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IMPACT OF FOOD INSECURITY ON COPING STRATEGIES: A COMPARISON OF
FAMILY AND COLLEGE PERCEPTION

By
Nora Halama

A thesis submitted to the faculty of The University of Mississippi in partial fulfillment of
the requirements of the Sally McDonnell Barksdale Honors College.

Oxford
May 2022

Approved by

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ABSTRACT

NORA HALAMA: Impact of Food Insecurity on Coping Strategies: A Comparison of Family and College Perception

(Under the direction of Dr. Laurel Lambert)

Food insecurity (FI), defined as the lack of consistent access to nutrient dense foods, is equally complex as it is prominent in low-income households. Many food insecure individuals have developed coping strategies to mitigate food deficiencies. There remains a gap in research regarding the influence food insecurity on these coping strategies during the transitional period of students from home life to college. The present study examines the impact of food insecurity on coping strategies among students during both high school and college experiences. A total of 231 freshmen at two large, urban universities completed a questionnaire that included the 6-item USDA HFSSM, demographic characteristics, and anthropometric measurements in December of 2021. Approximately 26% of students experienced FI during their senior year of high school. Very low food secure (VLFS) high school students practiced denying themselves preferred food ($p=0.027$), limiting portion sizes ($p=0.021$), and skipping meals ($p=0.001$) more often than low food secured students (LFS). Approximately 48% of students reported experiencing FI during their freshmen year of college, with VLFS freshmen denying themselves preferred food ($p=0.002$), limiting portion sizes ($p=0.002$), and skipping meals ($p<0.001$) more often than LFS students. In comparison to those who were food insecure during both their high school and freshman year experience, this study found that FI freshmen practiced denying themselves preferred food ($p= 0.007$) and skipping meals to eat a larger meal later more often ($p<0.001$) compared to FI high

school students. It is essential to examine the interrelationships between food security status and coping strategies to understand how to best address FI within this high-risk population.

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INTRODUCTION

An individual's access to nutrient-dense food to manage a healthy lifestyle may appear to be a basic human right; however, even within the United States, a large proportion of households face the challenge of food insecurity. Food insecurity is public health concern, as it impacts one's overall health in both the short- and long-term, increasing the risk of chronic disease development and poor mental health (Gregory & Coleman-Jensen, 2017; Palakshappa et al., 2019).

Moreover, specific populations face an even greater risk of developing food insecurity due to environmental factors. Both the adolescent and college student populations continue to report high rates of food insecurity due to the demands of their physical, social, and emotional development (Burriss et al., 2020; El Zein et al., 2018; Fernandez et al., 2019; McLaughlin et al., 2012). With previous research indicating that food insecurity starts freshman year for undergraduate students, the transition from home life in high school to that of a dormitory freshman is a highly vulnerable period (McArthur et al., 2018). This transition period remains an understudied topic within food insecurity literature.

As our understanding of food insecurity expands, patterns of food-related coping strategies—strategies used in efforts to manage food insufficiencies within a household—have become more pronounced and identifiable (Maxwell, 1996). The practice of such coping strategies, however, indicates a worsening situation of food access or availability (Davies, 1993). Therefore, food-related coping strategies may prove to be prolonging a food-insecure state as individuals are known to evade seeking additional assistance due to their desire for social acceptance (El Zein et al., 2018).

Food insecurity remains a difficult topic to study, as it is transient in nature and influenced by a multitude of factors both within and around an individual. As the body of literature regarding food insecurity continues to grow, researchers are aiming to identify these factors which perpetuate one's food insecurity to circumvent these negative implications. The objective of this study was to evaluate how food-related coping strategies are associated with food security status in students during this transitional period from home to college. This study also aimed to evaluate the difference in coping strategies among students who reported food insecurity in both high school and college to further examine the relationship food insecurity has with specific coping strategies.

At the conclusion of this study, the results indicated a significant difference between high school students with very low food security practicing the specific coping strategies of denying themselves preferred food, limiting portion sizes, and skipping meals more often than low food-secured high school students. Similarly, the very low food-secured freshmen practiced the same coping strategies more often than the low food-secured freshmen students. The results also revealed food-insecure freshmen to be significantly more likely to practice certain coping strategies in comparison to their food-insecure high school experience. Thus, exploring the reasons behind these significant differences among coping strategies would provide an opportunity for future researchers interested in the mechanisms of food insecurity.

REVIEW OF LITERATURE

Food Insecurity

Food insecurity, defined as the lack of consistent access to nutrient dense foods to manage a healthy lifestyle, influences approximately 10.7% of households in the United States (Althoff et al., 2016; *U.S. Department of Agriculture, Household Food Security in the United States Report*, 2019). Food-insecure households face a wide-range of challenges that typically include financial hardships as well as mental and physical health consequences. Most food-insecure adults struggle with low-income stressors such as depression, fatigue, and obesity (Seligman et al., 2010). A significant association between an adult's food insecurity status with the likelihood of a chronic disease development has been found (i.e., hypertension, coronary heart disease, hepatitis, stroke, cancer, asthma, diabetes, arthritis, chronic obstructive pulmonary disease, and kidney disease) (Gregory & Coleman-Jensen, 2017). Chronic diseases not only have present health implications but also future health complications when they are not properly treated, ultimately imposing a poorer overall quality of life (Gregory & Coleman-Jensen, 2017). Previous research has speculated that food insecurity causes adverse health effects through nutritional deficiencies, negative mental state due to concerns regarding access to food, and abstaining from medical treatment (Palakshappa et al., 2019).

Moreover, food insecurity's general prevalence in society as well as its overall ill-effects are no longer in question; instead, researchers aim to identify higher risk populations in efforts to better understand the exact mechanisms by which food insecurity manifests itself. However, by definition, food security status is seen as “an inherently subjective social condition” (Nikolaus et al., 2019). This becomes problematic to study at

only one period in time because an individual's financial resources shift over time, which typically correlates with a subsequent shift in their food security status (Fernandez et al., 2019). The vast majority of research on the subject of food security has been conducted in a cross-sectional manner, resulting in a transient picture of food security in the population of interest. For this reason, researchers are stressing the need for more longitudinal studies to capture the evolution of food security throughout a period of life (Brown et al., 2019; Bruening et al., 2016a).

Despite food security's subjective nature, the United States Department of Agriculture (USDA) has developed a validated measure of household food security status. The USDA Household Food Security Survey Module (HFSSM) is considered the gold standard in assessing food security, consisting of an 18-item questionnaire aimed at identifying the presence and severity of a household's financially based food insecurity and hunger (Blumberg et al., 1999; Ellison et al., 2021). An expert panel of multidisciplinary researchers from the Committee on National Statistics (CNSTAT) of the National Academies has reviewed and affirmed the appropriateness of the USDA's 18-item HFSSM, specifically analyzing the measurement methods and the functionality of the language used to communicate the necessary information through each question (*U.S. Department of Agriculture Economic Research Service - Ranges of Food Security and Food Insecurity*, 2021). In response to recommendations made by the CNSTAT, the USDA expanded the definitions from the previous food security classifications (Table 1) (*U.S. Department of Agriculture Economic Research Service - Key Statistics & Graphics*, 2021).

