily)	254	18.4
I don't know	334	24.2
Energy drinks help you study		
True	410	29.8
False*	774	56.2
I don't know	194	14.1
Peanut butter is a good source of protein		
True*	887	64.5
False	78	5.7
I don't know	411	29.9
Powdered milk is less nutritious than fresh milk		
True	624	45.3
False*	173	12.6
I don't know	582	42.2
Coffee creamers like Cremora, are dairy products		
True	350	25.4
False*	493	35.8
I don't know	534	38.8

Table 4-31: Association between food security level and knowledge and perceptions of basic nutrition concepts

	n	%	LEVELS OF FOOD SECURITY								p-value
			High		Marginal		Low		Very low		
			n	%	n	%	n	%	n	%	
Healthy food is generally more expensive (n=1378)											
True	917	66.5	82	8.9	130	14.2	221	24.1	484	52.8	.002*
False (*not necessarily)	357	25.9	26	7.3	79	22.1	79	22.1	173	48.5	
I don't know	104	7.5	3	2.9	27	26.0	23	22.1	51	49.0	
Frozen vegetables are healthy (n=1375)											
True*	659	47.9	76	11.5	114	17.3	151	22.9	318	48.3	.0009*
False	253	18.1	13	5.1	42	16.6	55	21.7	143	56.5	
I don't know	463	33.7	22	4.8	79	17.1	117	25.3	245	53.0	
Starchy foods are fattening (n=1376)											
True	789	57.3	71	9.0	137	17.4	178	22.6	403	51.1	.123
False (*not necessarily)	254	18.5	25	9.8	44	17.3	65	25.6	120	47.2	
I don't know	333	24.2	15	4.5	54	16.2	79	23.7	185	55.6	
Energy drinks help you study (n=1374)											
True	410	29.8	13	3.2	63	15.4	105	25.6	229	55.9	<.0001*
False*	770	56.0	81	10.5	146	19.0	178	23.1	365	47.4	
I don't know	194	14.1	17	8.8	27	13.9	40	20.6	110	56.7	
Peanut butter is a good source of protein (n=1372)											
True*	885	64.5	78	8.9	162	18.3	193	21.8	451	51.0	0.09
False	76	5.5	8	10.5	14	18.4	22	29.0	32	42.1	

	n	%	LEVELS OF FOOD SECURITY								p-value
			High		Marginal		Low		Very low		
			n	%	n	%	n	%	n	%	
I don't know	411	30.0	24	5.8	60	14.6	107	26.0	220	53.5	
Powdered milk is less nutritious than fresh milk (n=1375)											
True	621	45.2	53	8.5	97	15.6	134	21.6	337	54.3	
False*	173	12.6	18	10.4	30	17.3	52	30.1	73	42.2	0.06
I don't know	581	42.3	40	6.9	108	18.6	136	23.4	297	51.1	
Coffee creamers like Cremora, are dairy products (n=1373)											
True	348	25.3	22	6.3	49	14.1	80	23.0	197	56.6	
False*	493	35.9	49	10.0	100	20.4	120	24.4	222	45.2	0.01*
I don't know	534	38.9	40	7.5	86	16.1	123	23.0	28	53.4	

4.8.7.4 Preferred platforms for receiving skills training

In this section, the survey aimed to elucidate which platforms the students' would prefer for receiving food and nutrition training and information. The responses are summarised in Table 4.32. Participants showed a strong preference for receiving a monthly newsletter per email and using a UFS website /Blackboard (UFS teaching and learning) platform.

Table 4-32: Preferred platforms for receiving food and nutrition training and information

	Frequency (n)	Percentage (%)
If you would like to receive guidance on food-related issues, on which platforms would you prefer to receive it on? (Select all that apply to you)		
UFS1504	199	14.35
Gateway programme	148	10.67
Blackboard / UFS website	748	53.93
Presentations at the residences	162	11.68
KovsieFM	175	12.62
OTHERS (suggested by the participants in response to an open question)		
Monthly newsletter (email)/email	1002	72.24
Printed media	37	2.67
Social media	27	1.95
SMS	142	10.24
WhatsApp	27	1.95
Cooking videos	10	0.72
Nutrition module / Cooking course	7	0.50
Nutrition workshops / classes / demonstrations/ /competitions/ seminars	25	1.80
Nutrition App	1	0.07
Consultations with dietitians	2	0.14
If **you chose any of the above, from whom would you want to get the information? (select all your preferences)**		
Lecturers	263	18.96
Peers	328	23.7

Qualified dietitians	1117	80.5
Dietetics students	678	48.9
Consumer science students	552	39.8
OTHERS (suggested by the participants in response to an open question)		
Gym / Fitness instructors / Sport scientists (biokineticist)	13	0.9
Chefs / Hospitality students	31	2.2
Other healthcare professionals / Social worker	13	0.9
Other healthcare students	9	0.7
Lecturers	7	0.5
Financial experts	9	0.7
"As long as they are experts / good examples"	23	1.7
"As long as its relatable, consistent, practical"	5	0.4
Resident Heads /mothers / parents / pastors	12	0.9
SRC / Friends / Tutors	42	3.0

4.8.8 Preference for receiving a food stipend

Lastly, participants were asked about their preference for receiving any food stipend (Table 4. 33). Most students (83.4%, n=1126) indicated that they would prefer money in their account instead of a special card.

Table 4-33: Preference for receiving a food stipend

	Frequency (n)	Percentage (%)
If you were to receive a stipend (amount earmarked) for food from whomever is paying for your studies, how would it you prefer to receive it		
Paid into your bank account	1126	83.4
Paid into a special card that you - can only swipe for food (at discounted / subsidised prices)	225	16.7

A comment from an earlier section of the survey where participants had to indicate barriers to pooling money for ingredients and sharing the cooking and food preparation may illuminate this preference to some extent:

"I can only use my student card to buy food because I use a bursary from the Department of Education and it doesn't send money directly into my account. I, therefore, can't contribute physical money." (R996)

However, there were no association of this preference with food security level (Table 4.34).

Table 4-34: Associations between level of food security and preference for receiving a food stipend

	n	%	LEVELS OF FOOD SECURITY								p-value
			High		Marginal		Low		Very low		
			n	%	n	%	n	%	n	%	
How would you prefer it be paid if you were to receive a stipend (amount earmarked) for food from whoever is paying for your studies? (n = 1348)											
Paid into your bank account	1123	83.3	88	7.8	184	16.4	268	23.9	583	51.9	.30
Paid into a special card that you - can only swipe for food (at discounted / subsidised prices)	225	16.7	21	9.3	47	20.9	49	21.8	108	48.0	

CHAPTER 5: DISCUSSION

5.1 Introduction

Growing poverty, high unemployment and the high cost of living are economic issues that have widened the divide between the impoverished and the middle classes in South Africa. Despite social grants and RDP housing, a considerable proportion of the South African population has monthly incomes below the poverty line. Poverty is aggravated by infectious disease, predominantly HIV/AIDS, tuberculosis, and COVID-19, as well as alcohol abuse, household violence, escalating crime, women and child abuse, gang-related activities, teen pregnancies, and the growing prevalence of single mother or child-headed households struggling to survive (Maluleke, 2020; Ngyende, 2012). Furthermore, since 2018 the number of students who attend university from low-income households have increased substantially. Some of the significant realities that impede their learning have proven to be hunger and lack of finances to support their basic needs. Failure to address these student food insecurity concerns can result in poor mental and physical health, severely impacting academic achievement (Gwacela, 2013).

South African universities have grown increasingly conscious of hunger as a rising concern among students, and diverse food aid programmes have been developed. These include Stop Hunger Now (SHN) - an international charitable organization - that supplied 7128 meals each week as food aid to University of Johannesburg students in 2013, and the University of the Witwatersrand farmers' market (Wegerif & Adeniya, 2019). At the UFS, the No Student Hungry Campaign has provided food bursaries to a relatively small number of students since 2011 (van den Berg, Raubenheimer, 2015), while Tiger Brands, Gift of the Givers and Rise Against Hunger have been donating food that the university hands out to students in need.

This research conducted in 2020 at the UFS, which has two urban campuses in Bloemfontein and a third rural campus in QwaQwa, aimed to explore the food security level among students, the campus food assistance initiatives, the narrative of the students' interaction, their current food environments, and how food security level and food environment were interrelated.

5.2 Socio-demographic profile

The current study sample represented 4.1% of the student population in 2020, but the sample size was large enough to yield a small margin of error at a high confidence level. A comparison of the sample's demographic attributes to those of the total student population in 2020 suggests that the sample depicted the population well, bolstering the generalisability of the findings to the entire student population. However, the research sample was slightly over-represented by students studying on the university's urban Main Campus instead of the considerably smaller urban South Campus and the rural Qwaqwa Campus.

5.3 Student food security level

The challenges related to capturing the intricacy of food insecurity with a self-administered questionnaire are acknowledged (Hughes et al., 2011). The multi-item measurement module was used in the present study, as with the 2013 UFS Food Security Survey. Figure 6 compares the 2013 and 2020 food security levels at the UFS using the USDA 8-item Household Food Security Module for Adults.

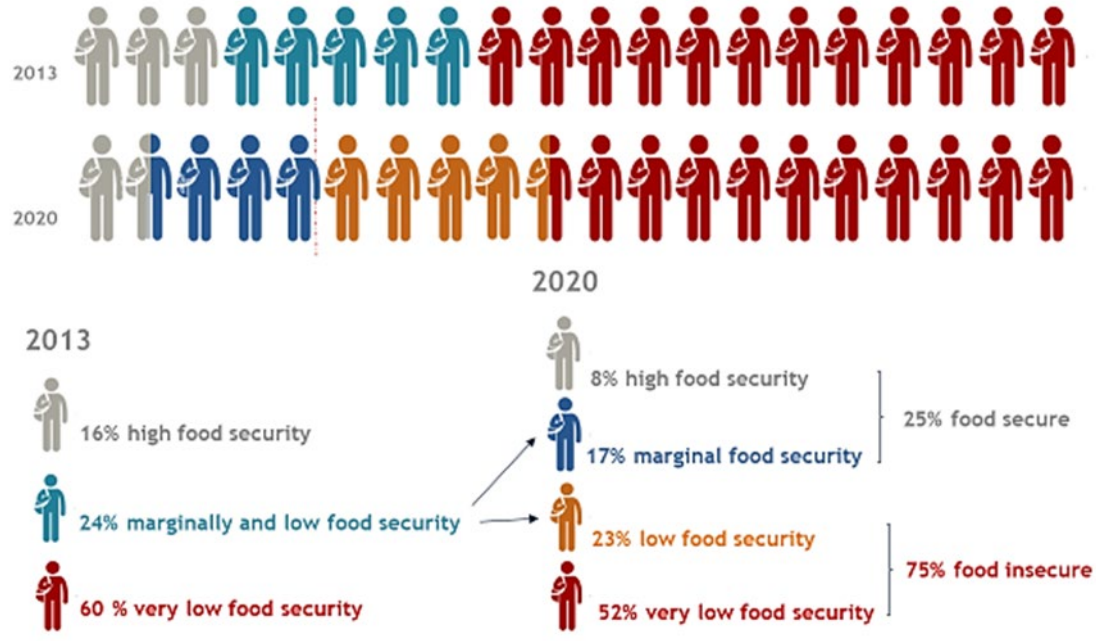

Figure 5.1: Comparison of 2013 and 2020 food security level at the UFS using the USDA 8-item Household Food Security Module for Adults.

In 2013, the scoring system was adapted slightly to merge the marginal and low food security into one category after Hughes et al. (Hughes et al., 2011), whereas, in the 2020 survey; the tool was scored as per instructions of the USDA (Veras, 2012) findings. It appears that the proportion of participants with very low food security declined from 59.5% to 52.4%. The current study showed that food insecurity remains a significant issue at UFS, with more than half of the student body concerned about food running out and almost 60% having to cut the quantity or skip meals due to limited funds (58.1%). The findings are consistent with earlier findings at the UFS (Van den Berg & Raubenheimer, 2015).

The Survey of Student Engagement (SASSE) collects data from undergraduate students to assess their participation in practical educational activities and how helpful and engaging the institutional environment is. Consequently, the institution can see how student engagement data can better explain higher education challenges. The 2016 annual SASSE report utilised a single validated question from the Australian National Nutrition Survey to measure food security, namely, *"In the last 12 months, during the academic term, were there any times that you ran out of food and could not afford to buy any more?"* As opposed to the usual yes/no answer used to categorise participants as food insecure/secure, respectively, when using the single-item module; the SASSE asked participants to specify the frequency and reported that this was experienced on most days or daily by 30.3% of participants in 2016, 29.6% in 2017 and 26.6% in 2018. In the 2018 SASSE, 85% of NSFAS participants answered 'yes' to this question, and 29% reported “almost daily” occurrence or “daily”. In the 8-item USDA HFSSM used in the 2013 and the current UFS food security surveys, the item: "*Did you ever not eat for a whole day, because you did not have enough money for food?***"** was probably the closest approximation to the food security item used in the SASSE. In thecurrent study survey, 24% of participants answered "yes" to this question, with 26.1% stating that they experienced this almost every month, which is very similar to the 2018 SASSE findings.

In the current study, the prevalence of food insecurity was higher than the 65.3% reported among university students in Kwazulu-Natal in 2013. A recent study at the University of the Witwatersrand among the 2019 first-time first-year students found that 71% were food insecure (Wagner et al., 2021), which is very similar to the current survey, UFS figures for a sample representing the entire student population reported

above. In 2017, 20% of South African households had inadequate or severely inadequate access to food (Statistics South Africa, 2019). Thus, at least in some South African universities, food insecurity remains higher than in the general population.

Food insecurity (FI) has been identified as an emerging problem among university students including those in high income countries such as Australia. Food insecurity was prevalent in the student sample (12.7-46.5%), (based on method of analysis) (Hughes et al., 2011). Canada, Australia and Poland, ranges between 9-89% depending on the context and the instruments used (Lee et al., 2018;Nikolaus et al., 2020). In the United States of America (USA), overall, 56% of students were food insecure (Maroto et al., 2015). With all the higher educations food aid initiatives, and government interventions, food insecurity is still more severe at SA universities than at universities in developed countries (Gwacela, 2013; Hughes et al., 2011; Davis & Sumara, 2002; Chaparro et al., 2009).

5.3.1 Associations between food security level and socio-demographics

The highest percentages of food insecurity occurred among males, Black Africans and first-generation students. Senior students were slightly more likely to be food insecure than first-time first-year students. The same trends with gender, race, relationship status, level of study and campus were also observed in the 2013 UFS Food Insecurity Survey (Van den Berg & Raubenheimer, 2015). Food security status was significantly associated with financial arrangements to pay for studies, with those receiving NSFAS being significantly more food insecure, which is to be expected as they have to come from low-income households to qualify for NSFAS. Notably, this may also explain why in the current study, students living with their parents were no longer significantly more food secure than those who did not, as was the case in the 2013 study. In 2013, only 15% of the respondents were receiving NSFAS (Van den Berg & Raubenheimer, 2015), while in the current study, it was 68%. Thus, household food security at the parents' homes is expected to be lower than in 2013.

