UNIVERSITY STUDENT FOOD INSECURITY

IN THE WAKE OF

COVID-19

By

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Abstract: Food insecurity is a ubiquitous problem in the United States rooted in inequality. At a time when higher education credentials are an essential pathway to economic stability and social mobility, college costs have risen, household income has stagnated, and the purchasing power of financial aid has declined. As a result, many low-income students in pursuit of breaking the poverty cycle struggle to secure their basic needs. With the Covid-19 pandemic disproportionately affecting those who are already disadvantaged, this study examines what factors are associated with increases in student food insecurity. This mixed-methods study draws upon a survey that was distributed to a random sample of 5000 students between April 2nd and April 30th, 2020. The quantitative phase of the analysis incorporates bivariate and multivariate methods to examine perceived social support, bonding and bridging forms of social capital, living arrangements, financial factors, age, and gender. The qualitative phase analyzes open-ended questions, employing an inductive data-driven approach. Findings reveal that social support is a key determinant of student food insecurity, which is particularly important given that this relationship has been arguably overlooked in the literature. Students utilized bonding (i.e. family) more than bridging (i.e., food bank, university pantry, community fridge, and community hub/group) social ties to access food at that time as lockdown measures limited the availability of the latter. Students who lived alone were more likely to experience food insecurity than those who lived with others. Students who moved back home with their parents were able to mitigate the condition by being provided with food and other resources. The utilization of student loans was positively associated with increases in student food insecurity. Food accessibility issues pertaining to the availability and affordability of nutritionally adequate food stemmed from panic buying, financial hardship, lack of transport, lockdown restrictions, social distancing measures, and fear of exposure to the virus. Overall, the results presented in this thesis show that students who were socially and financially disadvantaged were at increased risk of food insecurity in the wake of Covid-19.

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CHAPTER I

INTRODUCTION

In an increasingly competitive and global economy, higher education credentials are an essential pathway for individual opportunity and financial security. Yet with tuition fees and living costs rising exponentially, students without the luxury of familial financial backing are forced to rely upon on loans, grants, and scholarships (Goldrick-Rab 2016). While arguably a necessary investment, the decreased purchasing power of financial aid can result in students having to prioritize their expenses and sacrifice basic needs (Goldrick-Rab 2016). Consequently, food insecurity – defined as "the limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways" (Andersen 1990) – is a ubiquitous problem among university students (Goldrick-Rab 2018). While students – regardless of socioeconomic status – are vulnerable to bouts of food insecurity as they grapple with independent living and financial responsibility, those from low-income families are less likely to have substantial financial and social support systems to help buffer against prolonged periods of food insecurity (Goldrick-Rab 2016:147-162; Patton-López et al. 2014). Therefore, students from impoverish backgrounds are more likely to suffer the negative effects of food insecurity, such as suboptimal health, poor academic performance,

and social isolation (Allen and Alleman 2019; Farahbakhsh et al. 2015; Purdam, Garratt, and Esmail 2016; Stebleton, Lee, and Diamond 2020; Patton-López et al. 2014; Van Woerden, Hruschka and Bruening 2018). As a result, they are less likely to graduate and risk being straddled with mounting debt without a degree, further perpetuating the cycle of poverty (Goldrick-Rab 2016:218-232; Payne-Sturges et al. 2018). With 90% of OSU's first-time freshman relying upon financial aid to fund their education (NCES 2019a), along with 70% of undergraduates coming from the state of Oklahoma (College Factual 2020), where one out of four children reside in a food insecure household (OHEC 2015), additional research is required to investigate factors that alleviate and exacerbate the condition to ensure that low-income students are being supported to succeed. Furthermore, with the Covid-19 pandemic disproportionately affecting those who are already disadvantaged (Mental Health Foundation 2020; Parker, Horowitz, and Brown 2020), it is important to examine its impact on student food insecurity.

While there is a broad body of literature on food insecurity (e.g. Long et al. 2020) and a growing number of studies on university student populations (e.g., Broton and Cady 2020; Goldrick-Rab 2016; Henry 2020), few have examined the impact of Covid-19 on student food insecurity (for exceptions, see Defeyter et al. 2020; Goldrick-Rab et al. 2020a; Niles et al. 2020; Owens et al. 2020). With campus closures, job loss, social distancing measures, and housing displacement – to name a few – unsettling the lives of students, it is important to identify the predictors of food insecurity during the onset of Covid-19 and to investigate student's experiences of it in light of the pandemic. The proposed research seeks to address this by examining the following question: *what factors are associated with*

increases in student food insecurity at Oklahoma State University (OSU) after the onset of Covid-19?

Employing a mixed-methods approach, this study investigates the research question in two stages drawing upon primary survey data collection and analysis. The survey – which broadly examined student food security/insecurity – was sent via email to 5,000 students at OSU between April 2nd – 30th, 2020. A total of 366 surveys were returned. In the first phase of the analysis, I use bivariate and multivariate methods to examine possible predictors of food insecurity, including financial factors (i.e., income and the utilization of student loans), social aspects (i.e., living arrangements and perceived social support), food access (i.e., family, food bank, university pantry, community fridge, community hub/group) and additional demographic attributes (i.e., gender and age). In the second phase, employing an inductive data-driven approach, I conduct an analysis of the qualitative open-ended questions from the survey to provide additional results to further address the research question.

The remainder of the thesis proceeds as follows. The literature review begins by providing a general background of food insecurity before discussing student food insecurity specifically and the impact of Covid-19. I then discuss my theoretical perspectives, drawing upon a conceptual model of food insecurity (Alaimo 2005), social exclusion theory, and social capital theory, which forms the basis for my hypotheses. Next, I outline my methodology, describing the research site, data collection and sampling approach, data preparation procedure, and analytic strategy. Finally, I present and discuss my results before drawing conclusions and providing recommendations.

CHAPTER II

REVIEW OF THE LITERATURE

Background on Food Insecurity

The following section provides a broad background on food insecurity that first describes how it is defined and measured before outlining focal points of the literature.

Defining Food Security and Insecurity

Food *security* is defined as "a situation that exists when all people, at all times, have physical, social, and economic access to so sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO 2001). The United States Department of Agriculture (USDA) outlines four levels in the range of food *security*: high, marginal, low, and very low (USDA ERS 2019a). High food security is described as having no reported indication of food limitations; marginal food security is having one or two reported indications, such as anxiety over food shortage, but with little or no impact on diet or food intake; low food security is having some reports of diet change, such as reduced quality or variety, but with little or no impact on food intake; very low food security is having multiple reports of disrupted eating patterns and reduced food intake (USDA ERS 2019a). Food *insecurity* is a complex issue, fundamentally characterized by

limited reliable access to nutritionally adequate food (USDA ERS 2020a). Depending on the level of severity, food insecurity can mean potentially or actually experiencing some or all of the following concerns on a short- or long-term basis: running out of food before being able to afford to buy more, not being able to afford a balanced diet, having to reduce portion size or skip meals, experiencing the physical sensation of hunger, not eating for a day or more, and losing weight (USDA ERS 2019a). These aspects are commonly measured quantitatively using surveys (Pérez-Escamilla and Segall-Corrêa 2008).

Measuring Food Security and Insecurity

The USDA's Household Food Security Survey Module (HFSSM) has been adopted by researchers, health officials, and policy makers on local and national scales across the United States, Canada, and the United Kingdom (ENUF 2019). The full survey module contains 18 questions and is ideally suited to households with children. The following shorter versions (containing 6 and 10 questions) are available for situations when the full module is extraneous: Six-Item Short Form version of the Household Food Security Survey Module, US Adult Food Security Survey Module, and Self-Administered Food Security Survey Module for Youth Ages 12 and Older (USDA ERS 2019b). There are also supplemental questionnaires to obtain additional information, such as coping strategies and the utilization of food assistance programs (USDA ERS 2019b). While the USDA's instrument is the most common approach to measuring food security, a number of surveys are used to asses food insecurity at national and individual levels, including the Food and Agriculture Organization of the United Nations (FAO) Food Insecurity Experience Scale, National Health and Nutrition Examination Survey (NHANES) Food Frequency Questionnaire (FFQ), Survey of Income and Program Participation (SIPP), and the Current

Population Survey Food Security Supplement (CPS-FSS) (Pérez-Escamilla and Segall-Corrêa 2008; USDA ERS 2020b).

Focal Points in the Literature

Current food insecurity literature traverses a wide range of disciplines including sociology, politics, economics, public health, nutritional science, social work, and psychology. As will be discussed, researchers, officials and activists have broadly investigated the *causes* of food insecurity, such as the neoliberalism (Alkon 2014; La Via Campesina 2009; Long et al. 2020) and inequality (Alwitt and Donley 1997; Beaulac, Kristanjansson and Cummins 2009; Hilmers, Hilmers, and Dave 2012; Long et al. 2020, Raja, Ma and Yadav 2008; Shaw 2006; Walker, Keane, and Burke 2009), as well as the *effects* on health and well-being (Gregory and Coleman-Jensen 2017; Gundersen and Ziliak 2015; Farahbakhsh et al. 2017; Frongillo et al. 2017; Jyoti, Frongillo and Jones 2005).

Neoliberalism

Neoliberalism – defined as "a theory of political economic practices that proposes that human well-being can best be advanced by liberating individual entrepreneurial freedoms and skills within an institutional framework characterized by strong private property rights, free markets, and trade." (Harvey 2005:2) – is often considered a major driver of increased food insecurity in developed wealthy capitalist countries, such as the United States (Alkon 2014; La Via Campesina 2009; Long et al. 2020). Following the presidential inauguration of Ronald Regan in 1981, the introduction of neoliberalism in the US was seen as a solution to a growing economic crisis resulting from years of inflation and sluggish economic growth during the post-World War II era. However, as neoliberal

policies privatized industries, deregulated the market, and the government withdrew its support for social provisions, unemployment rates increased and social welfare benefits decreased, causing a further rise in poverty and inequality, which still persists today (Harvey 2005:3). According to the US Census Bureau, in 2018, 38.1 million people, or 11.8% of the population lived below the poverty line (US Census Bureau 2020) – defined as half of the average income of the total population (OECD 2020a).

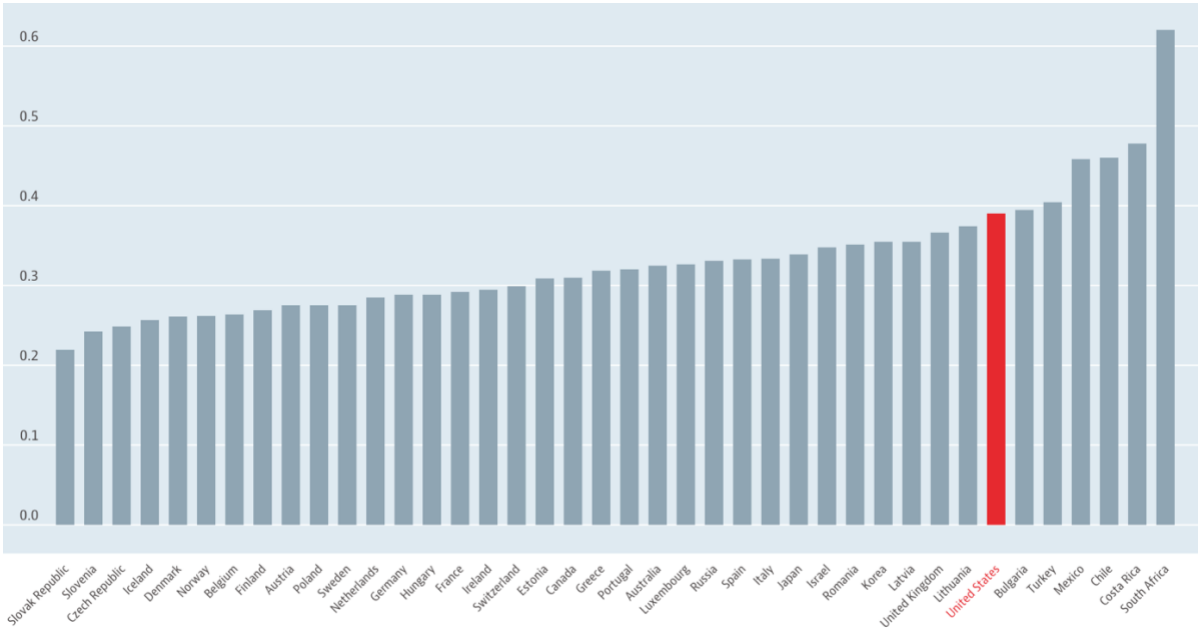
Throughout the neoliberal revolution, food has become increasingly commodified and corporatized beyond the control of citizens and communities on local and national scales (Riches 1999). Under the guise of "freedom" and "progress", neoliberal capitalism, it has been argued, has taken away livelihoods and resources, destroyed nature, and exploited those in poverty to gain wealth and control (La Via Campesina 2009). Aiding in this process is the neoliberal philosophy that civilian people should take responsibility for their own economic shortcomings rather than the government taking responsibility for their failures (Alkon 2014). Consequently, hunger has been depoliticized (Riches 1999). The tendency to assume that food insecurity only exists in developing nations is testimony to the extent of which it is removed from political and public discourse in affluent countries. In 2018, 14.5 million households in the US (11.1% of the population) experienced some degree of food insecurity (USDA ERS 2020d).

Inequality

After the global financial crisis of 2007-2008, austerity measures have caused the inequality gap to widen in many wealthy nations, including the US, UK, Australia, and Germany (OECD 2011). A major driver of rising inequality pertains to *income inequality*,

a dimension of social class, which refers to the uneven distribution of earnings among a population (Carter and Howard 2020). In the US, income inequality is commonly measured using the Gini coefficient, which ranges between 0 (indicating perfect equality) and 1(indicating perfect inequality) (US Census Bureau 2016). As shown in Figure 1, income inequality is higher in the US compared to other OECD countries, and the US is the highest among G7 countries (i.e., US, Canada, UK, France, Germany, Italy, and Japan).

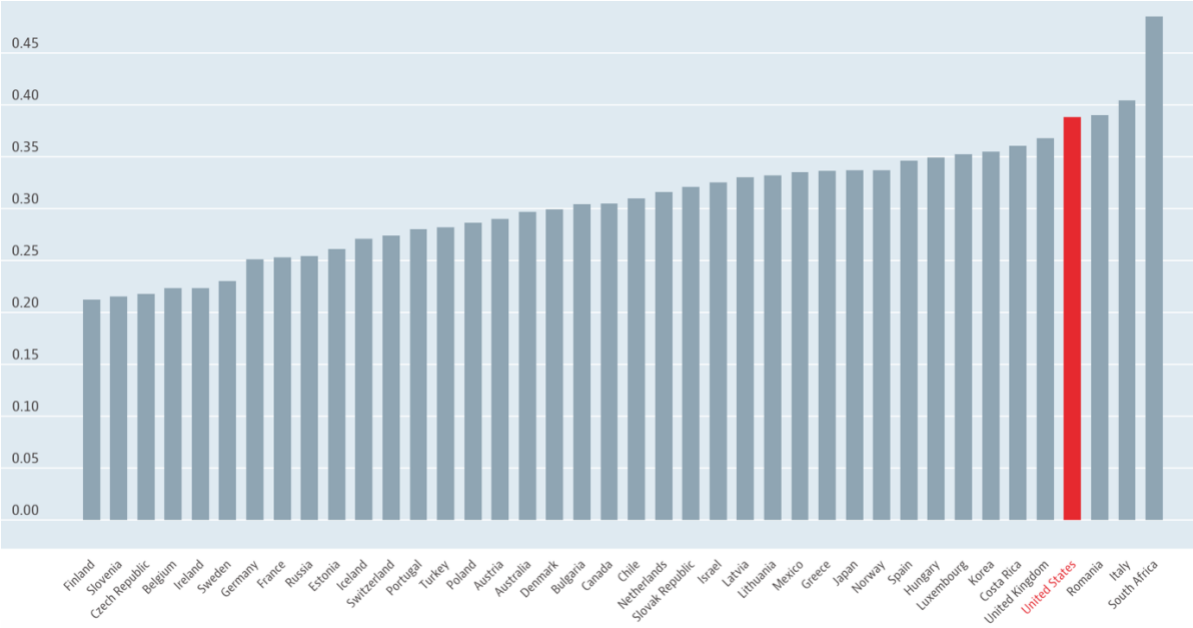
Figure 1. Income Inequality Across Various Nations



(OECD 2020b)

Consequently, the poverty gap, which refers to the ratio of which the average income of the total population falls below the poverty line, is also high in the US (OECD 2020a) (see Figure 2).

Figure 2. The Poverty Gap Across Various Nations



(OECD 2020a)

Within the US, income inequality has returned to levels of the Gilded Age since neoliberal policies have eroded efforts to make improvements, such as depreciating the value of the minimum wage, enacting neoliberal tax reforms that benefit the rich, and decreasing unionization (Saez and Zucman 2014; Carter and Howard 2020). Being a direct determinant of standard of living, income inequality can negatively impact one's ability to secure their basic needs (Carter and Howard 2020). When income is limited and one is forced to make sacrifices, food is often the first to be constrained (Edin and Lein 1997). Therefore, food insecurity is a growing problem among US households in the lower income quintiles (e.g. Elmes 2018); which disproportionately comprises of Black and Hispanic households (Kochhar and Cillufo 2018). To address the economic and social disparities in

food insecurity, I now turn attention to how class and race inequalities are structurally maintained, reproduced, and challenged within the food system.