Table 1
Labels Defining the Ranges of Food Security

Food Security	
High Food Security <i>Food Secure*</i>	No reported indications of food-access problems or limitations.
Marginal Food Security <i>Food Secure*</i>	One or two reported indications—typically of anxiety over food sufficiency or shortage of food in the house. Little or no indication of changes in diets or food intake.
Food Insecurity	
Low Food Security <i>Food Insecure without Hunger*</i>	Reports of reduced quality, variety, or desirability of diet. Little or no indication of reduced food intake.
Very Low Food Security <i>Food Insecure with Hunger*</i>	Reports of multiple indications of disrupted eating patterns and reduced food intake.

**The previous classifications, prior to 2005, include food secure, food insecure without hunger, and food insecure with hunger (U.S. Department of Agriculture Economic Research Service - Ranges of Food Security and Food Insecurity, 2021).*

The USDA HFSSM also has abbreviated forms for when circumstances (i.e., limited sample size) or available resources do not allow for the use of the full 18-item scale. In the development of this shortened survey module, Blumberg et al. (1999) excluded questions only applicable to households with children and questions that indicated the most severe food insecurity with hunger. Nonetheless, the 6-item HFSSM correctly identified 97.7% of households' food security status in comparison to the full 18-item HFSSM, only underestimating food insecurity and hunger by 0.3% points (Blumberg et al., 1999). Therefore, despite the exclusion of 12-items in the HFSSM, the 6-item scale appears to maintain the integrity of the full 18-item scale.

Obesity and the Food Insecure Population

Over the past decade, the prevalence of obesity in the United States appears to be steadily trending upward, with approximately 40% of adults and 19% of youth being classified as obese in the population (Hales, 2017). Drewnowski & Specter, (2004) examined the relationship many individuals in compromised financial situations face when deciding between the cost of food items and the energy density of those food items. Energy dense foods are defined as foods that contain excessive carbohydrates, processed sugars, or saturated fats (Drewnowski & Specter, 2004). This study concluded that individuals with inadequate financial resources are more likely to select energy dense foods because of the low cost and high palatability of these foods, which contributed to an overall lower diet quality (Drewnowski & Specter, 2004). These dietary behaviors may be a contributing factor to not only the increased weight gain among food-insecure individuals, but also a barrier to weight loss (Palakshappa et al., 2019). In fact, one study found that a greater percentage of women who report a diet deficiency, than not, were also overweight (Peter, 2012).

The “hunger-obesity paradigm” has been termed to describe the relationship between obesity and food insecurity (Nettle et al., 2017). Simply attributing a food insecure individual’s obesity as a byproduct of overeating does not accurately describe their fluctuating access to food (Nettle et al., 2017). A meta-analysis of previous literature regarding food insecurity in association with overweight and obesity revealed an overall positive correlation for women in high-income countries (Nettle et al., 2017). Consequently, individuals battling both food insecurity and obesity are at an even greater risk for poor health outcomes in both the short and long-term (Palakshappa et al., 2019).

When compared to obese, food-secure adults, adults who were obese and food-insecure had a higher likelihood of medical comorbidities including coronary artery disease, diabetes, and asthma (Palakshappa et al., 2019).

Adolescents and Food Insecurity

Food insecurity in adolescents continues to be a prominent public health concern in the United States with an estimated 27% of low-income families with children experiencing low food security (Coleman-Jensen et al., 2020). Grouped under the umbrella of household food security assessments, the adolescent population lacks a substantial body of research regarding food insecurity's adverse impact. Adolescents have been found to be twice as likely to experience the burden of food insecurity compared to younger children living in low-income, urban households (Moffitt & Ribar, 2016). High food insecurity within the adolescent population has a range of mental health implications including an increased likelihood of mood, anxiety, behavior, and substance disorders (McLaughlin et al., 2012).

Moreover, adolescents are particularly at high risk for the consequences of food insecurity due to their increased nutritional needs and experience with social pressure (Burriss et al., 2020; Moffitt & Ribar, 2016). The maturation that occurs, both physically as well as cognitively, during adolescence is influenced by an individual's diet quality, as poor dietary behaviors have been linked to health risks such as weight gain, low bone mineralization, and poor academic performance (Burriss et al., 2020; Craigie et al., 2011). One study explores this developmental stage further, conducting focus groups comprised of teenagers on their perceptions of factors that influence food insecurity (Burriss et al., 2020). With 44% of the teenagers from this sample classified as food-insecure, they

provided valuable insights into the concerns this population faces, which included a negative perception of the overall support provided by their school meal programs, the stigma and bullying from peers that accompanied receiving meal assistance, and the socioeconomic pressures from their families to provide food (Burris et al., 2020).

Despite both food-insecure and food-secure middle and high school students recognizing similar benefits aligned with eating healthy, food-insecure students, perceived healthy eating as unappealing and inconvenient (Widome et al., 2009). Food-insecure students were also more likely to have a Body Mass Index (BMI) greater than the 95th percentile, and previous research has identified a high prevalence of food-insecure children who are overweight (Eisenmann et al., 2011; Widome et al., 2009). The co-existence of food insecurity and overweight status may appear to be paradoxically correlated, yet previously observed associations reveals the potential health risks this population faces (Eisenmann et al., 2011; Metallinos-Katsaras et al., 2009).

College Undergraduates and Food Insecurity

Similarly, the subpopulation of college undergraduate students encounter a great number of risk factors for food insecurity that revolve around finances and aspects of resource management, which has been tied to the occurrence of obesity and weight gain (Anderson et al., 2003; Gaines et al., 2014). Undergraduate students remain a poorly understood population in the context of food insecurity, fitting in neither the adult nor the adolescent subpopulations that have been more thoroughly studied (Bruening et al., 2017). As the body of literature surrounding food insecurity in undergraduate students has begun to grow, studies are revealing its high prevalence rate in this population, ranging from 14% to 43%. This greatly exceeds the household percentage in the United

States (Bruening et al., 2017; El Zein et al., 2018; Gaines et al., 2014; Martinez et al., 2018). This higher percentage range of food insecure students may not reflect the true proportion experiencing food deficiencies due to the uncertainty of how to classify students within the context of the Household Food Security Survey Model (HFSSM) (Ellison et al., 2021). This uncertainty beckons yet more research to focus on this highly sensitive group of individuals.

Undergraduate students also experience a culmination of physical and environmental risk factors that include, but are not limited to, their inadequate financial and employment status, forfeiting healthy food choices so as to afford educational costs, and their limited eligibility for assistance programs such as Supplemental Nutrition Assistance Program (SNAP) (Fernandez et al., 2019; Martinez et al., 2018). Additionally, the mental pressures of undergraduate life including stressful coursework requirements, a limited availability of time due to a multitude of high demands, and the unanticipated difficulties of living independently have been identified as a facilitators of low food security (Fernandez et al., 2019). Perpetuating their already physically and mentally compromised situations are their social barriers of feeling stigmatized or embarrassed to access food assistance programs, such as on-campus food pantries (El Zein et al., 2018).

College Freshmen and Food Insecurity

Freshmen students, subject to all the same risk factors as the generalized college student, must contend with the added stress of adapting to a new environment and handling unexpected additional responsibilities of attending college (Fernandez et al., 2019). Freshman year is a pivotal point in terms of health for students. Food insecurity for undergraduate students was determined to begin freshman year, with 22% of first-

year students reporting food insecurity at one point during the year and 42% of these students believing their access to food had worsened over the course of the year (McArthur et al., 2018). Juxtaposed with lack of food access, Anderson et al., (2003) found that the majority of students experienced weight gain during their first year of college and the number of students classified as overweight or obese essentially doubles from the months of September to May. Thus, the typical college-lifestyle of inconsistent meal patterns, unhealthy eating habits, alcohol use, low physical activity, and poor mental health has been associated with the occurrence of food insecurity in this population, who face a higher probability of poor health outcomes both in the short and long-term (Bruening et al., 2016b, 2018).