5.3.2 Opinions and experiences regarding food assistance offered by the UFS

More than half of the participants in the current study indicated that they would apply for food assistance, yet more than 40% indicated that they would not, although a large percentage of these students would have been food insecure, based on the overall

high prevalence of food insecurity in the current study. Most said they did not need it, and their response is possibly explained by their responses to the open-ended question where they had to explain their choice. These comments expressed appreciation for the NSFAS stipend for living expenses (R1500/month at the time), and even though they often struggled to make it through the month, they were confident in their ability to provide for themselves. Many respondents expressed that others needed the assistance more than they did and that it would be inconsiderate of them because they received a food stipend from NSFAS.

In contrast to the 2013 study (Van den Berg & Raubenheimer, 2015), only about 5% of respondents indicated that they feared stigmatisation, although literature supports an association between food assistance and stigmatisation (El Zein et al., 2018). Possibly, this means that the UFS has made some in-roads to normalise food assistance, but more research is necessary to understand the change.

The University of Kwazulu-Natal (UKZN), the University of Witwatersrand (Wits), the University of Johannesburg (UJ), and the UFS have all been at the forefront of advocating for food security programmes in South Africa. The Stellenbosch University (SU) task team report on an institutional framework on food security has joined their ranks to establish an SU food bank to assist food insecurity and promote cohesion and justice on campus (Dunn-Coetzee & Foflonker, 2019). Compared with the Australian study, students who received government aid are considered at risk since their benefits are usually 20–39% below the poverty threshold (Hughes et al., 2011; Sugawara et al., 2014; Snow et al., 2004). Given that food insecurity is becoming common in higher education institutions, long-term measures to eliminate hunger and offer comprehensive support to students must be implemented.

5.4 Students’ experiences of their food environment

Student food environments’ personal domain is commonly ignored; for many students, attending university would be their first time away from their families and communities. They may lack the knowledge and skills necessary to source, store, and prepare food and promote nutrition sufficiency and food safety. Furthermore, according to the 2012 South African National Health and Nutrition Survey, South Africans' general nutrition knowledge is inadequate, primarily in the Eastern Cape, Free State, and North-West Provinces. The survey further states that variables that affect awareness and

knowledge vary according to socio-economic factors, accessibility and availability to education programmes. Although nutrition education alone may not be enough to maintain a balanced diet, it can positively shape perceptions and improve overall food intake behaviours (Shisana et al., 2013).

At the UFS, a study assessed the food environment available to students on the food aid programme (No Student Hungry campaign); in 2013, there were six permitted vendors on the main campus, including one tuck shop and one restaurant. There were also take-away food outlets and cafeterias. Only 1% of the dietary products available could be categorised as dairy, 4.8% as fruit, and 5.7% as vegetables. Foods high in refined sugar (frequently in conjunction with refined starch and fat) accounted for approximately one-third (29.2%) of all goods sold. Similarly, research has found that the university campus food environment promotes unhealthy eating patterns (Meko & Jordaan, 2016).

Diet is a social activity where the availability, accessibility, price, and acceptance of various meals all play a role. The locations wherein students purchase food can have a significant impact on eating habits. As a result, this is an excellent illustration of how the local food environment influences the general public's dietary habits (Franco et al., 2015; Murphy et al., 2017; Meko & Jordaan, 2016).

Fruits and vegetables are widely recommended for their health-promoting properties. Phytochemicals and bioactive components found in plant-based foods act as antioxidants, anti-inflammatories, phytoestrogens, and other protective mechanisms. Additionally, these foods are good sources of dietary fibre, which has been linked to a decreased incidence of obesity and obesity-related diseases (Kaiser et al., 2015)

Our study was congruent with earlier research, finding that, according to the students' comments, sweets, crisps, cold beverages, and warm foods like "vetkoek" (deep-fried dough), energy-dense food, and foods high in saturated fat with a low nutrient value sold on and near campus was the most inexpensive choices. Fast food outlets, cafeterias and food halls on the campuses serve ready-to-eat meals, and 62.3% of participants reported that they "always" or "often" bought ready-to-eat food at these vendors.

Among the factors that influenced the participants' food choices during the academic term, the price had the most sizeable influence at 73.3% (Figure 4.1).

Other factors such as convenience, the familiarity of food (represented by food participants have tried before), the food they are used to at home and religion, were seen as important in guiding food purchases, with many reporting (ranging from 40-43%) that it influenced them greatly. Overall, 35.7% of participants replied that they very often make food choices based on the need to satisfy hunger rather than worrying about the food's nutritional quality, and only 31.4% indicated that they sometimes consider the nutritional quality of food.

According to the results of a recent study conducted at a New Zealand urban university regarding the purchasing behaviour of students in the campus food environment (Roy et al., 2019), combining nutrition promotion or information with incentives to increase healthy food purchases can improve healthy food purchasing behaviour in students. Incentives included healthy food price reductions or making healthy foods more accessible. In both the current study and the New Zealand study (Roy et al., 2019), student comments resoundingly called for healthier food to be available at lower prices to be made available on campus. Roy et al. (2019) conclude that policy interventions are needed to address campus food availability, accessibility, pricing, and promotion.

5.4.1 Self-reported drivers of food purchasing behaviour

Price was the most significant determinant influencing purchase behaviour in the current study. High food costs and lower socioeconomic status restrict students' buying power, limiting healthy and nutritious meals. The comments made it clear that the perceived barrier to eating nutritious food is the cost. These findings suggest that food-insecure students might be contributing to their food insecurity by their lack of cooking, time management, and budgeting skills, resulting in their reliance on overpriced convenient food. In the current study, students relied on convenience foods due to time pressure and affordable prices despite the poor nutritional quality of the foods, which they were aware of based on their comments. Young adults experience the fastest rates of weight gain due to an obesity-promoting environment (Allman-Farinelli et al., 2008), and therefore, this issue needs addressing.

Having more affordable healthy food available would likely positively impact the student’s purchasing behaviour (Roy et al., 2019). Not all healthy foods are expensive. Some nutrient-dense foods are affordable; for example, lentil stew with onions, carrots, and peppers or butternut soup with rice and beans are low-cost and nutrient-rich

(Vorster et al., 2013; Maillot et al., 2010). Increasing the price of unhealthy foods relative to healthy foods might reduce consumption, while a small-scale "unhealthy food tax" could fund health promotion programmes and help students make healthier food choices (Alagiyawanna et al., 2015). However, these would only be viable if concerted efforts are made to increase the availability and accessibility of healthier foods on the campuses, which is not currently the case at most universities in South Africa.

A healthy food environment necessitates both supply and demand from customers and store owners to address health disparities. The buyer behaviour is equally driven by the availability and accessibility of food supplies (Martin et al., 2012). The Internal processes of food choices (i.e., decision-making measure) and students' eating selections emerged to be somehow influenced by perceived environmental aspects such as affordability, convenience, acceptability and adequacy, which appeared to interact closely with participants attitudes to inform internal processes of the decision-making process. Students transitioning to independence are exposed to a nutritionally poor food environment (Bruening, Brennhofer, van Woerden, Todd & Laska, 2016). The outcomes of this study revealed the influence of financial pressure on food procurement. Three-quarters of students indicated they did not always have enough money to eat. After integrating all of the variables in a logistical regression model, this remained the most vital determinant of food insecurity. According to this study, price is a significant determinant influencing purchase behaviour.

5.4.1.1 Opinion of food insecure students regarding the ready-to-eat food, take away food and prepared meals sold on the university campus

Most participants reported buying ready-to-eat food from street vendors, which is high in energy but low in nutritional value. Obesogenic settings are connected with high incidences of overweight and obesity. These conditions make it difficult, if not impossible, to buy or consume fresh produce (Rideout et al., 2015).

In the current study, on-campus, there are few healthy food alternatives in comparison to fast-food restaurants, the food halls and cafeterias were commended for offering good value for money along with healthier options. The healthier options were more costly than the "junk food" sold at the campus fast-food franchises and requested that fresh fruits, vegetables, salads, and low-fat items be made easily accessible at

reasonable prices. Findings from this study echo the literature on the role of food desserts and obesogenic environments are barriers to purchasing nutritious food (Alber et al., 2018; Deliens et al., 2014; Sleddens et al., 2015; Rideout et al., 2015).

Participants indicated that food outlets on UFS campuses often do not cater to religious, medical, or lifestyle dietary requirements or that traditional or cultural-specific foods are not accessible. Students were asked their opinion about a possible outlet on campus that sold healthy, filling, ready-to-eat meals at a realistic price. Notably, this is the first South African campus-based study to explore the phenomenon to transform the food environment that caters to healthy food at an affordable price. Most indicated that they would regularly purchase such a healthy meal. Affordability and convenience (as well as taste) were some of the motivators for participants' meal choices, the frequency and amount of food consumed increase as food becomes more accessible, readily available, and visible in the immediate environment, consistent with the findings of Musher-Eizenman et al. (2010).

Tertiary institutions have a responsibility to create a campus environment that facilitates healthy lifestyle changes. However, prior and current research indicates that many tertiary food environments are dense in energy but deficient in nutrients, which might be heavily marketed (Roy et al., 2016). Combining nutrition promotion or information with incentives could increase healthy food purchases, such as healthy food price reductions or making healthy foods more accessible. However, campuses are integrated into town structures and not stand-alone entities may find this difficult to implement.

5.4.2 Practices regarding drinks sold on campuses

Surprisingly, most of the participants took water to class. Water is a crucial nutritional and multifunctional element, and multiple physiological systems control water balance and hydration status. Therefore, water is vital to health, and everyone has the right to clean, safe water (Flegal et al., 2012; Vorster, 2013; WHO-Unicef, 1978). Only around a quarter of the participants bought water on or near campus, indicating the importance of having access to clean, safe water sources on campus to fill their water bottles. However, interestingly, food-insecure students were less likely to take water to class and more likely to buy sugary drinks on campus than food-secure students. The concept of continuing eating behaviours such as skipping breakfast, which may

be a remnant of low-income food-insecure households, persists throughout adulthood, even when financial resources NSFAS are available.

5.4.3 Breakfast

In the current study, less than half (40.7%) of the respondents regularly ate in the morning before going to campus. Breakfast is frequently referred to as one of the most important meals of the day, as it aids in the re-fuelling of the body with energy and necessary nutrients and helps to kick-start metabolism. Studies show that breakfast eaters have considerably greater calcium and folate intakes and significantly lower total fat intakes than breakfast-skippers (Fayet-Moore et al., 2016). Breakfast and cereal consumers are more likely to reach calcium and fibre objectives than breakfast-skippers and non-cereal consumers (Fayet-Moore et al., 2016).

Adolescents are particularly vulnerable to adverse health patterns, including increased fast-food consumption and physical inactivity. The frequency of breakfast consumption declines in the transition to young adulthood. Health-promoting behaviour patterns, such as adequate exercise and sleep, also decline during this period (Mposula, 2019). In South Africa, the reported prevalence of adolescents skipping breakfast ranges between 13 and 36% (Mposula, 2019).

In the current study, food-insecure participants had significantly lower probabilities of consuming breakfast, similar to food-insecure students in the US (Burrows, Whatnall, 2017; Bruening et al., 2016; Hebden et al., 2015).

Breakfast consumption has been linked to improved performance in memory and attention activities. Eating a healthy breakfast is also linked to better performance on comprehension exams. Therefore, the current results are of serious concern as skipping breakfast has been associated with detrimental effects on intellectual capacity, academic performance, university attendance, psychosocial behaviour, and mood in adolescents (Mposula, 2019). Students who are food insecure are more likely to miss other meals and to pick low-quality, energy-dense foods deficient in nutrients. Food insecurity has been associated with more significant absences from school and worse grades.

5.4.3.1 Lunchboxes and practices and opinions about bringing food to campus

Several participants expressed that packing a lunchbox saves money, is easy, convenient and improves health. The main impediment for not packing lunch was time. Interestingly, food-insecure students were significantly less likely to take a lunchbox to campus than food-secure students. Lack of money and food at home was one of the themes that emerged as barriers.

A substantial number of respondents expressed wanting to bring food from home. However, the main barrier they expressed was the lack of microwave facilities to reheat this food (and cold storage to keep food from spoiling). Maize meal is the most frequently and affordable staple food in South Africa (van Jaarsveld et al., 2015; Khumalo et al., 2011). Staple foods in South Africa are less expensive per unit of energy than animal products, fruits, and vegetables (Steyn et al., 2012; Temple et al., 2009), and most people in disadvantaged areas prefer them (Labadarios et al., 2011; McHiza et al., 2015). A large percentage of current students are NSFAS beneficiaries, indicating that they come from low-income households. They most likely attended public schools, wherein students benefited from the South African schools feeding scheme. (Education, 2012). Apart from not having money, they now need to get used to packing a lunchbox. Most African households consume maize meal (pap) about three times a day, prepared as soft porridge with sugar, with milk/amasi, or cooked stiff and served with either cabbage/spinach/tomato and onion relish/amasi. The majority of students in the current study were also confident in their pap cooking skills, as discussed later on. The excessive consumption of staple foods (maize and bread) may be fueled by low cost of these commodities (Africa. et al., 2007; McHiza et al., 2015).

Even though students wanted to pack lunch from home, many reported feeling too ashamed to bring their own food to university for fear of being labelled too poor if they brought maize porridge to campuased on the food in their lunchboxes. There seemed to be a westernised perception of what a lunchbox should contain. Several participants stated that they had little money and could not afford to buy bread and spreads. Triangulate well with the question on drivers of food purchasing behaviour in which the majority of students rated food that they were used to at home or that they had tried

before as essential drivers. Moreover, these were significantly ($p=.002$ and $p<.0001$, respectively) more critical to food-insecure students than food-secure students.

The UFS has an opportunity to incorporate informal vendors to sell affordable staple food acceptable to students. The vendor could also sell fresh fruits and vegetables at reasonable prices. Indeed, when asked if they think that vendors that sell fruit and vegetables on campus at reasonable prices, the majority of students thought it an excellent idea.

5.4.4 Practices and opinions regarding shopping to prepare own food during the academic term

Until the mid-1990s, all the residences on the UFS campus had catered food halls. Then, the service was deemed too expensive, and a new model was adopted in which students prepare their own meals in their residences, which means that around 26 students per hall of a residence on campus share a small kitchen equipped with two-plate electric stoves. Otherwise, students purchase prepared meals from food vendors. The food outlets on the Main Campus include fast-food franchises on the Thakanang Bridge. All three campuses have cafeterias that also sell fast food. Recently, several small food halls that serve cooked meals have also opened in response to pressure from food security interest groups. The Main Campus now has three such food hall/cafeterias that serve a daily prepared meal for around R39 per day (excluding beverages). Steps towards similar facilities on the South and Qwa-Qwa Campus is in the making.