The formation of "food deserts" – defined as "poor urban areas where residents cannot buy affordable, healthy food" (Cummins and Macintyre 2002:436) – is major cause of food insecurity in advanced capitalist nations, contingent upon economic and social inequalities exacerbated during the neoliberal revolution (Alwitt and Donley 1997; Beaulac, Kristjansson, and Cummins 2009; Walker, Keane, and Burke 2010). Food deserts are usually low-income neighborhoods in developed wealthy countries, segregated by economics, race and ethnicity, that lack nearby supermarkets and have limited options to buy healthy food (Raja, Ma and Yadav 2008). There are several theories regarding the development of food deserts in the US. Some hypothesize that capital investment in large supermarket retailers, such as Walmart, led to the expansion of stores on the outskirts of cities, where land is cheaper and more widely available (Walker, Keane, and Burke 2009). These large chain stores tend to be more affordable than small independent neighborhood grocery stores, which are often forced out of business as a result (Walker, Keane, and Burke 2009). In order to access more affordable supermarkets on the outskirts of the city, it is necessary for customers to own a car or to be able to afford public transportation (Walker, Keane, and Burke 2009). For many low-income, poverty-stricken households, this is simply not an option and they are forced to rely on locally available food sources, which tend to provide less nutritionally adequate food (Alwitt and Donley 1997; Shaw 2006). Another perspective suggests that the economic and conjointly racial/ethnic segregation that occurred during 1970's-80's, when more affluent (mostly white) households moved to the suburbs leaving low-income households (mostly people of color and minority groups)

in the inner-cities (Walker, Keane, and Burke 2009), was a major driver of the creation of food deserts. As the average household income decreased in inner-cities, local supermarkets were forced to close or reopen in suburban areas, where the median household income was higher, further enhancing unequal access to affordable healthy food (Alwitt and Donley 1997; Shaw 2006; Walker, Keane, and Burke 2009). In this respect, inequalities related to class and race are often intertwined in socio-spatial processes pertaining to food access.

Beyond the absence of supermarkets, underserved communities are disenfranchised from the food environment by their restriction of choice in food practices, which reflect and perpetuate class division (Alkon and Agyeman 2011; Bedore 2014; Caruso 2014). For example, in the US, locally produced organic food is largely consumed by those in the middle- and upper- classes, who can afford to base their dietary choices on preference and morality; whereas food consumption among the lower-classes is based on what is readily available and meets survival needs (Biltekoff 2012:232-254; Caraher and Coveney 2015:1-9; Gallager 2010). In low-income neighborhoods, these options are rather limited, with the food environment predominantly comprising of fast-food outlets and convenience stores (Hilmers et al. 2012). As a result, many low-income Americans suffer from obesity and malnutrition (Gregory and Coleman-Jensen 2017; Libman 2015:55-65; Shannon 2014; Troy, Miller and Olson 2011:33-50) for which they are stigmatized and condemned for their poor choices and individual failings (Bedore 2014; Caruso 2014; Shannon 2014). This not only affects their self-worth (Caruso 2014) but also their capacity to fully participate in society and the workplace to better their life-chances (Bedore 2014; Elmes 2018).

Addressing these issues is the concept of "food justice" - defined as "the struggle against racism, exploitation, and oppression taking place within the food system that addresses inequality's root cause both within and beyond the food chain" (Hislop 2014). Food justice is a grassroots approach to reducing inequalities in the food system initiated in and by low-income and racially segregated communities subjected to food oppression due to social and economic inequality. Its emergence has been accredited to the groundwork laid by the Delano Grape Strike and the Black Panthers Breakfast Program in the 1960s, as well as the farmer's strikes and the development of the Institute for Food and Development Policy in the 1970s (Cadieux and Slocum 2015). Food justice advocates for under-served communities with a focus on urban race, class, and gender issues mainly in North America and Europe as a means to attain a more socially justice food system (e.g., Cadieux and Slocum 2015; Dowler 2014:160-175). Initiatives involve tackling inequality surrounding the production, distribution, and consumption of food by promoting sustainable, agroecological, locally produced food sources, providing access to food and land, improving wages for agricultural workers, investing in underserved communities, establishing community-based businesses in the production, processing and retail of food, and encouraging a solidarity economy (Holt-Giménez 2010). While researchers in this field tend to agree on the failures of the corporate food system (Alkon 2014), there are some critiques regarding the *doing* of food justice. For example, the development of community gardens in underserved neighborhoods can be seen as an example of doing food justice (Obach and Tobin 2014; Okvat and Zautra 2011); however, there is a concern that urban agriculture projects contribute to gentrification, which may result in detrimental consequences as the price of once-affordable houses rise and low-income residents are

forced out of their homes (Marche 2015; Massey 2017). Furthermore, organizers of these programs tend to be white privileged individuals and the community participants are usually poor and people of color. Scholars point out that it is therefore necessary to explain *how* this is justice (Cadieux and Slocum 2015) when inequality is often at the forefront of such endeavors. It is therefore necessary to consider the implications of cross-class alliances. Although community and consumer support are necessary to help mobilize food justice movements and organizations (Gates 2017; Herrington and Mix 2019), researchers contend that it is not sufficient enough to create lasting changes at the macro level (Cadieux and Slocum 2015; Hislop 2014). Thus, food insecurity is a persistent problem in the US, along with food-related health conditions such as obesity, hypertension, coronary heart disease and diabetes (e.g. Gregory and Coleman-Jensen 2017).

Physical, Mental, and Social Health Implications

There is a large body of literature focusing on the health effects of food insecurity. Researchers have examined how food insecurity impacts food intake and diet quality (e.g. Hanson and Connor 2014), and the consequences on physical health (e.g. Gregory and Coleman-Jensen 2017). For example, low-income families who are exposed to food insecurity often run out of money to buy enough food at the end of the month as resources dwindle (Hamelin, Beaudry, and Habicht 2002; Kuhn 2018). This cyclical pattern of having adequate/inadequate food intake disrupts metabolism and causes weight gain (Laraia 2013; Jyoti et al. 2005). As the food budget tightens, families lean toward cheaper, energy-dense foods such as processed foods and carbohydrates, rather than fresh goods, which are usually more expensive to buy (Seligman, Laraia, and Kushel 2010; Laraia 2013); this has been known to both cause and worsen diabetes (Seligman et al. 2010). Other

health problems linked to food insecurity include asthma, obesity, hypertension, coronary heart disease, hepatitis, stroke, cancer, kidney disease, poor oral health and sleep deprivation (Gregory and Coleman-Jensen 2017; Gundersen and Ziliak 2015; Laraia 2013).

In addition to physical implications, food insecurity (and poverty in general) is associated with adverse mental health outcomes such as anxiety, depression, suicide ideation, cognitive difficulties, and behavioral problems (Alaimo, Olson and Frongillo 2002; Jyoti et al. 2005; Farahbakhsh et al. 2017; Gundersen and Ziliak 2015). For instance, parents in food insecure households feel anxious about the uncertainty of having enough food to last the month, which can intensify into panic as the cupboards become bare and they struggle to feed their children (Hamelin et al. 2002). Food insecurity among children is associated with impaired social skills, anti-social behavior and poor social relations (Connell 2004; Gennetian et al. 2016; Jyoti et al. 2005), largely stemming from disruptions in emotional and cognitive development due to adverse experiences they have endured growing up in poverty, such as less supportive social networks (Jensen 2009). For example, poverty-stricken households are often more crowded and parents have less time to dedicate to their children's needs. As a result, children are likely to rely on their peers for social and emotional support (Jensen 2009:8). Consequently, food insecure children are often less able than food secure children to control their behavior, get along with others, and establish and maintain friendships. Problem behaviors manifest externally and internally, such as acting-out or socially withdrawing (Jyoti et al. 2005). School disciplinary infractions, such as bullying and fighting, coincide with cyclical food insecurity (Gennetian et al. 2016; Kuhn 2018) and negatively impact academic outcomes (Jyoti et al. 2005). Food insecurity

among adolescents has been associated with dysthymia and suicidal behaviors (Alaimo et al. 2002). Perhaps unsurprisingly, a number of studies have verified that low levels of food security are association with low levels of subjective well-being (e.g., Connell et al. 2005; Frongillo et al. 2017).

Alienation is an emerging concern, resulting from frustration felt over not having control of the food situation and feeling the need to hide it due to embarrassment and stigmatization (Hamelin et al. 2002; Purdam et al. 2016; Reutter et al. 2009). For example, some people are discouraged from utilizing food assistance programs due to the fear of being viewed as "poor" (e.g., Purdam et al. 2016; Long et al. 2018). Instead, they may seek support from trusted members of their social network (e.g., family or friends) outside of the public eye to acquire resources, such as borrowing food or money (Bartfield and Collins 2017; Connell et al. 2005; Farahbakhsh et al. 2015). Those lacking support systems may be forced to go without or access food in socially unacceptable ways, such as pawning belongings or stealing food (Bartfield and Collins 2017; Farahbakhsh et al. 2015), increasing their risk of social exclusion.

Both children and adults experience social exclusion by not being able to take part in the social aspects of food and eating. For example, in many cultures it is common for children to celebrate their birthday socially with friends and family. The celebration traditionally involves a birthday cake, party food, and an exchange of gifts, which food insecure households struggle to provide (Hamelin et al. 2002; Meijs et al. 2019). Consequently, these children are unable to participate in the same culturally accepted traditions as their peers, resulting in social isolation at school (Meijs et al. 2019). In addition, households who experience food insecurity cannot afford to invite family and

friends over for dinner – not only due to lack of food but also the inability to provide culturally acceptable "status" victuals, such as cheese and wine – which diminishes their social network and leads to isolation (Hamelin et al. 2002; Healy et al. 2019).

Beyond Causes and Effects

Beyond exploring the causes and effects of food insecurity, researchers have examined policy making (Chilton and Rose 2009; WFP 2020), the mobilization of food assistance programs (Herrington and Mix 2019), the efficacy of interventions (Holley and Mason 2019; Gundersen, Kreider, and Pepper 2018; Long et al. 2018; Stretesky et al. 2020), and factors that drive and discourage individuals from utilizing food aid services (Prayogo et al. 2017; Purdam et al. 2016). Furthermore, they have measured the prevalence of food insecurity among various populations, including households (USDA ERS 2020c), low income neighborhoods (Hilmers et al. 2012), children (Connell et al. 2005; Graham et al. 2016; Holley and Mason 2019; Jyoti et al. 2005), the elderly (Wolfe et al. 1996; Lee and Frongillo 2001) and increasingly university student populations (e.g., Blagg et al. 2017; Broton and Cady 2020; Farahbakhsh et al. 2017; Goldrick-Rab, Sara. 2016; Henry 2020; Nazmi et al. 2019). While there is a plethora of food insecurity literature, few have examined the condition in light of Covid-19, particularly among students (for exceptions, see Defeyter et al. 2020; Goldrick-Rab et al. 2020; Niles et al. 2020; Owens et al. 2020).

Student Food Insecurity

According to annual surveys conducted by The Hope Center for College, Community, and Justice (hereafter referred to as The Hope Center), the rate of student food insecurity has been persistently high with 42-56% of students at two-year institutions and

33-42% at four-year institutions experiencing the condition between 2015-2019 (Goldrick-Rab et al. 2020a). A study conducted at OSU found that 42% of its students were food insecure with 16% experiencing low levels and 26% experiencing very low levels of food security (Balsiger 2016). Compared to the national average of household food insecurity at 11.1% (USDA ERS 2020c), the rate of student food insecurity is disproportionality high. In recognition of this problem, there is a growing body of research examining the predictors of student food insecurity (e.g., social class, financial independence, and the utilization of financial aid), coping strategies (e.g., applying for financial aid, seeking employment, living with others, and utilizing support networks), the effects on student outcomes (e.g., poor academic performance and diminished engagement in campus life) and how it is being addressed by colleges and federal programs (e.g., Broton and Cady 2020; Goldrick-Rab 2016; Henry 2020). The forthcoming section will review these findings before discussing the implications of Covid-19.

Financial Constraints

With the neoliberal ideology that individuals should take responsibility for their economic shortcomings being firmly instilled in the minds of society (Alkon 2014), coupled with higher education being fundamental to upward mobility, a substantial number of students come from economically disadvantaged backgrounds in pursuit of escaping the poverty cycle (Broton, Weaver, and Mai 2018; The Brookings Institution 2015). The share of undergraduates coming from poor families has risen from 12% in 1996 to 20% in 2016, accounting for a significant growth in college enrollment across the US (Fry and Cilluffo 2019). Despite efforts to improve college accessibility (e.g. The White House 2014), rising costs, income stagnation, and the decreased purchasing power of financial aid pose

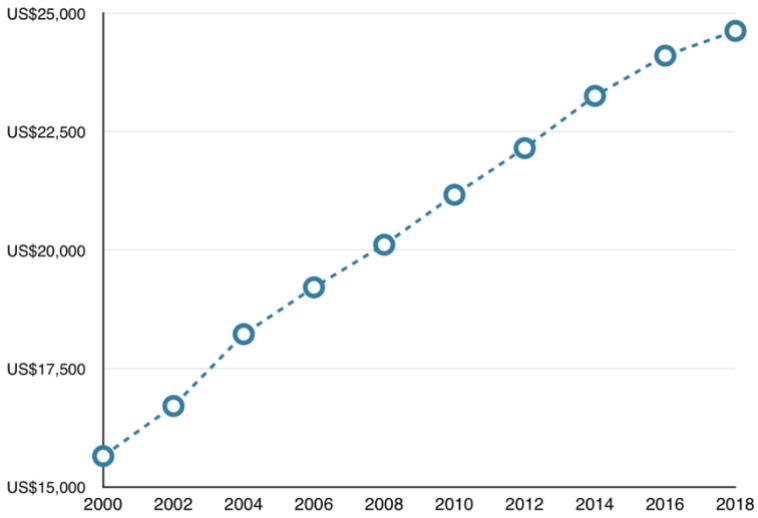
obstacles for low-income students who struggle to make ends meet. The following section will discuss financial constraints pertaining to financial independence, the inadequacy of financial aid, and implications surrounding employment.

Financial Independence

Evidence confirms that food insecurity is associated with financial independence (Broton et al. 2018; Bruening et al. 2017; Gaines et al. 2014), a situation commonly faced by students today (Dubick, Mathews, and Cady 2016). As will be discussed, this is largely due to the inability of low-income families to contribute toward their child's college education and changes in the "traditional" versus "nontraditional" student body.

Post-secondary education has become an increasingly necessary step in attaining employment security and financial stability, with jobs that once required a high school diploma now requiring a college degree. However, the cost of attaining a college degree (see Figure 3) creates barriers for low-income families.

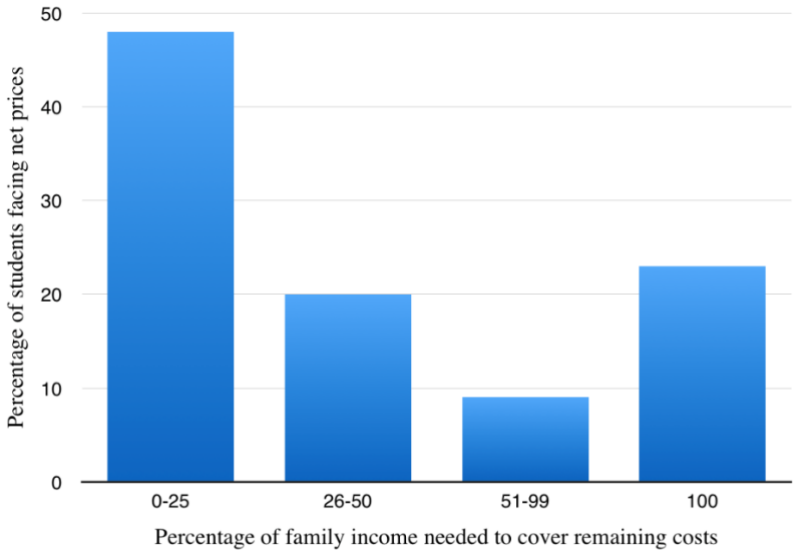
Figure 3. Rising College Costs Accounting for Tuition, Fees, Room, and Board



(based on NCES 2019b)

Simultaneously, annual household incomes have fallen, leaving families with fewer resources to contribute towards college costs (Kochhar and Fry 2015). Even after accounting for grant aid (e.g., scholarships and tuition discounts), families would still need to pay a significant fraction of their annual income to cover remaining net costs (i.e., tuition and fees, room and board, books, and supplies) (Kelchen 2018), as shown in Figure 4.

Figure 4. Net Price as a Percentage of Family Income in 2015-2016



(based on Kelchen 2018)

This places immense financial strain on low-income families – classified as earning less than 200% of the federal poverty dependent upon family size (NCCP 2020) - as illustrated in Table 1.

Table 1. Family Contribution Based on 2017 Federal Poverty Thresholds

Family Size	Low Income (< 200% of poverty level)	Required Contribution			
		0-25%	26-50%	51-99%	100%
1	<$24,120	$0-6030	$6271-12060	$12301-23878	$24,120
2	<$32,480	$0-8120	$8444-16240	$16564-32155	$32,480
3	<$40,840	$0-10,210	$10,618-20,420	$20,828-40431	$40,840
4	<$49,200	$0-12,300	$12,792-24,600	$25,092-48708	$49,200

(Based on HHS 2017; Kelchen 2018)

Increments in percentages correlate with the type of college attended, specifically public 2/4-year, private nonprofit 2/4-year, and private for-profit 2/4year institutions. A higher fraction of students from low-income families are attending community colleges and less selective four-year colleges than those from higher-income families to navigate costs (Fry and Cilluffo 2019). Nevertheless, the percent of students who are required to pay more than 100% of their family's total annual income to cover remining college costs has doubled since 2004 (Kelchen 2018). Without familial financial backing, low-income students have little option but to rely upon loans, find employment, or sacrifice basic needs to make ends meet (Goldrick-Rab 2016; Broton and Cady 2020:16-17).

The Inadequacy of Financial Aid

Student food insecurity is positively associated with receiving financial aid (Chaparro et al. 2009; Dubick et al. 2016; Gaines et al. 2014; Hughes et al. 2011; Payne-Sturges et al. 2018). While financial aid is geared to support low-income students, its purchasing power has depreciated significantly. For example, The Pell Grant – a needs-

based subsidy received by 40% of undergraduates from low-income families (Broton and Cady 2020) – has decreased by one-third at public institutions and one-quarter at private institutions during the last two decades, accounting for tuition and fees alone (NASFAA 2018) as illustrated in Figure 5.

Figure 5. Purchasing Power of the Pell Grant Accounting for Tuition and Fees

(NASFAA 2018)

After considering additional costs, such as housing, food, books, supplies, transport etc., it is estimated that the average annual cost of college comes to approximately $18,000 at two-year institutions and over $25,000 at four-year institutions, yet the maximum Pell Grant is only worth $6,345 and no longer stretches as far as it once did (Broton and Cady 2020:15-16; Federal Student Aid 2020a). Furthermore, the analysis of financial need tends to overestimate the amount that students are able to contribute toward their educational costs and underestimate costs of living; meaning that the amount they receive is inadequate for their actual needs (Broton and Cady 2020:16; Kelchen, Goldrick-Rab, and Hosch 2017). From another perspective, while evidence suggests that financial aid has insufficiently kept up with the true costs of college (Broton and Cady 2020:15-17), some

financial aid officers argue that students lack the skills to budget their finances and live within their means and have accused them of over-borrowing (Goldrick-Rab 2016:42) – though there is a lack of empirical evidence to support these claims.

