Food Security, Factors Influencing Food Acceptance, and Preferred Food Assistance Delivery Modalities: A Survey of Students Attending a Medium Sized, Primarily Residential Emerging Research institution

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ABSTRACT

FOOD SECURITY, FACTORS INFLUENCING FOOD ACCEPTANCE, AND PREFERRED FOOD ASSISTANCE DELIVERY MODALITIES: A SURVEY OF STUDENTS ATTENDING A MEDIUM SIZED, PRIMARILY RESIDENTIAL EMERGING RESEARCH INSTITUTION

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Food pantries are the most common form of food assistance provided on college campuses. However, there are several barriers that prevent college students from utilizing pantry resources, leading to low campus food pantry utilization and awareness. Barriers, poor pantry utilization, and awareness have been well documented. However, there is little information currently available regarding factors that facilitate college students’ acceptance of food assistance, and the food distribution modalities that food insecure college students prefer. The purpose of this study was to determine these factors and preferences so they may be used to improve food assistance programs on college campuses.

To investigate the preferred food distribution modalities and factors that facilitate college students’ acceptance of food assistance, a cross-sectional online survey study design was utilized. To create the survey, questions about demographics, food distribution modalities, and awareness of the campus food pantry was combined with the USDA’s U.S. Household Food Security Survey Module: Six-Item Short Form. The short form was utilized as a validated
measure of food insecurity status. The target population of this study included undergraduate students from Northern Illinois University (NIU). This survey was administered in the spring 2023 semester using emails from the NIU Clearinghouse. Data collection lasted for a total of four weeks. Descriptive statistics and chi square analyses were used to analyze the data.

Of the students sampled, 82.3% were aware of NIU’s campus food pantry, but only 14.8% reported utilizing the pantry. Among very low and low food insecure students, 24.2% and 20.5% reported using the NIU food pantry, respectively. Also, among very low and low food insecure students, 19.1% and 28.2% reported being unaware of the NIU food pantry, respectively. Additionally, students reported that food pantries (68.4%), hallway distribution sites (51.9%), meal swipe donation programs (40.3%), and dining hall food recovery programs (40%) were the most preferred food distribution modalities. Furthermore, the survey participants reported that NIU students would be more likely to accept food assistance if food assistance was provided in a convenient location (93.7%), and if fresh fruits and vegetables were made available (85.4%).

Due to the amount of food insecure students that reported unawareness of the NIU food pantry, these results suggest that the pantry’s advertising efforts could be improved. Additionally, the results of this study suggest that NIU should expand its existing food pantry and food recovery programs. Furthermore, NIU should consider implementing new hallway food distribution sites as well as a meal swipe donation program per the results of this study. Lastly, the results suggest that NIU should prioritize offering food assistance programs in convenient locations and providing fresh fruits and vegetables as part of these programs.
FOOD SECURITY, FACTORS INFLUENCING FOOD ACCEPTANCE, AND PREFERRED FOOD ASSISTANCE DELIVERY MODALITIES:

A SURVEY OF STUDENTS ATTENDING A MEDIUM SIZED, PRIMARILY RESIDENTIAL EMERGING RESEARCH INSTITUTION

BY

AMY MARTIN
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A THESIS SUBMITTED TO THE GRADUATE SCHOOL IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE MASTER OF SCIENCE

DEPARTMENT OF NUTRITION AND DIETETICS

Thesis Director:
Nancy Prange
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CHAPTER 1

INTRODUCTION

Food insecurity is a major public health issue in the United States today. Food insecurity is defined as insufficient or uncertain access to food that is safe and satisfies nutritional needs, or the inability to obtain food in a socially acceptable manner (Gaines et al., 2014; Payne-Sturges et al., 2018; Zigmont et al., 2020). Usually, food insecurity arises as a result of inadequate financial or other resources (Payne-Sturges et al., 2018; Zigmont et al., 2020). Since the Great Recession began in 2007, food insecurity has been on the rise in the general American population (Payne-Sturges et al., 2018). Recently, the COVID-19 pandemic impacted food insecurity rates among Americans. Per the data collected by the USDA, food insecurity rates during 2020, the first year of COVID-19 pandemic, were comparable to food insecurity rates before the pandemic. In both 2019 and 2020, the USDA reported that 10.5% or 13.8 million American households were food insecure (USDA, 2023a). Then, in 2021, food insecurity rates decreased slightly to 10.2% or 13.5 million US households according to the USDA (USDA, 2023a). However, this was followed by a significant increase in food insecurity in 2022, with 12.8% or 17 million US households being food insecure (USDA, 2023a). Therefore, it is evident that the COVID-19 pandemic has yielded a net increase in food insecurity among the American population.

While food insecurity is prevalent among the overall US population, young adults are at a higher risk. This is due to their employment in entry-level positions that offer low wages, which
In turn, makes it challenging for them to cover essential expenses such as food. (Jesch et al., 2021).

In particular, young adult college students are at an even greater risk for food insecurity. According to previous research, while food insecurity rates among young adults can range from 9 to 14%, food insecurity may impact between 14 and 35% of college students (Jesch et al., 2021; Zigmont et al., 2020). This is important because food insecurity has major consequences for college students including negative impacts on their academic performance, psychosocial health, and physical health (El Zein et al., 2019; Henry, 2017; Meza et al., 2019; Morris et al., 2016; van Woerden et al., 2019; Weaver et al., 2020; Zigmont et al., 2020).