Meal Plans and Food Insecurity

Freshmen students at public universities also characteristically live in on-campus dormitories and are required to purchase a meal plan; however, this does not lighten the burden of food insecurity among these students. At a large, midwestern university, first-year students with an unlimited meal plan, which is defined as unrestricted access to buffet-style campus dining halls, reported a 14% prevalence rate of food insecurity (Mei et al., 2021). All freshmen students in this sample had similar access to food resources, yet significant differences were noted in students' diets, which aligned with their food security status (Mei et al., 2021). Moreover, food-insecure students reported lower fruit, vegetable, and fiber consumption and an increased intake of dairy, calcium, and total added sugars, Mei et al. (2021) observed an association between food insecurity and insufficient dietary intake.

Possibly identifying a promoter of the poor dietary intake of college students, another study assessed food insecurity in relation to students' unused meals within different meal plans, which included 8 meals/week, 180 meals/semester, 14 meals/week, and unlimited meals (van Woerden et al., 2019). In the spring semester, students enrolled in the most economical meal plan (8 meals/week) reported a significantly higher percentage of food insecurity compared to students on the most expensive meal plan (unlimited) ($p= 0.01$) (van Woerden et al., 2019). The food-insecure students also did not use all their available meals.

One plausible explanation for food insecure students not accessing all their meals, is number of hours worked each week. Studies have shown a positive relationship between increasing levels of food insecurity and the total number of hours an employed student works each week, indicating a work schedule may hinder students from accessing the dining halls during hours of operations (Goldrick-Rab et al., 2018; Mei et al., 2021; van Woerden et al., 2019). Other factors, such as food insecurity's relationship with stress and food intake or the impact of former dietary habits, have been suggested as mechanisms that may facilitate food insecurity in students with meal plans, yet the paradoxical nature of these findings calls for further investigation into this niche of the population (Mei et al., 2021).

Food-Related Coping Strategies

In the analysis of food security, researchers have questioned the concept of food-related coping strategies as an additional means of monitoring food security status (Maxwell, 1996). Coping strategies have been defined as short-term responses in efforts to mitigate the effects of household food insufficiencies (Davies, 1993). As the

mechanisms used in coping strategies are transient by definition, there reaches a point in the severity of a household's food insecurity status in which these mechanisms may no longer adequately buffer insufficiencies (Wood et al., 2007). The view that implementing coping strategies is a means of "getting by" in a time of food scarcity is a common misconception because the actual use of such strategies is indicative of a worsening situation regarding food availability (Davies, 1993).

Previous research on coping strategies conducted by Maxwell (1996) identified six commonly practiced means of coping from several focus group discussions, capturing a well-rounded picture of how individuals both perceive and handle instances of food deficiency. These strategies included eating foods that are less preferred and less expensive to adapt to lower income, limiting portion sizes, borrowing food or money to buy food, maternal buffering (mothers voluntarily lessen their intake to provide for children), skipping meals, and skipping eating for whole days (Maxwell, 1996). Expanding on Maxwell's (1996) work identifying coping strategies, Woods et al. (2007) observed a pattern in the strategies used specifically by food pantry clients. This pattern of first limiting the number of eating instances, then restricting second helpings, and lastly reducing portion sizes of food given to children was noted among clients classified with a higher degree of food insecurity. By employing these extreme food limiting measures within their households, this study highlights the integral role food-related coping strategies play in the development of food insecurity as well as hunger in households (Wood et al., 2007).

In light of the COVID-19 pandemic, food-insecure households experienced environmental stressors that intensified both the physical and economic barriers to

accessing nutrient dense foods (Niles et al., 2020). Niles et al. (2020) noted the significantly higher likelihood of food-insecure households to utilize coping strategies. The strategies this research identified, closely resembling the themes Maxwell (1996) observed, included disrupted eating patterns, purchasing lower priced foods, receiving food from friends and family, and utilizing available food assistance programs (Niles et al., 2020). Disrupted eating patterns alone have been shown to be associated with poorer mental and emotional health as well as a decreased immune function (Althoff et al., 2016). Therefore, as food-insecure households begin integrating coping mechanisms to fare food insufficiencies, the negative implications of food insecurity have become an increasingly greater public health concern.

Therefore, the purpose of this study was to investigate how food-related coping strategies are associated with food security status in freshmen undergraduate students and high school students. Three hypotheses were established:

(H1) the status of a student's food security impacts the type and extent of coping strategies used during their freshman year of college,

(H2) the status of a student's food security status impacts the type and extent of coping strategies used during their senior year of high school, and

(H3) the type and extent of the coping strategy used changes as students transition from senior year in high school to freshman year in college.

METHODS

Study Population

Researchers recruited freshmen undergraduate students from two urban, public universities with one university located in Michigan and the other in Mississippi. Universities were of comparable size in student population, required freshmen students to live on campus in student housing and purchase a meal plan. Food insecurity was the highest in the state of Mississippi at 15.3%, while food insecurity in the state of Michigan is classified as near the United States average of 10.7% (*U.S. Department of Agriculture, Household Food Security in the United States Report, 2019*). Also, the universities are in notably different regions of the United States with data representative of both the southern and midwestern regions (*U.S. Department of Agriculture Research Service - Regions, 2021*).

Survey Development

A 36-item survey was developed with questions assessing students' food security (food access and availability), food-related coping behaviors, demographic characteristics, financial aid status, and anthropometric measurements. Food security status was determined using the USDA 6-item Household Food Security Survey Module (Table 2) (USDA-ERS, 2012). Questions were used to capture the food security status of students during two specific time periods which were, once in reference to their experience during their senior year of high school and the other in reference to their experience during their fall semester at their university.

As established by USDA, food security status is determined by the number of affirmative responses from the food security questions. Each affirmative response,

(answering “yes,” “often true,” or “sometimes true”) to a question, was totaled to produce a raw score that reflected an individual’s food security status. A total score between 0-1 affirmative responses indicated high or marginal food security, a total score between 2-4 affirmative responses indicated low food security, and a total score between 5-6 affirmative responses indicated very low food security.

The use and frequency of food-related coping strategies were determined by the adaptation of 5 of the 6 coping practices, identified by Maxwell (1996) (Table 3). The concept of maternal buffering was not included in the present study because this practice refers to toddlers and is not applicable to undergraduate freshmen living in on-campus housing.

A six-point Likert scale was used to determine the frequency of use of each coping strategy. The response options included 1 = “every meal,” 2 = “at least once per day,” 3 = “several times per week,” 4 = “several times per month,” 5 = “several times per year,” and 6 = “never.” Coping strategies were presented in reference to students’ experience during their senior year of high school and their experience during their freshman fall semester at their university. A total of 6 questions were derived, with the question on borrowing food or money to buy food being separated into two questions (Table 3). All questions were analyzed and reviewed by the Statistical Consulting Services at the University of Mississippi. The survey was pilot tested for clarity and functionality with one focus group of freshmen students and an introductory Nutrition and Hospitality Management course at the University of Mississippi. All study protocols were approved by both the University of Mississippi and Eastern Michigan University Institutional Review Boards.

Demographic characteristics, including, age, sex, race/ethnicity, and anthropometrics (i.e., height and weight) were included on the survey. The survey also requested students to indicate which, if any, forms of financial support they receive and the relative frequency they access their meal plan on campus each day.