Financial aid can come from a variety of sources including federal and state governments, educational institutions, and private organizations. Some accrue interest (i.e., federal and private loans), others do not have to be repaid (i.e., scholarships and grants) – so long as terms and conditions are met (e.g., good academic standing and course completion) (Federal Student Aid 2020b). There are four types of federal loans: direct subsidized loans for undergraduates who demonstrate financial need; direct unsubsidized loans for undergraduates and graduates, which is not based on financial need; direct PLUS loans for graduates, professional students, and parents of dependent undergraduates to help pay for educational costs not covered by financial aid, which is dependent upon credit history; and direct consolidation loans, which allows the borrower to combine multiple federal loans into a single loan (Federal Student Aid 2020b). The annual amount that students are able to borrow depends on which school year they are in and whether they are deemed financially dependent - which students age <24 are assumed to be (Henry 2017). There is also an aggregate loan limit, which once reached, cannot be surpassed; this ranges between $31,000 to $138,500 (Federal Student Aid 2020c). Beyond interest rates (between 2.75% and 4.30%), there are additional loan fees for direct subsidized and unsubsidized loans at 1.05% prior to 2019 (Federal Student Aid 2020c). As of 2019, the average college debt among US students was $32,731, although more than 600,000 borrowers had over $200,000 in outstanding debt (ValuePenguin 2020). For students who are able to achieve their goals of success, taking out a student loan or adhering to the terms of a

grant/scholarship is arguably a worthwhile investment. However, those who fail to keep up with loan requirements or leave college without a degree risk being straddled with mounting debt without the means to pay it off. Reflective of the current neoliberal environment, higher education has become an increasingly privatized market in which students are consumers and risk-taking entrepreneurs, responsible for their own successes and failures (Goodnight, Hingstman, and Green 2015; Kanade and Curtis 2019).

While financial aid has provided many low-income students with access to universities, some are deterred from completing the application process due to cumbersome bureaucratic hurdles. For example, the Federal Application for Federal Student Aid (FAFSA) selectively requests income verification for 30% of applicants in order to determine eligibility and low-income students are disproportionately targeted at increasing rates (Smith 2018). It is estimated that 22% (or 90,000) of low-income students who are selected annually for income verification will give up on their application (Smith 2018). Officials speculate that this is due to following reasons: 1) applicants have complicated family structures that make verifying information (e.g. parent's tax returns) a challenge; 2) delays resulting from having to source additional information cause them to miss their chance at "first come, first served" aid; and 3) applicants misinterpret that they are ineligible for financial aid upon receiving the verification notice (Smith 2018). Thus, further effort is needed to provide transparency and ease the application process of federal aid in order to provide low-income students with the support they are entitled to receive.

Implications of Employment

In addition to receiving financial aid, many low-income students are likely to work part time to pay for uncovered college costs, such as food and housing (Broton and Cady 2020:16; Farahbakhsh et al. 2015; Patton-López et al. 2014). Student employment, however, generally encompasses low-paid jobs requiring long hours to earn a meager wage. These positions are often unstable by lacking regular shifts and long-term job security (Broton and Cady 2020:16). Therefore, low-income students who find employment may be subjected to irregular income and sudden job loss, forcing them to sacrifice their basic needs when the budget gets tight – the burden of which affects their ability to focus on their education and engage in campus life. A study conducted by Goldrick-Rab (2016) revealed that a sample of 3,000 low-income students (classified as earning <$25,000 a year) at a public institution in Wisconsin struggled to secure their basic needs (such as food and housing) despite working excessive hours in part-time employment and putting their education on hold to save up money. Out of these students, more than half left college without a degree and less than 20% managed to finish their bachelor degree within four years (Goldrick-Rab 2016). Other studies uphold that low-income students are more likely to work long hours to cover college costs and have found that this negatively effects their grades, academic and social involvement, and likelihood of graduating (Allen and Alleman 2019; Orozco and Cauthen 2009; Pike, Kuh, and Massa-McKinley 2009). On the other hand, some students have mitigated food insecurity by finding work in an establishment that provides free meals (Henry 2020:35). Therefore, students must weigh up the benefits and the costs of undertaking employment while attending college. Nevertheless, students who work while attending school have a higher rate of food

insecurity than those who do not (Blagg et a. 2017; Freudenberg et al. 2011; Patton-López et al. 2014; Soldavini, Berner, and Da Silva 2019).

Social Factors

For students who are unable to secure their basic needs despite applying for financial aid and seeking employment, having a social support network to fall back on can help alleviate food insecurity. Sources can include informal networks, such as family, friends, neighbors, or spouse/partner and formal networks, such as food aid programs (Hadley et al. 2007; Interlenghi and Salles-Costa 2013; Wolfe et al. 1996). This section will outline how social factors shape student food insecurity, focusing on aspects pertaining to living arrangements and social exclusion.

Living Arrangements

Studies indicate that types of living arrangements are associated with student food insecurity (Broton et al. 2018; Chaparro et al. 2009; Dubick et al. 2016:9-10; Gallegos, Ramsey and Ong 2014; Maroto, Snelling and Linck 2015; Martinez et al. 2018; Micevski, Thornton and Brockington 2014; Mirabitur et al. 2016; Morris et al. 2016). In general, students who live with their parents or relatives are less likely to experience food insecurity than those who do not (Chaparro et al. 2009; Gallegos et al. 2014; Hughes et al. 2011; Maroto et al. 2015; Martinez et al. 2018; Micevski et al. 2014; Morris et al. 2016). This is due to the financial benefits associated with familial dependence, such as spending less on housing costs (Chaparro et al. 2009; Martinez et al. 2018), having transport to access affordable food sources (Hughes et al. 2011), and meals provided for by family members (Farahbakhsh et al. 2017; Morris et al. 2016). In a study examining food insecurity at 42

colleges in Wisconsin, Broton et al. (2018) found that students who lived off-campus with their parents had a 26% chance of food insecurity compared to 37% who lived off campus with others, and 23% who lived on campus.

Although students who live on campus (most commonly freshman) usually have access to a meal plan, it should not be assumed that they are protected from food insecurity (Martinez et al. 2018). In a report examining 43,000 students in 66 institutions across 20 states, Goldrick-Rab et al. (2018) found that 26% of students living on campus with a meal plan experienced food insecurity. Similarly, in a study examining food insecurity among 3,800 students at 34 institutions, Dubick et al. (2016) found that 43% of students enrolled in meal plans experienced food insecurity. Meal plans can be insufficient as they are tiered and chosen on the basis of financial means rather than nutritional needs. Consequently, students with limited finances choose the most basic meal plan – as low as eight meals per week - which is not enough to cover their dietary needs without additional supplementation (Bruening et al. 2017; Broton et al. 2018; Martinez et al. 2018; Watson et al. 2017). Furthermore, students who live in campus dorms report having inadequate kitchen equipment to store and prepare food, forcing them to buy unhealthy processed food (Henry 2017; Watson et al. 2017). Without transport, they are limited to campus food sources, which tend to be more expensive than those off-campus, especially without a meal plan (Broton et al. 2018). Nevertheless, those who live on campus are considered to be in a better financial position than those who live off campus due to the high costs associated with the former (Broton et al. 2018; Goldrick-Rab 2016; Goldrick-Rab et al. 2018).

Students who live off campus without their parents are at a higher risk of food insecurity compared to those who live with their parents or on campus (Broton et al. 2018;

Goldrick-Rab et al. 2018; Martinez et al. 2018; Morris et al. 2016; El Zein et al. 2019). Some suggest this is due to challenges associated with financial independence, such as experiencing difficulty paying rent and utilities, which are often covered by parents for those living at home and by the housing package for those living on campus (Goldrick-Rab et al. 2015; Martinez et al. 2018; El Zein et al. 2019; Riddle, Niles, and Nickerson 2020). In addition to struggling with financial management, (El Zein et al. 2019), students who live off-campus sometimes lack cooking skills, resulting in unhealthy eating habits (Bruening et al. 2017; Hughes et al. 2011; Riddle et al. 2020); whereas students who have others to cook their meals for them are less likely to be food insecure than those who cook for themselves (Hughes et al. 2011). Interestingly, studies show a rise in food insecurity among students in and beyond their junior year, the point at which many have transitioned from the relative safety net of campus accommodation (i.e., not having to worry about rent or utilities and having a meal plan) to off-campus independent living (Martinez et al. 2018; Riddle et al. 2020). Correspondingly, students have advocated for the need for universities to teach life skills, including financial management and food preparation skills, in order to better prepare them for this change (Watson et al. 2017). It is also important to consider that a large number of students living off-campus with others are likely to fit the "non-traditional" profile, meaning they are financially independent, have one or more dependents to provide for, are a single parent, do not have high school credentials, delayed postsecondary enrollment, or are employed full-time (NCES 2015). Given these challenges, it is not surprising that they are likely to face financial hardship and an increased risk of food insecurity as they support themselves to attend college.

The correlation between food insecurity and living alone is considerably higher than living with others, regardless of relationship (Maroto et al. 2015). This is presumably due to having no-one to share housing costs with (e.g., rent and utilities) as well as resources (e.g., food, kitchen equipment, food preparation skills, and transport) that affect food affordability and accessibility (Henry 2017; Hughes et al. 2011).

Social Exclusion

While having a social support system to fall back on to borrow money or access food can help mitigate food insecurity (Hughes et al. 2011; Martinez et al. 2018), the condition is associated with social exclusion (Healy 2019; Mejis et al. 2019). Social exclusion is a process involving "the lack or denial of resources, rights, goods and services, and the inability to participate in the normal relationships and activities, available to the majority of people in a society, whether in economic, social, cultural or political arenas." (Levitas et al. 2007:9). Students experience social exclusion in a number of ways, largely stemming from a perceived sense of poverty-related stigma, which inhibits their ability to access food assistance programs, form social relations, and take part of the full college experience (Allen and Alleman 2019; El Zein 2018; El Zein et al. 2019; Henry 2017; Stebleton et al. 2020).

In a study examining food insecurity across eight US universities, El Zein et al. (2019) found that 77.8% of food insecure students did not utilize campus food pantries. Similarly, at the University of Florida, 72% of food insecure students reported not using the on-campus food pantry (El Zein et al. 2018). While there are several reasons for this, such as student's not being aware that the resource exists, a lack of information regarding

eligibility, feeling those resources are not meant for them (i.e. that others are worse off), and inconvenient hours of operation, the major cause stems from fear of stigmatization (El Zein 2018; Henry 2017). For example, students are concerned that they will be seen and judged by their peers (Henry 2017) and are more likely to utilize an on-campus pantry if they are provided discretion and privacy (El Zein et al. 2019; Henry 2017). Students also prefer to use on-campus rather than off-campus food pantries as they view them as a student rather than community resource (Dubick et al. 2016). The same phenomenon can be seen in other instances regarding financial aid, for example, The US Government Accountability Office (GAO) estimates that out of the 3.3 million students who are potentially eligible for the Supplemental Nutrition Assistance Program (SNAP) less than half participate (GAO 2018).

Food insecure students try to conceal their struggles from their peers due to shame and embarrassment (Allen and Alleman 2019; Henry 2017; Stebleton et al. 2020). Allen and Alleman (2019), found that students made excuses for not eating, such as saying they were on a diet. One student bought groceries that they would not usually buy when friends visited so it did not appear that the cupboards were bare or that they could not afford to eat "normally". Many avoided food-related social situations, such as going out for lunch or dinner with friends, which affected their ability to form social relations. As a result, they were less likely to cultivate the same social capital as their wealthier peers. Unfortunately, many food insecure students do not realize that their experiences are a shared struggle, which contributes to feelings of isolation (Stebleton et al. 2020). However, those who are able to confide in friends benefit from emotional support, a sense of solidarity (Allen and Alleman 2019), and access to food (Hughes et al. 2011; Martinez et al. 2018).

Demographic Attributes

In addition to those previously discussed (i.e., financial situation, employment status, and living arrangements), the relationship between food insecurity and several other demographic attributes have been examined. These include gender, age, and race and ethnicity.

Gender

Associations between gender and student food insecurity have produced mixed findings. The nation's largest study on student food insecurity conducted by The Hope Center (Goldrick-Rab et al. 2018), found that female and non-binary students experienced higher levels of food insecurity compared to male students (37%, 46%, and 28% respectively). Similarly, Martinez et al. (2018) found that females experienced higher rates of food insecurity than males (67%, 32%). Riddle et al. (2020), found no association between food insecurity and female or male students, however, a significant correlation between food insecurity and transgender or non-binary students. On the other hand, some studies have failed to find a significant correlation between student food insecurity and gender (Chaparro et al. 2013; Gaines et al. 2014; Hughes et al. 2011; Maroto et al. 2015).

Regarding coping strategies, one study found that female students were more likely to utilize personal networks, take out payday loans, or steal in order to access food; whereas males were more likely to go without (Henry 2017). In addition, a higher fraction of female students are employed compared to males (BLS 2018). In terms of nutrition, female students have a higher intake of fruit and vegetables than males (including those who are

food insecure), which they contribute to healthy eating habits being associated with femininity (De Backer et al. 2019; Mirabitur et al. 2016; Ruby and Heine 2011).

Age

Age is a risk factor for student food insecurity (Freudenberg et al. 2011; Martinez et al. 2018; Payne-Sturges et al. 2018). Martinez et al. (2018) found that students age 17-24, experienced a significantly higher rate of food insecurity than those 25-34 and 35+ (79%, 17%, and 3% respectively). This could be due to difficulties accessing financial aid resulting in an increased risk of financial instability and therefore food insecurity. As previously discussed, federal student aid considers students age <24 to be financially dependent (Henry 2017), however, a significant fraction are financially independent (i.e. Dubick et al. 2016) yet still required to provide their parent's financial information, which can be challenging (Smith 2018). In addition, Henry (2017) found that older students (age 23-49) are more likely to report a dietary requirement (e.g., food allergy, vegetarianism, and anemia) that impacts their food budget and level of food insecurity.

Race and Ethnicity

Research shows that race and ethnicity is a predictor for food insecurity among college students, with students of color consistently identified as experiencing higher levels of food insecurity than white students (e.g., Broton et al. 2018; Dubick et al. 2016; Freudenberg et al. 2011; Maroto et al. 2015; Martinez et al. 2018). For example, in a study set within two community colleges in Maryland, US, Maroto et al. (2015) found that African American students were twice as likely as white students to be food insecure (61% and 32% respectively) – which is reflective of the situation among the general US

population (USDA ERS 2020d). They also found that 71% of multi-racial and 50% Hispanic and Asian students were food insecure. Among 10 University of California campuses, Martinez et al. (2018) found that Hispanic students (1.8) faced the highest odds of food insecurity followed by non-Hispanic Black (1.7), mixed race/other (1.4), Asian (1.3), and non-Hispanic white students (1.0). At the University of Hawai'i in Mānoa, Chaparro et al. (2009) found that Hawaiians/Pacific Islanders (38%) and Filipinos (33%) had the highest rates of food insecurity, followed by mixed-race/white (24%), Chinese (16%), other (15%), and Japanese (8%) students.

Implications of Covid-19

In March 2020, OSU – like most educational institutions in the US – commenced lockdown measures to help prevent the spread of Covid-19. In-person classes went online, residence halls were emptied where feasible, campus amenities were closed or at reduced capacity, services were held remotely, and events were canceled or held virtually (OSRHE 2020). Amid these unexpected disruptions, students experienced job loss or reduced income, and emergency resources failed to meet their needs (Goldrick-Rab et al. 2020). Evidence shows that "exogenous shocks" or "tipping points" are associated with an increased risk of food insecurity, particularly those that destabilize one's financial situation (Gundersen, Kreider, and Pepper 2011; Gaines et al. 2014; Henry 2020:28-29). Gaines et al. (2014), found that 42% of food insecure students had experienced some form of disturbance in their life that had led to their current situation. Similarly, Henry (2020) found that 40% of food insecure students had experienced a life changing event that had caused them to become financially unstable. Evidence suggests that low-income students who lack emergency resources to endure unexpected financial hardship are at significantly higher

risk of food insecurity (Gaines et al. 2014; Henry 2020:28-29). Therefore, low-income students who were previously food secure may now be facing food insecurity due to crises arising from the pandemic.

A recent study conducted by The Hope Center (Goldrick-Rab et al. 2020) found that Covid-19 intensified basic needs insecurity among students. Through conducting a survey among 38,000 students between April 20th – May 5th, 2020, they found that 33% had lost their job, 15% experienced homelessness, and 38% experienced food insecurity due to the pandemic (Goldrick-Rab et al. 2020). Out of the 58% of students facing basic needs insecurity, only 15% applied for SNAP and 15% for emergency aid – largely due to misunderstandings regarding eligibility (Goldrick-Rab et al. 2020). Furthermore, recognized correlates of student food insecurity prior to the pandemic, such as students with children experiencing high levels of food insecurity compared to those without children (Goldrick-Rab, Welton, and Coca 2020), showed a lack of relationship after the pandemic (Goldrick-Rab et al. 2020), suggesting that the outbreak of Covid-19 has problematized assumptions about food insecurity, such as who experiences it and how it occurs. Thus, further research is required.