Students' comments in the current study indicated that on-campus dining is too costly for most. Students also felt that the choices are primarily unhealthy and that the few accessible healthier alternatives are more expensive than the unhealthy options. There is only one general shop on the Main Campus, and pricing for essential food products are 50–100% more than at counterparts off-campus.

Thus, most students (76.7%) in the current study indicated that they often or always prepare their own meals for which they need to shop for ingredients. A surprising finding was that food-insecure students were significantly more likely to buy ingredients from Shoprite, which is quite far away from the Main Campus, while Pick-n-Pay, Checkers and the Spar are within a 2 km radius of the Main Campus. The

perception of these students was that the shops near the campus were expensive; thus, they chose to walk to Shoprite (to save transport costs) and cross major streets with heavy traffic, which is dangerous and also time-consuming.

The Qwaqwa Campus and South Campus are both also quite far from a Shoprite. In fact, there are no grocery shops or supermarkets near the South Campus at all, and to walk to the nearest supermarket or grocery shop would mean crossing rather dangerous areas (as some student comments also mentioned). In this sense, the South Campus is essentially a food desert (Battersby, 2019; High-Level Panel of Experts on Food Security and Nutrition, 2017).

Walking long distances makes it difficult to bulk buy, which is generally more cost-effective. Students reported that transport is often needed to get the shopping home as carrying heavy groceries across such distances is difficult. From the comments, it emerged that they often have to pay more for a private cab as the minibus taxis limit the number of shopping bags they can take on board. Thus, additional costs are incurred. The findings are consistent with earlier studies that linked a lack of transportation to grocery shopping with food insecurity. The link could be explained by the fact that those without access to private transport are more likely to live in poverty. People who do not have transport may have to resort to local shops, which are generally more expensive than supermarkets (Gorton et al., 2010; Ma et al., 2017).

Students also noted that lack of time for studying was a major barrier to buying ingredients for food preparation; thus, most only shopped for ingredients and fresh produce once or twice a month, limiting the amount of fresh produce they could keep, particularly in light of their storage restraints as discussed next (Henry, 2017; Larson et al., 2006; Gwacela, 2013). This was significantly more for food-insecure students, possibly reflecting the consequence of not having someone else responsible for food shopping and meal preparation. Providing students with access to affordable healthy meals and healthy options might help ease some of the root factors contributing to food insecurity (Van den Berg, Raubenheimer, 2015).

5.4.5 Food storage and preparation facilities

In the current study, most students stored their food and goods in their bedrooms. Sharing storage space opened up the possibility of having food stolen, as some

indicated in the comments. The University of KwaZulu Natal also echoed this finding (Gwacela, 2013). When disadvantaged students share communal kitchens and other resources, such as refrigerators, with wealthy students, the possibility of food theft increases, having a severe impact on food security (Gwacela, 2013). One out of every ten students did not have access to a refrigerator, and most only had access to one or two shelves of what was commonly only a shared bar fridge.

Furthermore, food-secure students were less likely to have access to a fridge in their room or share it with others in a commune. The study contrasts Hughes et al., (2011) findings that there are no considerable differences in cooking and storage facilities between food secure and food insecure students (Hughes et al., 2011). Not having sufficient cold storage space limits the amount of fresh produce like fruit, vegetables and dairy that a student can keep.

5.4.6 Buying from a shopping list or in bulk

In the current study, nearly half of the students ever purchased in bulk, which is usually cheaper, particularly for fresh produce in season. About a quarter of participants reported that they did not shop from a shopping list. A shopping list would prevent impulsive buying and intern prevent over spending. The 2013 UKZN case study of first-year students on probation and at-risk of academic exclusion echoes that most students lacked the grocery listing skills; therefore, funds were misdirected to non-essential items instead of healthy food. In addition, limited financial and listing skills hampered students ability to consume nutrient-dense meals (Gwacela, 2013). In the current study, there was no significant association of these two items with food security levels. Some of the themes that emerged were that it would be impossible to buy in bulk with a limited budget as food prices are high and unaffordable; that buying food in bulk would help most people save; however, it is expensive; that they were avoiding food getting spoiled by avoiding having too much of one product; and that they lacked refrigeration space. The problem could be alleviated by pooling money together and creating a shopping list of foods they commonly use, and they could buy those items in bulk.

On the contrary, the National Nutrition Week 2021 recommends that frozen fruits and vegetables be cost-effective when students have access to a freezer. Alternatively, if fresh vegetables or fruit are available at a reasonable price, bought in bulk and freeze

(National Department of Health, 2021) or share with others, another benefit for pooling money together. Furthermore, some of the items that can be bought in bulk, with a long shelf life, namely peas, chickpeas, lentils, beans, and soybeans.

5.4.7 Putting money into a common fund for groceries

Only 14.5% of the participants indicated that they and their mates put money together towards a common fund for groceries, even though the stokvel is a South African known saving or investment scheme, where a group of people contribute a fixed amount to a shared pool. Historically, the stokvels served as a financial relief and social network. This scheme allows bulk buying and access to a more significant discount (African Response Research, 2012). Most students did not utilise this credit union. Bulk purchasing is regarded as prohibitively expensive. Some students state that fellow students are untrustworthy and wasteful in their behaviour. Another reason for not pooling money was a lack of trust, which several participants mentioned during the survey.

5.4.8 Interest in an online store for essential foods

The study explored if students would support an online grocery store. In retrospect, the question should have stated that "basic foods" refers to basic food items or groceries and ingredients. While 26.3% were uncertain whether they would utilise the service, it could indicate that they would be open to the service should students given more information. Others could not comprehend how the service would work. Over a third highlighted the convenience of online service, in addition to suggestions for a variety of payment options (cash, card, speed point). Some did not want outsiders to come to their residence; they suggested a campus pickup. At the time of the survey, online grocery shopping would have been a foreign idea for most students from low-income backgrounds.

A study in Malaysia published in 2019 stated that a new wave is developing in the food and beverage business's online food delivery (OFD) business (Teck-Chai & David, 2019). The study refers to time saved, browsing for price comparison and convenience as motivation factors (Cho & Sagynov, 2015; Yeo et al., 2017). The Covid-19 pandemic has, however, caused supermarket chains to expand their online services and has made the idea of shopping online much more familiar. Checkers has

introduced Sixty60, an on-demand one-hour grocery delivery service as seen on the internet. The current survey shows that food-insecure students chose to buy groceries. The smartphone app delivers groceries and beverages at the same low prices as Checkers. Checkers is the first supermarket chain to provide a 60-minute grocery delivery service in South Africa (https://www.checkers.co.za/sixty60). The status of orders and deliveries can be tracked in real-time using a smartphone app, and the service is available at R35 per delivery. Possible future online options for students. Even though this is a viable option, the online store of Checkers does not offer an extensive range e of products, and specials are only available in-store.

The benefits of online grocery shopping for students would be to save time and not have to carry heavy groceries or pay for transport. They could buy smaller amounts more frequently (particularly if they order in groups to save on the delivery fee), and therefore, they could have regular access to fresh produce like fruits, vegetables, and dairy. The exercise would also train students to create a shopping list. In their comments, students highlighted that the costs should be based on the student budget, and the online service should recognise that not all students can afford healthy foods due to students alluding to healthy food being unaffordable. Among the suggestions were that the online service should provide them with access to breakfast products, fruits, bread, milk, vegetables, and airtime. Online shopping could be optimised by students (sef-efficacy) to improve their options and choices as it overcomes transportation limitations and cost. And time can be spent on their studies.

5.4.9 Food storage and preparation facilities

What is evident from this study is that limited storage, meal preparation facilities, lack of utensils, and food theft due to shared storage space, prohibit students from preparing meals. These findings corroborate with earlier research, but they also help us better understand the variety of challenges that food-insecure students confront at university (Gwacela, 2013).

Additionally, communal kitchens are standard in university-owned residences. Food theft is more likely due to this arrangement, contributing to food insecurity (Gwacela, 2013; Dominguez-Whitehead, 2015). The findings suggest that universities should

have a system of serving nutritious meals twice or thrice per day to food-insecure students, ensuring students have access to sufficient food at all times and minimising the frequency of food theft.

According to Henry (2017), students in dorms (residencies) commented about the shortage of kitchen appliances for storing and cooking food. They were limited in the types of food they could prepare since they did not have a refrigerator or a stove. One participant claimed she intended to buy healthier foods, but budgetary constraints prevented her from buying raw, whole, or natural foods. Several more research arrived at the same conclusion (Benner-Kenagy, 2013).

5.4.10 Barriers to food preparation and cooking

The dominant barriers to cooking were highlighted. Participants identified time as the most substantial and most frequent perceived impediment, consistent with earlier research (Larson et al., 2006). Participants could not devote time to preparing meals, cooking, or cleaning owing to a perceived lack of time due to the rigorous schedule of the university. Others cited impediments to meal preparation were lack of cold storage, equipment such as stoves, insufficient space, and students who do not clean after using the kitchen, consistent with previous research (Benner-Kenagy, 2013). A number of participants raised the high cost of electricity and the impracticalities of students in a commune having to contribute to buying and sharing prepaid electricity and dealing with load shedding. Indeed, students in the residences mentioned of having electricity provided to them as an enabler to cooking and keeping food.

Lack of cooking skills was another barrier highlighted, contrary to a US study in which most participants rated their culinary abilities excellent or outstanding (McArthur et al., 2018).

Home-cooked meals are not just generally cheaper than the commercial ready-to-eat meals but also healthier. People who report more frequent home food preparation are more likely to meet the Healthy People 2010 dietary objectives for fat, calcium, fruit, vegetables, and whole grains (U.S. Department of Health and Human Services., 2000). Thirty-five per cent of those who reported high preparation ate five servings of fruits or vegetables per day, compared to only three servings per person who reported very low preparation (Witcher, 2020).

As part of the general transition to university or college, students in elementary and secondary schools are urged to acquire self-regulation around eating. According to the World Health Organization, such self-management skills can help students select a healthy lifestyle and maintain a healthy lifestyle (WHO). According to the US literature (LaCaille et al., 2011), future interventions would strengthen students' self-regulation abilities. Self-regulation and self-management abilities can assist students in making healthier decisions and maintaining a healthy lifestyle as growing young adults (Deliens et al., 2014). This study shows that intervention efforts to increase home meal preparation should address the barriers that students face to storing and preparing meals before also addressing the misperceptions about the time required to prepare meals. Participants in a 2017 University of California survey stated that improving food literacy may assist in addressing the generally held student misconception that nutritious food is expensive; several campuses have launched programmes to increase food literacy and improve student food security (Watson et al., 2017).

5.4.11 Confidence in cooking skills

In the current study, when compared to food secure participants, low and very low food secure participants reported feeling less confident in their cooking abilities, including following a recipe, cooking a nutritious meal, cooking a meal in a short period, and cooking a nutritious meal without spending much money. The analysis is similar to the findings of Knol et al. (2014).

. Gaines et al. (2014) examined food security and associated risk factors; a sample of 557 undergraduate students at a large, public university in the southeastern US found that most wanted nutritious eating on a budget (70.3%), over two-thirds wanted to eat healthily (65.4%), and over half of students wanted to learn how to cook (50.3%). When participants in the current study were asked to indicate other food and nutrition-related topics they would want to receive guidance on, 572 participants submitted free-text comments. Of these, a total of 26.4% (n=151) stated that they needed guidance on healthy eating, diets (possibly healthy diets) and preparing vegetables. Some wanted financial guidance 2.6% (n=15).

5.4.12 Cooking for several days

The prevalence of food insecurity is highest in unmarried students and those sharing housing with other students and lowest in students living with their parents or relatives. Access to food storage and cooking equipment may be further determinants of food acquisition and consumption in the personal domain. Some cited barriers included a lack of resources and overcrowding in the communal kitchen. Several respondents complained that other students did not tidy up after using the stove/kitchen. Other themes that emerged as barriers were having different cultural backgrounds, cooking styles, diets, and preferences, as well as food allergies. Conflict, or fear of conflict over contributions, catering for diverse preferences, and cooking duties was another theme. Some participants just reported that they did not like sharing without giving further explanation.

5.4.13 Sharing food preparation and cooking and eating together

According to a large body of sociological evidence, eating together strengthens relationships, encourages good health, social cohesion, and collective identity (Pliner et al., 2009; Yates & Warde, 2017). However, some participants in the current study highlighted the difficulty of generally preparing meals. In addition, planning meals that everyone would want to eat and arranging a time when everyone was available to cook together and eat were cited as common barriers.

Other themes that emerged include mutual trust, close relationships, equal contribution, and reciprocal and communal contracting as enablers for preparing and sharing meals. Overall, it seemed that students did not have the skills to negotiate these social contracts among themselves, which is an area where the university could assist with skills training. Some enabling themes and suggestions that the participants contributed were that, because everyone participates, sharing often saves money due to bulk buying, and that housemates with a less hectic schedule can help with cooking meals.

5.4.13.1.1 Eating together or alone

Most participants (69.3%) in the current study "always" or "often" ate meals alone, in their rooms. Only 28% often ate at least one meal per day with others. Eating alone was also significantly associated with lower food security status ($p<.0001$). Pliner et

al., state that eating alone is linked to poor nutrition in both young and old. For some, eating alone allows avoiding public criticism and the critical people who judge the size of the meal (Pliner et al., 2009). As mentioned in the previous point, students also highlighted the difficulties of arranging a time when everyone was available to eat together.

5.4.14 Basic nutritional knowledge and perceptions

Nutrition knowledge is a critical component that improves eating habits and can significantly support nutritional requirements throughout life, culminating in a bodyweight ideal for developmental level. Even though nutrition education is only one component of health literacy, but it is a critical component. Inadequate food consumption is closely linked to all major NCDs and accounts for the majority of cases. Despite the vast extent of nutrition education programmes, it is surprising that the influence of nutrition information on food consumption remains largely understudied.

Students at the University of California described their food literacy confidence and competence in terms of planning, selecting, cooking, and eating meals. Many participants indicated University of California Los Angeles (UCLA) courses as a credible provider of food-related academic information (Watson et al., 2017). Students who are food insecure consume fewer fruits, vegetables, dairy products, and legumes than students who are not experiencing acute food difficulties (Otto, 2016). A food desert is characterised by a scarcity of nutritional food, whereas an abundance of empty calories characterises a food swamp (Rideout et al., 2015).

Gallegos et al., highlight concerns among Austrian tertiary food-insecure students. Students from food-insecure households were twice as likely to rate their general health as only fair or poor. Food insecurity and ill health are most likely linked to poor nutrition, stress, and overexposure to the modern-day obesity pandemic components (Gallegos et al., 2014).