Table 2

USDA 6-item Household Food Security Survey Module

1. “The food that (I/we) bought just didn’t last, and (I/we) didn’t have money to get more.” Was that often, sometimes, or never true for (you/your household) in the last 12 months?
 2. “(I/we) couldn’t afford to eat balanced meals.” Was that often, sometimes, or never true for (you/your household) in the last 12 months?
 3. In the last 12 months, since (name of current month), did (you/you or other adults in your household) ever cut the size of your meals or skip meals because there wasn’t enough money for food?
 4. [IF YES ABOVE, ASK] How often did this happen—almost every month, some months, but not every month, or in only 1 or 2 months?
 5. In the last 12 months, did you ever eat less than you felt you should because there wasn’t enough money for food?
 6. In the last 12 months, were you ever hungry but didn’t eat because there wasn’t enough money for food?
-

Table 3

Food-Related Coping Strategies

1. How often did you eat foods that were less preferred because there was not enough money for foods that you would rather eat?
 2. How often did you limit how much you ate at a meal to have food last longer?
 3. How often did you need to ask other people for food so that you did not go hungry?
 4. How often did you borrow money to buy food so that you did not go hungry?
 5. How often did you skip a meal to eat a larger meal at a later time because there was not enough money?
 6. How often did you skip eating for a day or more because there was not enough money for food?
-

Survey Distribution

Undergraduate students classified as freshmen (less than 30 academic hours) were recruited through the Student Housing Director at both universities. All undergraduates living in traditional freshman campus housing were sent a link to their school email, inviting them to take a survey via an anonymous Qualtrics link. Students were incentivized to participate in the survey by receiving a hyperlink to enter a raffle to win one of six \$25 Amazon gift cards upon completion. Funding was provided by the University of Mississippi Sally McDonnell Barksdale Honors College Research Fund.

The survey was received by 2223 students at the University of Mississippi and 1313 students at Eastern Michigan University a total of 3 times within a 2-week period. The University of Mississippi received 205 responses, and Eastern Michigan University received 156 responses, of which 139 responses and 94 responses respectively met the criteria for data analyses. To meet the criteria for data analyses, respondents must have completed the survey in greater than 72 seconds, answered the attention check questions correctly, and completed more than 65% of the survey (J. L. Huang et al., 2012). All data was collected by participant self-report methods during the months of November and December of 2021.

Data Analysis

Before testing the hypotheses, the data were checked for normality for each food security status group and each coping strategy variance. Independent t-tests were used to test hypotheses H1 and H2 to evaluate if data were normally distributed for each group of food insecurity status (food insecure and very food insecure). Levene's tests were performed to assess the homogeneity of variance assumption of independent t-tests. The

assumptions were met if Levene's test p-value was greater than 0.05. The non-parametric Mann-Whitney tests were used to test hypotheses 1 and 2 if data was not normally distributed for each group of food insecurity status.

Paired t-test was performed to test hypothesis H3 if data were normally distributed for each coping strategy variance and each group of food security status. Otherwise, the Wilcoxon signed-rank test was used for testing hypothesis 3. An alpha level of 0.05 was utilized for all tests. SPSS 27 was employed for all tests in the study.

RESULTS

Sample Description

The data collected from both the University of Mississippi and Eastern Michigan University were combined with the intent for a greater generalizability of the results. In the analytic sample of 231 students, the distribution of race/ethnicity and gender are found in Table 4 with 77.1% of students identifying as white or Caucasian and 80.5% as female. The distribution of sex did not resemble that of the broader undergraduate student populations of the University of Mississippi nor Eastern Michigan University, as discussed in the limitations. The race/ethnicity in the analytic sample more closely resembled that of the University of Mississippi than that of Eastern Michigan University (Table 4). Student food security status in high school revealed approximately 15% experienced very low food security (VLFS), 11% reported low food security (LFS) and 74% reported as food secure (Table 5). While in college, student food insecurity almost doubled, as they reported experiencing approximately 26% VLFS, 23% LFS, and 52% reported as food secure (Table 5). Student respondents also reported on the frequency of the use of their meal plan, with approximately 43% accessing their meal plan twice per day, 24% once per day, and 16% do not use it every day (Table 6).

Table 4
Student Demographics

Race/Ethnicity	Sample
White or Caucasian	77.1%
Black or African American	12.6%
Hispanic, Latino, or Spanish	1.3%
Asian or Asian Indian	3.0%
Native Hawaiian or Other Pacific Islanders	0.4%
Other	4.8%
Gender	
Male	14.3%
Female	80.5%
Non-binary/ Third Gender	3.0%
Prefer not to say	0.9%
Other	0.4%
Age	
18 years old	71.4%
19 years old	25.5%
20 years old	1.3%
21 years old	0.4%
22 years old and older	0.9%

Table 5*Food Security Status of Sample in High School and College*

Food Security Status	High School	College
Very Low Food Security	14.7%	25.5%
Low Food Security	11.3%	22.5%
Food Secured	74.0%	51.9%

Table 6*Frequency of Meal Plan Access*

Meal Plan Usage	Frequency
Once per day	23.8%
Twice per day	43.3%
Three times per day	13.0%
Four or more times per day	1.3%
I do not know	2.2%
Do not use every day	15.6%

Table 7*Frequency of Financial Support*

Financial Support	Frequency
Scholarships	82.3%
Grants	29.0%
Work-Study Jobs	3.5%
Loans	1.7%
Aid for International Study	0.4%
Aid for State/Federal Government (ex: SNAP Program)	12.1%
Other	2.6%
No financial support	6.5%

Results of Hypothesis H1

Descriptive statistics showed that data was normally distributed for coping strategies 1, 2, and 5 in freshmen students with low food security status (LFS) and very low food security status (VLFS). Variances were homogenous for these coping strategies. Thus, independent t-tests were conducted to test hypothesis H1, which was to test the differences in coping strategies between LFS and VLFS freshmen students.

As shown in Table 8, the independent-samples t-tests revealed a statistically significant difference between the first coping strategy used by VLFS freshmen students ($M = 2.86$, $SD = 1.18$) and LFS freshmen students ($M = 3.60$, $SD = 1.26$), $t(109) = -3.16$, $p = 0.002$. Effect size was large, Cohen's $d = 1.22$. Thus, the VLFS freshmen students denied themselves preferred food items more often than the LFS freshmen students while on their meal plans.

According to results of the independent t-tests for coping strategy 2, VLFS freshmen students ($M = 3.63$, $SD = 1.23$) limited how much they ate at each meal more often than the LFS freshmen students ($M = 4.40$, $SD = 1.32$), $t(109) = -3.21$, $p = 0.002$. Effect size was large, Cohen's $d = 1.27$.

The results of the independent t-tests showed a statistically significant difference in coping strategy 5 with VLFS freshmen students ($M = 3.58$, $SD = 1.18$) skipping meals to eat larger meals at a later time more often than the LFS freshmen students ($M = 4.50$, $SD = 1.46$), $t(109) = -3.68$, $p < 0.001$. Effect size was large, Cohen's $d = 1.32$.

The data was not normally distributed for coping strategies 3, 4 and 6 in the VLFS and LFS students. Thus, the non-parametric Mann-Whitney test was used to test hypothesis H1 and compare the ranks of coping strategies 3, 4 and 6 between LFS and

VLFS freshmen students. No differences were observed in coping strategy 3 ($p= 0.26$), coping strategy 4 ($p= 0.47$), or coping strategy 6 ($p= 0.06$).