There are several reasons why college students experience greater food insecurity rates than the overall American population and the general young adult population. This includes a lack of on-campus grocery stores, transportation constraints, and inadequate cooking facilities and skills (Meza et al., 2019; Zigmont et al., 2020). Though all these factors may contribute to food insecurity among college students, the biggest underlying reason for this issue appears to be school-related expenses (El Zein et al., 2019; Morris et al., 2016; Zigmont et al., 2020). Tuition and textbook costs represent a large financial burden for college students (El Zein et al., 2019; Zigmont et al., 2020). The cost of college tuition surpasses the financial resources of many college students, as tuition rates have increased more quickly than the median income has grown (El Zein et al., 2019). Unfortunately, even tuition at public colleges has become expensive due to cuts in state support for public colleges (El Zein et al., 2019). To complicate the matter further, college presents a difficult transition period for young adults. As students learn to live away from home, they must take on new responsibilities, such as managing their own finances (El Zein et
Since school-related expenses are so costly, and students often have limited financial resources, they must be purposeful with their spending habits. Oftentimes, this leads students to prioritize rent, tuition, and utility bills over food costs. After paying these bills, many college students are not left with enough money to purchase food (El Zein et al., 2019).

Another factor that may contribute to food insecurity among college students is their lack of eligibility for government food assistance programs. To reduce food insecurity among Americans, the US government has created several programs including the School Breakfast Program (SBP) and the National School Lunch Program (NSLP). However, neither of these programs allow college students to qualify for benefits (USDA, 2023c, 2022d). Thus, many young adults are ineligible for government food assistance during a life stage when finances are already limited (Davidson & Morrell, 2020). Historically, college students have also not been eligible for food assistance from the Supplemental Nutrition Assistance Program (SNAP). However, as a result of the COVID-19 pandemic, SNAP benefits have been expanded to provide aid to college students. The “Consolidated Appropriations Act, 2021” was signed into law by the President to extend SNAP benefits to college students (USDA, 2020; U.S. Department of Education, 2021). This act permits any college student who fits one of two criteria to receive SNAP benefits. These two criteria include: being eligible to receive state or federally financed work study or having an expected family contribution of zero, including students that qualify for a maximum Pell Grant (USDA, 2020; U.S. Department of Education, 2021). If a student fits one of these criteria and satisfies all of SNAP’s other financial and non-financial SNAP requirements, they can receive benefits. Though this Act helps to provide SNAP benefits to college students, this assistance is only temporary, as this Act only remained in place until 30
days following the lift of the COVID-19 public health emergency (USDA, 2020; U.S.
Department of Education, 2021). According to the Consolidated Appropriations Act, 2023, the
temporary college student exceptions have been discontinued. Therefore, as of July 1st, 2023,
college students are no longer eligible to receive SNAP benefits (U.S. Congress, 2023; USDA,
2023b).

Since college students do not qualify, or only temporarily qualified, for national food
assistance programs, they have been forced to cope with their food insecurity using other
methods. These coping methods include selecting foods to buy based on price and not nutritional
value, eating less food, relying on others such as friends or family for food, attending campus
events where food is available, and seeking employment to help them afford food (Farahbakhsh
et al., 2015; Henry, 2017; Hughes et al., 2011; McArthur et al., 2018; Waity et al., 2020; Watson
et al., 2017; Zigmont et al., 2021).

Food insecurity among college students has many negative impacts on the lives of these
students, two of which are its effects on health and academic performance. It has been well
documented that food insecure college students have poorer quality diets, higher levels of stress,
higher levels of depression, and poorer quality sleep (Bruening et al., 2018; El Zein et al., 2019;
Farahbakhsh et al., 2017; Payne-Sturges et al., 2018; Raskind et al., 2019; Zigmont et al., 2020).
It has also been established that food insecure college students have lower GPAs than their food
secure peers (El Zein et al., 2019; Morris et al., 2016; van Woerden et al., 2019; Weaver et al.,
2020; Zigmont et al., 2020). One study found that a significantly higher number of food secure
individuals had a GPA between 3.50 and 4.00 (El Zein et al., 2019). On the contrary, a
significantly higher amount of food insecure students had a GPA between 2.50 and 2.59 (El Zein
et al., 2019). In general, food insecure students in this study were nearly twice as likely to earn a GPA lower than a 3.00 compared to their food secure classmates (El Zein et al., 2019). Another study found that the likelihood of underachieving academically (as measured by GPA) was significant for food insecure students (Weaver et al., 2020). Additionally, food insecurity was inversely related to earning a GPA in the upper 10% of all scores (Weaver et al., 2020). Food insecure students were three times less likely to be among the highest 10% of GPA scores than their food secure peers (Weaver et al., 2020). They were also twice as likely than their food secure classmates to earn a GPA within the lowest 10%. This included GPAs that ranged from a 0.08 to a 2.37 (Weaver et al., 2020). A third study discovered that students with the lowest GPA scores (ranging from 0 to 1.99) were less likely to be highly food secure (Morris et al., 2016). On the other hand, those in the highest GPA range (≥3.00) were more likely to be highly food secure (Morris et al., 2016).