A growing body of evidence in food-insecure college students in the USA reiterates that lack of resources, poor intellectual capabilities, and short attention span are partly due to inconsistent access to good nutrition. Extensive findings support the negative associations between academic performance and food insecurity amongst students in higher learning (Weaver et al., 2020; Martinez et al., 2020; Patton-López et al., 2014).

Food poverty leads to learners' underperformance, an extended completion period and a high dropout rate (Sabi et al., 2018; Adeniyi, Mirugi-Mukundi & Nthoiwa, 2018).

5.4.15 Topics for skills training

Participants indicated the most significant interest in training on healthy eating on a tight budget and improving their budgeting knowledge. Students who can keep track of their costs and prepare their meals are more likely to be food secure. According to other research, food insecurity is mainly caused by financial restrictions and/or a lack of financial and food management (Gaines et al., 2014; Brown et al., 2005; McArthur et al., 2018). Nutrition education is critical to assisting in alleviating student hunger. Students express frustration at knowing which healthy food to eat but lack the skills or resources to procure it. Sixty percent of students wanted more nutrition-related programming at their institutions (Verderaime, 2020).

Food management skills alone may not be enough to ensure nutritional adequacy and food security for financial assistance students. There is a need for financial education to be included in elementary health education. First-year students have shown a desire for educational options that help them draw up a budget, manage their money and make healthy decisions (McArthur et al., 2018; El Zein, Shelnutt, Colby, Vilaro, Zhou, Greene, Mathews, 2019).

Self-sufficiency initiatives can help enhance food security by upskilling students in budgeting and creating a shopping list, buying in bulk to optimise bought food to create healthy meals for themselves (Alaimo, 2005), and institutional support as involvement in health promotion programmes. According to research done at the University of Minnesota in the US, males and females who frequently prepared meals reported dietary intakes that matched the Healthy People 2010 guidelines for calcium, fruit, and vegetables (U.S. Department of Health and Human Services., 2000). Findings highlight the importance of university and community-based courses that educate young adults on nutritious food preparation. On-campus cooking classes for all students. Sessions on the preparation of nutritious food on a limited budget and ideas on creating quick and balanced meals. The study further reiterates the vital role registered dietitians play in motivating clients to prepare healthy home-cooked meals. These curbs fast food consumption, high in saturated fat and sodium (Larson et al., 2006).

The mentioned studies align with the current study skills set that students would be interested in receiving guidance from the UFS. The more significant proportion highlighted healthy eating on a tight budget, budgeting skills, healthy diet and recipes to create healthy meals. According to previous research, individuals with high or average cooking skills, food preparation knowledge and financial knowledge are less likely to be food insecure than those with lower skill levels. To cook healthy meals, on a budget, specific competencies and knowledge are essential. Organisations or critical informants involved in food insecurity also identified the importance of nutrition knowledge and food preparation skills as barriers to food security. Indeed, those with lower self-rated cooking skills were found to be eight times more likely to be food insecure (Gorton et al., 2010).

5.4.16 Cooking specific foods and dishes

Foods and recipes most students felt confident in their ability to cook starchy meals, but not so much in cooking dry legumes or preparing recipes using tinned legumes.

A recent study amongs American university students found that the students desire for financial and food literacy training (Watson et al., 2017). As expressed by the student in the current study. The training could entail cheaper sources of protein, such as legumes. Legumes provide fibre, iron, copper, magnesium, manganese, zinc, and phosphorus. Legumes are inherently low in fat, saturated fat, and cholesterol, being plant foods. Half a cup of beans contains 483 Kilojoules (kJ) calories, 20g carbohydrate, 7g fibre, 8g protein, and 1g fat. Legumes have a glycemic index of 10-40. Many healthy eating plans include legumes, such as the Mediterranean diet and low-Glycemic Index(GI) diets (Polak et al., 2015).

5.4.17 Preferred platforms for receiving skills training for university food insecure students

Participants in the survey showed considerable interest in receiving a monthly newsletter via email and accessing the UFS website / Backboard (UFS teaching and learning) platform. Similarly, in a European qualitative study, students believed that nutritional education on the internet and social media platform was vital (Deliens et al., 2014).

5.4.18 Preference for receiving a stipend

The study identified that students preferred transferring funds into their banking account. The preferred platform is similar to the NSFAS form of payment. Currently, NSFAS sends the bursary (including the stipend for living expenses) straight into the student's account rather than to the institution. Although this gives students more control over their money, studies show that there is a lot of pressure on students to support their families back home (Van den Berg & Raubenheimer, 2015), as also came out in the comments in the current study. Therefore, there would be no accountability or guarantee that the money would be spent on healthy food. Triangulating with comments on previous questions on the questionnaire, it also became apparent that one of the reasons why students would rather have the stipend in their own accounts than pay over to the university for food (and the same reason why they find it hard to pool their money with other students and buy in bulk) is that the stipend is the only money that they have control over should emergencies come up during the course of the month.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

Finally, in this chapter, reflections regarding the limitation of the study and suggestions for further research are postulated.

The survey aimed to investigate student food security, campus food assistance initiatives, student interaction narratives, existing food environments, and the relationship between food security and food environment. The survey was implemented to assess the level of food security among UFS students. Secondly, the study explored the personal domain, how students interact with and experience their food environment, based on the theory that food insecurity is also a function of the food environment. The detailed objectives were to determine the following for the participants:

1. Socio-demographic profile;
2. Level of food security;
3. Associations between security level and socio-demographics;
4. Awareness and utilisation of food assistance programmes;
5. Students' experiences of the food environment that they are exposed to while studying at the UFS, with regards to:
    i. Accessibility of food-related to transport, distance and time spent accessing food;
    ii. Affordability of food and personal purchasing power;
    iii. Convenience relative to time and effort preparing and consuming food;
    iv. The desirability of food-related to preferences, acceptability, tastes, desires, attitudes, culture, and food-related knowledge and skills (including cooking self-efficacy score);

6.1 Limitations of the study

A limitation of this study was that the survey was scheduled to run from May 1st until May 21st, 2020. Due to the COVID-19 outbreak, students were evacuated from campuses and classes were suspended in mid-March. However, to salvage the study, the survey was opened soon after lockdown, but after students had some time to settle

down, and the questions were changed to repeatedly remind and urge participants to report only on their experiences during the academic semester before lockdown.

Another limitation was related to the first-time first year students of 2020, as they had only been on campus for around six weeks before the lockdown, so they had very limited experience of being students and navigating the food environment of a UFS student during the normal academic terms.

Also, students studying on the South Campus and QwaQwa Campus and postgraduates were somewhat underrepresented in the sample, while female students and those on NSFAS were slightly overrepresented in the study.

The survey also did not include a question to determine if the students are sending money home as remittances in assuming responsibility for their families' well-being. However, the fact that this was taking place emerged from several uncoerced free-text responses from the students in the survey.

6.2 Conclusions

Food insecurity poses a risk to the cognitive, developmental, and financial challenges faced by university students. Institutional and structural solutions must promote holistic well-being in higher education settings to understand the effect of food insecurity on physical, emotional, and academic well-being.

In this study, 75% of respondents in a sample that overrepresented the university student population and was sufficiently powered were classified as food insecure. Nearly 60% of students skipped meals due to financial constraints (58.1%), while almost half worried about food shortages. The highest percentages of food insecurity occurred among men, Africans and those who were first-generation students. More than half of the participants in the current study indicated the need for food assistance. High food costs and lower socioeconomic status restricted students' buying power, limiting healthy and nutritious meals. Students relied on convenience foods due to time pressure, affordable prices and students are more prone to eating food of poor nutritional quality. Food-insecure students had significantly lower probabilities of consuming breakfast, taking a lunchbox to class, or eating in communal settings. Food-insecure students were also more dependent on public transport to shop for groceries, walked long distances from campus or their communes in search of more

affordable groceries (in their perception), incurred extra travel costs to bring groceries home. Moreover, food-insecure students were more likely to keep their groceries in their bedroom, have limited access to fridge and freezer space, and have less confidence in their own cooking skills. Themes related to high food prices, high workloads and lack of time to shop and cook, inadequate cooking utensils and available stove facilities, overcrowded kitchens, poor hygiene kitchen practices by fellow students, trust and practical issues related to sharing money for food, buying in bulk, sharing cooking duties and sharing meals, and sharing electricity costs emerged.

Inadequate nutritional intake socioeconomic constraints significantly reduce nutrient intake and limited dietary diversity. This culminates in a lack of essential nutrients vital for preventing diseases, promoting growth, and maintaining good health. Nutritionally adequate, nutritious meals and institutions that offer platforms for skills training are among the most critical factors in a student's success. In the current study, students expressed the desire to buy healthy meals and live a healthy lifestyle; however, they found food unaffordable for students from lower socioeconomic backgrounds, including those who do not have access to financial aid.

This study highlighted that students' food security and food environment are significantly linked and highlights a multitude of barriers in the food environment regarding accessibility, affordability, convenience and desirability, showing how they disproportionally affect the students who are already the most vulnerable to food insecurity and hunger.

Higher education is an opportunity for students to escape poverty; on the contrary, ambitions of acquiring a degree is thwarted if the substantial population of students go hungry. It completely undermines the country's investment in human capital. The revision of governmental financial aid programmes and the establishment and expansion of food aid campaigns at higher education institutions, with financial support from non-governmental organisations and the private sector, may alleviate students' pressures due to food insecurity. However, regulations and interventions are also required to guarantee that nutritional food is affordable and accessible on campus. All stakeholders should take immediate action if comprehensive and long-term solutions to the food insecurity dilemma in South African higher education are to be established.

Tertiary institutions are hubs of resource-rich infrastructure and personnel. The university environment is an excellent platform to adopt lifestyle interventions, promote, educate, and leave an indelible mark on the lives and health of students in higher learning and, thus, embrace transformational lessons into adulthood. By collaborating and sharing resources, a multidisciplinary team including dietitians, physiotherapists, psychologists, nurses, and educators who are experts in various fields to teach course-embedded skills could ideally utilise the available health facilities and expertise employ the latest technology, to develop and implement sustainable solutions. The private sector can also be lobbied to participate in win-win solutions as part of their corporate social responsibility. Corporate social responsibility has four categories: environmental responsibility, economic responsibility, ethical responsibility, and philanthropic responsibility. A philanthropic obligation is the corporate responsibility to engage in social causes. Such synergy would break down of existing silos that keep individuals, departments and the private sector working independently and hinder collaboration. As Plotnikoff et al. (2015) point out, '*partnership encourages engagement, cohesion, and successful collaborations*". Thus, universities have the capacity to find win-win solutions to help the money that the government is already investing in students by way of the NSFAS food stipend, go further, and towards healthier food.

6.3 Recommendations

Given its potential to increase disparities in academic achievement, physical and psychological wellbeing, and future success, eliminating food insecurity is a primary priority. The campus food environment would have to be transformed, focusing on making it possible for students to access affordable healthy foods on the allowance that those that are most food insecure have available for food (Van den Berg & Raubenheimer, 2015; Meko et al., 2016).

These are some of the food initiatives and/or collaborations that may be successful:

- Have adequate, affordable, catered food options on campus. Subsidising meals would be costly for the institution, but partnerships with private enterprises could provide win-win solutions. Students make up a substantial portion of the clientele of supermarkets in any University city or town, and offering groceries and fresh produce at discounted student prices would be an investment

(seeing, for example, how loyal the students in the survey were to certain supermarket chains).

- Exploring ways to restructure financial aid to guarantee that students have access to nutritious meals could also help to alleviate food insecurity. Any solution would have to consider the concerns students in the current study raised about not having physical access to funds throughout the month and having to provide for those back home.
- Providing skills training regarding, budgeting, planning food shopping to ensure that food is available throughout the month, eating healthy on a tight budget, food preparation and cooking skills. Students should be educated on life skills to help them handle limited resources more efficiently (Kassier & Veldman, 2013). Registered dietitians could play an essential role in upskilling students to make nutritious meals at home with the available facilities. Dietitians could also help educate on the South African food-based dietary guidelines, recommending a daily intake of fruit, vegetables, dairy, and legumes to promote good health.
- Create hubs where facilities such as microwaves to reheat lunchboxes with cooked food brought from home, fridges to keep the food from spoiling, and refrigerated tap water available for all students. Such hubs should also have facilities and create an atmosphere where students can share meals and socialise.
- Renovating of cooking facilities and installing more stoves and storage facilities for on-campus students. Off-campus student accommodation needs to adhere to appropriate standards of access to cooking and food storing facilities relative to the number of students sharing. Also, the logistical issues of sharing prepaid electricity should be considered.
- Demystify the concept of pooling money together and bulk buying by educating the student on the benefits and how to enter into and manage agreements with each other around these issues.
- Contractual agreements between the university and supermarket chains that now all offer online shopping. The most food insecure students in the current

study were very loyal supporters of certain supermarket chains. As part of their corporate social responsibility, these supermarket chains could provide online shopping and delivery at special student discounts. This would allow more frequent shopping and overcome the lack of storage facilities, time and distances that prevent students from having healthy fresh produce daily.

- Finding ways to bring affordable fresh, high quality fruits and vegetables within easy access to students on the campuses, for example, in the form of non-campus fruit and vegetable vendors that sell fresh produce in season in small amounts that are practical to students. Individual fruits such as bananas or apples that are cheaper and more readily available on campus may prevent students living on energy dense cheap fast foods like slap chips and street foods like vetkoek and polony and kota (Free State version of Bunny Chow).

6.4 Further research

The research should be repeated at various universities. Most students at all public South African universities live in communes, flats, informal settlements, and townhouses off-campus, where they battle the same issues raised by students in the current study. Future research may wish to investigate whether student food insecurity remains over the years of study and the association between student food insecurity and time to graduation or failure to graduate. Another emerging challenge is housing insecurity and its association with food insecurity.

REFERENCES

Adeniyi, O., Mirugi-Mukundi, G., & Nthoiwa, J. 2018. Economic and Social Rights in South Africa - National colloquium on access to food for students in South African tertiary institutions: Challenges of hunger among students in higher education in South Africa. *ESR Review: Economic and Social Rights in South Africa*, 19(4): 21–23. https://dullahomarinstitute.org.za/socio-economic-rights/esr-review-archives/archives/esr-review-no-4-vol-21-of-2018/event_national-colloquium-on-access-to-food-for-students-in-south-african-tertiary-institutions-challenges-of-hunger-among-students-in-hig.

Adeniyi, O. & Durojaye, E. 2019. *The right to food of students in tertiary institutions in South Africa prepared by Oluwafunmilola Adeniyi*. Cape Town. https://foodsecurity.ac.za/wp-content/uploads/2020/07/Booklet-on-the-right-to-food-in-SA-Tertiary-Insititutions-final-version-July-2020.pdf.

African Response Research. 2012. Stokvels - A hidden economy. *African Response Research*, (May 2012): 1–19. https://www.africanresponse.co.za/assets/press/2012StokvelHiddenEconomy.pdf.