Results of Hypothesis H2

Descriptive statistics showed that data was normally distributed for coping strategies 1, 2, and 5 in two groups of students (LFS and VLFS) during their high school experience. Variances were homogenous for these coping strategies). Thus, independent t-tests were conducted to test hypothesis H2, which was to test differences in coping strategies between LFS and VLFS students during their senior high school year.

As shown in Table 8, the independent-samples t-test revealed a statistically significant difference between the first coping strategy of VLFS high school students ($M= 3.29$, $SD= 1.09$) and of LFS high school students ($M= 4.04$, $SD= 1.46$), $t(58)= -2.27$, $p=0.03$. Effect size was large, Cohen's $d = 1.26$. Thus, the VLFS high school students denied themselves preferred food items more often than the LFS high school students.

According to results of the independent t-test for coping strategy 2, VLFS high school students ($M = 3.44$, $SD = 1.54$) limited how much they ate at each meal more often than the LFS high school students ($M= 4.38$, $SD= 1.50$). The difference was statistically significant, $t(58)=-2.38$, $p=0.02$. Effect size was large, Cohen's $d = 1.52$.

The results of the independent t-test showed a statistically significant difference in coping strategy 5 with VLFS high school students ($M = 3.79$, $SD = 1.32$) skipping meals to eat larger meals at a later time more often than the LFS high school ($M= 4.96$, $SD= 1.11$), $t(58)=-3.63$, $p=0.001$. Effect size was large, Cohen's $d = 1.52$.

The data was not normally distributed for coping strategies 3, 4 and 6 in the food security status groups. Thus, the non-parametric Mann-Whitney test was used to test

hypothesis H2 and compare the ranks of coping strategies 3, 5 and 6 between two groups of students during their high school experience with low and very low food security status. No differences were observed between very low food security status and low food security status for coping strategy 3 ($p= 0.18$), 4 ($p= 0.35$), or 6 ($p= 0.77$).

Table 8
Independent T-Test Results of Hypothesis 1 and Hypothesis 2

Coping Strategy	<i>M(SD)</i>	<i>t-value</i>
1. How often did you eat foods that were less preferred because there was not enough money for foods that you would rather eat?		
High School VLSF	3.29 (1.09)	-2.27*
High School LSF	4.04 (1.46)	-2.18
College VLSF	2.86 (1.18)	-3.16**
College LFS	3.60 (1.26)	-3.15
2. How often did you limit how much you ate at a meal to have food last longer?		
High School VLSF	3.44 (1.54)	-2.38*
High School LFS	4.38 (1.50)	-2.39
College VLFS	3.63 (1.23)	-3.21**
College LFS	4.40 (1.32)	-3.20
5. How often did you skip a meal to eat a larger meal at a later time because there was not enough money?		
High School VLFS	3.79 (1.32)	-3.63***
High School LFS	4.96 (1.11)	-3.71
College VLFS	3.58 (1.18)	-3.68***
College LFS	4.50 (1.46)	-3.63

Note: Scale, 1 = every meal to 7 = never

* $\leq .05$, ** $\leq .01$, *** $\leq .001$

Results of Hypothesis H3 Testing

Descriptive statistics showed that data was normally distributed for coping strategies 1, 2, 5 and 6 in students with food insecurity during their freshmen year and in students with food insecurity during their high school experience. Students that were both food insecure in college and high school constituted a sample size $n= 49$.

Variances were homogenous for these coping strategies. Thus, paired t-tests were conducted to test hypothesis H3, which was to test the differences in the coping strategies used by food insecure students in their college freshmen year and high school year.

As shown in Table 9, on average, the practice of the first coping strategy for food insecure freshmen students ($M= 2.84, SE= 0.18$) was significantly higher than the practice of the first coping strategy for food insecure students' high school experience ($M= 3.43, SE= 0.18$), $t(48)= 2.84, p= 0.007$. The effect size was large, Cohen's $d = 1.46$.

The use of coping strategy 2 among students during their freshmen year and high school experience was not statistically significant $t(48)= 1.28, p= 0.21$. Students during their high school experience ($M= 3.67, SE= 0.23$) and students during their freshmen year experience ($M= 3.39, SE= 0.17$) both limited how much they ate at each meal to a similar extent.

On average, the practice of coping strategy 5 for food insecure freshmen students was significantly higher ($M= 3.33, SE= 0.19$), compared to the practice of coping strategy 5 among high school students ($M= 4.10, SE= 0.19$), $t(48)= 4.19, p < 0.001$. The effect size was large, Cohen's $d = 1.30$.

The use of coping strategy 6 among freshmen students and high school students was not statistically significant $t(48)= 1.90, p= 0.06$. High school students ($M= 4.69, SE= 0.20$) and freshmen students ($M= 4.31, SE= 0.23$) both skipped eating for a day or more to a similar extent.

The data was not normally distributed for coping strategies 3 and 4. Thus, the non-parametric Wilcoxon signed ranks test was used to test hypothesis H3 and compare the medians of coping strategy 3 and the medians of coping strategy 4 between freshmen

and high school students. The median of the frequency of coping strategy 3 ($p= 0.22$) and coping strategy 4 ($p= 0.49$) did not significantly differ for freshmen and high school students.

Table 9
Paired Sample T-Test Results of Hypothesis 3

Coping Strategy	<i>M(SE)</i>	<i>t-value</i>
1. How often did you eat foods that were less preferred because there was not enough money for foods that you would rather eat?		
FI High School	3.43 (0.18)	
FI College	2.84 (0.18)	2.84**
2. How often did you limit how much you ate at a meal to have food last longer?		
FI High School	3.67 (1.57)	
FI College	3.39 (1.19)	1.28
5. How often did you skip a meal to eat a larger meal at a later time because there was not enough money?		
FI High School	4.10 (1.32)	
FI College	3.33 (1.18)	4.19***
6. How often did you skip eating for a day or more because there was not enough money for food?		
FI High School	4.69 (0.20)	
FI College	4.31 (0.23)	1.90

Note: Scale, 1 = every meal to 7 never
* $\leq .05$, ** $\leq .01$. *** $\leq .001$

DISCUSSION

The purpose of this study was to investigate how food-related coping strategies are associated with food security status in freshmen undergraduate students and high school students. Specifically, this study addresses the three following hypotheses: (H1) the status of a student's food security impacts the type and extent of coping strategies used during their freshman year of college, (H2) the status of a student's food security status impacts the type and extent of coping strategies used during their senior year of high school, and (H3) the type and extent of the coping strategy used changes as students transition from senior year in high school to freshman year in college. The findings from each hypothesis suggest that food-related coping strategies are associated with student food security status.

The results of both the students' freshman and high school experience revealed a greater dependency on eating less preferred foods because there was not enough money, limiting quantity of meal consumption, and skipping meals. h coping strategies in those with a lower food secure status. Maxwell (1996) categorized the coping strategies on order of least to most severe. The first two strategies are the least severe strategies and are meant to provide insight into how students are combating food insufficiencies (Maxwell, 1996).

Moreover, coping strategy 1 (*eating foods that are less preferred*) is a relatively common means of adjusting to a decrease in income across all income groups, as all but the wealthiest individuals admitted to the intermittent use of this strategy (Maxwell, 1996). Another study found that in the circumstances of increased physical and economic barriers, food insecure individuals would buy different, cheaper foods as a way to cope

(Niles et al., 2020). Food secure students may practice this strategy as well, in light of a multitude of factors such as the student's weekly or monthly budget, the type of meal plan or school lunch program the student has access to, or the obtainability of the student's preferred foods (Fernandez et al., 2019; van Woerden et al., 2019).