Due to the high prevalence of food insecurity on college campuses and its negative impacts on students, many institutions have begun implementing interventions to address this issue. Solutions that have been implemented by institutions include dining hall food recovery programs, reduced price meal plans, community gardens, meal vouchers for students, programs where students can work for food, allowing students to donate meal swipes to their peers, and campus food pantries (Diaz & Gaylor, 2020; Freudenberg et al., 2019; Henry, 2017).

Of these solutions, the most common is the creation of on-campus food pantries. This is because food pantries are a simple and economical way to address food insecurity among college students (Landry et al., 2022). While food pantries do not cost much in terms of effort or money, they have not proven to be the most effective way to provide food assistance due to the barriers
that college students encounter when utilizing food pantries. These barriers include a fear of disappointing one’s family, inconvenient hours of operation, and insufficient information regarding food pantries (El Zein et al., 2018; McArthur et al., 2020; Meza et al., 2019; Waity et al., 2020). Another major barrier to food pantry use is stigma. College students find the use of food pantries to be a stigmatizing experience. Thus, despite needing food assistance, many college students do not use food pantries (Daugherty et al., 2019; El Zein et al., 2018; McArthur et al., 2020; Weaver et al., 2021). While barriers to accessing food assistance have been well documented, there is little information currently available regarding factors that facilitate college students’ acceptance of food assistance, and the food distribution modalities that food insecure college students prefer. The purpose of this study was to determine these factors and preferences so they may be used to improve food assistance programs on college campuses.

Statement of the Problem

Presently, there are over 800 food pantries on American college campuses nationwide (Metti, 2021). This demonstrates that many American colleges are instituting food pantries on their campuses in an attempt to address food insecurity among college students. In the eyes of university administrators, food pantries are a financially and logistically attractive solution since the cost to open these pantries is modest and pantries are not complicated to implement (Landry et al., 2022). However, prior research has established that stigma is associated with the use of food pantries. This stigma manifests in feelings of embarrassment, judgment, and shame related to the use of food pantries (Daugherty et al., 2019; El Zein et al., 2018, 2022; McArthur et al., 2020; Weaver et al., 2021). This stigma dissuades many food insecure students that could benefit
from food assistance from utilizing the services of pantries (Weaver et al., 2021). For example, a study conducted by El Zein et al. (2018) found that only 38.5% of the food insecure college students surveyed had used their campus’ food pantry in the past. Social stigma was found to be a major barrier to food pantry use in this sample, as 36.8% of the students surveyed, half of which were food insecure, reported this as an impediment to their use of the pantry (El Zein et al., 2018). Even lower campus food pantry utilization was noted in a study by McArthur et al. (2020), as only 17.4% of the food insecure college students surveyed reported accessing a campus food pantry. Stigma was also a barrier to pantry use reported among this sample, as 20% of the food insecure students reported that they felt too embarrassed to ask for food assistance from food pantries. This data suggests that the use of food pantries can be stigmatizing for college students and dissuade them from utilizing pantry services. In addition to the issue of stigma, food pantries are only successful in expanding food access if students are motivated and willing to use them (McArthur et al., 2020). Since food pantry use can be stigmatizing, and college students must be motivated to use this resource, different food distribution modalities and factors that facilitate college students’ acceptance of food assistance should be studied further.

The present study aims to determine the factors that drive college students’ willingness to utilize food assistance and the food distribution modalities that are the most student friendly. If these factors and modalities are identified, they can be used to improve future food assistance programs for the college student population. Thus, the information gained from this study can be implemented to encourage the use of food assistance among food insecure college students.
Background and Significance

NIU Student Demographics

The target population for this survey is undergraduate students at Northern Illinois University (NIU). As of the fall 2022 semester, 11,429 undergraduate students are enrolled at NIU (NIU Office of Institutional Effectiveness, 2023). With an undergraduate student population of 11,429 students, it is not feasible to survey everyone. Thus, a sample of the population will be surveyed, and the data gathered from this sample will be used to make general conclusions about the entire population.

Of these 11,429 undergraduate students, 47.29% are male and 52.71% are female (NIU Office of Institutional Effectiveness, 2023). Based on the racial and ethnic demographics of NIU’s undergraduate student population, 43.65% students identify as White, 23.76% identify as Hispanic or Latino, and 20.65% identify as Black (NIU Office of Institutional Effectiveness, 2023). In addition, 51.37% of the undergraduate students are Pell Grant eligible, and 50.78% are first-generation college students (NIU Office of Institutional Effectiveness, 2023).

NIU Campus Food Insecurity Resources and Challenges

Like other college campuses, the main resource that NIU offers to address food insecurity is an on-campus food pantry. The “Huskie Food Pantry” is located in the Chick Evans Field House on NIU’s campus (NIU, n.d.-a). According to the fall 2023 semester hours, students can receive food assistance from the pantry on Wednesdays and Thursdays between 4:00 PM and 6:00 PM. In the past, students simply showed up at the designated food distribution timeslots
with their NIU identification card. When they arrived, the students checked in at the pantry’s front desk (NIU, n.d.-a). The pantry operated on a first-come, first-served basis. Thus, the students who arrived the earliest at the pantry were allowed into the pantry first. To determine the order in which students were allowed into the pantry, each student was provided with a ticket number as they arrived (NIU, n.d.-a). Then, once the pantry’s hours of operation began, students were called into the pantry in numerical order based on these tickets.