Ahmad, N. S. S., Sulaiman, N., & Sabri, M.F. 2021. Food insecurity: Is it a threat to university students' well-being and success ? *International Journal of Environmental Research and Public Health*, 18: 1–11.

Alber, J.M., Green, S.H., & & Glanz, K. 2018. Perceived and Observed Food Environments, Eating Behaviors, and BMI. *American Journal of Preventive Medicine*, 54(3): 423–429. http://dx.doi.org/10.1016/j.amepre.2017.10.024.

Battersby, J. 2019. The food desert as a concept and policy tool in African cities: An opportunity and a risk. *Sustainability (Switzerland)*, 11(2). https://www.mdpi.com/2071-1050/11/2/458.

Belachew, T., Hadley, C., Lindstrom, D., Gebremariam, A., Lachat, C., & Kolsteren, P. 2011. Food insecurity, school absenteeism and educational attainment of adolescents in Jimma Zone Southwest Ethiopia: A longitudinal study. *Nutrition Journal*, 10(1): 1–9.

Belachew, T., Hadley, C., Lindstrom, D., Gebremariam, A., Lachat, C. & Kolsteren, P. 2011. Food insecurity, school absenteeism and educational attainment of adolescents in Jimma Zone Southwest Ethiopia: A longitudinal study. *Nutrition Journal*, 10(1): 29.

Benner-Kenagy, S. 2013. *College students' attitudes and barriers to cooking*. Washington State Vancouver University.

Van den Berg, L. & Raubenheimer, J. 2015. Food insecurity among students at the University of the Free State, South Africa. *South African Journal of Clinical Nutrition*, 28(4): 160–169. http://www.tandfonline.com/doi/full/10.1080/16070658.2015.11734556.

Van den Berg, V.L., Abera, B.M.M., Nel, M. & Walsh, C.M. 2013. Nutritional status of undergraduate healthcare students at the University of the Free State. *South African Family Practice*, 55(5): 445–452. https://doi.org/10.1080/20786204.2013.10874394.

Boek, S., Bianco-Simeral, S., Chan, K. & Goto, K. 2012. Gender and race are significant determinants of students' food choices on a college campus. *Journal of Nutrition Education and Behavior*, 44(4): 372–378. https://linkinghub.elsevier.com/retrieve/pii/S1499404612000024.

Brown, L.B., Dresen, R.K., & & Eggett, D.L. 2005. College students can benefit by participating in a prepaid meal plan. *Journal of the American Dietetic Association*, 105(3): 445–448. https://linkinghub.elsevier.com/retrieve/pii/S000282230401990X.

Bruening, M., Brennhofer, S., van Woerden, I., Todd, M., & Laska, M. 2016. Factors Related to the High Rates of Food Insecurity among Diverse, Urban College Freshmen. *Journal of the Academy of Nutrition and Dietetics*, 116(9): 1450–1457. https://linkinghub.elsevier.com/retrieve/pii/S2212267216301162.

Bruening, M., Argo, K., Payne-Sturges, D. & Laska, M.N. 2017. The Struggle Is Real: A Systematic Review of Food Insecurity on Postsecondary Education Campuses. *Journal of the Academy of Nutrition and Dietetics*, 117(11): 1767–1791. https://linkinghub.elsevier.com/retrieve/pii/S2212267217305518.

Burrows, T. L., Whatnall, M. C., Patterson, A. J., & Hutchesson, M.J. 2017.

Associations between dietary intake and academic achievement in college students: A systematic review. *Healthcare*, 5(60): 1–13.

Buscher, L.A., Martin, K.A., & & Crocker, S. 2001. Point-of-purchase messages framed in terms of cost, convenience, taste, and energy improve healthful snack selection in a college foodservice setting. *Journal of the American Dietetic Association*, 101(8): 909–913. https://linkinghub.elsevier.com/retrieve/pii/S0002822301002231.

Cafiero, C., Viviani, S., & & Nord, M. 2018. Food security measurement in a global context: The food insecurity experience scale. *Measurement*, 116(October): 146–152. https://linkinghub.elsevier.com/retrieve/pii/S0263224117307005.

Camelo, K. & Elliott, M. 2019. Food Insecurity and Academic Achievement Among College Students at a Public University in the United States. *Journal of College Student Development*, 60(3): 307–318. https://muse.jhu.edu/article/726905.

Cardenas, D., Bermudez, C. & Echeverri, S. 2019. Is nutritional care a human right? *Clinical Nutrition Experimental*, 26: 1–7. https://doi.org/10.1016/j.yclnex.2019.05.002.

Cele, N. 2021. Big data-driven early alert systems as means of enhancing university student retention and success. *South African Journal of Higher Education*, 35(2): 56–72. https://www.journals.ac.za/index.php/sajhe/article/view/3899.

Chaparro, M.P., Zaghloul, S.S., Holck, P., & & Dobbs, J. 2009. Food insecurity prevalence among college students at the University of Hawai'i at Mānoa. *Public Health Nutrition*, 12(11): 2097–2103. https://www.cambridge.org/core/product/identifier/S1368980009990735/type/journal_article.

Cho, Y.C. & Sagynov, E. 2015. Exploring Factors That Affect Usefulness, Ease Of Use, Trust, And Purchase Intention In The Online Environment. *International Journal of Management & Information Systems (IJMIS)*, 19(1): 21.

Clifford, D., Anderson, J., Auld, G., & & Champ, J. 2009. Good Grubbin': Impact of a TV Cooking Show for College Students Living Off Campus. *Journal of Nutrition Education and Behavior*, 41(3): 194–200. https://linkinghub.elsevier.com/retrieve/pii/S1499404608000109.

Davis, B., & Sumara, D. 2002. Constructivist discourses and the field of education: Problems and possibilities. *Educational Theory*, 52(4): 409–428. https://www.gc.cuny.edu/CUNY_GC/media/CUNY-Graduate-Center/PDF/Centers/Center for Human Environments/cunyfoodinsecurity.pdf%0Ahttp://files/288/cunyfoodinsecurity.pdf.

Deliens, T., Clarys, P., De Bourdeaudhuij, I., & & Deforche, B. 2014. Determinants of eating behaviour in university students: A qualitative study using focus group discussions. *BMC Public Health*, 14(1): 1–12. http://www.biomedcentral.com/1471-2458/14/53 26 June 2021.

Department of Higher Education and Training. 2019. *The 2000 to 2016 first time entering undergraduate cohort studies for public higher edcuation institutions*. Pretoria, South Africa.

Dominguez-Whitehead, Y. 2015. Students' food acquisition struggles in the context of South Africa: The fundamentals of student development. *Journal of College Student Development*, 56(3): 292–308. https://doi.org/10.1353/csd.2015.0022.

Dubick, J., Mathews, B., &, Cady, C. & . 2016. Hunger on campus: The challenge of food insecurity for college students. *CUFBA website*, (October): 1–47. https://studentsagainsthunger.org/hunger-on-campus/.

Dunn-Coetzee, M. & Foflonker, K. 2019. *Final report: Stellenbosch university task team for an institutional framework on food security*. Cambridge. https://www.sun.ac.za/english/learning-teaching/student-affairs/Documents/Policies/Final Report SU Institutional Framework on Food Security 2019.pdf.

Eche, D. 2018. Studying food security among students: a comparative case study between public and private universities in Quito-Ecuador. *Nutrición Hospitalaria*, 35(6): 1372–1378.

Farahbakhsh, J., Hanbazaza, M., Ball, G.D.C., Farmer, A.P., Maximova, K., & & Willows, N.D. 2017a. Food insecure student clients of a university-based food bank have compromised health, dietary intake and academic quality. *Nutrition & Dietetics*, 74(1): 67–73. https://onlinelibrary.wiley.com/doi/10.1111/1747-0080.12307.

Farahbakhsh, J., Hanbazaza, M., Ball, G.D.C., Farmer, A.P., Maximova, K., & & Willows, N.D. 2017b. The association between food insecurity and academic achievement in Canadian school-aged children. *Public Health Nutrition*, 20(15): 2778–2785. https://www.cambridge.org/core/product/identifier/S1368980017001562/type/journal_article.

Flegal, K.M., Carroll, D., Kit, B.K. & Ogden, C.L. 2012. Prevalence of obesity and trends in the distribution of body mass index among US adults, 1999-2010. *JAMA - Journal of the American Medical Association*, 307(5): 491–497.

Flores, S.O., Ortiz, F., Cruz, E.R., Machado, E.D., Kaur, B., Hlubik, K., Ortiz, R. & Rios, L.K.D. 2019. P169 Food Access Information and Nutrition Education Needs Assessed by College Student Key-Informants. *Journal of Nutrition Education and Behavior*, 51(7): S109.

Franco, M., Bilal, U. & Díez, J. 2015. Food Environment. In *Encyclopedia of Food and Health*. Elsevier: 22–26. https://linkinghub.elsevier.com/retrieve/pii/B9780123849472003068.

Freedman, M.R., & & Brochado, C. 2010. Reducing Portion Size Reduces Food Intake and Plate Waste. *Obesity*, 18(9): 1864–1866. https://doi.org/10.1038/oby.2009.480.

Gaines, A., Robb, C.A., Knol, L.L. & Sickler, S. 2014. Examining the role of financial factors, resources and skills in predicting food security status among college students. *International Journal of Consumer Studies*, 38(4): 374–384. https://onlinelibrary.wiley.com/doi/10.1111/ijcs.12110.

Gallegos, D., Ramsey, R. & Ong, K.W. 2014. Food insecurity: Is it an issue among tertiary students? *Higher Education*, 67(5): 497–510. https://doi.org/10.1007/s10734-013-9656-2.

Gorton, D., Bullen, C.R., & & Mhurchu, C.N. 2010. Environmental influences on food security in high-income countries. *Nutrition Reviews*, 68(1): 1–29. https://academic.oup.com/nutritionreviews/article-lookup/doi/10.1111/j.1753-4887.2009.00258.x.

Gwacela, M. 2013. *Academic performance: A case study of first year students of*

probation and at-risk of academic exclusion. University of Kwazulu Natal. https://researchspace.ukzn.ac.za/xmlui/handle/10413/10586.

Heale, R. & Twycross, A. 2015. Validity and reliability in quantitative studies. *Evidence Based Nursing*, 18(3): 66–67. https://pubmed.ncbi.nlm.nih.gov/25891415/.

Hebden, L., Chan, H.N., Louie, J.C., Rangan, A. & Allman-Farinelli, M. 2015. You are what you choose to eat: Factors influencing young adults' food selection behaviour. *Journal of Human Nutrition and Dietetics*, 28(4): 401–408. https://onlinelibrary.wiley.com/doi/10.1111/jhn.12312.

Henry, L. 2017. Understanding food insecurity among college students: Experience, motivation, and local solutions. *Annals of Anthropological Practice*, 41(1): 6–19. https://onlinelibrary.wiley.com/doi/10.1111/napa.12108.

High Level Panel of Experts on Food Security and Nutrition. 2017. *Nutrition and food systems*. Rome. http://www.fao.org/3/a-i7846e.pdf.

Holben, D.H. & Marshall, M.B. 2017. Position of the academy of nutrition and dietetics: Food insecurity in the United States. *Journal of the Academy of Nutrition and Dietetics*, 117(12): 1991–2002. https://linkinghub.elsevier.com/retrieve/pii/S2212267217316180.

Horacek, T.M., Erdman, M.B.-, Reznar, M.M., Olfert, M., Brown-Esters, O.N., Kattelmann, K.K., Kidd, T., Koenings, M., Phillips, B., Quick, V., Shelnutt, K.P. & White, A.A. 2013. Evaluation of the food store environment on and near the campus of 15 postsecondary institutions. *American Journal of Health Promotion*, 27(4): e81–e90. http://journals.sagepub.com/doi/10.4278/ajhp.120425-QUAN-220.

Hoyland, A., Dye, L. & Lawton, C.L. 2009. A systematic review of the effect of breakfast on the cognitive performance of children and adolescents. *Nutrition Research Reviews*, 22(2): 220–243. https://www.cambridge.org/core/product/identifier/S0954422409990175/type/journal_article.

Hughes, R., Serebryanikova, I., Donaldson, K., & & Leveritt, M. 2011. Student food insecurity: The skeleton in the university closet. *Nutrition & Dietetics*, 68(1): 27–32. https://doi.org/10.1111/j.1747-0080.2010.01496.x.

Kaiser, L.K., Usher, K. & Spees, K. 2015. Community food security strategies: An exploratory study of their potential for food insecure households with children. *South African Journal of Clinical Nutrition*, 6(2): 1–38. https://www.researchgate.net/publication/288839385_Community_Food_Security_Strategies_An_Exploratory_Study_of_Their_Potential_for_Food_Insecure_Households_with_Children/link/5686caf008ae197583975c7c/download.

Kassier, S., & Veldman, F. 2013. Food security status and academic performance of students on financial aid: The case of University of KwaZulu-Natal. *South African Journal of Clinical Nutrition*, 90(2013): 248–264. http://alternation.ukzn.ac.za/Files/docs/20.6/12 Kas.pdf.

Kassier, S. & Veldman, F. 2013. Food security status and academic performance of students on financial aid : The case of University of KwaZulu-Natal. *Alternation Special Edition*, 90(9): 248–264.

Krukowski, R.A., West, D.S., Harvey-Berino, J. & Elaine Prewitt, T. 2010. Neighborhood impact on healthy food availability and pricing in food stores. *Journal of Community Health*, 35(3): 315–320. http://link.springer.com/10.1007/s10900-010-9224-y.

Kuruvilla, S., Sadana, R., Montesinos, E. V., Beard, J., Vasdeki, J.F., Araujo de Carvalho, I., Thomas, R.B., Drisse, M.-N.B., Daelmans, B., Goodman, T., Koller, T., Officer, A., Vogel, J., Valentine, N., Wootton, E., Banerjee, A., Magar, V., Neira, M., Bele, J.M.O., Worning, A.M., & & Bustreo, F. 2018. A life-course approach to health: Synergy with sustainable development goals. *Bulletin of the World Health Organization*, 96(1): 42–50. http://www.who.int/entity/bulletin/volumes/96/1/17-198358.pdf.

Labadarios, D., Mchiza, Z., Steyn, N.P., Gericke, G., Maunder, E., Davids, Y. & Parker, W. 2011. Food security in South Africa: a review of national surveys. *Bulletin of the World Health Organization*, 89(12): 891–899. http://www.who.int/bulletin/volumes/89/12/11-089243.pdf.

LaCaille, L.J., Dauner, K.N., Krambeer, R.J. & Pedersen, J. 2011. Psychosocial and environmental determinants of eating behaviors, physical activity, and weight change among college students: A qualitative analysis. *Journal of American College Health*, 59(6): 531–538.

https://www.tandfonline.com/doi/full/10.1080/07448481.2010.523855.