Similarly, coping strategy 2 (*limiting portion sizes*) is a highly variable, less invasive strategy among food insecure individuals. Not only does the use of this strategy significantly change across the seasons, but also the ways in which individuals implement this strategy greatly varies (Maxwell, 1996). For example, the restriction of second helpings has previously been associated with a higher degree of food insecurity (Woods et al., 2007). Students who limited portion sizes were likely able to eat enough to be satisfied but had to remain conscious of the amounts they ate in order to not run out of food for later (Maxwell, 1996). With students having access to meal plans on-campus, the implementation of this coping strategy may indicate a more complex situation at play in food insecure freshmen. One theory may be that employed students face time constraints during the typical dining hall hours, so they are only able to eat a smaller portion of their meal.

The experience of students during their senior year of high school and freshmen year of college additionally revealed a reliance on coping strategy 5 (*skipping meals to eat a larger meal at a later time*). This strategy is the more severe manifestation of limiting portion sizes, in which individuals would eat fewer meals per day in order to feel satisfied after these meals when food was not sufficient enough for three meals each day (Maxwell, 1996). The significance of skipping meals among high school students may be linked to their food availability within their household. One study found that food

insecure middle school and high school students reported a limited availability of healthy foods in their household (Widome et al., 2009). On the other hand, the approximately \$8 meal swipe per meal does not typically cover an entire meal at the respective universities in this study. Therefore, with insufficient finances, food insecure students may be choosing to use their available finances for one or two meals rather than three each day.

On the other hand, a student's personal preference may limit whether they choose to eat a meal or not due to the limited options of a financial restricted diet. A previous study looking specifically at the eating behaviors and perceptions of food among food insecure middle school and high school students concluded that the eating patterns of these food insecure students differed significantly from their food secure peers (Widome et al., 2009). Compared to food secure students, food insecure students were more likely to perceive healthy eating as inconvenient with healthy foods not tasting good leading to food insecure students consuming more calories from fat in their diets (Widome et al., 2009). More studies are needed to understand how food insecure students perceive their school lunch program and the factors which may perpetuate their food insecurity in light of this resources.

The primary means by which many universities address the problem of food insecurity among students is through food pantries, which may provide temporary relief for students experiencing acute food insecurity (Bruening et al., 2017). However, even with the improvements to food access, some students may still experience resistance in seeking help due to social barriers (El Zein et al., 2018). With factors outside of physical accessibility influencing student food security, it is possible that implementation of food-related coping strategies is perpetuating an avoidable condition. Thus, by determining

why certain strategies are used more frequently than others, researchers will gain insights into both the severity and longevity of food insecurity (Maxwell, 1996).

A high school student's household environment and food management skills likely play a prominent role in the development of similar, if not the same, coping strategies when they transition into college. While in high school, students typically are not purchasing the food for the household, but instead rely on parent/guardian purchases. As students move into the new environment of college, they are faced with a multitude of mental as well as physical stressors, which may exacerbate their food insecurity (Fernandez et al., 2019; Martinez et al., 2018). During these stressful times, students may more easily revert to habitual processes in order to cope.

On the other hand, in comparing students who were both food insecure in high school and during the freshmen year of college, this study revealed that food insecure freshmen used both coping strategy 1 (*eating foods that are less preferred*) and coping strategy 5 (*skipping meals to eat a larger meal at a later time*) more than when they were food insecure high school students. Overall, the results of this study revealed a 22% increase in food insecure individuals from high school to freshman year of college. As students are no longer under the care of their household, they may now be experiencing the food insecurity that their household shielded them from in high school (Maxwell, 1996; Noonan et al., 2016).

Appendix X provides students' responses to the optional open-ended question: *What suggestions do you have for [your university] in terms of making food more accessible or more likely to meet your needs* provides insight into the perception of students' current circumstances both living on-campus and with a purchased meal plan.

Responses were categorized into four major themes and include: (1) access to healthier food options, (2) cheaper healthy food options, (3) more options for dietary restricted students, and (4) extend dining hall hours of operation. Overall, students expressed frustration with unhealthy food choices typically being their only option. By highlighting these commonly faced barriers to food access on-campus, university administration has direction in implementing more safeguards for students who face food insecurity. With 48% of freshmen students experiencing some level of food insecurity in this sample, which is four times the national average, it is essential that the barriers regarding students' ability to access their meal plan and the quality of food be addressed.

The number of meal plans vary for both The University of Mississippi and Eastern Michigan University students, not always including 3 or more meals per day. A previous study found that students on the less expensive meal plans (8 meals per week) were more likely to report food insecurity than their counterparts with the most expensive meal plan (unlimited meals). Also the students on the less expensive meal plans did not use all of their available meals (van Woerden et al., 2019). Although appearing counterintuitive, other researchers have established an association between the total number of hours an employed student works each week and an increasing level of food insecurity (Goldrick-Rab et al., 2018; Mei et al., 2021; van Woerden et al., 2019). Thus, extraneous factors, such as employment, may be hindering these students from accessing their purchased meal plans throughout the day. In these situations, food access is restricted for reasons other than food availability, so to circumvent such restrictions, education could be provided on how to use dining hall operations to obtain the necessary

food for later. In learning how to manage food along their schedules, students could greatly benefit from any improvement in the quality of food.

Study Strengths and Weaknesses

This study fills an important gap in the literature of food insecurity, providing a more detailed picture of the type and frequency of coping strategies food insecure students practice. Through implementing a cross-sectional study of each student's current and previous experience, the fluidity of one's food security status is more clearly depicted across two time periods as opposed to just one time period. However, cross-sectional studies provide only a transient picture of food insecurity, so we are not able to determine a causal relationship between food insecurity and coping strategies among the freshmen and high school student experience.

This study also has a greater generalizability than much of the previous research in food insecurity, as we studied a sample of freshmen at 2 large, public universities within different regions of the United States. Moreover, students were observed at a similar point in their academic career with similar access to dining halls across campus. However, both the University of Mississippi and Eastern Michigan University have 3 or more meal plan options for students, and this information was not obtained from the student respondents.

The sample in this study was relatively small ($n= 231$) with the dominant respondents being female ($n= 186, 80.5\%$). However, this small sample size maintained a large effect size (Cohen's $d > 0.8$), revealing not only the clinical significance of these results, but also the study's reliability. All data collected was self-reported, which may be subject to social desirability and recall bias. In efforts to reduce reporting errors and bias,

data was collected through validated tools, including the USDA 6-Item HFSSM and the Coping Strategies Questionnaire. Finally, this study was limited in that additional information, such as outside employment and student and family income were not requested, which may influence the relationship between food insecurity and coping strategies.

CONCLUSION

This study found that certain food-related coping strategies are associated with increasing levels of food insecurity among both high school and freshmen college students. It remains unclear why the high school and college students with a VLFS status more frequently used the specific coping strategies of eating foods that are less preferred, limiting portion sizes, and skipping meals to eat a larger meal at a later time as they did. It also remains unclear why food insecure college students more frequently used the specific coping strategies of eating foods that are less preferred and skipping meals to eat a larger meal at a later time in comparison to food insecure high school students. However, previous research has established not only the high prevalence rate of food insecurity in both the adolescent and undergraduate population but also the negative effects on physical, mental, and social health (Burriss et al., 2020; Fernandez et al., 2019; Moffitt & Ribar, 2016).