As of the spring 2023 semester, the Huskie Food Pantry implemented a new online registration process. This new system allows students to sign up for a ten-minute time slot before the pantry’s distribution hours (NIU, n.d.-a). Participants in this system will enjoy reduced waiting times since they can arrive at the pantry at their scheduled time, eliminating the need to wait for their number to be called. Upon entering the pantry, students have the freedom to select any groceries they desire for their shopping. On their way out of the pantry, student volunteers help them bag their groceries (NIU, n.d.-a). Though the Huskie Food Pantry encourages students to utilize this new system, they still accept walk-ins (NIU, n.d.-a). However, these students are likely to encounter longer wait times compared to those that register online, as appointments have priority. Walk-in students are allowed into the pantry sporadically, as their entry is dependent on which ten-minute time slots still have space available (NIU, n.d.-a). If a student urgently needs food when the pantry is closed, emergency food bags can be picked up via the NIU Police and Public Safety (NIU, n.d.-a).

Another food insecurity resource offered on NIU’s campus is “Huskie Harvest,” new to campus as of the spring 2023 semester. This is a food recovery program where leftover food from on-campus catering events is gathered, packed into containers by student volunteers, and
provided to students (NIU College of Health and Human Sciences, 2023). This food is provided to NIU students via the freezers in the Huskie Food Pantry. While the food pantry provides a variety of non-perishable food and some produce, Huskie Harvest provides unique, freezer-friendly, single serving meals (NIU College of Health and Human Sciences, 2023).

A final food insecurity resource offered on NIU’s campus are the “Communiversity Gardens.” These community vegetable gardens were created to address the food deserts in the DeKalb community, with the ultimate goal of reducing food insecurity (NIU Communiversity Gardens, n.d.). There are four gardens that are part of the Communiversity Gardens initiative, two of which are located on NIU’s campus, and two of which are off campus. These gardens provide fresh vegetables to those in need of food within DeKalb County. More specifically, the produce that is grown at these gardens is donated to food pantries, community meal locations, and other programs in DeKalb County (NIU Communiversity Gardens, n.d.). Recently, NIU has expanded the number of gardens on its campus as part of its “Edible Campus” initiative. Similar to the Communiversity Gardens, the goal of the Edible Campus program is to provide locally grown produce to NIU’s campus, decrease food insecurity, promote sustainable food systems, and provide educational opportunities to NIU students (NIU, n.d.-b). Four gardens have been created as part of the Edible Campus initiative, all of which are located on NIU’s campus. While three of these gardens are not free to pick, the garden located next to NIU’s Founder’s Memorial Library includes multiple raised garden beds that allow students to harvest produce to take home at any time (NIU, n.d.-b).

While NIU does offer some food assistance modalities on its campus, the modalities offered provide limited aid to food insecure students. The Huskie Food Pantry is only open on
Wednesdays and Thursdays every week for a total of four hours. If neither of the pantry’s food distribution time slots work for a student’s schedule, that individual might be missing out on needed food assistance. Also, as previously mentioned, food pantry usage has been associated with stigma, and this stigma dissuades food pantry usage among college students (Daugherty et al., 2019; El Zein et al., 2018, 2022; McArthur et al., 2020; Weaver et al., 2021). Though the Huskie Food Pantry’s new online registration system could reduce student’s perception of stigma, it is still reasonable to infer that stigma could be deterring NIU students from seeking out food assistance from the Huskie Food Pantry. In addition, while the Communique and Edible Campus Gardens provide locally grown produce to the DeKalb Community, these gardens unfortunately do not provide food year-round to NIU’s students.

Due to the limited resources currently offered by NIU, the food insecure students on this campus could benefit immensely from an expansion of food assistance modalities. However, it is difficult to know what food assistance resources should be added to NIU’s campus. This is because there is currently limited research regarding the factors that facilitate college students’ acceptance of food assistance and their preferred food distribution modalities. The present study will work to fill this gap in the literature and will provide valuable information that NIU’s administration can use to inform future food insecurity intervention efforts.

Research Questions

1. What are college students’ preferred food distribution modalities, what factors facilitate college students’ use of food assistance, and are they aware of their campus’ food pantry?
2. Is there a difference in food assistance acceptance and food distribution modality preferences between college students of varying food security status?

3. Do factors such as year in school, gender, race/ethnicity, first-generation status, age, living situation, meal plan status, employment status, financial aid usage, or past food assistance usage make a difference in the food assistance acceptance of college students?

Specific Aims

Specific Aim 1: To determine college students’ attitudes towards food assistance acceptance, their preferred food distribution modalities, and their awareness of their campus’ food pantry.

Specific Aim 2: To determine if there is a difference in food assistance acceptance and food distribution modality preferences between different levels of food insecure college student.

Specific Aim 3: To determine if year in school, gender, race/ethnicity, first-generation status, age, living situation, meal plan status, employment status, or past food assistance usage makes a difference in the food assistance acceptance of college students.
CHAPTER 2

LITERATURE REVIEW

Introduction

Food insecurity measurements determine whether a household’s food supply is sufficient and stable enough to keep members healthy. As a result, food insecurity is an indicator of economic hardship (Patton-López et al., 2014). This hardship is amplified among college students, as tuition costs have increased in recent years. Between 2005 and 2011, the cost of attending 4-year public colleges and universities increased by 24% (College Board Research, 2019). These tuition costs increased another 13% between 2011 and 2016 (College Board Research, 2019). This is concerning, because many college students prioritize paying their tuition bills over paying for food, leading to food insecurity among students (Davidson & Morrell, 2020).