Lachat, C.K., Verstraeten, R., De Meulenaer, B., Menten, J., Huybregts, L.F., Van Camp, J., Roberfroid, D. & Kolsteren, P.W. 2009. Availability of free fruits and vegetables at canteen lunch improves lunch and daily nutritional profiles: A randomised controlled trial. *British Journal of Nutrition*, 102(7): 1030–1037. https://www.cambridge.org/core/product/identifier/S000711450930389X/type/journal_article.

Larson, N.I., Perry, C.L., Story, M. & Neumark-Sztainer, D. 2006. Food preparation by young adults is associated with better diet quality. *Journal of the American Dietetic Association*, 106(12): 2001–2007.

Lee, S.D., Hanbazaza, M., Ball, G.D.C., Farmer, A., Maximova, K., & & Willows, N.D. 2018. Food insecurity among postsecondary students in developed countries. *British Food Journal*, 120(11): 2660–2680. https://doi.org/10.1108/BFJ-08-2017-0450.

Maroto, M.E., Snelling, A., & & Linck, H. 2015. Food insecurity among community college students: Prevalence and association with grade point average. *Community College Journal of Research and Practice*, 39(6): 515–526. http://www.tandfonline.com/doi/abs/10.1080/10668926.2013.850758.

Martin, K.S., Havens, E., Boyle, K.E., Matthews, G., Schilling, E.A., Harel, O. & Ferris, A.M. 2012. If you stock it, will they buy it? Healthy food availability and customer purchasing behaviour within corner stores in Hartford, CT, USA. *Public Health Nutrition*, 15(10): 1973–1978.

Martinez, S.M., Frongillo, E.A., Leung, C., & & Ritchie, L. 2020. No food for thought: Food insecurity is related to poor mental health and lower academic performance among students in California's public university system. *Journal of Health Psychology*, 25(12): 1930–1939. http://journals.sagepub.com/doi/10.1177/1359105318783028.

Maynard, M.S., Meyer, S.B., Perlman, C.M. & Kirkpatrick, S.I. 2019. Experiences of food insecurity among undergraduate students: "You can't starve yourself through school". *Canadian Journal of Higher Education*, 48(2): 130–148.

McArthur, L.H., Ball, L., Danek, A.C. & Holbert, D. 2018. A high prevalence of food

insecurity among university students in Appalachia reflects a need for educational interventions and policy qdvocacy. *Journal of Nutrition Education and Behavior*, 50(6): 564–572. https://doi.org/10.1016/j.jneb.2017.10.011.

Meko, N. M. L., & Jordaan, E.M. 2016. The food environment of students on a financial assistance programme at the University of the Free State, Bloemfontein. *South African Journal of Clinical Nutrition*, 29(3): 116–117. http://dx.doi.org/10.1080/16070658.2016.1198608.

Mposula, Z. 2019. *Selected clinical risk factors for lifestyle diseases in relation to the current dietary practices of sponsored vs. non-sponsored African University students in Durban*. Durban University of Technology.

Munro, N., Quayle, M., Simpson, H. & Barnsley, S. 2013. Hunger for knowledge: Food insecurity among students at the University of KwaZulu-Natal. *Perspectives in Education*, 31(4): 168–179. https://www.researchgate.net/publication/277291353_Hunger_for_knowledge_Food_insecurity_among_students_at_the_University_of_KwaZulu-Natal?enrichId=rgreq-9badccaff834fb95828e325c8792137c-XXX&enrichSource=Y292ZXJQYWdlOzI3NzI5MTM1MztBUzoyNjYyMjg4NzQ4NzA3ODZA.

Murphy, M., Badland, H., Koohsari, M.J., Astell-Burt, T., Trapp, G., Villanueva, K., Mavoa, S., Davern, M. & Giles-Corti, B. 2017. Indicators of a health-promoting local food environment: a conceptual framework to inform urban planning policy and practice. *Health Promotion Journal of Australia*, 28(1): 82–84. http://doi.wiley.com/10.1071/HE15098.

National Department of Health. 2021. *National Nutrition Week (NNW) 2021 " Eat more vegetables and fruit every day " Concept document*. Pretoria, South Africa. https://www.nutritionweek.co.za/NNW2021/docs/NNW2021 - Concept document 2021.pdf.

Nikolaus, C.J., An, R., Ellison, B. & Nickols-Richardson, S.M. 2020. Food insecurity among college students in the United States: A scoping review. *Advances in Nutrition*, 11(2): 1–22.

Otto, A. 2016. *The University of Tennessee's campus environment: Health status,*

perception, and its effect on health-related behaviors. University of Tennessee. https://trace.tennessee.edu/utk_chanhonoproj/1943%0AThis.

Owens, M.R., Brito-silva, F., Kirkland, T., Moore, C.E., Davis, K.E., Patterson, M.A., Miketinas, D.C. & Tucker, W.J. 2020. Prevalence and social determinants of food insecurity among college students during the COVID-19 pandemic. *Nutrients*, 12(2515): 1–17.

Patton-López, M.M., López-Cevallos, D.F., Cancel-Tirado, D.I., & & Vazquez, L. 2014. Prevalence and Correlates of Food Insecurity Among Students Attending a Midsize Rural University in Oregon. *Journal of Nutrition Education and Behavior*, 46(3): 209–214. https://linkinghub.elsevier.com/retrieve/pii/S1499404613007070.

Pliner, P., & & Bell, R. 2009. *A table for one: The pain and pleasure of eating alone*. Woodhead Publishing Limited. http://dx.doi.org/10.1533/9781845695712.4.169.

Plotnikoff, R.C., Costigan, S.A., Williams, R.L., Hutchesson, M.J., Kennedy, S.G., Robards, S.. L., Allen, J., Collins, C.E., Callister, R. & Germov, J. 2015. Effectiveness of interventions targeting physical activity, nutrition and healthy weight for university and college students: a systematic review and meta-analysis. *International Journal of Behavioral Nutrition and Physical Activity*, 12(1): 45. https://ijbnpa.biomedcentral.com/articles/10.1186/s12966-015-0203-7.

Polak, R., Phillips, E.M., & & Campbell, A. 2015. Legumes: Health benefits and culinary approaches to increase intake. *Clinical Diabetes*, 33(4): 198–205.

Raskind, I.G., Haardörfer, R. & Berg, C.J. 2019. Food insecurity, psychosocial health and academic performance among college and university students in Georgia, USA. *Public Health Nutrition*, 22(3): 476–485. https://www.cambridge.org/core/product/identifier/S1368980018003439/type/journal_article.

Raza, A., Fox, E.L., Morris, S.S., Kupka, R., Timmer, A., Dalmiya, N. & Fanzo, J. 2020. Conceptual framework of food systems for children and adolescents. *Global Food Security*, 27(September): 100436. https://doi.org/10.1016/j.gfs.2020.100436.

Rideout, K., Mah, C.L. & Minaker, L. 2015. Food environments: An introduction for public health practice. *National Collaborating Centre for Environmental Health*, (December): 1–7.

http://www.ncceh.ca/sites/default/files/Food_Environments_Public_Health_Practice_Dec_2015.pdf.

Roy, R., Hebden, L., Kelly, B., De Gois, T., Ferrone, E.M., Samrout, M., Vermont, S., & & Allman-Farinelli, M. 2016. Description, measurement and evaluation of tertiary-education food environments. *British Journal of Nutrition*, 115(9): 1598–1606. https://www.cambridge.org/core/product/identifier/S0007114516000568/type/journal_article.

Roy, R, Kelly, B., Rangan, A. & Allman-Farinelli, M. 2015. Food environment interventions to improve the dietary behavior of young adults in tertiary education settings: A systematic literature review. *Journal of the Academy of Nutrition and Dietetics*, 115(10): 1647-1681.el. http://dx.doi.org/10.1016/j.jand.2015.06.380.

Roy, Rajshri, Kelly, B., Rangan, A. & Allman-Farinelli, M. 2015. Food environment interventions to improve the dietary behavior of young adults in tertiary education settings: A systematic literature review. *Journal of the Academy of Nutrition and Dietetics*, 115(10): 1647-1681.e1.

Roy, R., Soo, D., Conroy, D., Wall, C.R., & & Swinburn, B. 2019. Exploring university food environment and on-campus food purchasing behaviors, preferences, and opinions. *Journal of Nutrition Education and Behavior*, 51(7): 865–875. https://doi.org/10.1016/j.jneb.2019.03.003.

Rychetnik, L., Webb, K., Story, L., & & Katz, T. 2003. *Food security options paper: A planning framework and menu of options for policy and practice interventions*. Sydney. https://uploads-ssl.webflow.com/59d609a219d90a00015d55c5/5deb8cefcad2177774d0e56c_food-security.pdf.

Sabi, S.C., Kolanisi, U., Siwela, M. & Naidoo, D. 2019. Students' vulnerability and perceptions of food insecurity at the university of KwaZulu-Natal. *South African Journal of Clinical Nutrition*: 1–8.

Sabi, S.C., Siwela, M., Kolanisi, U. & Naidoo, D.K. 2018. Complexities of food insecurity at the university of KwaZulu-Natal: A review. *Journal of Consumer Sciences*, 46: 10–18. https://www.researchgate.net/publication/329239794.

Sadelek, T. 2019. Perception of food quality by consumers: Literature review. *European Research Studies Journal*, XXII(1): 52–62. https://www.ersj.eu/journal/1407/download.

Shisana, O., Labadarios, D., Rehle, T., Simbayi, L., Zuma, K., Dhansay, A., Reddy, P., Parker, W., Hoosain, E., Naidoo, P., Hongoro, C., Mchiza, Z., Steyn, N., Dwane, N., Makoae, M., Maluleke, T., Ramlagan, S., Zungu, N., Evans, M., Jacobs, L., & & Faber, M. 2013. *South African national health and nutrition examination survey (SANHANES-1)*. Cape Town. http://www.hsrc.ac.za/uploads/pageNews/72/SANHANES-launch edition (online version).pdf.

Slavin, J.L. & Lloyd, B. 2012. Health benefits of fruits and vegetables. *Advances in Nutrition*, 3(4): 506–516.

Sleddens, E.F.C., Kroeze, W., Kohl, L.F.M., Bolten, L.M., Velema, E., Kaspers, P.J., & & Kremers, S.P.J. 2015. Determinants of dietary behavior among youth: An umbrella review. *International Journal of Behavioral Nutrition and Physical Activity*, 12(1).

Snow, S., Mackinnon, M. & Slater, J. 2004. *An investigation into student income support at the Queensland University of Technology*.

Statistics South Africa. 2019. *Towards measuring the extent of food security in South Africa*. Pretoria. www.statssa.gov.za.

Steyn, N. P., & Mchiza, Z.J. 2014. Obesity and the nutrition transition in Sub-Saharan Africa. *Annals of the New York Academy of Sciences*, 1311(1): 88–101.

Story, M., Kaphingst, K.M., Robinson-O'Brien, R. & Glanz, K. 2008. Creating healthy food and eating environments: Policy and environmental approaches. *Annual Review of Public Health*, 29: 253–272. https://www.annualreviews.org/doi/10.1146/annurev.publhealth.29.020907.090926.

Stroebele, N., Ogden, L.G. & Hill, J.O. 2009. Do calorie-controlled portion sizes of snacks reduce energy intake? *Appetite*, 52: 793–796. https://linkinghub.elsevier.com/retrieve/pii/S0195666309000440.

Stuber, N. 2014. Nutrition and Students ' Academic Performance How does nutrition

influence students ’ academic. , 651-280–27(Wilder Research): 1–10. https://www.wilder.org/sites/default/files/imports/Cargill_lit_review_1-14.pdf.

Sugawara, E., & & Nikaido, H. 2014. Food Insecurity: Is it an Issue Among Tertiary Students? *Higher Education*, 67(5): 497–510.

Tam, R., Yassa, B., Parker, H., O’Connor, H. & Allman-Farinelli, M. 2016. On campus food purchasing behaviors, preferences, and opinions on food availability. *Nutrition*, 37: 1 22. http://dx.doi.org/10.1016/j.nut.2016.07.007.

Teck-Chai, L. & David, N.G. 2019. Online food delivery services: Making food delivery the new normal. *Researchgate*, 1(1): 62–77. https://www.researchgate.net/publication/334050513_Online_Food_Delivery_Services_Making_Food_Delivery_the_New_Normal/link/5d148043458515c11cfb6d5e/download.

Turner, C., Aggarwal, A., Walls, H., Herforth, A., Drewnowski, A., Coates, J., Kalamatianou, S., & & Kadiyala, S. 2018. Concepts and critical perspectives for food environment research: A global framework with implications for action in low- and middle-income countries. *Global Food Security*, 18: 93–101. https://linkinghub.elsevier.com/retrieve/pii/S2211912418300154.

Turner, C., Kadiyala, S., Aggarwal, A., Coates, J., Drewnowski, A., Hawkes, C., Herforth, A., Kalamatianou, S. & Walls, H. 2017. 2017. *Concepts and methods for food environment research in low and middle income countries.* London, UK. http://linkinghub.elsevier.com/retrieve/pii/B9780123849472003068.

U.S. Department of Health and Human Services. 2000. *Healthy people 2010: Understanding and improving health*. Washington, DC: U.S.: Government Printing Office. https://files.eric.ed.gov/fulltext/ED443794.pdf.

Ukegbu, P., Nwofia, B., Ndudiri, U., Uwakwe, N. & Uwaegbute, A. 2019. Food insecurity and associated aactors among university students. *sage journal*, 40(2): 271–281. http://journals.sagepub.com/doi/10.1177/0379572119826464.

University of the Free State: Center for Teaching and Learning. 2016. *ENgaging the #STUDENTVOICE: Annual Report 2016*. Bloemfontein.

Veras, R.P. 2012. US household food security survey module: Three-stage design, with screener economic research service, USDA. *Economic research report*, 1:

1–12. https://www.ers.usda.gov/media/8271/hh2012.pdf.

Vorster, H. 2013. Revised food-based dietary guidelines for South Africa: Challenges pertaining to their testing, implementation and evaluation. *South African Journal of Clinical Nutrition*, 26(3): S3–S4. http://www.ajol.info/index.php/sajcn/article/view/97782.

Vorster, H.H., Badham, J.B., & & Venter, C.S. 2013. Food-Based Dietary Guidelines for South Africa: An introduction 1. *South African Journal of Clinical Nutrition*, 26(3): 5–12.

Wagner, F., Kaneli, T., & & Masango, M. 2021. Exploring the relationship between food insecurity with hunger and academic progression at a large South African University. *South African Journal of Higher Education*, 35(5): 296–309. https://www.journals.ac.za/index.php/sajhe/article/view/4099.

Watson, T.D., Malan, H., Glik, D. & Martinez, S.M. 2017. College students identify university support for basic needs and life skills as key ingredient in addressing food insecurity on campus. *California Agriculture*, 71(3): 130–138. https://doi.org/10.3733/ca.2017a0023.