CHAPTER III

THEORETICAL PERSEPCTIVES

Conceptual Model of Food Insecurity

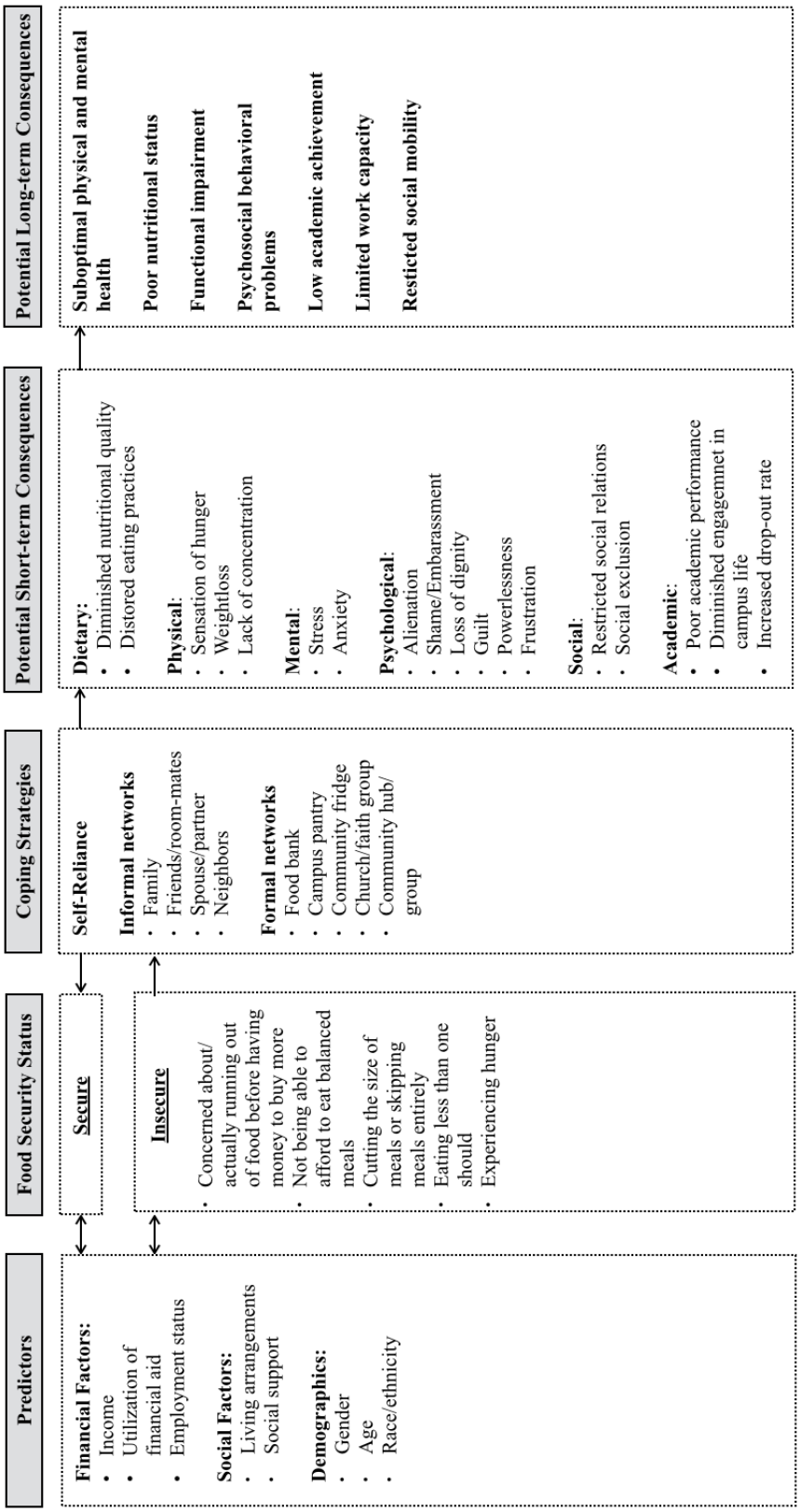
Predictors of student food insecurity during the Covid-19 outbreak are somewhat unknown. However, Alaimo (2005) provide a conceptual model for understanding the condition among the general population, which I expand upon. The original framework was developed by synthesizing findings from a number of ethnographic studies conducted in the US and Canada dating back to the 1980s, which examined how low-income families experienced food insecurity. The model outlines the condition of food insecurity as well as risk factors, coping strategies and potential short- and long-term consequences. The condition of food insecurity is defined similarly to that of the USDA, pertaining to restricted access to a suitable diet regarding quantity, quality, variety, and social acceptability. Increased risk factors include financial hardship, employment, social support, sociodemographic aspects (such as age, race/ethnicity, and family structure), as well as food skills, kitchen equipment, and transport. Coping strategies are categorized into three sections: "self-reliance" (e.g. stretching out food to make it last), "informal bartering" (e.g. social support networks), and "formal institutions" (e.g. food assistance programs).

The consequences of food insecurity include physical, mental, cognitive, and academic/employment related outcomes.

Figure 6 presents the student-specific adaptation of the conceptual model. Contingent upon the literature, predictors include: financial factors, including as income (Broton et al. 2018; Elmes 2018; Patton-López et al. 2014), the utilization of financial aid (Chaparro et al. 2009; Dubick et al. 2016; Gaines et al. 2014; Hughes et al. 2011; Martinez et al. 2018; Payne-Sturges et al. 2018), and employment status (Blagg et a. 2017; Freudenberg et al. 2011; Patton-López et al. 2014; Soldavini et al. 2019); social factors, namely, living arrangements (Broton et al. 2018; Chaparro et al. 2009; Dubick et al. 2016:9-10; Gallegos, Ramsey and Ong 2014; Maroto et al. 2015; Martinez et al. 2018; Micevski et al. 2014; Mirabitur et al. 2016; Morris et al. 2016) and social support (Broton et al. 2018; Frongillo et al. 2003; Hadley et al. 2007; Interlenghi and Salles-Costa 2014; Sharifi et al. 2017; Wolfe et al. 1996); and demographic attributes, such as gender (Broussard 2019; Goldrick-Rab et al. 2018; Martinez et al. 2018), age (Freudenberg et al. 2011; Martinez et al. 2018; Payne-Sturges et al. 2018), and race/ethnicity (Broton et al. 2018; Dubick et al. 2016; Freudenberg et al. 2011; Maroto et al. 2015; Martinez et al. 2018). While it was necessary to add to original model to make it student specific, it was also necessary to remove irrelevant factors. For example, I did not include “health insurance" as students at OSU are provided access to university health services. Regarding the condition of food insecurity, I employ the classifications outlined in the USDA’s Six-Item Short Form list (USDA ERS 2019b) rather than those suggested by Alaimo (2005). While they are similar, the former is widely used in current quantitative studies (i.e. Goldrick-Rab, Broton, and Eisenberg 2015; Martinez et al. 2018; Patton-López et al. 2014)

and considered an accurate description. Guided by the literature, I closely follow the coping strategies outlined in the original model which pertain to sources and forms of social support. However, the examples provided are contingent upon those likely utilized by students, such as family, friends, and spouse/partners. Similarly, much of the potential short- and long-term consequences are comparable to those in the original model with the addition of student specific outcomes, such as poor academic performance, increased drop-out rate (Martinez et al. 2018), and diminished engagement in campus life (Stebleton et al. 2020).

Figure 6. Conceptual Model of Student Food Insecurity - adapted from Alaimo (2005)



While the adapted model provides a framework for understanding food insecurity among students under "normal" circumstances, Covid-19 poses complexities that have yet to be understood. Although many of the predictors are likely to operate as expected, some of these assumptions maybe overturned. For example, among the student population, being employed is usually associated with food insecurity (Blagg et a. 2017; Freudenberg et al. 2011; Patton-López et al. 2014; Soldavini et al. 2019). However, as businesses and organizations closed to prevent the spread of the virus, many individuals suffered job loss (Parker et al. 2020). As students tend to hold jobs that offer little security (Broton and Cady 2020:16), those who relied on part-time work to secure their basic needs are likely to face sudden unemployment, increasing the risk of food insecurity. Therefore, the association between employment status and student food insecurity at the time may be obscured. In addition, students aged 19-24 usually experience a higher degree of food insecurity than those in older age groups (Martinez et al. 2018). However, changes in circumstances may alter this finding. For example, students with children may now have more mouths to feed since schools closed, exposing them to food insecurity. Similarly, students with older children who were previously independent, may once again be dependent after having to move back home due campus closures, job loss etc., putting pressure the family's resources. Thus, Covid-19 is likely to have acted as a "tipping point", intensifying pre-existing food insecurity and pushing students who previously had high/marginal levels of food security to an increased risk of low/very low levels. Further research is therefore necessary to establish the leading predictors at that time. I address this by investigating the following research question:

- *Research Question*: what factors are associated with increases in student food insecurity at OSU after the onset of Covid-19.

Based on the findings of existing literature, this study examines the following hypotheses:

- *Hypothesis 1*. Low income status will be positively associated with student food insecurity.
- *Hypothesis 2*. The utilization of financial aid will be positively associated with student food insecurity.
- *Hypothesis 3*. Students who live with their parents will experience lower levels of food insecurity than those who do not live with their parents.
- *Hypothesis 4*. Students who live alone will report higher levels of food insecurity than those who live with others.
- *Hypothesis 5*. Females will be more likely to experience food insecurity than males.
- *Hypothesis 6*. Students age 18-24 will experience higher levels of food insecurity than those aged 25 and above.

A caveat should be considered with regard to the hypotheses: there is no hypothesis regarding race and ethnicity because the instrument did not include this measure.

Social Exclusion Theory

Drawing upon social exclusion theory, I explore the effects of social support on student food insecurity. Stemming from the work of Max Weber ([1922] 1978:43-46) and Emile Durkheim (Durkheim and Bellah 1973:63-113), social exclusion can be viewed as a socially constructed multi-dimensional process, by which unequal power relations operating at macro- and micro- levels embolden structural inequality and reinforce barriers

that prevent certain – less powerful – groups of people from fully accessing the rights and opportunities available to others (Lister 2004:75-76). As outlined by the Bristol Social Exclusion Matrix, potential domains of social exclusion include *resources* (i.e., economic/material and social resources, and access to public and private sectors), *participation* (i.e., in economic, social, political, civic, and cultural contexts, as well as the opportunity to develop education and skills), and *quality of life* (including health and well-being, living environment, crime, harm, and criminalization), which operate as both risk-factors and outcomes (Levitas et al. 2007:10). Thus, social exclusion is suitably characterized as, "a short-hand term for what can happen when people or areas suffer from a combination of linked problems such as unemployment, poor skills, low incomes, poor housing, high crime environment, bad health, and family breakdown" (Social Exclusion Unit 2001:11).

Social exclusion theory has largely been used to frame literature applying rights-based approaches with an emphasis on poverty (Jordan 1996; Gallie, Paugam, and Jacobs 2010), equal opportunity (Carr and Chen 2004; Rees 1998; Lewis and Lockheed 2008), access (Cass, Shove, and Urry 2005; Gacitúa-Marió and Woolcock 2008; Healy 2019; Meijs 2019), social mobility (Cass et al. 2005; Gacitúa-Marió and Woolcock 2008), and discrimination (Byvelds and Jackson 2019; Gacitúa-Marió and Woolcock 2008; Reutter et al. 2009). Within the realm of food insecurity, social exclusion theory has been applied to explore the role of food in social life and to understand the social and cultural deprivations that accompany food poverty (Healy 2019; Mejis et al. 2019). Incorporating these approaches, this study draws upon social exclusion theory to frame student food insecurity not only in terms of food access and social/cultural participation, but in the broader arena

of the institution to understand the factors that restrict low-income students from accessing equal opportunity in education and breaking the cycle of poverty. Furthermore, by integrating a rights-based approach, an emphasis is placed the violation of Article 25 and 26 in the United Nations Declaration of Human Rights (UN General Assembly 1948), which pertain to the basic rights to food and education.

Social Capital Theory

Engaging social capital theory, I explore how social connections impact food insecurity outcomes. Originally developed by sociologists, Bourdieu (1985) and Coleman (1988), the concept of social capital has been applied and expanded upon across various fields, including political science (e.g., Fukuyama 2000; Hooghe and Stolle 2003; Putnam 2000), business and economics (e.g., Boisot 1995; Gittell and Vidal 1998; Häuberer 2011), psychology (e.g., Perkins and Long 2002), agriculture (Sseguya, Mazur, and Flora 2018), and nutritional science (e.g., Martin et al. 2004). In this study, I consider social capital as a concept involving one's ability to access resources embedded in social networks, the fundamental assumption being that participation in social groups provides opportunities to share and secure assets.

Credited to Gittell and Vidal (1998), Putnam (2000) identifies two important dimensions of social capital, *bonding* and *bridging*. Bonding refers to social ties that link members of interrelated groups, examples pertain to kinship, race, religion, social economic status, and political partisanship. Shared norms and shared values facilitate social cohesion and trust, which drives reciprocity between group members (Flora, Flora and Gasteyer 2016:165-170; Hofferth and Iceland 1998; Putnam 2000:47-48). In the realms of

food insecurity, this could involve sharing food, transportation, and pooling resources (Paul, Paul, and Anderson 2019). Bridging describes social ties that are formed across diverse social cleavages, such as neighborhood communities, government organizations, and civil rights movements (Putnam 2000:47-48). Regarding food insecurity, this could involve utilizing local food pantries or benefiting from government aid programs, such as SNAP (Paul, Paul, and Anderson 2019). While social capital can help mitigate food insecurity (Chriest and Niles 2018; Paul et al. 2019; Sseguya et al. 2018; Martin et al. 2004), the condition is also associated with social exclusion (Chase and Walker 2012; Healy 2019; Meijs et al. 2019; Reutter et al. 2009), which inhibits one's ability to form social ties. Thus, it is expected that food insecure students have diminished social networks to turn to for support.

Theoretical Synthesis

Incorporating social exclusion theory and social capital theory, I explore how social ties impact the outcome of securing food (i.e., mitigating food insecurity). In this sense, I view social networks as a form of social capital at the individual level embedded in social relations. "Bonding" refers to the social ties that link members of interrelated groups, such as family. "Bridging" refers to those that are formed across broad social networks, such as a local food bank or university pantry. As values, beliefs, and attitudes shape the extent to which members may access the group's resources (Bhandari and Yasunobu 2009), it is expected that one's ability to acquire food from various forms of social networks will depend on the degree to which they experience social exclusion, such as isolation, stigmatization, and distrust. Furthermore, with businesses and organizations having to close due to lockdown restrictions along with emergency resources not yet made being

available at the start of the pandemic, it is conceivable that forms of bridging social networks were less accessible at that time.

Based on theories pertaining to social exclusion and social capital, I hypothesize:

- *Hypothesis 7*. Students who perceive higher levels of social support will report lower levels of food insecurity.
- *Hypothesis 8.* Students will utilize bonding social ties more than bridging social ties to access food at that time.

CHAPTER IV

METHODOLOGY

Research Site

The study is part of a larger project between four universities in the US and UK, specifically OSU, University of Northumbria, The University of Sheffield, and Ulster University. This document focuses only on data collected at OSU, a public research institution in Stillwater, Oklahoma. University enrollment includes 20,307 undergraduate students and 3,690 graduate students. 96% of undergraduates and 55% of graduates are in full-time education. 51% of the overall student population identify as female and 49% as male (information regarding other gender identities is unknown). Regarding race, 67% of students identify as white, 10% multi-racial, 8% Hispanic, 4% Black or African American, 4% American Indian or Alaska Native, and 2% Asian. International students comprise 5% of the student body, the majority of which being from China (20%), India (15%), Kuwait (11%), and Saudi Arabia (10%) (OSU IRA 2020).

Data Collection and Sampling

Upon receiving approval from the institutional review board (IRB) at OSU (see Appendix A), I received the email addresses of a random sample of 5,000 undergraduate

and graduate students. The survey (see Appendix B) – which asked about student's experiences at that time (including student profile living arrangements, financial situation, employment status, food situation, well-being, and perceived social support) – was first emailed (see Appendix C) to the sample of students on April 2nd, 2020, and a reminder was sent out on April 7th. Students were informed that their participation was voluntary and that I did not know of any risks associated with taking part. I disclosed that by completing the survey, students were giving consent for the data to be used and would be provided confidentiality by removing identifying information. There was an incentive to be drawn for one of ten $25 Amazon gift-cards for completing the survey; winners were selected randomly and sent their reward via email. Those who decided to take part were directed to the online survey platform, Prolific. A total of 366 surveys were completed.

Data Preparation

To prepare for analysis, it was necessary to perform some data management in the form of cleaning and editing to ease the process of coding and transcribing, prevent errors, and maintain quality of research. Responses were inspected individually by the researcher. Potential mistakes/outliers (such as unrealistically high monthly expenditure on accommodation and non-existing zip-codes) were tagged. Vague responses, namely, "same as before" were rectified where possible. Multiple choice responses were restructured by creating separate columns for each answer, rather than having them all stacked in a single column/cell. "Other" responses were reviewed to determine whether new categories should be created. Open-ended questions were examined; nonsensical responses and those containing no viable information (e.g., "not at this time", "no thank you,") were deleted. Identifying information (i.e. email addresses) were also removed. Finally, applicable

responses were coded for quantitative analysis and the open-ended questions were transcribed for qualitative analysis. Thus, the research question is addressed by integrating mixed-methods.

Quantitative Data

The quantitative phase involved constructing measures of food insecurity and social support based on questions pertaining to the USDA's Six-Item Short Form list (USDA ERS 2019b) and the Multidimensional Scale of Perceived Social Support (MSPSS) (Zimet et al. 1988), respectively.

Food Insecurity Scales

The primary dependent variables in this study are the food insecurity scales that were constructed by adding together data pertaining to the USDA's Six-Item Short Form list (USDA ERS 2019b) - a measure that has been implemented in previous studies within university populations (i.e., Allen and Alleman 2019; Goldrick-Rab et al. 2015; Martinez et al. 2018; Patton-López et al. 2014). The short form version is considered a reliable alternative to the full version by the USDA (USDA ERS 2019b) and was employed in this study as it is less of a burden to complete and is better suited to the research population. The original questionnaire includes a contingency question, which asks how often respondents cut meals. As the data exhibited a low frequency of responses for this question, I decided against including it in the analysis. Furthermore, rather than creating a scale that combined all of the 5 food insecurity questions together, I decided to create two scales, which depict the level of food insecurity (question 1-2) and coping mechanisms (question 3-5). This helped navigate small sample size issues as those who had never experienced

food insecurity did not answer questions 3-5, and also added an interesting dimension to the analysis. The level of food insecurity scale indicates the extent to which students experienced food insecurity. The coping mechanisms scale signifies the degree to which those who experienced the condition utilized strategies to cope with it – which is also indicative of the severity level. The food insecurity scales consist of student's responses to the following statements and questions, which were contextualized following the outbreak of Covid-19 in the US and assessed using a Likert scale.