High food insecurity prevalence among college students is important because food insecurity among college students is associated with negative health impacts. This includes higher odds of becoming obese, declines in mental health, eating fewer fruits and vegetables, and higher depression, anxiety, and stress (El Zein et al., 2018; Landry et al., 2022). Though it has not been researched using the college student population, food insecurity has also been linked to increased rates of hyperlipidemia, hypertension, and diabetes. This suggests that food insecurity experienced during college years could negatively impact one’s health in the long term.
(El Zein et al., 2018). In addition to affecting the physical health of college students, food insecurity has been found to produce a variety of psychosocial effects among college students as well.

Psychosocial Effects of Food Insecurity on College Students

One study that documented the psychosocial effects of food insecurity on college students was conducted by Meza et al. (2019). In this qualitative study, 25 undergraduate students at a university in California were interviewed on their campus food pantry use. The interview questioned students about their thoughts, emotions, and experiences related to food insecurity, and how food insecurity has affected their academic performance and psychosocial wellbeing. One psychosocial effect discussed by the students during the interviews was fear of not having enough food. For many students, this fear manifested in feelings of anxiety, worry, and stress that impacted both their academic performance and overall daily life. Another psychosocial effect noted by the researchers was a limited ability to build social connections. Many important social opportunities in college surround food, which often prevents food insecure students from engaging with their peers. Several of the student interviewees reported feeling left out from social interactions and being excluded from a key component of the college experience. An additional psychosocial effect identified in this study was feelings of hopelessness and unworthiness. Some of the students expressed feeling hopeless because they might never recover financially from their struggles with food insecurity during college. This stems from the fact that a significant number of these students had to accumulate substantial debt to cover their essential expenses. Other students expressed a sense of unworthiness when it came to seeking assistance, as they felt that there were fellow community members, like homeless
individuals, facing even more significant challenges than they were. A final psychosocial effect of food insecurity was feelings of anger towards their university for not intervening enough on behalf of their food insecure students. The students reporting these sentiments emphasized that their university was not doing enough to supply its food insecure students with helpful resources.

Another study by Henry (2017) found similar psychosocial effects among a different sample of food insecure college students. In this study, 27 food insecure college students were interviewed, and 5 focus groups were conducted with food secure students. The food insecure students reported withdrawing from social outings because they could not afford to eat at a restaurant with their peers. These individuals stated that they refrained from participating in these outings because they were concerned about their friends forming a negative opinion of them due to their food insecurity. Therefore, several students mentioned that, to avoid judgement from their peers, they either only discussed their food insecurity with a few friends, or that they did not discuss this issue at all. Students also discussed how their participation in extracurricular activities was limited due to food insecurity. These same students reported being unable to participate in clubs and organizations, socialize and visit with friends, go on school outings, and attend parties, events, and football games. Overall, these students shared the sentiment that food insecurity was isolating and prevented them from making friends and engaging in desired activities during their college years. Also, similar to the participants in the previous study, the students in this study felt ashamed of their self-insufficiency. These feelings of shame prevented them from asking their parents for assistance and from seeking other forms of food assistance. These students also mentioned feeling unworthy of external help, as others were in more severe situations than them. Thus, they did not want to take resources away from these individuals that
they believed needed the resources more than them. In general, there was a common sentiment held among the students included in this study that they “should be able to provide for themselves.”

A final study that briefly discussed similar psychosocial effects was conducted at the University of California, Los Angeles (Watson et al., 2017). The researchers for this qualitative study conducted 11 focus groups with the goal of better understanding food insecurity among college students. The results of the study demonstrated that food insecurity had major consequences on the social lives of the students interviewed. Specifically, the students discussed being unable to share meals with friends due to having insufficient meal swipes or needing to save money. Thus, students were prevented from eating at dining halls and restaurants as a result of their food insecurity. This limited the social opportunities available to food insecure students. In summary, food insecurity has a variety of negative psychosocial effects on college students that prevent them from fully engaging in the college experience.

Academic Effects

A variety of studies have identified a connection between food insecurity and academics. Specifically, food insecure students have been found to have lower academic performance and encounter more academic obstacles than their food secure peers. According to research by Farahbakhsh et al. (2017), many food insecure students encounter adverse academic outcomes due to their lack of food. For this study, the researchers analyzed the relationship between food security status and perceived academic quality. The main objective of this research was to examine the effects of food insecurity on the academic experiences of University of Alberta
student food bank clients. The researchers collected data using a cross-sectional design and a convenience sample of 58 students. Each student was asked to complete the Adult Food Security Survey Module to measure their food security status. To identify the effect of food insecurity on academic outcomes, the students responded to a survey question that asked, “As a student, have you experienced any of the following because you didn’t have enough money for food?” The response options included: “the inability to concentrate in class or during an exam, the inability to study for an exam, the inability to complete an assignment, failing or withdrawing from a course, the inability to attend class, none of the above applies to me, and don’t know or decline to answer.” The results demonstrated that 44.8% of the sample were moderately food insecure, and 44.8% were severely food insecure. In terms of academic outcomes, 60% of the subjects reported struggling with at least one adverse academic experience due to their food insecurity. Also, those with severe food insecurity were more likely to report an adverse academic experience than their food secure peers. These results suggest that food insecurity has a negative impact on the academic experiences of college students (Farahbakhsh et al., 2017).