Weaver, R.R., Vaughn, N.A., Hendricks, S.P., McPherson-Myers, P.E., Jia, Q., Willis, S.L. & Rescigno, K.P. 2020. University student food insecurity and academic performance. *Journal of American College Health*, 68(7): 727–733. https://www.tandfonline.com/doi/full/10.1080/07448481.2019.1600522.

Wegerif, M. & Adeniya, O. 2019. Student hunger at South African universities needs more attention. *Elitsha*. http://wwmp.org.za/elitsha/2019/10/07/student-hunger-at-south-african-universities-needs-more-attention/.

WHO-Unicef. 1978. Alma-Ata 1978 Primary Health Care. *International Conference on Primary Health Care*: 63.

Witcher, B.J. 2020. *Healthy People 2010 progress report and Healthy People 2020 objectives: Meeting of the diabetes mellitus interagency coordinating committee*.

Wolfson, J.A., Insolera, N., Cohen, A.J. & Leung, C.W. 2021. The effect of food insecurity during college on graduation and type of degree attained: evidence from a nationally representative longitudinal survey. *Public Health Nutrition*: 1–22. https://www.cambridge.org/core/product/identifier/S1368980021003104/type/jou

rnal_article.

Xhoza, C., & du Plessis, R. 2020. *Behaviourial and health impacts of the Covid-19 pandemic in South Africa*. Pretoria, South Africa. file:///C:/Users/youhe/Downloads/kdoc_o_00042_01.pdf.

Yates, L. & Warde, A.. 2017. Eating together and eating alone: Meal arrangements in British households. *British Journal of Sociology*, 68(1): 1–22.

Yeo, V.C.S., Goh, S.-K. & Rezaei, S. 2017. Consumer experiences, attitude and behavioral intention toward online food delivery (OFD) services. *Journal of Retailing and Consumer Services*, 35: 150–162. http://dx.doi.org/10.1016/j.jretconser.2016.12.013.

El Zein, A., Mathews, A. E., House, L., & Shelnutt, K.P. 2018. Why are hungry college students not seeking help? Predictors of and barriers to using an on-campus food pantry. *Nutrients*, 10(9): 2–14. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6163327/.

El Zein, A., Shelnutt, K. P., Colby, S., Vilaro, M. J., Zhou, W., Greene, G., … Mathews, A.E. 2019. Prevalence and correlates of food insecurity among U.S. college students: A multi-institutional study. *BMC Public Health*, 19(1): 1–12. https://pubmed.ncbi.nlm.nih.gov/31142305/.

7.1 ADDENDUM B: Ethics approval

UNIVERSITY OF THE FREE STATE
UNIVERSITEIT VAN DIE VRYSTAAT
YUNIVESITHI YA FREISTATA

UFS·UV
HEALTH SCIENCES
GESONDHEIDSWETENSKAPPE

Health Sciences Research Ethics Committee

04-May-2020

Dear **Mrs Nokuthula Rebecca Mabena**

Ethics Clearance: **Food: environment, security and experiences of students at the University of the Free State**
Principal Investigator: **Mrs Nokuthula Rebecca Mabena**
Department: **Human Nutrition Department (Bloemfontein Campus)**
APPLICATION APPROVED

Please ensure that you read the whole document

With reference to your application for ethical clearance with the Faculty of Health Sciences, I am pleased to inform you on behalf of the Health Sciences Research Ethics Committee that you have been granted ethical clearance for your project.

Your ethical clearance number, to be used in all correspondence is: **UFS-HSD2020/0306/2605**

The ethical clearance number is valid for research conducted for one year from issuance. Should you require more time to complete this research, please apply for an extension.

We request that any changes that may take place during the course of your research project be submitted to the HSREC for approval to ensure we are kept up to date with your progress and any ethical implications that may arise. This includes any serious adverse events and/or termination of the study.

A progress report should be submitted within one year of approval, and annually for long term studies. A final report should be submitted at the completion of the study.

The HSREC functions in compliance with, but not limited to, the following documents and guidelines: The SA National Health Act. No. 61 of 2003; Ethics in Health Research: Principles, Structures and Processes (2015); SA GCP(2006); Declaration of Helsinki; The Belmont Report; The US Office of Human Research Protections 45 CFR 461 (for non-exempt research with human participants conducted or supported by the US Department of Health and Human Services- (HHS), 21 CFR 50, 21 CFR 56; CIOMS; ICH-GCP-E6 Sections 1-4; The International Conference on Harmonization and Technical Requirements for Registration of Pharmaceuticals for Human Use (ICH Tripartite), Guidelines of the SA Medicines Control Council as well as Laws and Regulations with regard to the Control of Medicines, Constitution of the HSREC of the Faculty of Health Sciences.

For any questions or concerns, please feel free to contact HSREC Administration: 051-4017794/5 or email EthicsFHS@ufs.ac.za.

Thank you for submitting this proposal for ethical clearance and we wish you every success with your research.

Yours Sincerely

Dr. SM Le Grange
Chair : Health Sciences Research Ethics Committee

Health Sciences Research Ethics Committee
Office of the Dean: Health Sciences
T: +27 (0)51 401 7795/7794 | E: ethicsfhs@ufs.ac.za
IRB 00011992; REC 230408-011; IORG 0010096; FWA 00027947
Block D, Dean's Division, Room D104 | P.O. Box/Posbus 339 (Internal Post Box G40) | Bloemfontein 9300 | South Africa
www.ufs.ac.za

7.2 ADDENDUM B: Survey information document, consent and questionnaire

EvaSys	2020 UFS Students Food Experiences Study	Electric Paper
Department of Nutrition and Dietetcs		

Mark as shown: ☐☒☐☐☐ Please use a ball-point pen or a thin felt tip. This form will be processed automatically.
Correction: ☐■☐☒☐ Please follow the examples shown on the left hand side to help optimize the reading results.

1. INFORMATION

1.1 Over the last decade, the University of the Free State, like other institutions of higher education in South Africa and around the world, have become aware of the increasing struggle of students to feed themselves appropriately during the academic term. The issue has been the focus of several national forums and colloquiums and the need for more research to guide decisions and interventions have been identified. Thus, the **University of the Free State (UFS) is conducting this survey to gather information regarding the factors that influence how Kovsie-students choose, procure, store, prepare and eat food during the academic term, and what they thnk about their options.** Your participation will be greatly appreciated.

IF YOU DECIDE TO PARTICIPATE: **IT IS VERY IMPORTANT THAT YOU ANSWER ALL QUESTIONS AS THEY APPLY TO YOUR SITUATION AS A STUDENT OF THE UFS BEFORE COVID-19 LOCKDOWN STARTED FOR THE UFS**

Approval for the survey has been obtained from the Health Sciences Research Ethics Committee, as well as the Vice Rector: Research of the UFS. There is no personal risk to you in completing this survey. Participation is voluntary and you can withdraw your participation at any time by contacting the research team, with no repercussion at all. By choosing to proceed to the survey and submitting the completed survey, you agree that you have read and understand the information above, and give your informed consent for the researchers to use your responses together with other institutional data. All data will be used for the purpose of the study as stated above and will be kept strictly confidential. Data will be stored with password protection in the Department of Nutrition and Dietetics and the Department of Biostatistics. The findings will be summarised and only reported as statistics for entire groups, so that individual contributions will not be discernible in any way. The survey will take an estimated 15 – 20 minutes to complete and will close on 30 June 2020. Please complete all sections of the questionnaire before submitting it.

Participants will not receive any remuneration for participating in the study, but, as a token of our appreciation for your participation, you will stand a chance to win one of ten x R250 cash prizes which will be determined by a lucky draw. If you wish to be eligible to win this prize, please provide your email address in question 2.2; however, you are not obligated to provide your email address if you do not want to be eligible to win the prize.

If you have any questions regarding the study, you can contact the Health Sciences Research Ethics Committee (051 401 7795/4 or email ethicsFHS@ufs.ac.za) or contact the research team in the Department of Nutrition and Dietetics, Ms Nokuthula Mabena, Prof Louise van den Berg, and Ms Liska Robb, via email at vdbergvl@ufs.ac.za.

☐ Yes, I want to take the survey

2. *PERSONAL INFORMATION*

2.1 Please indicate your student number

2.2 If you want to be in the lucky draw to receive one of ten R250 prizes, please provide your email address:

2.3 In what year were you born? (yyyy)

2.4 In which month of the year were you born (1 - 12)?

2. *PERSONAL INFORMATION* [Continue]

2.5 On which day of the month were you born (dd)?

2.6 Please indicate your gender:

☐ Male ☐ Female ☐ Other

2.7 Please indicate your level of study.

☐ Undergraduate ☐ Postgraduate

2.8 On which campus did/do you attend classes during the first semester of 2020 (before lockdown)?

☐ Main campus ☐ South Campus ☐ Qwaqwa Campus

☐ I registered for distance learning and do/did not attend classes at any of the three campuses during 2020

2.9 Please indicate your relationship status:

☐ Single ☐ In a steady relationship (not living together) ☐ In a steady relationship (living together)

☐ Married ☐ Divorced ☐ Other

2.10 If you have chosen 'other', please specify:

2.11 Do any of your family members (immediate relatives) hold a qualification from a university?

☐ No, I hope to be the first ☐ Yes ☐ I prefer not to answer

☐ I don't know

2.12 How do you pay for your studies? (Select all that apply):

☐ Self ☐ Parents/relatives/benefactor ☐ NSFAS

☐ Another type of bursary ☐ Bank loan ☐ Another type of loan

☐ Trust fund ☐ Employer ☐ Other

2.13 If you chose 'other', please specify:

For the rest of the questions, remember that your answers must reflect your situation as a student of th UFS during the academic term(s) before COVID-19 lockdown started for the UFS.

2.14 Do you receive an amount of money that is specifically earmarked for food and/or living costs (a stipend)? (Choose only or

☐ Yes, for food ☐ Yes, for living expenses ☐ Yes, for food and living expens combined

☐ No, I do not receive a stipend for food and/or living expenses

2.15 Do you stay with your parent(s) / relative(s) (at home) during the academic

☐ term? Yes ☐ No

2.16 If not with your parents (at home), where do you stay during the academic term?

☐ University residence ☐ In a commune (student house) / flat / townhouse ☐ Informal settlement

☐ I do not have a specific place to stay during the academic term ☐ Other

2.17 If you have chosen 'other', please specify:

2. *PERSONAL INFORMATION* [Continue]

2.18 If you live in a commune / flat / townhouse during the academic term, how many people live with you?

2.19 How far (in **kilometers**) do you have travel from where you stay during the academic term, to the campus (thus, a single, one way trip)? *[If it is less than 1 km or if you do not know, leave the question open and indicate in the following question]*

2.20 The distance is less than a km or you do not know the distance: ☐ Less than one km ☐ I do not know

2.21 How do you **mostly** travel between where you stay during the academic term, and campus? (choose one)

☐ I walk ☐ I take a minibus taxi ☐ I take a cab (private taxi)
☐ I take a bus ☐ Someone drops me off ☐ I drive myself with a car
☐ I drive myself with a motorbike ☐ I use a bicycle / scateboard

2.22 How much in total (to the nearest **Rand**) do you usually pay for your transport to and from campus per month? *[If you don't know, leave the question open and select "I do not know" below]*

2.23 If you don't know the amount, please select 'I do not know'. ☐ I do not know

2.24 How long does it take you (convert to **minutes**) to get from where you stay, to campus (thus, a single, one-way trip) using this transport? *[If you don't know, leave the question open and select "I do not know" below]*

2.25 If you don't know the time travelled, please select 'I do not know'. ☐ I do not know

3. *WHEN YOU MAKE DECISIONS ABOUT WHAT FOOD TO BUY DURING THE ACADEMIC TERM, HOW MUCH ARE YOU USUALLY INFLUENCED BY THE FOLLOWING? (Remember: this applies to your situation during the academic term(s) at the UFS before the lockdown)*

		4	3	2	1	0	
3.1	Price	Very much ☐	☐	☐	☐	☐	Not at all
3.2	Convenience	Very much ☐	☐	☐	☐	☐	Not at all
3.3	Making healthy choices	Very much ☐	☐	☐	☐	☐	Not at all
3.4	Getting substantial portions	Very much ☐	☐	☐	☐	☐	Not at all
3.5	Time pressures / busy schedule	Very much ☐	☐	☐	☐	☐	Not at all
3.6	Your religion	Very much ☐	☐	☐	☐	☐	Not at all
3.7	Your culture	Very much ☐	☐	☐	☐	☐	Not at all
3.8	Your lifestyle choices (eg vegan / vegetarian, etc,)	Very much ☐	☐	☐	☐	☐	Not at all
3.9	Your medical conditions	Very much ☐	☐	☐	☐	☐	Not at all
3.10	Selecting foods that you are used to at home	Very much ☐	☐	☐	☐	☐	Not at all
3.11	Selecting foods that you have tried before	Very much ☐	☐	☐	☐	☐	Not at all
3.12	Satisfying hunger rather than worry about nutrition/food quality	Very much ☐	☐	☐	☐	☐	Not at all
3.13	How alert you feel after eating it	Very much ☐	☐	☐	☐	☐	Not at all
3.14	Trying out new things	Very much ☐	☐	☐	☐	☐	Not at all
3.15	Peer pressure	Very much ☐	☐	☐	☐	☐	Not at all
3.16	Food smells around the vendors	Very much ☐	☐	☐	☐	☐	Not at all
3.17	Fear of food poisoning	Very much ☐	☐	☐	☐	☐	Not at all
3.18	Food advertising	Very much ☐	☐	☐	☐	☐	Not at all

4. *DURING THE ACADEMIC TERM, HOW OFTEN DO YOU BUY READY-TO-EAT FOOD / TAKEAWAYS / PREPARED MEALS AT THE FOLLOWING OUTLETS? (Remember: this applies t your situation during the academic term(s) at the UFS before the lockdown)*

		Never	Rarely	Sometimes	Often	Always
4.1	Thakaneng Bridge on main campus	☐	☐	☐	☐	☐
4.2	Cafeterias and food halls on campus	☐	☐	☐	☐	☐
4.3	FoodZone on the main campus	☐	☐	☐	☐	☐
4.4	Street vendors around campus	☐	☐	☐	☐	☐
4.5	Fast food outlets around campus	☐	☐	☐	☐	☐
4.6	Coffee shops / restaurants around campus	☐	☐	☐	☐	☐
4.7	Grocery shops around campus	☐	☐	☐	☐	☐
4.8	Shops / vendors in town	☐	☐	☐	☐	☐

4.9 Any comments / opinions on the ready-to-eat food and meals available on your campus?

4.10 Any realistic suggestions regarding the ready-to-eat foods and meals on campus that would help you eat well?

4.11 During the academic term(s) (before lockdown), how much (to the nearest **Rand**) do you usually spend per month on **read to-eat food / take-aways / / prepared meals?** *[If you don't know, leave the question open and select "I do not know" belo*

4.12 If you cannot estimate the amount, please select 'I do not know'. ☐ I do not know

4.13 How often do you bring your own food from where you stay to eat and drink on campus?

☐ Never ☐ Rarely ☐ Sometimes
☐ Often ☐ Always

4.14 Any comments/suggestions regarding barriers or difficulties that you experience to bring your own food to eat and drink on campus?