Level of food insecurity scale:

1. The food that I bought just didn't last and I don't have money to get more (0= 'never true', 1= 'sometimes true', 2= 'often true', 8= 'don't know', 9= 'prefer not to say')
2. I can't afford to eat balanced meals (0= 'never true', 1= 'sometimes true', 2= 'often true', 8= 'don't know', 9= 'prefer not to say')

Coping mechanisms scale:

3. Have you ever cut the size of your meals or skipped meals because there wasn't enough money for food? (0= 'no', 1= 'yes', 8= 'don't know', 9= 'prefer not to say')
4. Did you ever eat less than you felt you should because there wasn't enough money for food? (0= 'no', 1= 'yes', 8= 'don't know', 9= 'prefer not to say')
5. Were you ever hungry but didn't eat because there wasn't enough money for food? (0= 'no', 1= 'yes', 8= 'don't know', 9= 'prefer not to say')

For analysis purposes, 'don't know' and 'prefer not to say' responses were recoded as missing cases. Higher scores are indicative of lower degrees of food security (USDA ERS 2012). In the level of food insecurity scale, 0 represents high food security, 1 - marginal

security, 2-3 – low security, and 4 – very low food security. In the coping mechanisms scale, 0 represents no coping strategies employed, and 1– 3 represents the number of coping strategies employed. The level of food insecurity scale showed good internal reliability with Cronbach's alpha value of 0.7645 (mean= .930, st. dev= 1.188); as did the coping mechanisms scale with Cronbach's alpha value of 0.8369 (mean = 9.79, st. dev= 1.208). The descriptive statistics for the components of the food insecurity scales are reported in Table 2.

Table 2. Descriptive Statistics for the Components of the Food Insecurity Scales and Social Support Scale

	Mean	St. Dev.	Min	Max	*n*	Cronbach's Alpha
Level of food insecurity						0.7645
Food didn't last	.328	.552	0	2	338	
Couldn't afford to eat balanced meals	.635	.760	0	2	348	
Coping mechanisms						0.8319
Had to cut or skip meals	.396	.490	0	1	217	
Ate less than should	.377	.486	0	1	212	
Didn't eat when hungry	.226	.419	0	1	217	
Social support scale						0.9146
There is a special person around when I am in need	3.856	1.195	1	5	355	
There is a special person with whom I can share my joys or sorrows	3.915	1.148	1	5	354	
My family really tries to help me	4.082	1.00	1	5	353	
I get the emotional help and support I need from my family	3.734	1.148	1	5	354	
A have a special person who is a real is a source of comfort to me	3.887	1.201	1	5	353	
My friends really try to help me	3.765	1.002	1	5	353	
I can count on my friends when things go wrong	3.780	1.044	1	5	353	
I can talk about my problems with my family	3.571	1.177	1	5	354	
I have friends with whom I can share my joys or sorrows	3.991	1.017	1	5	352	
There is a special person in my life who cares about my feelings	3.946	1.229	1	5	352	
My family willing to help make decisions	3.975	1.001	1	5	354	
I can talk about my problems with friends	3.963	1.052	1	5	352	

Social Support Scale

Social support was measured using the Multidimensional Scale of Perceived Social Support (MSPSS) (Zimet et al. 1988), which has predominately been used across the field of health (i.e., Hameed et. al 2013; Jenkins et al. 2013; Sharifi et al. 2017; Zimet et al. 1988) and has been found to have strong validity and reliability (Zimet et al. 1990). While other conceptions of social support exist, such as the network model and the received

support model (Sarason, Sarason, and Pierce 1990), researchers have found that perceived social support is a better predictor of outcomes (Barrera 1986; Dunkel-Schetter and Bennet 1990; Sarason, Sarason, and Pierce 1990; McDowell and Serovich 2007). The MSPSS consists of 12 items which measure perceived social support from different sources, namely, family, friends, and significant other. Traditionally, these aspects are assessed using a 7-point Likert scale ('very strongly disagree', 'strongly disagree', 'mildly disagree', 'neutral', 'mildly agree', 'strongly agree', 'very strongly agree'). For ease of formatting and filling out the survey, I decided to collapse it to a 5-point Likert scale. Thus, the scale of social support consists of student's responses to the following statements (1= 'strongly disagree', 2= 'disagree', 3= 'neutral', 4= 'agree', 5= 'strongly agree'):

1. There is a special person who is around when I am in need
2. There is a special person with whom I can share my joys and sorrows
3. My family really tries to help me
4. I get the emotional help and support I need from my family
5. I have a special person who is a real source of comfort to me
6. My friends really try to help me
7. I can count on my friends when things go wrong
8. I can talk about my problems with my family
9. I have friends with whom I can share my joys and sorrows
10. There is a special person in my life who cares about my feelings
11. My family is willing to help me make decisions
12. I can talk about my problems with my friends

The total scores for answering these statements depict low (12-36), moderate (37-48), and high (49-60) levels of perceived social support. The scale of social support shows good reliability, with a Cronbach's alpha value of 0.9146 (mean= 46.474, st. dev= 2.234). The descriptive statistics of social support scale components are reported in Table 2.

Income

Income is an ordinal that consists of brackets of income ranges: 1= 'Less than $5,000', 2= '$5,000 to $9,999', 3= '$10, 000 to $14,999', 4= '$15,000 to $19,999', 5= '$20,000 to $24,999', 6= '$25,000 to $29,999', 7= '$30,000 to $34,999', 8= '$35,000 to $39,999', 9= '$40,000 to $49,999', 10= 'More than $50,000' (mean= 2.713, st. dev= 2.194). In the multivariate analysis, income is transformed into its natural log (ln) form because the untransformed version is skewed (skewness = 1.733). Table 3 contains the descriptive statistics for the variables in the analysis.

Table 3. Descriptive Statistics for Variables in the Analysis

	Mean	St. Dev.	Min	Max	*n*	Skewness
Level of food insecurity scale	.930	1.188	0	4	328	1.068
Coping mechanisms scale	.979	1.208	0	3	190	.708
Social support scale	46.474	9.534	12	60	348	-.747
Income	2.713	2.194	1	10	363	1.733
Student loan	2.026	1.864	0	5	305	.289
Age	1.317	.718	1	5	363	2.453
Dichotomous Categorical Variables	Percentages					
Live with parents	3.30%					
Do not live with parents	96.70%					
Live alone	19.50%					
Do not live alone	80.50%					
Gender: female	70.91%					
Gender: male	29.09%					
Accesses food through family	86.45%					
Does not access through family	13.55%					
Accesses food through food bank	9.03%					
Does not access through food bank	90.97%					
Accesses food through university pantry	5.16%					
Does not access food through university pantry	94.84%					
Accesses food through community fridge	1.94%					
Does not access through community fridge	98.06%					
Accesses food through community hub/group	3.23%					
Does not access through community hub/group	96.77%					

Student loan

The utilization of student loans is an ordinal variable that was measured by asking students the extent to which they used this form of financial support to meet their university expenses. Responses involved a 6-point Likert scale, ranging from 0= ‘none’, 1= ‘very little’, 2= ‘less than half’, 3= ‘about half’, 5= ‘all or nearly all’ (mean= 2.026, st. dev= 1.864).

Live with parents

Living with parents is a dichotomous variable where living with parents is coded as 1 (*n*= 3.30%) and not living with parents is coded as 0 (*n*= 96.70%). Although the sample size was small for the former category of this variable (*n*= 5 for 'live with parents', *n*= 166 for 'do not live with parents'), I decided to include it in the analysis as it is a substantive predictor of food insecurity.

Live alone

Living alone is a dichotomous variable where living alone is coded 1 (*n*= 19.50%) and not living alone is coded as 0 (*n*= 80.50%)

Gender

Gender was originally measured as a nominal variable with 3 categories where 0= 'male', 1= 'female', and 2= 'nonbinary'. However, it was recoded dichotomously as there were only three non-binary folks in the sample, which limited findings from being extrapolated. Therefore, gender is a dichotomous variable where 0= 'male' (*n*= 29.09%) and 1= 'female' (*n*= 70.91%).

Age

Age is an ordinal variable consisting of brackets of age groups where 1= '18-24', 2= '25-29', 3='30-39', 4= '40 or older' (mean= 1.317, st. dev= .718). In the multivariate analysis, age is transformed into its natural log (ln) form because the untransformed version is skewed (skewness = 2.453).

Bonding social ties

Bonding social ties pertain to a question that asked students whether or not they accessed food by a means other than purchasing it from food shop/grocery store, specifically through their family. This dichotomous variable is coded 0= 'no' (*n*= 13.55%) and 1= 'yes' (*n*= 86.45%).

Bridging social ties

Like bonding social ties, forms of bridging social ties pertaining to questions that asked students whether or not they accessed food by a means other than purchasing it from food shop/grocery store. These dichotomous variables are coded 0= 'no' and 1= 'yes'. They include accessing food through a food bank (*n*= 9.03%, 90.97%, respectively), university pantry (*n*= 5.16%, 94.84%, respectively), community fridge (*n*= 1.94%, 98.06%, respectively) and community hub/group (*n*= 3.23%, 96.77%), respectively.

Qualitative Data

To further support quantitative findings and to provide additional data to address the research question, I conduct a qualitative analysis involving the following three open-ended questions from the survey: 1) "Has your diet changed as a result of the coronavirus? If yes, in what way?"; 2) "Has coronavirus changed your food shopping in any other way? If yes, how?"; 3) "Is there anything else that you would like to share with us about the affordability, adequacy, healthiness, or otherwise of your shopping habits at this current time?". Following a data-driven inductive approach, initial coding was based on the questions themselves to open-up the data, consisting of broad themes such as the ways in which students' diet and shopping changed after the outbreak. The transcripts were then

re-read, coding categories were refined based on the themes that emerged from the data, and preliminary sub-codes were assigned. Consequently, broad themes began to include more specific content. Throughout the process of developing a coding framework, "memoing" – a strategy outlined by Karp (see Hesse-Biber 2017: pp.142-144), was adopted to help think more deeply about the data process, about what fits and what does not. Detailed memos were recorded after every analysis session on a digital word document, which provided ample space to develop and organize ideas and allowed for easy storage and retrieval of previous notes and codes. In the early stages, memos were short and simple but took on more depth as the analysis developed. This constant dialogue and reflexivity with the data stimulated creativity and allowed for the emergence of new and unexpected insights and directions. As new themes began to emerge, I once again reflected upon them and aimed to disprove them in order to capture complexities and deviances, as well as establish plausible patterns. After gathering a solid understanding of the data and reaching a point of saturation (i.e. when no new codes arose in the data), I conducted inter-coder reliability checks to affirm that my analysis made sense. Appendix D displays the finalized coding frame.

Analytic Strategy

The purpose of this study is to examine potential factors associated with student food after the onset of Covid-19. To address the research question and to test the associated hypotheses, I conduct statistical analyses using bivariate correlations and Ordinary Least Squares (OLS) regression to examine multivariate associations using STATA version 16.0 (StataCorp 2019). For the bivariate analysis, I use the Pearson correlation coefficient and *t*-tests to examine the relationship between variables. I then control for other possible

explanations of food insecurity by conducting a multivariate analysis with OLS regression. The multivariate analysis comprises of four models. Models 1 and 2 test the levels of food insecurity scale dependent variable and models 3 and 4 test the coping mechanisms scale dependent variable. In models 1 and 3, the independent variables include income (H_1), gender (H_5), age (H_6), the utilization of student loans (H_2), live with parents (H_3), and live alone (H_4). In models 2 and 4, the independent variables include the social support scale (H_7), and accessing food through family (H_8). I did not to include a fully saturated model as the sample sizes for the overall models became too small.

I tested the assumptions of OLS regression to make sure that data was suitable for analysis (Gujarati and Porter, 2009). First, to test for multicollinearity, I examined Variance Inflation Factor (VIF) for all the independent variables in all four models. All VIF values were under 1.2, well below the recommended values for meeting the assumption. Second, I examined the normality of residuals with the inspection of histograms and through the Jargue-Bera (JB) test for normality. In two instances the JB test was rejected, suggesting the possibility of non-normal errors, however, the samples sizes were large enough where this should not meaningfully affect the results (see, the Lindberg-Feller Central Limit theorem; Gujarati and Porter 2009). Finally, a visual inspection of the histogram of residuals did not suggest a violation of the assumption of homoscedasticity.

In addition to quantitative analysis, I conduct a qualitative analysis of open-ended questions using Nvivo 12 (QSR International 2021). The purpose is not only to provide triangulation and facilitate validity, but to bring context to quantitative findings and to discover additional factors, providing more evidence to help answer the research question and associated hypotheses.

The qualitative findings are organized and presented following guidelines outlined by Schreier (2012:219-240). The findings are organized by categories rather than cases as they are data-driven and the coding frame is an important result. The findings are presented using continuous text, which is appropriate given that the categories are described one after an another. Each category section includes a summary of underlying concepts, illustrated by quotes.

CHAPTER V

RESULTS

Bivariate Results

In Table 4, the relationships between interval ratio variables are assessed with correlations. The bivariate correlation indicates support for H_7, displaying a significant negative correlation between social support and both the level of food insecurity (r= -0.2801, p<0.01) and coping mechanisms (r= -0.1798, p<0.05). This suggests that increases in social support are associated with lower levels of food insecurity. H_1 is supported, with a significant negative correlation between income and food insecurity (r= -0.1259, p<0.05), suggesting that increases in income are associated with lower level of food insecurity. H_2 is also supported with a significant positive correlation between the utilization of student loans and food insecurity (r= 0.1787, p<0.05), suggesting that the more students rely on student loans to meet their university expenses, the more likely they are to experience food insecurity. There was no support provided for H_6, displaying an insignificant negative correlation with age (r= -0.0845).

Table 4. Bivariate Correlation Matrix with Food Insecurity Scales

	1	2	3	4	5	6
Level of food insecurity (1)	1.000					
Coping mechanisms (2)	0.6502**	1.000				
SS scale (3)	-0.2801**	-0.1798*	1.000			
Income (4)	-0.1259*	-0.0894	-0.0266	1.000		
Student loan (5)	0.1787**	0.0156	-0.0131	0.0013	1.000	
Age (6)	-0.0845	-0.0645	0.0043	0.5733**	0.0217	1.000

Note: **p<0.01, *p<0.05

In Table 5, the comparisons of means for dichotomous variables pertaining to the level of food insecurity scale are assessed using independent samples *t*-tests. Students who live with their parents (mean= .444) reported a lower mean than those who do not live with their parents (mean= .944). While this suggests that those who do not live with their parents experienced a higher degree of food insecurity than those who do, support for H_3 was not provided (t= 1.2442, p= 0.2143). Students who live alone (mean= 1.279) reported a higher mean than those who live with others (mean=.850) and support for H_4 was observed (t= -2.8582, p= 0.0108). Females (mean= 1.043) were more likely to experience food insecurity than males (mean= .634) and support for H_5 was provided (t= -2.8510, p= 0.0046).

In an examination of the frequencies of the variables measuring bonding (accesses food through family: n= 124/does not access food through family: n= 19) and bridging social ties (accesses food through food bank: n= 13/does not access food through food bank: n= 130; accesses food through university pantry: n= 8/ does not access food through university pantry: n= 135; accesses food through a community fridge: n= 3/ does not access food through a community fridge: n= 140; accesses food through a community hub/group: n= 5/ does not access food through a community hub/group: n= 138), support for H_8 is provided, with more students relying on their families to access food at that time. Interestingly, bridging social ties were barely utilized at all, which further lends support to

H_8. Due to the small frequencies of the variables associated with bridging, I decided against including them in the multivariate analysis. Before doing so, I tried combining them in a scale, however, the Cronbach's alpha value was very low, indicating that the scale would be unreliable.

The impact of various forms of social ties on the level of food insecurity displayed interesting results. Students who accessed food through family (mean= .919) experienced lower levels of food insecurity than those who did not (mean= 1.526) (t= 2.0587, p= 0.0414), suggesting that family support acted as a buffer against food insecurity. Students who accessed food through a food bank (mean= 1.923) reported a higher levels of food insecurity than those who did not (mean= .908) and the result is statistically significant (t= -2.9620, p= 0.0036). While this suggests that food insecure students indeed utilized food banks at that time, it also shows that it was not enough to mitigate the condition. Similarly, students who accessed food through a community hub/group (mean= 2) experienced higher levels of food insecurity than those who did not (mean= .964), however, this result was not significant (t= -1.8979, p= 0.0598). Accessing food through a university pantry (mean= 1.625) and through a community fridge (mean= 1.667) was also associated with higher levels of food insecurity, however, the results are not significant (t= 0.1333, p= 0.1333, t= -0.9640, p= 0.3367, respectively).

Table 5. T-tests for Dichotomous Variables Associated with the Level of Food Insecurity Scale

Dichotomous Variables	*n*	Mean	St. dev	t-value	df	Pr
Live with parents (1)	9	.444	.726	1.2442	326	0.2143
Do not live with parents (0)	319	.944	1.196			
Live alone (1)	61	1.279	1.440	-2.5636	326	0.0108
Do not live alone (0)	267	.850	1.110			
Gender: female (1)	231	1.043	1.243	-2.8510	322	0.0046
Gender: male (0)	93	.634	.953			
Accesses food through family (1)	124	.919	1.166	2.0587	141	0.0414
Does not access through family (0)	19	1.526	1.389			
Accesses food through food bank (1)	13	1.923	1.441	-2.9620	141	0.0036
Does not access through food bank (0)	130	.908	1.151			
Accesses food through university pantry (1)	8	1.625	1.188	-1.5100	141	0.1333
Does not access through university pantry (0)	135	.963	1.206			
Accesses food through community fridge (1)	3	1.667	.577	-0.9640	141	0.3367
Does not access through community fridge (0)	140	.986	1.217			
Accesses food through community hub/group (1)	5	2	1.870	-1.8979	141	0.0598
Does not access through community hub/group (0)	138	.964	1.174			

Table 6 displays the comparisons of means for dichotomous variables pertaining to the food insecurity coping mechanisms scale, which are assessed using *t*-tests. Students who live with their parents (mean= .571) reported a lower mean than those who do not live with their parents (mean= .995). While this suggests that those who do not live with their parents experienced a higher degree of food insecurity than those who do, support for H_3 was not provided (t= 0.9088, p= 0.3646). Students who live alone (mean= 1.447) experienced a higher degree of food insecurity than those who live with others (mean= .862) and support for H_4 was observed (t= -2.7167, p= 0.0072). Females (mean= 1.050) experienced higher levels of food insecurity than males (mean= .862), however, support for H_5 was not provided (t= -1.4813, p= 0.1402).