Moreover, these results provide insights into how students are coping with food insufficiencies. Food insecurity is a multifaceted condition in which no singular cause can be defined as the sole contributor. Thus, both policymakers and university administration should not only focus on taking steps that aid in the alleviation of food insecurity's ill-effects by addressing the noted food restrictions, but also, they should focus on educating students on how to use these facilities in times of food insecurity.

The complex nature of food insecurity and its extensive impact on students throughout their transitional period from high school to college remains an understudied topic, so this study provides several prompts for future research regarding the impact of coping strategies within those facing food insecurity. In combining the concepts of food-

related coping strategies with the student experience of food insecurity, this research has redirected the attention from food insecurity intervention through access to resources to, instead, food insecurity intervention through education on resources.

Future research on the data obtained from this study should analyze the relationship between food insecurity and student demographics, meal plan usage, and financial aid status. Also, if this study were repeated, a longitudinal study that follows students from high school into college may provide valuable information regarding this transitional period. By obtaining a well-rounded picture of the food insecure students who practice coping strategies, researchers can target interventions to these specific populations and overall better understand how food insecurity is facilitated.

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APPENDICES

APPENDIX A

Student Email Consent Script

Email Subject Line: Complete a Survey and Enter a Raffle to **Win Amazon Gift Card**

Dear student,

Hello! My name is Nora Halama, and I am researching the impact of food availability on coping skills in college students for my senior thesis with the Sally McDonnell Barksdale Honors College at the University of Mississippi. The link below will take you to a web-based survey, which will take approximately 10 minutes to complete. After completing the survey, you will have the opportunity to enter a raffle for one of six \$25 Amazon gift cards by providing your email and phone number (to receive a text message).

All answers in this survey will be anonymous and confidential, so there will be no way to determine your identity through the survey. If you have any questions or concerns, please do not hesitate to reach out.

Best,

Nora Halama

SMBHC Undergraduate Student

Department of Nutrition and Hospitality Management

University of Mississippi

nehalama@go.olemiss.edu

Or

Dr. Lambert PhD, RD

Associate Professor and Advisor

Department of Nutrition and Hospitality Management

University of Mississippi

lambertl@olemiss.edu

APPENDIX B

Qualtrics Survey

Information Sheet

Title: An Investigation on Food Insecurity and Coping Skills in College Freshmen

Investigator

Nora E. Halama, Student, B.S.
Department of Nutrition and Hospitality
Management
108 Lenoir Hall
The University of Mississippi
(662) 915-7039

Advisor

Laurel G. Lambert, Faculty, Ph.D., R.D.N
Department of Nutrition and Hospitality
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108 Lenoir Hall
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Description

The purpose of this research project is to determine the impact of food insecurity on coping skills in student during their high school to college years. We would like to ask you a few questions about your experience with food insecurity and any commonly practiced coping skills in both the high school and college setting.

Cost and Payments

It will take you approximately 10 minutes to complete this survey. At the end of the survey, you will be redirected via a hyperlink to another survey to enter a raffle to win one of six \$25 Amazon gift cards. You will only need to provide your email or phone number (to receive a text message) to participate in the raffle.

Risks and Benefits

You may feel uncomfortable with some of the questions due to their personal nature. For example, you will be asked to recall if there were times you were without food or your food was greatly limited and other similar questions. We do not think that there are any other risks. A lot of people enjoy taking questionnaires.

Confidentiality

The data collected from this survey will be anonymous and confidential. Your email and/or phone number will only be used to enter the raffle for an Amazon gift card and will not be associated with your survey responses.

Right to Withdraw

You do not have to take part in this study, and you may stop participation at any time. If you start the study and decide that you do not want to finish, all you have to do is to tell Ms. Halama or Dr. Lambert (contact information listed above). You may skip any questions you prefer not to answer.

IRB Approval

This study has been reviewed by The University of Mississippi's Institutional Review Board (IRB). If you have any questions, concerns, or reports regarding your rights as a participant of research, please contact the IRB at (662) 915-7482 or irb@olemiss.edu.

Statement of Consent

I have read and understand the above information. By completing the survey, I consent to participate in the study.

- Yes, I consent
- No, I do not consent

Qualifications

1. Are you 18 or older?
 - Yes
 - No

2. Are you currently a freshman (between 0-30 academic hours) in your first semester at the University of Mississippi (Ole Miss)?
 - Yes
 - No

3. Please select your Residence Hall.
 - Crosby
 - Deaton
 - Hefley
 - Martin
 - Stewart
 - Stockard
 - Residence Hall 3
 - Other (please specify)

Food Insecurity (HS)

Instructions: The following six questions are going to ask you to think back to your senior year of high school and the food you had available.

1. **While you were a senior in high school**, the food you had available didn't last, and you didn't have enough money to buy more food.
 - Often true
 - Sometimes true
 - Never true
 - Don't know

2. **While you were a senior in high school**, you couldn't afford to eat balanced meals.
- Often true
 - Sometimes true
 - Never true
 - Don't know
3. **While you were a senior in high school**, did you ever reduce the size of your meals or skip meals because there wasn't enough money for food?
- Yes
 - No
 - Don't know
4. [IF YES ABOVE, ASK] How often did you reduce or skip meals because there wasn't enough money **during your senior year in high school**?
- Almost every month
 - Some months but not every month
 - Only 1 or 2 months
 - Don't know
5. **While you were a senior in high school**, did you ever eat less than you felt you should because there wasn't enough money for food?
- Yes
 - No
 - Don't know
6. **While you were a senior in high school**, were you ever hungry but didn't eat because there wasn't enough money for food?
- Yes
 - No
 - Don't know

Coping Mechanisms (HS)

The following seven questions will ask similar questions to the previous questions. But, this set of questions asks about the frequency of food availability **during your senior year of high school**.

1. How often did you eat foods that were less preferred because there was not enough money for foods that you would rather eat?
- Every Meal
 - At least once per day
 - Several times per week
 - Several times per month
 - Several times per year
 - Never

2. How often did you limit how much you ate at a meal to have food last longer?
 - Every Meal
 - At least once per day
 - Several times per week
 - Several times per month
 - Several times per year
 - Never

3. How often did you need to ask other people for food so that you did not go hungry?
 - Every Meal
 - At least once per day
 - Several times per week
 - Several times per month
 - Several times per year
 - Never

4. Please select the option “several times per month.”
 - Every Meal
 - At least once per day
 - Several times per week
 - Several times per month
 - Several times per year
 - Never

5. How often did you borrow money to buy food so that you did not go hungry?
 - Every Meal
 - At least once per day
 - Several times per week
 - Several times per month
 - Several times per year
 - Never

6. How often did you skip a meal to eat a larger meal at a later time because there was not enough money?
 - Every Meal
 - At least once per day
 - Several times per week
 - Several times per month
 - Several times per year
 - Never

7. How often did you skip eating for a day or more because there was not enough money for food?
- Every Meal
 - At least once per day
 - Several times per week
 - Several times per month
 - Several times per year
 - Never

Food Insecurity (College)

The following six questions are going to ask you to think about your fall semester at Ole Miss and the food you have had available.