Another study that supports the findings of Farahbakhsh et al. was conducted by Zigmont et al. (2020). In this cross-sectional study, undergraduate students from a mid-sized, public university in Connecticut were surveyed to assess the prevalence of food insecurity and its impact on academic performance. The final sample size included a random stratified sample of 919 students. Food insecurity was measured using the following survey question, “In the past 12 months, was there any day when you or anyone in your family went hungry because you did not have enough money for food?” This question was adapted from the USDA 18-question Household Food Security Survey Module (HFSSM). Academic data were gathered by asking
students to indicate whether they agreed or disagreed with the following statements: “I am satisfied with my current academic performance in college” and “I am able to maintain focus in my classes.” Students were also asked whether they fell asleep in class more than once per week. Academic performance was assessed by asking students, “What is your overall GPA?” The survey results indicated that 30.1% of students had experienced food insecurity in the last year. In terms of academic performance, food insecure students were found to be less successful students, as they achieved lower GPAs than their food secure counterparts. Also, food insecure students had a greater chance of experiencing academic troubles like the inability to focus and falling asleep during class. Overall, food insecurity was significantly associated with a lower feeling of satisfaction in regard to academic performance. These findings imply that food insecurity has a negative effect on the academic performance and experiences of college students (Zigmont et al., 2020).

Several studies from El Zein et al. (2019), Weaver et al. (2020), Morris et al. (2016), and Maroto et al. (2015) have been able to quantify the exact impact that food insecurity has on the academic performance of college students. In the cross-sectional study by El Zein et al. (2019), the researchers administered an online questionnaire to first year college students from 8 different American universities. This questionnaire was used to analyze the food security status and academic performance of these students. A total of 855 students participated in the survey. The results revealed that 19% of the students were food insecure. In terms of academic performance, a significantly higher number of food secure students had a GPA between 3.50 and 4.00. Conversely, a significantly larger number of food insecure students had a GPA between 2.50 and 2.59. The food insecure students in this study were almost twice as likely to earn a GPA
less than a 3.00 when compared to their food secure peers. These results imply that challenges presented by food insecurity can lead to academic difficulties. In general, these findings suggest that food insecurity needs to be addressed on college campuses. This will help to ensure students succeed in their studies and graduate on time (El Zein et al., 2019).

Another study by Weaver et al. (2020), quantified food insecurity’s impact on academics. Researchers performed a cross-sectional study to assess the relationship between food security status and GPA. A total of 2,055 undergraduate students at a mid-sized public university in New Jersey participated in the survey. To determine food security status, the USDA food security measure was used, and the university’s student database provided the necessary GPA information. According to the results, 48% of the students surveyed experience food insecurity. These food insecure students were significantly more likely to underachieve academically (as measured by GPA). The results also showed that food insecurity was inversely related to earning a GPA in the upper 10% of all scores. Food insecure students were three times less likely to be among the highest 10% of GPA scores, and twice as likely to earn a GPA in the lowest 10% than their food secure classmates. The lowest 10% of scores included GPAs between a 0.08 to a 2.37. Similar to the previous study, these findings highlight the implications that food insecurity has on academic success, and its potential to negatively impact on-time graduation rates and student retention (Weaver et al., 2020).

Further support on food security and academic success among college students comes from Morris et al. (2016). In their cross-sectional study, the researchers surveyed students from four Illinois universities about their food security status and GPA achievements. The Household Food Security Survey Module was used to measure food security status, and one of the
demographics questions asked students to self-report their GPA. Of the 1,882 students that participated in this virtual survey, 35% experienced food insecurity. In regard to GPA, the students with the lowest GPA scores (ranging from 0 to 1.99) were less likely to be highly food secure. Inversely, the students with GPAs in the highest range (≥3.00) were more likely to be highly food secure. Congruent with the two aforementioned studies, these results imply that those experiencing food insecurity tend to have lower GPAs (Morris et al., 2016).