In an examination of the frequencies of the variables measuring bonding (accesses food through family: n= 70/does not access food through family: n= 9) and bridging social ties (accesses food through food bank: n= 7/does not access food through food bank: n=

72; accesses food through university pantry: *n*= 4/ does not access food through university pantry: *n*= 74; accesses food through a community fridge: *n*= 3/ does not access food through a community fridge: *n*= 76; accesses food through a community hub/group: *n*= 3/ does not access food through a community hub/group: *n*= 76), support for H_8 is provided, with more students relying on their families to access food at that time. Similarly, bridging social ties were barely utilized at all, which further lends support to H_8. Again, due to the small frequencies of the variables associated with bridging, I decided against including them in the multivariate analysis.

While the impact of various forms of social ties on coping mechanisms displayed similar results to those on level of food insecurity in terms of means, these findings are not statistically significant. Students who accessed food through family (mean= .1.071) experienced lower levels of food insecurity than those who did not (mean= 1.778) (*t*= 1.5834, *p*= 0.1174). Students who accessed food through a food bank (mean= 2) reported a higher levels of food insecurity than those who did not (mean= 1.070) (*t*= -1.878, *p*= 0.0642). Students who accessed food through a university pantry (mean= 1.75) reported higher levels of food insecurity than those who did not (mean= 1.12) *(t*= -0.9648, *p*= 0.3376). Those who accessed food through a community fridge (mean= 1.667) reported higher levels of food insecurity than those who did not (mean= 1.132, *t*= -0.7125, *p*= 0.4783). Students who accessed food through a community hub/group (mean= 1.666) reported higher levels of food insecurity than those who did not (mean= 1.132, *t*= -1.7125, *p*= 0.4783).

Table 6. T-test for Dichotomous Variables Associated with the Coping Mechanisms Scale

Dichotomous Variables	*n*	Mean	St. dev	t-value	df	Pr
Live with parents (1)	7	.571	.976	0.9088	188	0.3646
Do not live with parents (0)	183	.995	1.216			
Live alone (1)	38	1.447	1.309	-2.7167	188	0.0072
Do not live alone (0)	152	.862	1.157			
Gender: female (1)	139	1.050	1.253	-1.4813	186	0.1402
Gender: male (0)	49	.755	1.031			
Accesses food through family (1)	70	1.071	1.277	1.5834	77	0.1174
Does not access through family (0)	9	1.778	1.093			
Accesses food through food bank (1)	7	2	1.414	-1.878	77	0.0642
Does not access through food bank (0)	72	1.070	1.237			
Accesses food through university pantry (1)	4	1.75	1.5	-0.9648	77	0.3376
Does not access through university pantry (0)	74	1.12	1.262			
Accesses food through community fridge (1)	3	1.667	1.528	-0.7125	77	0.4783
Does not access through community fridge (0)	76	1.132	1.269			
Accesses food through community hub/group (1)	3	1.666	1.528	-1.7125	77	0.4783
Does not access through community hub/group (0)	76	1.132	1.269			

Based on the bivariate results, I found preliminary support for H_1, H_2, H_4, H_5, and H_7. There is also support for H_8 when looking at the variable frequencies.

Multivariate Results

Table 7 displays the results from the regression models. Models 1 and 2 pertain to the level of food insecurity scale and models 3 and 4 refer to the coping mechanisms food insecurity scale. In model 1, increases in student loans are associated with increases in food insecurity (b= .120, p= 0.003): a one unit increase in the utilization of student loans leads to .120 increase in the level of food insecurity (on a scale from 0-4), holding income, gender, age, and living arrangements constant. This finding supports H_2. The remaining independent variables in the model (i.e., income, living with parents, living alone, gender, and age) did not have a statistically significant association with the level of food insecurity and did not provide support for H_1, H_3, H_4, H_5, or H_6, respectively. In model 2, increases in social support are associated with decreases in food insecurity (b= -.031, p= 0.003): a

one unit increase in the level of perceived social support leads to a -.031 decrease in the level of food insecurity (on a scale from 0-4), holding accessing food through family constant. This finding supports H_7. Accessing food through family failed have an association with the level of food insecurity which does not provide support for H_4. In model 3, living alone is associated with higher levels of food insecurity (b= .530, p= 0.035): a one unit increase in living alone leads to a .530 increase in the utilization of coping strategies (on a scale from 0-3), holding income, gender, age, the utilization of student loans, and living arrangements constant. This finding provides support for H_4. The remaining independent variables in the model (i.e., income, the utilization of student loans, living with parents, gender, and age) failed to have an association with the utilization of coping mechanisms and did not provide support for H_1, H_2, H_3, H_5, or H_6, respectively. In model 4, none of the independent variables (i.e., income, the utilization of student loans, living with parents, living alone, gender, age, and accessing food through family) have an association with the utilization of coping mechanisms. These findings do not provide support for H_1, H_2, H_3, H_4, H_5, H_6, or H_7, respectively.

Based on the regression models, support is provided for H_2, H_4, and H_7.

Table 7. Ordinary Least Squares Regression Coefficients (*b*) and Standard Errors (SE) for Independent Variables in the Analysis

	Model 1 *Level of Food Insecurity Scale*		Model 2 *Level of Food Insecurity Scale*		Model 3 *Coping Mechanisms Scale*		Model 4 *Coping Mechanisms Scale*	
	b	SE	*b*	SE	*b*	SE	*b*	SE
Demographics								
Income (natural log)	-.057	.121			.007	.162		
Gender	.242	.163			.276	.223		
Age (natural log)	-.305	.236			-.478	.314		
Financial Aid								
Student loan	.120**	.040			-.010	.052		
Living Arrangements								
Live with parents	-.458	.413			-.420	.465		
Live alone	.302	.188			.530*	.249		
Social Support Scale			-.031**	.010			-.010	.013
Bonding Ties								
Food access: Family			-.537	.298			-.690	.529
Constant	.579**	.167	2.920**	.540	.777**	.238	1.843*	.763
F	3.56**		6.46**		1.53		1.41	
Adjusted R^2	0.0549		0.0749		0.0197		0.0106	
N	265		136		160		77	

Note: **p<0.01, *p<0.05

Qualitative Results

From the qualitative analysis (see Appendix E), the most common themes regarding the causes of student food insecurity during the onset of Covid-19 pertain to *food accessibility* (34% coverage), *social support* (12% coverage) and *financial status* (7% coverage). Evidence of food insecurity emerged throughout various themes, involving concerns about running out of food, not being able to eat balanced meals, having to cut the size of meals, and skip meals entirely. Many of the categories in the coding frame are related in terms of being a cause or consequence of one another.

Food accessibility issues arose from the limited *availability* and *affordability* of nutritional food, largely due to panic buying and lockdown restrictions. Cheaper staple

items that were likely to be consumed by those already food insecure, such as bread, rice, and pasta, were often out of stock:

> "As someone who makes many rice-based dishes regularly, it's been very hard to eat because everyone keeps taking the rice."

> "My main source of carbs was rice and rice is very hard to find."

Fresh produce such as meat, dairy, fruit, and vegetables were not only scarce but also more expensive, particularly with cheaper alternatives being the first to go:

> "People are selfishly hoarding food and household supplies, so those normal items that we need for the apartment and necessary grocery items are now often out of stock, so we either go without or buy a much more expensive product. One example was instead of affordable meat, we had to buy $35 steaks because it was the only meat available."

Students who were unable to afford to purchase more expensive items had to rely on cheaper options, which were often less healthy:

> "Honestly, my shopping habits are absolutely unhealthy. Unfortunately, the price of healthy food is much more than my family can afford at the moment, especially with a picky 4 year old. We have to buy snacks and foods we wouldn't of purchase [sic] other than for her."

> "Healthy food options at grocery stores need to be much more affordable. It is ridiculous that you can purchase junk food cheaper than you can purchase vegetables."

> "My diet is a lot less healthy now, since the primary concern while shopping is safety, rather than diet. Also, due to financial concerns, a less expensive diet usually corresponds to a less healthy diet."

Students also experienced difficulties attaining *suitable* food, particularly regarding dietary requirements and cultural preferences as items were out of stock and specialty stores were closed:

> "Struggle to find allergy free foods for restricted diets within my family."

> "I cannot eat gluten and there has been a lack of gluten free foods in stores."

> "Indian store is closed, so we are eating foods with the groceries that are available in Walmart."

Lockdown restrictions inhibited students' ability to freely access grocery stores, which impacted the *type* of food they consumed and the *variety* of their diet. For example, instead of buying fresh produce, which would require more frequent trips to the grocery store, many relied on shelf stable foods with little nutritional value:

> "Without the ability to go to the market I'm eating lots of cheap food like ramen noodles, can foods, etc."

> "Fresh foods, breads, and such are lot [sic] harder to come by right now. Not only is it a scarcity problem on shelves, most of what I usually cook required me to go out to the local market (which of course is not recommended right now). For the most part, I eat pre-packaged foods."

> "Fewer fresh foods and healthy foods because I am not able to go to the grocery store frequently."

Though cases were few (<1% coverage), accessibility issues also stemmed from transport restrictions due to local bus services - that were usually free of charge for students – being suspended, as well as students being unable to afford alternative forms of transport due to income loss, having to travel to multiple stores to source necessary items, avoiding ride sharing to prevent exposure to Covid-19, and having diminished social networks to share transport with due to housing displacement and social distancing measures.

Beyond food accessibility issues, *social support* from *informal* and *formal networks* affected student food insecurity in a number of ways. In the majority of cases, students benefited from moving back in with their parents as they were provided with nutritional meals on a regular basis, which improved their diet and buffered against food insecurity:

> "During the school year, I live on my own and can barely afford to eat. I had to move back into my parent's house because the university closed, which means my on-campus job also closed and I'm temporarily unemployed. Since I'm living at home, I'm eating a lot more than I usually do."

> "Now that I'm included in the meals that my parents prepare, I'm eating better. If I was still at my university, I would probably be struggling to buy any food."

> "It's actually improved since moving back home. During the semester, I struggle to pay for tuition and food."

On the contrary, some students reported that moving back with their parent's had a negative effect on their diet, though cases were few and not always indicative of food insecurity:

> "I eat less consistently now that I am at my parent's home. On campus, I always went to have dinner with friends and I was always able to get something I wanted. "Now I eat whatever my parents provide, which is sometimes not appetizing to me."

> "I snack more and usually less healthy options that my parents provide."

Family, spouses, friends, acquaintances, and neighbors enabled food access by sharing resources and shopping for those who were at increased risk for severe illness from Covid-19:

> "My husband's job/paycheck makes things very easy for us. My grad student stipend alone would greatly change my experience."

> "I have to find someone to take me [to the store], which was the same before, but none of my friends stayed so I must rely on acquaintances."

> "I do all the shopping for my immediate family. I shop for my home and for my grandparents, as my county has one confirmed case, but they are all at high-risk."

While formal networks, such as faith groups and food pantries, provided support before the pandemic, closures resulting from lockdown measures meant that students lost access to those resources, which increased their risk of food insecurity:

> "Before covid 19 I would get a free meal once a week from my synagogue and free leftovers a couple evenings a week from the university if they had any left. In the mornings I would buy a bagel and coffee in between classes that would count as a breakfast and lunch. For my shifts at work I would try to make something at my apartment to bring or if I didn't have time I would order out. After covid 19 I'm making meals at home. There's less money for groceries because my shifts have been cut. A neighbor couple are dropping off lunch once a week because they know I don't have much."

Financial status, in terms of *income* and *employment*, was directly impacted by the pandemic, as students were laid off or lost shift-work due to campus and businesses closures. This resulted in increased financial hardship, which lead to students having to find other ways of accessing food, along with prioritizing their spending and tightening their food budget. In addition to moving back in with their parents and turning to cheaper less healthy food options, students coped by rationing food, eating smaller portions, and skipping meals entirely which are symptomatic of food insecurity:

> "My hours at my job got cut so I haven't been able to spend as much on food because I have to worry about rent."
>
> "I don't eat lunch any more. Cheaper to pay for 2 meals a day than 3."
>
> "Healthier food > more expensive > smaller portions."

Though cases were few (<1% coverage), there is indication that *skills and equipment* and *time* are also associated with student food insecurity. Without the knowledge and resources required to prepare basic healthy meals, students relied on ready-made meals, snacks, and fast food. However, those who were able to cook for themselves and had the equipment to do so benefited from having more *time* to prepare nutritional meals.

CHAPTER VI

DISCUSSION

Both quantitative and qualitative analyses identify *social support* as a key correlate of student food insecurity during the onset of Covid-19, which supports H_7. The quantitative analysis in model 2 demonstrates that higher levels of perceived social support from family, friends, and significant other is associated with lower levels of food insecurity. The qualitative findings show that students who had social support networks to fall back on were able to access resources through those relations, such as shelter and food from parents, financial support from spouses, meal packages from neighbors, and transport from friends and acquaintances, which helped alleviate food insecurity. Though the literature is sparse regarding the association between social support and food insecurity, this finding upholds and expands upon a number of studies. Hadley et al. (2005) and Interlenghi and Salles-Costa (2014) found that perceived social support contributed to reduced food insecurity among poverty-stricken households in Rio de Janeiro, and Tanzania, respectively. In a study analyzing social support among low-income families experiencing food insecurity in North Carolina, Ahluwalia et al. (1998) found that participants utilized social networks including family, friends, and neighbors as a coping mechanism to access food, information, and emotional support. Garasky et al. (2008) found

that households across rural communities in the US were less likely to experience food insecurity when they had others to turn to for help, including family, friends, and other food assistance sources. These findings demonstrate that having a social support network to turn to in times of need can help mitigate food insecurity, particularly in regard to the reciprocity of resources. In the present study, the availability of such networks, however, was affected by social distancing measures, housing displacement, and lockdown restrictions. Further research is required to examine the experiences of students who lacked social support, particularly as those from low-income backgrounds are less likely to have substantial social networks (Goldrick-Rab 2016:147-162; Patton-López et al. 2014). Furthermore, while social support networks are often mobilized during times of disaster, victims tend to experience support deterioration (Kaniasty and Norris 1997); meaning that while perceived social support is associated with student food insecurity during the onset of Covid-19, this may not be the case at a later date. Longitudinal studies among a purposive sample of food insecure students could help determine whether this finding is generalizable.

Engaging social capital theory, quantitative findings show that students utilized bonding (i.e. family) rather than bridging social ties (i.e., food bank, university pantry, community fridge, and community hub/group) to access food at that time, which supports H_8. This expands upon Martin et al. (2004), who examined the association between social capital and food insecurity among low-income households in Hartford, Connecticut. Similarly, to the present study, the authors viewed social capital in terms of the reciprocity of resources among informal (i.e., family and neighbors) and formal (i.e., community-based organizations) social networks. Thus, informal and formal networks can be

considered a proxy of bonding and bridging social ties as they constitute the same sources in which resources are embedded. They found that those who participated in both social (informal) or civic (formal) events had higher levels of social capital and were less likely to experience food insecurity, suggesting that households benefited from utilizing both bonding and bridging social ties. In the present study, however, qualitative findings suggest that lockdown restrictions severed bridging social ties as community-based food assistance services were forced to close. Therefore, informal forms of social capital were seemingly not available at this time. On the other hand, it is possible that students may not have been aware that those resources were available or were deterred from using them due to issues surrounding stigmatization, as the literature would suggest (e.g. El Zein et al. 2018; Purdam et al. 2016).

In model 3, living alone was significantly associated with the utilization of coping strategies, which supports H_4. This finding echoes a study conducted among two community colleges in Maryland, which found that 82% of students who lived alone reported the highest rates food insecurity compared to those who lived with others (Maroto and Snelling 2015). Presumably, this is due to having no-one to share housing costs with, such as rent and utilities, putting pressure on the food budget; as one student in the present study noted,

> "Having to choose between rent and eating is awful."

It is also possible that living alone is indicative of a lack of social support network.

While qualitative findings suggest that students who lived with their parents were less vulnerable to food insecurity, quantitative results failed to find a significant

association, which does not fully support H_3. This finding is surprising in light of several previous studies, which have found that students who live with parents/relatives experience significantly lower levels of food insecurity than those who do not (i.e., Chaparro et al. 2009; Gallegos et al. 2014; Hughes et al. 2011; Maroto et al. 2015; Martinez et al. 2018; Micevski et al. 2014; Morris et al. 2016). One explanation could be that students who do not live with their parents are in a better financial position than those who do, given the high costs associated with independent living. This notion is supported by qualitative findings, which show that many students who experienced sudden financial instability resulting from the pandemic (i.e., reduced income and job loss) made the conscious decision to move back with their parents as a coping strategy; meaning that students who may have otherwise faced a "tipping point" into food insecurity (Gundersen, Kreider, and Pepper 2011; Gaines et al 2014; Henry 2020:28-29) managed to mitigate the situation, whereas those who had the financial means to live independently continued to do so. On the other hand, the survey question, which the quantitative data pertains to, asked where students lived during the school year, which may have been a grey area as students experienced unexpected housing displacements at that time; meaning that some may have temporarily moved back in with their parents but stated where they would usually otherwise live.

In model 1, the utilization of student loans is significantly associated with the level of food insecurity, which supports H_2. This finding replicates several studies which have found that students who rely on financial assistance to fund their education are more likely to be food insecure than their counterparts (i.e. Chaparro et al. 2009; Dubick et al. 2016; Gaines et al. 2014; Hughes et al. 2011; Martinez et al. 2018; Payne-Sturges et al. 2018).

With the decreased purchasing power of financial aid (Goldrick-Rab 2016), coupled with students often receiving an amount that is inadequate for their actual needs (Broton and Cady 2020:16; Kelchen, Goldrick-Rab, and Hosch 2017), it is probable that they are forced to make sacrifices – food being among the first to go (Edin and Lein 1997).