5. *SHOPPING TO PREPARE YOUR OWN FOOD DURING THE ACADEMIC TERM (Remember: this applies to your situation during the academic term(s) at the UFS before the lockdown)*

5.1 Do you prepare or cook your own food where you stay during the academic term?

☐ Never ☐ Rarely ☐ Sometimes
☐ ☐

5. *SHOPPING TO PREPARE YOUR OWN FOOD DURING THE ACADEMIC TERM (Remember: this applies to your situation during the academic term(s) at the UFS before the lockdown)* [Continue]

5.2 How often do you buy groceries and ingredients to prepare food and cook for yourself?

☐ Several times per week ☐ Once per week ☐ Every second week
☐ Once per month ☐ Never

5.3 Have you and other students ever created a "stokvel" to buy groceries and ingredients for food preparation and cooking?

☐ Yes ☐ No

5.4 How much money (to the nearest **Rand)** do you usually spend per month on groceries and ingredients to prepare food and cook for yourself? *[If you don't know, leave the question open and select "I do not know" below]*

5.5 If you don't know the amount, select "I do not know". ☐ I do not know

5.6 Where do you mostly buy groceries and ingredients for food preparation and cooking? (Select all that apply)

☐ Shoprite ☐ Checkers ☐ Pick-n-Pay
☐ Spar ☐ Foodzone on main campus ☐ Vendors at taxi rank etc (for fresh produce)
☐ Other

5.7 If you chose 'other', at which other shops/vendors do you usually buy groceries and food to prepare or cook?

5.8 Do you buy from a shopping list?

☐ Yes ☐ No

5.9 Do you ever buy in bulk?

☐ Yes ☐ No

5.10 If you do not buy food in bulk, why not?

5.11 If you do buy in bulk, where do you buy?

5.12 How do you mostly get your groceries and food purchases back to where you stay?

☐ Walk and carry it ☐ Pay someone to push your purchases to where you stay in a trolley ☐ Take it on a minibus taxi
☐ Take it in a private cab or shuttle service ☐ Take a bus ☐ Get a lift from someone else
☐ Drive myself ☐ Bicycle / motorbike ☐ Other

5.13 If you have chosen 'other', please specify:

5.14 More or less how far (in **kilometers**) do you usually have to travel from where you stay during the academic term to where you buy groceries or ingredients for food preparation or cooking? (thus, how far us a single one-way trip) *[If it is less than 1 km or if you do not know, leave the question open and indicate in the following question]*

5. *SHOPPING TO PREPARE YOUR OWN FOOD DURING THE ACADEMIC TERM (Remember: this applies to your situation during the academic term(s) at the UFS before the lockdown)* [Continue]

5.15 If it is less than 1 km or you don't know the distance, please indicate: ☐ Less than 1 km ☐ I do not know

5.16 How long (convert to **minutes**) does a typical trip to buy groceries/food ingredients usually take (including travel time there and back and shopping time)? *[If you do not know, please leave this question open, and select 'I do not know' in the following question].*

5.17 If you don't know how long it takes, please select 'I do not know'. ☐ I do not know

5.18 How much money (to the nearest **Rand**) do you usually spend on traveling costs during a typical trip to buy groceries/food ingredients? *[If you do not know, please leave this question open, and select 'I do not know' in the following question]*

5.19 If you don't know the amount, please select 'I do not know'. ☐ I do not know

5.20 Do you ever pay someone to transport your groceries to campus/your home (for example in a shopping cart?) ☐ Yes ☐ No

5.21 If "yes", how much (to the nearest **Rand**) do they charge you per trip?

5.22 What are the problems/barriers you encounter when you shop for groceries and food to prepare or cook?

5.23 Is there anything in your current situation that makes it easy for you or helps you to shop for groceries and food to prepare or cook?

6. *PREPARING AND STORING FOOD DURING THE ACADEMIC TERM (Remember: this applies to your situation during the academic term(s) at the UFS before the lockdown)*

6.1 Where do you store your groceries (ingredients for cooking)?

☐ In my room where I sleep
☐ In a kitchen that I share with other students in a university residence
☐ In a kitchen that I share with housemates
☐ In a kitchen that I share with my family
☐ I my own private kitchen
☐ Other

6.2 If other, please indicate where else you store your groceries and food.

6. *PREPARING AND STORING FOOD DURING THE ACADEMIC TERM (Remember: this applies to your situation during the academic term(s) at the UFS before the lockdown)*
[Continue]

6.3 Which of the following appliances do you have access to for cooking your own food? (Select all that apply to you)

☐ Two plate stove (portable) ☐ Electric or gas oven ☐ Microwave oven
☐ Electric frying pan ☐ Other ☐ Full electric or gas stove

6.4 If other, which other cooking facilities do you use?

6.5 Which of the following do you have access to for cold storage of your food? (Mark all that apply to you)

☐ Fridge in your room in residence or commune ☐ Shared (communal) fridge (in residence or student commune) ☐ Fridge in my flat / townhouse / family home
☐ You do not have access to a fridge

6.6 Have you ever had your food stolen from your storage/fridge/freezer where you live during the first semester of 2020?

☐ Yes ☐ No

6.7 Do you have access to any of the following facilities to freeze your food?

☐ One shelf of freezer space ☐ Two shelves of freeze space ☐ More than two shelves of freezer space
☐ Small freezer compartment in an undercounter personal fridge ("bar" fridge)

	Never	Rarely	Sometimes	Often	Always
6.8 How often do you and other students contribute ingredients/ money to cook or prepare meals which you share?	☐	☐	☐	☐	☐
6.9 How often do you and other students take turns to prepare/ cook meals that you share?	☐	☐	☐	☐	☐
6.10 How often do you eat in the morning before going to class?	☐	☐	☐	☐	☐
6.11 How often do you cook or prepare enough food to last for several meals?	☐	☐	☐	☐	☐

6.12 What are the problems/barriers you encounter when you cook or prepare your own food?

6.13 In your current situation, is there anything that makes it easier for you, or helps you to prepare your own food?

6.14 What are the problems/barriers you encounter to share ingredients/money to prepare a meal in which you can all share?

6. *PREPARING AND STORING FOOD DURING THE ACADEMIC TERM (Remember: this applies to your situation during the academic term(s) at the UFS before the lockdown)*
[Continue]

6.15 In your current situation, is there anything that makes it easy, or helps you to share ingredients/money to prepare a meal in which you can all share?

	Never	Rarely	Sometimes	Often	Always
6.16 How often do you buy sugary drinks (e.g. carbonated rinks, energy drinks and cordials, excluding 100% fruit juice)?	☐	☐	☐	☐	☐
6.17 How often do you buy 100% fruit juice?	☐	☐	☐	☐	☐
6.18 How often do you take water to class?	☐	☐	☐	☐	☐
6.19 How often do you buy water on or around campus?	☐	☐	☐	☐	☐
6.20 How often do you eat your meals alone in your room?	☐	☐	☐	☐	☐
6.21 How often do you eat at least one meal per day in the company of others?	☐	☐	☐	☐	☐

How confident are you that you (personally) can complete each of the following tasks?	Extremely confident	Very confident	Moderately confident	Not very confident	Not confident at all
6.22 Cook a nutritious meal.	☐	☐	☐	☐	☐
6.23 Cook a meal in a short amount of time.	☐	☐	☐	☐	☐
6.24 Cook a nutritious meal without spending a lot of money.	☐	☐	☐	☐	☐
6.25 Follow a recipe.	☐	☐	☐	☐	☐

How confident are you that you (personally) can complete each of the following tasks?	Extremely confident	Very confident	Moderately confident	Not very confident	Not confident at all	I don't eat this
6.26 Cook pap	☐	☐	☐	☐	☐	☐
6.27 Cook rice / pasta	☐	☐	☐	☐	☐	☐
6.28 Cook dry legumes (dried beans, split peas, lentils)	☐	☐	☐	☐	☐	☐
6.29 Prepare dishes using tinned legumes (beans/split/peas/lentils)	☐	☐	☐	☐	☐	☐
6.30 Cook potatoes/sweet potatoes/pumpkin	☐	☐	☐	☐	☐	☐
6.31 Cook raw/frozen vegetables	☐	☐	☐	☐	☐	☐
6.32 Prepare dishes using tinned vegetables	☐	☐	☐	☐	☐	☐
6.33 Prepare fresh vegetables	☐	☐	☐	☐	☐	☐
6.34 Prepare salads	☐	☐	☐	☐	☐	☐
6.35 Cook meat/chicken/fish	☐	☐	☐	☐	☐	☐

6. *PREPARING AND STORING FOOD DURING THE ACADEMIC TERM (Remember: this applies to your situation during the academic term(s) at the UFS before the lockdown)*
[Continue]

6.36	Cook stews and other mixed dishes	☐	☐	☐	☐	☐	☐
6.37	Prepare dishes using tinned meat/ chicken/fish	☐	☐	☐	☐	☐	☐
6.38	Store cooked food safely	☐	☐	☐	☐	☐	☐
6.39	Store milk, maas and yoghurt safely	☐	☐	☐	☐	☐	☐
6.40	Store fresh fruit to preserve nutrient content	☐	☐	☐	☐	☐	☐
6.41	Store fresh vegetables to preserve nutrient content	☐	☐	☐	☐	☐	☐
6.42	Store and use oils and margarine to preserve nutrients and food safety	☐	☐	☐	☐	☐	☐

7. *PERCEPTIONS ON FOOD AND NUTRITION*

		True	False	I don't know
7.1	Healthy food is generally more expensive than junk food	☐	☐	☐
7.2	Frozen vegetables are healthy	☐	☐	☐
7.3	Starchy foods are fattening	☐	☐	☐
7.4	Energy drinks help you study	☐	☐	☐
7.5	Peanut butter is a good source of protein	☐	☐	☐
7.6	Powdered milk is less nutritious than fresh milk	☐	☐	☐
7.7	Coffee creamers like Cremora, are dairy products	☐	☐	☐

8. *NUTRITION AND FOOD INFORMATION AND PREFERENCES*

8.1 Would you be interested in receiving guidance from the UFS on the following: (Select all that apply to you)

☐ Healthy diet ☐ Budgeting skills ☐ Healthy eating on a tight budget
☐ Recipes ☐ Cooking skills

8.2 Indicate any other food and nutrition-related topics that you would like to receive guidance on?

8.3 If you would like to receive guidance on food-related issues, on which platforms would you prefer to receive it on? (Select all that apply to you)

☐ UFS101 / UFS1504 ☐ Gateway programme ☐ Blackboard
☐ Presentations at the residences ☐ KovsieFM ☐ Monthly newsletter (email)

8.4 Any suggestions for other ways that you would like to receive nutrition/budgeting/food preparation guidance?

8.5 If you chose any of the above, from whom would you want to get the information? (select all your preferences?)

☐ Lecturers ☐ Peers ☐ Qualified dietitians
☐ Dietetics students ☐ Consumer science students ☐ Other

8.6 Any suggestions for other people that you would like to receive nutrition/budgeting/food preparation guidance from?

8.7 In all honesty, if you had access to an outlet on campus that sold healthy, filling, ready-to-eat meals at a low, but realistic price, would you:

☐ Buy this healthy meal regularly ☐ Prefer to buy chips/hamburgers/ pizza at the campus fast food outlets ☐ Prefer to buy vetkoek / kwota at street vendors
☐ Prefer to cook for myself

8. *NUTRITION AND FOOD INFORMATION AND PREFERENCES* [Continue]

8.8 Would you be interested in buying basic food on campus from an online store?

☐ Yes ☐ No ☐ I don't know

8.9 If you would be interested in an online store for basic needs, what criteria would you like the online store to meet?

8.10 Would you be interested to buy fresh produce or healthy snacks from mobile/street vendors if the university could allow such vendors on campus (for example a stall that sells fruit / healthy snacks) or a vendor that walks around campus with fruit / healthy snacks to sell)?

☐ Yes ☐ No ☐ I don't know

8.11 If yes, what criteria would you like?

8.12 If you were to receive a stipend (amount earmarked) for food from whomever is paying for your studies, how would it help you best? if this amount is:

☐ Paid into your bank account ☐ Paid into a special card that you can only swipe for food (at discounted/subsidised prices)

9. FOOD SECURITY

***For next section of questions, it is very important that you think only about your experiences during the academic terms of the first semester of 2020, BEFORE LOCKDOWN** (regardless of your current situation)*
While studying at the UFS (before lockdown) evaluate the following three statements:

9.1 **'I worried whether my food would run out before I got money to buy more.'**

☐ Often true ☐ Sometimes true ☐ Never true

9.2 **'The food that I bought just didn't last, and I didn't have money to get more.'**

☐ Often true ☐ Sometimes true ☐ Never true

9.3 **'I couldn't afford to eat balanced meals.'**

☐ Often true ☐ Sometimes true ☐ Never true

9.4 **During the first semester of 2020, while studying at the UFS, did you ever cut down on the size of your meals or skip meals because there wasn't enough money for food?**

☐ Yes ☐ No

9.5 **If yes; how often did this happen?**

☐ Almost every month ☐ Some months, but not every month ☐ Only 1 or 2 months

9.6 **During the first semester of 2020, while studying at the UFS, did you ever eat less than you felt you should because there wasn't enough money for food?**

☐ Yes ☐ No

9.7 **During the first semester of 2020, while studying at the UFS, w**ere you ever hungry during the academic term, but didn't eat because there wasn't enough money for food?**?**

☐ Yes ☐ No

9.8 **During the first semester of 2020, while studying at the UFS, d**id you lose weight during the academic term, because you didn't have enough money for food?

☐ Yes ☐ No

9.9 **During the first semester of 2020, while studying at the UFS, d**id you ever not eat for a whole day, because there wasn't enough money for food?

☐ Yes ☐ No

9.10 **If yes, how often did this happen?**

☐ Almost every month ☐ Some months, but not every month ☐ Only 1 or 2 months

10. FOOD ASSISTANCE

10. FOOD ASSISTANCE [Continue]

10.1 **Would you apply for food assistance from the UFS (No Student Hungry bursary / food parcels)?**

☐ Yes ☐ No

10.2 **If no; why not?**

☐ I do not need it ☐ I need it, but I am too shy to apply ☐ I need it, but I am scared of being stigmatised

☐ I need it, but I do not know how/ where to apply for assistance ☐ Other reason

10.3 If other, please motivate?

10.4 If applicable to you, describe any other form of food assistance that you have utilised whilst studying at the UFS.

11. **Thank you for completing this survey. Your time and effort is greatly appreciated. Please click on 'submit' to finalise the completion of the questionnaire.**