Another cross-sectional study by Maroto et al. (2015) mirrors the results discussed above. These researchers surveyed students from two Maryland community colleges. A convenience sample of 301 students was asked to complete a survey. The survey included the 10-item Adult Food Security Survey Module to measure the student’s food insecurity over the past year. Students also self-reported their GPA through a multiple-choice question that asked them to select the GPA range that matches their performance. The researchers found that 56% of the survey participants were food insecure. These students were significantly less likely to achieve a GPA in the 3.5-4.0 range and significantly more likely to achieve a GPA in the 2.0-2.49 range. The regression analysis performed by the researchers also illustrated a relationship between food security and GPA. Specifically, they observed that becoming food secure would have a positive impact on a students’ GPA. Also, this analysis showed that being food insecure is linked with a 22% lower chance of achieving a 3.5-4.0 GPA than a 2.0-2.49 GPA. This was not an experimental study, so these researchers cannot conclude that food insecurity causes students to achieve lower GPAs. However, it does add to the findings of the other studies outlined above and strengthens the relationship between food insecurity and academic performance (Maroto et al., 2015).
Researchers Meza et al. (2019) conducted in-depth 20-to-25-minute interviews to gain insight into the experiences of food insecure college students. These researchers interviewed 25 undergraduate student clients of the University of California, Berkeley’s food pantry. During these interviews, participants were asked “How has your food situation affected your academic performance?” to inquire about their academic experiences. Additionally, prior to the interviews, the researchers administered a survey to these students to determine their food security status. The results showed that 28% of the students had low food security, and 60% of the students had very low food security. After the interviews concluded, the researchers identified several recurring themes they observed in their participants responses. Two of the themes that related to the academic consequences of food insecurity were the mental and physical tolls that food insecurity takes on students. Throughout the interviews, various participants mentioned that food insecurity is mentally draining, causing their academic performance to suffer. This is because instead of concentrating on their studies, food insecure students are preoccupied with where their next meal will come from. This leads to a trade-off situation where students are forced to choose between focusing on food and focusing on their schooling. A direct quote from one of the students states, “Food insecurity causes a lot of academic difficulty because it reduces [your] concentration. Eventually it’s the voice that’s constantly shouting at you...” Many students also discussed the physical symptoms of food insecurity during their interviews. In particular, they mentioned feeling fatigued and low energy. One student stated, “If you don’t have enough food, you don’t have the energy to study. [Food insecurity] affects all aspects of your life. You just feel worse about yourself.” Unfortunately, these physical manifestations are so intense that some students have considered switching majors or dropping out of college. Another participant stated,
“I didn’t have the stamina so that almost made me quit science. I just felt weak most of the time. I felt like I couldn’t continue with the STEM field because I didn’t have the energy.” Another physical consequence of food insecurity mentioned by the interviewees was stomach growling noises due to hunger. In some cases, this led to students purposefully missing class out of embarrassment and losing focus on their studies. These results suggest that food insecurity has major impacts on physical, mental, and academic well-being. Thus, systemic solutions must be implemented to alleviate this issue (Meza et al., 2019).

Government Food Assistance Programs

As mentioned previously, the exclusion of college students from government food assistance program eligibility could also contribute to the high rates of food insecurity among college students. The national food assistance programs that prohibit college students from qualifying include the SBP, NSLP, and SNAP programs. The USDA administers both the NSLP and the SBP (USDA, 2023c, 2023d). The purposes of these programs are to provide nutritious, cost-effective breakfasts and lunches to American youth in public and nonprofit private schools. Depending on a student’s financial resources, they receive different benefits from the SBP and NSLP. Students living in a household with an income at or below 130% of the federal poverty line are eligible for a free breakfast or lunch. Those living with a household income between 130 and 185% of the federal poverty line qualify for a reduced-price breakfast or lunch. Any student living in a household with an income above 185% of the federal poverty line is eligible for a low-cost but full-price breakfast or lunch (USDA, 2023c, 2023d). However, the SBP and NSLP
do not provide food benefits to college students, as eligibility is limited to students enrolled in pre-kindergarten through twelfth grade.

SNAP is a government program that provides food assistance to low-income Americans (USDA, n.d.). To be eligible for SNAP, households are required to meet a set of gross and net income limits. For example, a household of four individuals must have a gross monthly income of $3,007 or less per month, and a net monthly income of $2,706 or less to receive SNAP benefits (USDA, 2023e). Those that do qualify for SNAP receive funds to purchase food for their household. While the purpose of this program is to expand access to healthy food among low-income Americans, college students between the ages of 18 and 49 usually do not qualify for SNAP (USDA, 2023e). College students do not have access to this assistance, because a rule was created to prevent college students from qualifying. In the 1980’s, students from middle- and upper-class families were accepted into the SNAP program after claiming to be independent. To combat this, Congress proclaimed that any full-time college student was ineligible for SNAP benefits (Freudenberg et al., 2019). Once this rule was enacted, 250,000 students lost access to SNAP benefits. There are a few exceptions to this rule, but they are worded in such a way that one can easily mistakenly assume that they are ineligible (Freudenberg et al., 2019). One such exception is that college students can qualify for SNAP if they work 20 hours per week or more. However, this exception does not help many college students qualify for SNAP. This is because it can be difficult for students to receive 20 hours of work from one employer. Working 20 hours a week also hinders a student’s ability to stay on track with their academic course load (Freudenberg et al., 2019). Thus, college students experience many obstacles when attempting to qualify for SNAP. Additional challenges arise even when college students are eligible for SNAP.
For example, the SNAP application process is long, intimidating, and stigmatizing for college students. This can discourage eligible college students from applying for the program (Freudenberg et al., 2019). Overall, SNAP’s eligibility requirements limit college student’s access to food assistance instead of expanding it.

In summary, there are no national programs that exist to provide college students with food assistance. This is part of the reason why so many college students are food insecure. Recently, the demographic composition of the American college student population has changed. This population now includes more low-income students than it did previously (Landry et al., 2022). More specifically, the amount of American college students coming from households with incomes either less than or equal to 130% of the federal poverty line has increased. In 1996, only 28% of American college students came from these households, but this increased to 39% of students in 2016 (Freudenberg et al., 2019). Since there are now more college students struggling financially, there are more students that could benefit from food assistance programs.