Despite suggested support in the bivariate correlation matrix, quantitative analysis regarding models 1 and 3 failed to find a statistically significant association between income and food insecurity, which does not fully support H_1. Findings in the literature are also mixed. In a study conducted at a university in Australia, Hughes et al. (2011) reported that student food insecurity was significantly associated with low-incomes. However, Maroto et al. (2014) and Gaines et al. (2014) found a lack of significance between income and food insecurity among students. The former contributed this to difficulty in attaining accurate income data, such as the extent to which household members shared expenses or utilized credit cards. This may also be the case in the present study, which failed to obtain such information. In addition, it is possible that the utilization of student loans provides a more accurate reflection of students' financial situations than income, as model 1 may suggest. Further research is required to determine the extent to which other financial factors are more greatly associated with student food insecurity.

The quantitative analysis did not identify a significant correlation between gender and food insecurity, despite initial support from *t*-tests with both food insecurity scales, which showed that female students were more likely to be food insecure than males. This finding fails to fully support H_5. Previous studies have also produced mixed findings. Generally, females have been found to be at greater risk of food insecurity than males across various populations (i.e., Broussard 2019; Goldrick-Rab et al. 2018; Martinez et al.

2018; ERS USDA 2020d). Similarly, to the present study, Maroto et al. (2015) found that female students were more likely to be food insecure than males but failed to find a statistically significant association. Across the literature, gender has largely been measured dichotomously. However, recent studies show that non-binary and transgender students are at greater risk of food insecurity than female and male students (Goldrick-Rab et. al 2018; Riddle et al. 2020). On the contrary, some studies have failed to determine an association between gender and student food insecurity (Chaparro et al. 2013; Gaines et al. 2014; Hughes et al. 2011; Maroto et al. 2015). Given the controversy among these findings, further research is required, particularly beyond gender dichotomy.

Quantitative analysis did not find an association between age and food insecurity, which fails to support H_6. While this finding is surprising given the results of previous studies (i.e., Martinez et al. 2017), there is a possible explanation, which is supported by qualitative findings. In the present study, the majority of respondents were of traditional college age and are likely to fit into the traditional student profile, such as going to university directly after graduating from high school and being financially supported by their parents (NCES 2015). Under normal circumstances, these students often struggle with independent living, particularly in their freshman year as they develop basic life skills, such as financial management and food preparation skills (Watson et al. 2017). Furthermore, student accommodations sometimes lack adequate kitchen equipment to store and cook food, which can lead to students having to rely on ultra-processed food (Henry 2017; Watson et al. 2017). Subsequently, these students may be at higher risk of food insecurity. However, during the onset of Covid-19, students who had the support of their parents moved back to the safety of their family homes. As qualitative results show, these students

benefited from having meals provided for by their parents, access to adequate kitchen facilities, and reduced costs of living, which may have mitigated food insecurity. It would be interesting to know in which school year the majority of students who moved back home were, however, this study did not collect such information.

In addition to the hypotheses addressed in this study, qualitative findings have highlighted a number of inequalities in the domains of social exclusion, particularly regarding resources and quality of life (Levitas et al. 2007:10). Firstly, with panicked citizens stripping grocery store shelves bare, low-income students struggled to find affordable healthy food and were forced to turn to cheaper options with little nutritional value. Secondly, students who could afford to stockpile groceries reduced their exposure to Covid-19, whereas those who could not were forced to put their health at risk by having to visit the store on a more regular basis. Similarly, those who could afford to pay for delivery services such as Instacart, or had access to car to utilize curbside pick-up zones also reduced their exposure to Covid-19 as they could avoid visiting the store in person. Furthermore, with local bus services being suspended due to lockdown restrictions and social network systems being disbanded due to housing displacement and social distancing measures, those without access to a vehicle had to find other forms of transport, sometimes involving extra costs and impacting what they could buy. For example, one student noted, "I walk to the closer grocery store now that I have no car and do not want to be in a car with anyone else, and I buy food I know I can clean thoroughly." Presumably, this student was also limited by the amount that they could carry and the types of food that would not perish on the journey home. A lack of transport could also be associated with the low use of bridging social ties (i.e., food bank, university pantry, community fridge, and

community hub/group), as students may have had no way of getting to those resources. Finally, analogous with Owens et al. (2020), many students experienced sudden loss of income which meant that they had less money to spend on food, putting them at increased risk of food insecurity. Reports of those who were in a more stable financial position painted a very different picture than those who were living pay-check to pay-check, as the following experiences illustrate:

> "My husband's job/paycheck makes things very easy for us. My grad student stipends alone would greatly change my experience."

> "My work hours have been cut in half. Money was already incredibly tight before the pandemic. It's a very stressful and scary time."

Overall, these findings highlight that those who are economically and socially disadvantaged suffer the most, whereas those who have the resources to weather the storm can survive quite well, at least for some time.

CHAPTER VII

LIMITATIONS

While this study provides a baseline of knowledge on a topic that has yet to be fully understood, it is not without limitations. Firstly, the cross-sectional data was collected early on in the pandemic and circumstances likely got worse as unemployment levels rose and emergency resources dwindled. Therefore, the impact of Covid-19 on student food insecurity at that time was presumably not as severe as it would have been at a later date. It is important to recognize that these results represent an evolving situation. Secondly, students at the greatest risk of food insecurity may have experienced other forms of hardship that are likely to occur alongside the condition, such as homelessness and digital poverty (Goldrick-Rab et al. 2020a). As the survey was distributed via email, only those with access to the internet and a device such as a laptop, computer, or smartphone would have been able to complete it. Therefore, findings may represent a relatively privileged proportion of students, potentially resulting in a biased sample and producing conservative estimates. Thirdly, due to non-probability sampling, it is impossible to know how well the population of food insecure students are represented in the data and findings should be generalized judiciously. Fourthly, the survey relies upon self-reported data and given the stigma surrounding food insecurity (e.g. Purdam et al. 2016), students may have been

been deterred from fully disclosing their problems, resulting in an underrepresentation of the prevalence of food insecurity and associated hardships. Finally, race and ethnicity were not accounted for in the survey and further research is necessary to understand this dimension. Nevertheless, given that few studies have examined the factors that impacted student food insecurity during the Covid-19 pandemic, this study makes a valuable contribution to the literature.

While not necessarily considered a limitation in this study, it is worth considering whether a more pertinent measure of food insecurity can be created specifically for university students. This is a particularly pressing issue given the recent debate on whether the content validity of USDA's Food Insecurity Module is compromised among this population (e.g. Nikolaus, Ellison, and Nickols-Richardson 2019). Moreover, it would be beneficial to have a tool that first screens for food insecurity before probing further information, where applicable.

CHAPTER VIII

CONCLUSION AND IMPLICATIONS

This study contributes to a growing body of literature by identifying factors that are associated with university student food insecurity during the Covid-19 pandemic. Key findings suggest that social support, bonding and bridging forms of social capital, living alone, the utilization of student loans, and food accessibility issues pertaining to panic buying, financial hardship, lockdown restrictions, and lack of transport were related to student food insecurity in the early days of the outbreak.

The relationship between food insecurity and social support has been understudied in the literature, particularly among university student populations (for exceptions, see Owens et al. 2020). In the present study, quantitative findings demonstrate that higher levels of perceived social support from family, friends, and significant other are associated with lower levels of food insecurity. Further research should focus on the complexities of this association, such as how it is influenced by other factors (e.g., values and gender), how it may be subjective in nature, and the extent to which it translates into tangible resources.

Qualitative findings show that the mobilization of social support networks involving parents, spouse, neighbors, friends, and acquaintances, enabled access to food,

shelter, money, and transport - which helped alleviate food insecurity. This suggests that social support carries the strong potential to not only improve food insecurity outcomes but to build resilience during times of turmoil. Therefore, this information should be used to inform personnel officers on ways to strengthen social support networks among vulnerable populations, both within and beyond the campus context. In terms of future research, it would be interesting to explore whether the size of one's social network matters and whether certain sources have a greater impact on student food insecurity than others.

Few studies have explored the dimensions of social capital on food insecurity (for exceptions, see Chriest and Niles 2018; Leddy et al. 2020; Martin et al. 2005; Sseguya et al. 2018; Paul et al. 2019) and scarcely among student populations (for exceptions, see Willis and Fitzpatrick 2017). The present study found that bonding social ties (i.e. family) were utilized more than bridging social ties (i.e., food bank, university pantry, community fridge, and community hub/group) to access food during the onset of Covid-19. While qualitative findings suggest this may be down to lockdown restrictions forcing food assistance services to close, it could also be that students were unaware that those resources were available. Therefore, effort should be made to make this information clear. For example, faculty could include a basic needs statement on their syllabi – a document that *all* students have access to – communicating what resources are available, both on and off campus. In addition, consideration should be given regarding ways to reduce stigma, such as increasing awareness of food assistance programs and reducing barriers to access them.

Concurrent upon studies conducted prior to the pandemic, results show that students who lived alone (Maroto and Snelling 2015) and those who utilized financial aid (Chaparro et al. 2009; Dubick et al. 2016; Gaines et al. 2014; Hughes et al. 2011; Martinez

et al. 2018; Payne-Sturges et al. 2018) were at greater risk of food insecurity. This convergence with the literature promotes the generalizability of these findings.

Food accessibility pertaining to the availability and affordability of nutritionally adequate food was directly impacted by the pandemic. Most notably, the panic buying of citizens resulted in many staple items (e.g., pasta, rice, and bread) being out of stock. Healthy options, such as fresh vegetables, fruit, meat, and fish were not only difficult to find but also more expensive. As a result, low-income students were forced to either go without or turn to cheaper, less healthy options (e.g. ultra-processed food). Financial hardship, resulting from job loss and reduced shift-work, forced students to tighten their food budget and make sacrifices, such as purchasing cheaper – less healthy – options, cutting portion size, and skipping meals entirely. Furthermore, lockdown measures and concerns regarding exposure to the virus affected how often students shopped, impacting the types of food they bought (i.e. shelf-stable items with little nutritional value). In addition, a lack of transport impacted their ability to access food. These findings make a particularly important contribution to the literature, given their unique association with these unprecedented times.

Overall, the findings of this study accentuate the underlying problem of inequality, which has far reaching consequences. To tackle the root cause of student food insecurity, it is necessary to take a systematic long-term approach. For example, federal policies should focus on ways to support low-income students by improving college affordability, expanding the coverage of financial aid, and providing greater access to public assistance programs – helping to ensure that underserved students are given the equal opportunity to succeed in higher education and beyond.

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APPENDICES

Appendix A

Oklahoma State University Institutional Review Board

Date:	03/11/2020
Application Number:	IRB-20-130
Proposal Title:	An Examination of Food Insecurity and Social Support at Oklahoma State University
Principal Investigator:	Michael Long
Co-Investigator(s):	Lara Goncalves
Faculty Adviser:	
Project Coordinator:	
Research Assistant(s):	
Processed as:	Exempt
Exempt Category:	

Status Recommended by Reviewer(s): Approved

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in 45CFR46.

This study meets criteria in the Revised Common Rule, as well as, one or more of the circumstances for which continuing review is not required. As Principal Investigator of this research, you will be required to submit a status report to the IRB triennially.

The final versions of any recruitment, consent and assent documents bearing the IRB approval stamp are available for download from IRBManager. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be approved by the IRB. Protocol modifications requiring approval may include changes to the title, PI, adviser, other research personnel, funding status or sponsor, subject population composition or size, recruitment, inclusion/exclusion criteria, research site, research procedures and consent/assent process or forms.
2. Submit a request for continuation if the study extends beyond the approval period. This continuation must receive IRB review and approval before the research can continue.
3. Report any unanticipated and/or adverse events to the IRB Office promptly.
4. Notify the IRB office when your research project is complete or when you are no longer affiliated with Oklahoma State University.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact the IRB Office at 405-744-3377 or irb@okstate.edu.

Sincerely,

Oklahoma State University IRB

Appendix B

Food Affordability and Skills Survey

This survey is examining food security/insecurity for students from across a sample of universities in the UK and the USA. Please answer this questionnaire if you are over the age of 18. Your response will be treated with full confidentiality and all information is completely anonymous.

Section 1: About You

Q2. Are you an undergraduate or graduate student?
- Undergraduate student
- Graduate student
- Other (please list)_____

Q3. Are you a full time (check box) or part time (check box) student?
- Full time
- Part time

Q4. Are you an international student?
- Yes
- No

Q5. How many years have you been studying at your current university?
- Less than 1 year
- 1-2 years
- 2-3 years
- 3-4 years
- More than 4 years

Q6. How old are you? _____

Q7. What is your gender? _____

Q8. Where do you live during the school year?
- Dormitory/halls of residence or other university housing?
- Residence (house, apartment, etc.) within walking distance of the university
- Residence (house, apartment, etc.) within driving distance of the university
- Fraternity or Sorority house
- Other (please list):_____

Q9. With whom do you live during the school year? (check all that apply)

- No one, I live alone
- One or more other students
- My spouse or partner
- My child or children
- My parent/s
- Other relatives
- Friends who are not students at the university I'm attending
- Other (please list) _____

Q10. Please enter the zip code where you reside during the school year _____

Q11. How much do you estimate you spend on accommodation (e.g., rent and utilities) each month during the school year? _____

Q12. Where do you live when school is not in session?

- Dormitory/halls of residence or other university housing?
- Residence (house, apartment, etc.) within walking distance of the university
- Residence (house, apartment, etc.) within driving distance of the university
- Residence (house, apartment, etc.) in another city or town that is not within reasonable driving distance of the university
- Fraternity or Sorority house
- Other (please list) _____

Q13. With whom do you live when school is not in session? (check all that apply)

- No one, I live alone
- One or more other students
- My spouse or partner
- My child or children
- My parent/s
- Other relatives
- Friends who are not students at the university I'm attending
- Other (please list) _____

Q14. Please enter the zip code where you reside when school is not in session_____

Q15. Do you work? Yes/No

Q15a. If yes, how many hours a week do you work? ___

Q16. How do you meet your university expenses? Fill in the response that best estimates the amount of support from various sources:

	None	Very Little	Less than Half	About Half	More than Half	All or Nearly All
Self (Jobs/Savings/etc)						
Parents						
Spouse or partner						
Employer support						
Scholarship and grants						
Student Loans						
Other sources						

Q17. Please indicate your total annual income (from salary and/or loans).

- Less than $5,000
- $5,000 to $9,999
- $10, 000 to $14,999
- $15,000 to $19,999
- $20,000 to $24,999
- $25,000 to $29,999
- $30,000 to $34,999
- $35,000 to $39,999
- $40,000 to $49,999
- More than $50,000

Q18. Following the outbreak of the coronavirus (COVID-19) in the USA, please enter the zip code of where you are living at this current time

Q19. Following the outbreak of the coronavirus in the USA, how would you describe your diet

- I eat meat, fish, dairy and eggs, I am not very interested in even trying vegetarian food except occasionally (Omnivore)
- I eat meat, fish, dairy and eggs, I am happy to try some vegetarian dishes as well (Omnivore)
- I often eat vegetarian dishes or have vegetarian dishes as well as meat, fish, dairy and eggs (Omnivore)
- I eat fish, dairy and eggs in addition to products derived from plants (Pescatarian)
- I eat dairy and eggs in addition to products derived from plants (Ovo-lacto vegetarian)
- I eat dairy in addition to products derived from plants (Lacto-vegetarian)
- I only eat products derived from plants (Vegan)
- Other dietary requirements or choices [e.g. allergies, health conditions, religious/belief]

Q20. Has your diet changed as a result of the coronavirus? Yes/No

Q20a.
If yes, in what way?

Section 2: Your Food Situation

There now follows several statements that may be used to describe people's food situation. Please indicate whether the statement was often true, sometimes true, or never true for you at the present time (i.e. following the outbreak of the coronavirus in the USA).

Q21. I am worried that food will run out before I get money to buy more.

- Often True
- Sometimes True
- Never True
- Don't Know
- Prefer not to say

Q22. The food that I bought just didn't last, and I don't have money to get more.

- Often True
- Sometimes True
- Never True
- Don't Know
- Prefer not to say

Q23. I can't afford to eat balanced meals.

- Often True
- Sometimes True
- Never True
- Don't Know
- Prefer not to say

If you answered 'Often True' or 'Sometimes True' to one or more of Q21-23, continue to Q24, otherwise please skip to Q29

Q24. Since the outbreak of the coronavirus in the USA, have you ever cut the size of your meals or skip meals because there wasn't enough money for food?

- Yes
- No
- Don't Know
- Prefer not to say

Q24a. If 'Yes', how often did this happen?

- Almost every week
- Some weeks but not every week
- Only 1 or 2 weeks
- Don't Know

Q25. Since the outbreak of the Corona Virus in the USA, did you ever eat less than you felt you should because there wasn't enough money to buy food?

- Yes
- No
- Don't Know
- Prefer not to say

Q26. Since the outbreak of the Corona Virus in the USA, were you ever hungry but didn't eat because there wasn't enough money for food?

- Yes
- No
- Don't Know
- Prefer not to say

Q27. Since the outbreak of the Corona Virus in the USA, did you ever lose weight because you didn't have enough money for food?

- Yes
- No
- Don't Know
- Prefer not to say

If you answered 'Yes' to one or more of Q24-27, continue to Q28, otherwise please skip to Q29

Q28. Since the outbreak of the coronavirus in the USA, did you ever not eat for a whole day because there wasn't enough money for food?

- Yes
- No
- Don't Know

Q28a. If 'Yes', how often did this happen?

- Almost every week
- Some weeks but not every week
- Only 1 or 2 weeks
- Don't Know

Q29. Has coronavirus changed your food shopping in any other way? Yes / No

Q29a. If yes, how?

Section 3: Shopping, Spending and Food Skills

Q30. How to you rate your own skills in preparing and cooking a healthy meal?

- Poor
- Average
- Good
- Excellent

Q31. How is food usually prepared in your household?
(when cooking at home, what kind of foods/ingredients do you use to prepare meals?)

- From scratch - Mainly natural or minimally processed foods such as rice, beans, meat, vegetables, fruits, natural seasonings (eg fresh and dehydrated herbs, spices) and culinary ingredients (eg salt, sugar, oil, fat).
- With the use of semi-finished products - A mixture of natural or minimally processed foods with pre-cooked or ready-to-heat/ready-to-eat foods/ingredients (eg rice cooked with ready-made seasoning, salad with ready-made sauce, pasta served with ready-made sauce, canned vegetables used in culinary preparations).