1. **During the fall semester at Ole Miss**, the food you had available didn't last, and you didn't have enough money to buy more food.
- Often true
 - Sometimes true
 - Never true
 - Don't know
2. **During the fall semester at Ole Miss**, you couldn't afford to eat balanced meals.
- Often true
 - Sometimes true
 - Never true
 - Don't know
3. **During the fall semester at Ole Miss**, did you ever reduce the size of your meals or skip meals because there wasn't enough money for food?
- Yes
 - No
 - Don't know
4. [IF YES ABOVE, ASK] How often did you reduce or skip meals because there wasn't enough money **during the fall semester at Ole Miss**?
- Almost every month
 - Some months but not every month
 - Only 1 or 2 months
 - Don't know
5. **During the fall semester at Ole Miss**, did you ever eat less than you felt you should because there wasn't enough money for food?
- Yes
 - No
 - Don't know

6. **During the fall semester at Ole Miss**, were you ever hungry but didn't eat because there wasn't enough money for food?
- Yes
 - No
 - Don't know

Coping Mechanisms (HS)

The following seven questions will ask similar questions to the previous questions. But, this set of questions asks about the frequency of food availability **during your fall semester at Ole Miss**.

1. How often did you eat foods that were less preferred because there was not enough money for foods that you would rather eat?
- Every Meal
 - At least once per day
 - Several times per week
 - Several times per month
 - Several times per year
 - Never
2. How often did you limit how much you ate at a meal to have food last longer?
- Every Meal
 - At least once per day
 - Several times per week
 - Several times per month
 - Several times per year
 - Never
3. How often did you need to ask other people for food so that you did not go hungry?
- Every Meal
 - At least once per day
 - Several times per week
 - Several times per month
 - Several times per year
 - Never
4. Please select the option "several times per month."
- Every Meal
 - At least once per day
 - Several times per week
 - Several times per month
 - Several times per year
 - Never

5. How often did you borrow money to buy food so that you did not go hungry?
- Every Meal
 - At least once per day
 - Several times per week
 - Several times per month
 - Several times per year
 - Never
6. How often did you skip a meal to eat a larger meal at a later time because there was not enough money?
- Every Meal
 - At least once per day
 - Several times per week
 - Several times per month
 - Several times per year
 - Never
7. How often did you skip eating for a day or more because there was not enough money for food?
- Every Meal
 - At least once per day
 - Several times per week
 - Several times per month
 - Several times per year
 - Never

Demographic/Anthropometrics

Instructions: **Final questions** will ask you to answer questions about your demographics.

30. Do you currently receive any form of financial support? Please check all that apply.
- Scholarships
 - Grants
 - Work-Study Jobs
 - Loans
 - Aid for Military Families
 - Aid for International Study
 - Aid from State/Federal Government (ex: SNAP Program)
 - I do not receive any form of financial support
 - Other (please specify)
31. Please select your current age.
- 18 years old
 - 19 years old
 - 20 years old
 - 21 years old
 - 22 years and older

32. How do you describe yourself?
- Male
 - Female
 - Non-binary / third gender
 - Prefer not to say
 - Other
33. How would you describe your race/ethnicity? (Select all that apply)
- American Indian or Alaska Native
 - Asian or Asian Indian
 - Black or African American
 - Hispanic, Latino, or Spanish
 - Native Hawaiian or Other Pacific Islander
 - White or Caucasian
 - Other (please specify)
34. Current Height
- Feet:
 - Inches:
35. Current Weight: (in pounds)
36. How often do you access your meal plan (including flex and/or express money) on campus each day?
- Do not use everyday
 - Once per day
 - Twice per day
 - Three times per day
 - Four or more times per day
 - I don't know
37. What suggestions do you have for Ole Miss in terms of making food more accessible or more likely to meet your needs?

APPENDIX C

Suggestions for Making Food More Accessible or More Likely to Meet Needs

Access to Healthier Food Options

1. Make better food, something that I would actually like that's not greasy, messy, nasty, and cooked well.
2. We deserve better food options.
3. They need to have more readily available nutritional information and maybe more than one option for their main food dish, so students aren't stuck eating pizza or fries for every meal.
4. Incorporate more healthy option in the markets.
5. Less junk food options and possibly having a casual food market with actual healthy food options.
6. Healthier food places.
7. Not so sure really, I am just so tired of having to eat unhealthy fast food bc it's all I can get with my flex or meal swipes.
8. More food options and more options that have healthier foods.
9. Better food at the student union. Healthier options.
10. Need to provide more balanced options. Fruit, vegetables, etc.

Cheaper, Healthy Food Options

1. Have better food. Make meal plans worth more than they are.
2. Change the amount of money a meal plan can give from \$8. It usually isn't enough to fill up on, and I don't always have time to access the commons.
3. Increase the \$8 limit per meal swipe/lower prices of food and increase food options on campus.
4. Make the meal swipes worth \$9-\$10 so we don't have to waste a dollar of flex on meals. it would make it so we can buy more snacks and drinks to have in our dorms.
5. Make healthier options such as a salad place in the union. That way people can still use their meal swipes but stay healthy.

More Options for Dietary Restricted Students

1. Offer more options like before such as salads and burgers. I know a lot of people who don't eat because EMU does not accommodate their diets. Furthermore, there should be more things that are included in meal plans in the market.
2. Allow more foods to be a part of the meal plan at the market. A lot of the healthy food goes to waste and you guys have unhealthy food on there like donuts and chips so why isn't the yogurt and other things not on the meal plan. any food should be meal plan friendly!
3. Healthy food and food that meets dietary constrictions needs to be more readily available. I often find it difficult to find food that I can actually eat.
4. Maybe make it a bit more affordable and balanced as sometimes you have to skip out to make ends meet.

Extend Dining Hall Hours of Operations

1. Have more food options on campus that are open later and serve better tasting food.
2. I would like more healthy options. Freshii is really the only healthy option and it's open for about 2 hours and only for lunch.
3. Freshii open longer.
4. I would like more healthy options. Freshii is really the only healthy option and it's open for about 2 hours and only for lunch.
5. Have more healthy options especially later into the night for the on-campus students who work late.
6. Give more healthy options, and not have the hours so restricted. Also don't markup on campus so much.
7. Have more places open on weekends.
8. Have better/longer hours for food.
9. The union be open later.
10. Keep the Dining hall open 24 hours. Money isn't the issue that is barring me from access to food; it's the limited hours that a dining hall like Rebel Market has.

APPENDIX D

Institutional Review Board Approval Letter



THE UNIVERSITY of
MISSISSIPPI

Office of Research and Sponsored Programs

10/19/2021

Nora Halama

This is to inform you that your application to conduct research with human participants, "An Investigation of Food Insecurity and Coping Skills in College Freshmen" (Protocol #22x-074), has been determined as Exempt under 45 CFR 46.101(b)(#2iii). You may proceed with your research.

Please remember that all of The University of Mississippi's human participant research activities, regardless of whether the research is subject to federal regulations, must be guided by the ethical principles in The Belmont Report: Ethical Principles and Guidelines for the Protection of Human Subjects of Research.

It is especially important for you to keep these points in mind:

- You must protect the rights and welfare of human research participants.
- Any changes to your approved protocol must be reviewed and approved before initiating those changes.
- You must report promptly to the IRB any injuries or other unanticipated problems involving risks to participants or others.
- If research is to be conducted during class, the PI must email the instructor and ask if they wish to see the protocol materials (surveys, interview questions, etc) prior to research beginning.

If you have any questions, please feel free to contact the IRB at (662) 915-7482 or irb@olemiss.edu.

Sincerely,

Miranda Core
Research Compliance Specialist, Research Integrity and Compliance