- With the use of ultra-processed foods - Mainly pre-cooked or ready-to-heat/ready-to-eat foods and ingredients (e.g. ready-made sauce, ready-made seasoning, pre-seasoned raw meat, nuggets, ready-to-fry frozen potatoes, instant noodles, frozen lasagna or other ready-to-eat dishes, cake mix, ready-made desserts, artificial juice).

Q32. How often do you cook or prepare food for yourself?

- Every day or nearly every day (5-7 days a week)
- Several times a week (3-4 days a week)
- Once or twice a week
- Less than once a week

Q33. Which of the following beverages did you drink YESTERDAY: (check all that apply)

- Regular or diet soda
- Fruit juice or fruit drink in cans or boxes or from dispensers or prepared from powdered mix
- Chocolate milk in cans or boxes or from dispensers or prepared from powdered mix
- Tea or coffee in cans or boxes or from dispensers or prepared from powdered mix
- Any type of flavored yogurt drink
- None of the above

Q34. Which of the following foods did you eat YESTERDAY: (Check all that apply)

- Sausage or hamburger or nuggets
- Ham or salami or bologna
- Buns, rolls or any type of packaged bread
- French fries eaten in a fast-food restaurant
- Mayonnaise or ketchup or margarine

Q34f.

- Instant noodles or powder soup or any other branded shelf-stable ready meals
- Frozen lasagna or frozen pies or any other branded frozen ready meals
- Packaged salad dressing
- None of the above

Q35. Which of the following snacks or desserts did you eat YESTERDAY: (Check all that apply)

- Potato chips or any other type of packaged salty snacks

- Cookies or biscuits
- Branded (not homemade or artisanal) cakes, muffins or sweet pies
- Cereal bars
- Branded (not homemade or artisanal) ice creams or ice pops
- Chocolate bar or chocolate candies
- Sugared breakfast cereals
- None of the above

Q36. Please indicate which of the following equipment you have in the kitchen you are currently using (Check all that apply)

- a refrigerator
- a freezer compartment at top of a small fridge
- a minimum 2 drawer freezer or chest freezer
- a microwave oven
- electric stove
- a gas stove (ring)
- an electric grill (such as George Foreman)
- a gas oven
- an electric oven
- a convection oven
- a kettle
- a sous vide machine
- a toaster
- a sandwich toaster
- a slow cooker
- a pressure cooker - stovetop
- an electric pressure cooker
- a fryer
- a food processor
- electric rice cooker
- blender
- food mixer
- barbecue grill
- dish washing machine
- a coffee machine (electric)

- a bread machine
- a food steamer
- None of these

Q37. At the current time how much (US dollars) do you spend on average per week on food and drink (excluding alcohol) when you shop for groceries?

$_____

Q38. At the current time how much (US dollars) do you spend on average per week on alcohol during your grocery shop?

$_____

Q39. At the current time, how much (US dollars) do you spend on average per week on food and drink (excluding alcohol) outside the home?

$_____

Q40. At the current time, how much (US dollars) do you spend on average per week on alcohol) outside of the home?

$_____

Q41. At the current time, do you ever access food by a means other than purchasing it from a food shop/grocery store?

- Food Bank
- University Pantry
- Community Fridge
- Church/faith group
- Community hub / group
- Family

Q42. Are you currently doing the majority of your food shopping online? Yes / No

Q43. Based on your last visit, do the food shopping facilities in your local stores and supermarkets at this time have a good range of the following on the shelves? Tick all that apply to your buying habits

	Excellent	Good	Average	Poor	Very poor	Don't Know
Alcohol						
Bread						
Pasta, rice, noodles etc						
Beans and pulses						
Breakfast cereals						
Vegetables – fresh						
Vegetables – frozen						
Vegetables – canned						
Fruit – fresh						
Fruit – frozen						
Fruit – canned						
Fruit juices and smoothies						
Confectionary						
Crisps / nuts						
Soft drinks						
Ready meals						
Meat – fresh						
Meat – frozen						
Meat – processed						
Fish – fresh						
Fish – frozen						
Fish – processed						
Oily fish						
Sausages						
Cured meat						
Non-meat alternatives (Quorn, tofu etc)						
Pies and pasties						
Chips and other potato products						
Fats and oils						
Biscuits						
Cakes and pastries						
Soap and hand sanitizer						
Toilet roll						
Other personal hygiene products						

Section 4: Health and Wellbeing

Q44. As a result of the coronavirus, have you experienced a period of sickness or self-isolation?

Q44a. If 'Yes', for how many days?

Q45. Below are some statements about feelings and thoughts. Please check the box that best describes your experience of each at this current time.

Statement	None of the time	Rarely	Some of the time	Often	All of the time
I've been feeling optimistic about the future					
I've been feeling useful					
I've been feeling relaxed					
I've been dealing with problems well					
I've been thinking clearly					
I've been feeling close to other people					
I've been able to make up my own mind about things					

Q46. In general, would you say your health is? (Please check only one option):

- o Excellent
- o Very Good
- o Good Fair
- o Poor
- o Don't Know

Section 5: Social Support

Q 47. Please read the statements and check the box that best describes your experience of each at this current time.

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
There is a special person who is around when I am in need					
There is a special person with whom I can share my joys and sorrows					
My family really tries to help me					
I get the emotional help and support I need from my family					
I have a special person who is a real source of comfort to me					
My friends really try to help me					
I can count on my friends when things go wrong					
I can talk about my problems with my family					
I have friends with whom I can share my joys and sorrows					
There is a special person in my life who cares about my feelings					
My family is willing to help me make decisions					
I can talk about my problems with my friends					

Q48. Is there anything else that you would like to share with us about the affordability, adequacy or healthiness or otherwise of your food shopping habits?

……
……
……

Thank you for completing the survey. If you would like to be entered into a drawing for a $25 Amazon gift card, please enter your email address in the box below:

Email _____

You have now completed our questionnaire. You will be notified by email in the next few weeks if you have won an Amazon gift card. Thank you for taking the time to provide us with this information. We will share our results with you through your Student Union, whom we also thank for their generous participation.

Appendix C

Greetings OSU family member,

You are invited to participate in a survey to study hunger and food insecurity among students at OSU after the onset of the novel coronavirus (COVID-19). This project is part of a larger study that seeks to gather data on the food situation of university students in the US and United Kingdom during this time.

Please take a brief moment to look over the survey by clicking on this link (https://northumbria.onlinesurveys.ac.uk/food-affordability-availability-oklahoma) and, if you chose to do so, complete it. Your participation is voluntary. The survey asks a variety of questions about your food situation. It should take about 15 minutes to complete. By completing the survey, you are giving consent for the data to be used in this project. We do not know of any risks to you if you decide to participate in this survey. Your responses will be kept completely confidential and any identifying information will be removed from the data if used in future research studies.

If you complete the survey you will be entered into a drawing for one of 10 Amazon Gift Cards worth $25 each.

If you have any questions or concerns about completing the questionnaire or about being in this study, you may contact us at michael.long@okstate.edu. This project has been approved by the Institutional Review Board at Oklahoma State University. If you have questions about your rights as a research volunteer, you may contact the Oklahoma State University Institutional Review Board (IRB) at 405-744-3377 or irb@okstate.edu.

Sincerely,

Michael Long
Associate Professor
Department of Sociology
Oklahoma State University

Lara Gonçalves
Master's student
Department of Sociology
Oklahoma State University

Appendix D

Coding Framework

Key Theme	Subthemes and Definitions	Positive Example	Negative Example
Predictors of Student Food Insecurity	***Financial status*** (income/employment, financial dependence/independence)	"Stillwater won't let me out of my housing bills so financials are bad" "My work hours have been cut in half…"	"I am limited on what produce I am able to buy at the store, and by what I am able to afford" – while this relates to finances, it is an example of "accessibility" under the same key theme, "predictors of food insecurity" as it pertains to food affordability.
	Social support (i.e. utilizing informal networks such as family, friends/roommate, partner/spouse etc. and formal networks such as the university, community organization; etc.).	"I have to find someone to take me [shopping], which was the same before, but none of my friends stayed so I must rely on acquaintances." – this can also be coded under "accessibility"	"I have been relying on instacart and other grocery deliveries" – while this involves utilizing social networks, it is an example of "how/where" under "changes in shopping practice".
	Accessibility (e.g. food affordability, food availability, transport issues, suitability – i.e. dietary needs/preferences, cultural acceptability, lockdown restrictions, feeling	"It is hard to find fresh foods, bread, and eggs." "I am limited on produce I am able to buy at the store and what I am able to afford."	"I live with my parents and now don't have to pay my own grocery bills…"– while this relates to "food affordability," it should be jointly coded under "social factors" and "financial status" under the same key theme, "predictors of food insecurity."

	resources were "not for them").		
	Skills and Equipment (i.e. ability to prepare and cook food, access to kitchen equipment).	"Have to find new ways to cook since everyone keeps hording the stuff I normally buy, rice, pasta, etc." "only having a minifridge is hard to prepare meals"	"For the most part, I eat pre-packaged foods." – though this may suggest a lack of skills or equipment, it is not sufficient evidence; it should be categorized under "quality" within "changes in diet and dining."
	Time (i.e. having more/less time to cook).	"… I think my meals are slightly more healthy now since I have had more time to cook instead of just eating microwave food." – this can also be jointly coded under "quality" within "changes in diet and dining".	"Extremely hard to get food to cook at home." – this should be categorized under "skills and equipment." within "predictors of student food insecurity."
	Residency Status (i.e domestic or international student).	"Foreign students who receive money do not return to their home countries and receive no care." – this can be jointly coded under "financial status" and "social factors" within "predictors of food insecurity."	"I eat at home much more often." – this should be coded under "location" within "changes in diet and dining."
Changes in Diet and Dining	Changes in ***type*** of food begin eaten (i.e. carbohydrate, protein, dairy,	"More vegetables" "Less meat." "I started drinking more milk"	"It is hard to find fresh foods, bread, and eggs." - though this refers to diet, it is a more appropriate example "accessibility"

	fruit/vegetable etc.).		within "predictors of student food insecurity."
	Changes in ***quality*** of food (fresh/processed, healthy/unhealthy).	"I am eating less processed foods." "I am not eating as healthy."	"Healthy food is much more expensive…"- - this pertains to food affordability and should be categorized under "accessibility" within "predictors of student food insecurity."
	Changes in ***quantity*** of food (eating more or less).	"i just eat less."	"Less meat." - though this refers to quantity it is an example "type" within the same key theme, "changes in diet and dining."
	Changes in ***variety*** of diet (e.g. balanced or imbalanced))	"I am not able to grocery shopping / go out as much so my diet has less variety" – this can also be jointly coded under "lockdown restrictions" within "accessibility".	"lots of steak and egg" –this should be coded under "type" within the same key theme, "changes in diet and dining."
	Changes in ***function*** of food (e.g. fitness, weight loss, allergy-related, religiosity, boredom).	I'm eating more often out of pure boredom.	"I am shopping just to shop and it's awful" – this describes a motivation for shopping and should be categorized under "why" within "changes in shopping practice."
	Changes in ***location*** (e.g. where food is prepared/consumed such as at home or at a restaurant).	"After covid 19 I'm making meals at home."	"I tend to eat more at my parents home than I did at school." – this should be jointly coded under "quantity" and "social factors."
Changes in Shopping Practice	Aspects relating to changes in shopping, such as ***who*** (self, someone else),	"I try to buy food that will last longer." "I now use grocery pickup"	"Being at home, there are more mouths to feed and my mom mostly does the grocery shopping and cooking…" –

	where (in store, online, delivery, pick-up), ***how*** *(*i.e. items with a long shelf-life, essentials only, substituting, stockpiling), ***when*** (e.g. how often they shop, what time of day), ***why*** (reason for shopping beyond the need for food).		this should be categorized under "social factors."
Additional Health Concerns	Concerns relating to physical and mental health that are not encompassed by other themes. For example, concerns relating exposure to and the spread of Covid-19, and effects on mental health.	"my mental health seems to be getting bad" "Along with other students, I know my mental health is struggling. I've never felt this before, but i know my head is kind of messed up with the stress of everything."	"More mindless eating. Food has become a coping mechanism instead of fuel." – this is more suited to "function" in "changes in diet" "Do not go more than absolutely necessary. Used to go multiple times a week. Now try to go once every other week" – this fits under "when" in "changes in grocery shopping."
Miscellaneous	Aspects where meaning is unclear and unanticipated elements that are not described by any other categories in the coding frame.	"hard to find paper products"	Anything that cannot be suitably categorized under another key theme.

Appendix E

Qualitative Analysis Matrix (including coverage %)

Predictors of Food Insecurity		
Accessibility (34%)	Availability (18%)	"As someone who makes rice-based dishes regularly, it's been very hard to eat because everyone keeps taking the rice" "I am eating more processed foods as the stores are cleaned out" "There are less options for healthier groceries due to panic buying"
	Affordability (14%)	"I buy more processed food such as Ramen that is cheaper than healthier food" "Healthy food options at grocery store need to be much more affordable. It is ridiculous that you can purchase junk food cheaper than you can purchase vegetables." "More fast food and cheaper options"
	Suitability (4%)	"Struggle to find allergy free foods for restricted diets within my family" "I cannot eat gluten and there has been a lack of gluten free foods in stores" "Indian store is closed, so we are eating foods with the groceries that are available in Walmart"
	Lockdown Restrictions (2%)	"What I usually cook requires me to go out to the local market (which of course is not recommended right now). For the most part, I eat pre-packaged foods" "Without the ability to go to the market I'm eating lots of cheap food like ramen noodles, can foods, etc." "It has made it difficult to keep fresh fruit and vegetables or other perishable food items because of the inability to go to

		shopping regularly. This limits the options of having a well-balanced meal"
	Transport (1%)	"Lack of public transport" "I'm exploring more stores for food and it's costing more money on transport" "I have to find someone to take me [to the grocery store], which was the same before, but none of my friends stayed so I must rely on acquaintances." "I walk to the closer grocery store now that I have no car and do not want to be in car with anyone else."
	Others need it more (1%)	"If food pantries had an online service I would take advantage of it. However, I don't want to take from people who may need more than me and it really seems as if they need more help." "I pick things that will last longer and tend to stay away from things that are low stocked so that others who might really need them can have them."
Social Support (12%)	Informal Networks (11%)	"During the school year, I live on my own and can barely afford to eat. I had to move back into my parents' house because the university closed, which means my on-campus job also closed and I'm temporarily unemployed. Since I'm living at home, I'm eating more than I usually do" "A neighbour couple are dropping off lunch once a week because they know I don't have much" "I have to find someone to take me [to the grocery store], which was the same as before, but none of my friends stayed to I must rely on acquaintances"
	Formal Networks (2%)	"Before covid 19 I would get a free meal once a week from my synagogue and free

		leftovers a couple of evenings a week from the university if they had any left" "I usually have meals given to me as part of my scholarship, so I am buying more food at the store" "I used to use food shelfs"
Financial Status (7%)	Income and Employment (6%)	"My hours at my job got cut so I haven't been able to spend as much on food because I have to worry about rent" "If I were living at my apartment in Stillwater (my college town) I would be extremely concerned about afford food. I lost my source of income so I was forced to move home to be able to afford food"
	Dependent/Independent (1%)	"I have become dependent on my parents." "I moved home to my parents' house so I wouldn't have food expenses." "I live with my parents and now don't have to pay grocery bills. Before I spent around $100 a week on food not I eat what they make for them and my brother."
Skills and Equipment (1%)	"Buying more frozen meals and extra snack foods because I can't go out to eat or get fast food." "Less fast food since I now have easy access to a stove and oven." "Only having a minifridge is hard to prepare meals."	
Time (1%)	"I think my meals are slightly more healthy now since I have had more time to cook instead of just eating microwave food." "Healthy food is much more time consuming [to cook]."	
Changes in Diet and Dining		
Quality (10%)	"I'm eating more processed foods and less fresh food" "My parents make dinner, so I'm eating a bit healthier compared to the junk I was eating before" "[Diet] improved to include less restaurant/fast food meals to homemade" "More fast food, less going to the grocery store"	

	"Snacking constantly on more unhealthy options"
Location (6%)	"I eat out less and I eat healthier foods at home" "I have to cook at home instead of getting fast food/takeout" "I am back in my childhood home with homecooked meals instead of meals from fast food or university restaurants"
Variety (3%)	"I'm not able to go grocery shopping / go out as much so my diet has less variety" "Not a lot of meats are available at this time so I basically survive on peanut butter and waffles" "Meals seem to be less balanced and inconsistent – probably as a result from stress and anxiety.""
Function (2%)	"More mindless eating. Food has become a coping mechanism instead of fuel." "I'm eating more often out of pure boredom." "I am on Keto and sticking to it so far."
Quantity (2%)	"I don't eat lunch anymore. Cheaper to pay for 2 meals a day than 3" "I tend to eat more at my parents' house than I did at school" "I've been rationing my food because I'm scared I might run out" "Try not to eat as much so we do not have to shop often"
Changes in Shopping Practice	
How (24%)	"I am trying to buy in bulk so that I can limit my visits to the grocery store" "I shop minimally and try to get non-perishables. I'm not eating as well as before" "Have to come up with substitutes for out of stock food)
When (13%)	"I have massively reduced my numbers of trips to the grocery store per week/month" "I honestly go to the store more often for small amounts of crappy food"

	"I try to go to the store when it is restocking shelves"
Where (8%)	"I have to order it on an app to be delivered, so I have to cut down my budget for food because I have to spend money on delivery" "I only order from Walmart now because they have the grocery pickup option. I don't have to go into the store and I like that. However, I have to have a minimum purchase of $30. If I just need one thing I have to wait till I need enough for the minimum fee" "I'm exploring more stores for food and it's costing more money on transport"
Who (1%)	"I'm no longer the one shopping. It's my parents." "I am buying for the needy who can't get out."

VITA

Lara Gonçalves

Candidate for the Degree of

Master of Science

Thesis: UNIVERSITY STUDENT FOOD INSECURITY IN THE WAKE OF COVID-19

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Biographical:

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Completed the requirements for the Master of Science in Sociology at Oklahoma State University, Stillwater, Oklahoma in May, 2021.

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