Food Insecurity Coping Mechanisms

Due to the lack of national programs to address food insecurity among college students, students have adopted a variety of unhealthy coping mechanisms to cope with their food insecurity. Unsurprisingly, one of the main coping mechanisms reported in many studies is that students will purchase food based on price rather than nutritional value. While food insecure students might desire healthy foods, these items are usually beyond their budget (Zigmont et al., 2021). This lack of financial resources leads them to rely on cheaper, less nutritious options. This includes processed and convenience items such as ramen, frozen pizza, candy, and fast food
(Henry, 2017; McArthur et al., 2018; Zigmont et al., 2021). Overall, due to their limited budget, food insecure students prioritize a food being low cost over a food being of high nutritional quality (Zigmont et al., 2021). Another common coping mechanism used by food insecure college students is altering the size of their meals and suppressing their hunger. In order to make their food last longer, students will ration their food and eat smaller portions at each meal (Henry, 2017; McArthur et al., 2018; Zigmont et al., 2021). Students may also skip meals altogether to prevent themself from running out of food (Zigmont et al., 2021). Lastly, to curtail feelings of hunger, students might elect to consume excessive amounts of fluid (Henry, 2017). A final strategy college students use to cope with their food insecurity is changing the timing of their meals. Some college students will eat large amounts of food in the morning in hopes that it will keep them fueled all day. On the contrary, other students will put off eating until the end of the day (Zigmont et al., 2021).

Food Insecurity Solutions, Food Pantries, and Stigma

To address food insecurity on college campuses, secondary education institutions have implemented a variety of food insecurity interventions. These include community gardens, dining hall “meal swipe” donation programs and “round-up” purchase programs to provide meals to students, providing free meal vouchers to food insecure students, recovering leftover food from dining halls and allocating it to students, reduced price meal plans, and work for food programs (Diaz & Gaylor, 2020; Freudenberg et al., 2019; Henry, 2017). Despite the assortment of food insecurity interventions available, campus food pantries are the most common response
to this issue (Landry et al., 2022; McArthur et al., 2020). This is because food pantries are a fairly simple and inexpensive way to address food insecurity (Landry et al., 2022).

Unfortunately, college students may be deterred from using food assistance resources such as food pantries due to several barriers. One such barrier is logistical obstacles, such as inconvenient food pantry hours of operation, and a lack of information or knowledge about food pantry operations. Another major barrier that dampens college students’ willingness to access food pantries is stigma. Stigma is defined as an unacceptable departure from what is deemed normal by society (Goffman, 1963). For stigma to arise, there needs to be a reference group that is considered normal. In the case of food insecurity, the reference group would be food secure individuals, and the stigmatized group would be food insecure individuals. This reference group usually labels the stigmatized group as socially unacceptable, as they do not conform to what is deemed normal (Falk, 2001). For instance, food insecure individuals may be characterized as irresponsible by the reference group, because they are unable to afford food. The reference group might assume that it is the fault of the food insecure individuals for lacking food, as they spent their money carelessly (Daugherty et al., 2019). Stigma can negatively impact one’s earning potential, life path, academic achievement, and health in the long term (Crocker & Major, 1989; Dovidio et al., 2000; Falk, 2001; Major & O’Brien, 2005). In the short term, for food insecure college students, stigma can discourage them from seeking the food assistance they need. Several studies conducted among the college student population have identified that using food pantries is a stigmatizing experience for students (Daugherty et al., 2019; El Zein et al., 2018, 2022; McArthur et al., 2020; Weaver et al., 2021).
One such study was conducted by McArthur et al. (2020). These researchers surveyed 896 students at Appalachian State University in North Carolina about their experiences with food insecurity and the campus food pantry. The results indicated that of the 437 food insecure students that participated in the study, only 76 had ever utilized the campus food pantry. Thus, while about 50% of the students surveyed were food insecure, only 17.4% of these students had accessed the campus food pantry before. When asked why they had never taken food from the food pantry, 9.8% of the food insecure students surveyed cited logistical issues as their reason for not accessing the pantry. Specifically, these students reported that the pantry’s hours of operation did not align with their schedule, preventing them from accessing this resource. In addition, many food insecure students cited stigma as a reason why they had not used the pantry. About 20% of the food insecure students mentioned feeling embarrassed for needing food assistance, one-third of the students held the belief that someone else needed the resource more than them, and 10% said that they were unsure of how to ask for food assistance. Also, 2% of the food insecure students surveyed were hesitant to access the food pantry related to their family’s perception of food pantry stigma. These students reported that their families would not want them to ask for food assistance, so they had avoided using the food pantry. These findings suggest that stigma prevents students from accessing food pantries on college campuses.

Another study that discovered similar results was conducted by Weaver et al. (2021). These researchers administered a survey to students at a university in the northeastern region of the United States. This survey screened students for food insecurity, asked them about their experiences with food insecurity, and inquired about their willingness to use the campus food pantry. In addition to closed-ended demographics and food insecurity screening questions, this
survey also included several open-ended questions to gather student’s thoughts about food insecurity and food pantry use. In total, 2,055 students responded to the survey. Of those surveyed, 35% had very low food security, 17% had low food security, 18% had marginal food security, and 30% had high food security. When asked about their willingness to use the campus food pantry, students with very low food security were more likely to report feeling reluctant to access this food assistance. This is concerning because the students in the very low food security group are those that have the most to gain from using a campus food pantry. Also, students in both the very low food security and high food security categories reported negative feelings towards the use of the campus food pantry. Approximately 70% of the students in each group reported that they believed pantry use to be embarrassing and stigmatizing, or that they believed “others needed the resource more.” In terms of stigma and embarrassment, 61% of high food security students and 52% of very low food security students said that these factors would discourage them from accessing the campus food pantry. Specifically, they mentioned not wanting to “take handouts,” feeling judged by others, being seen as someone who needs help, or showing others that they cannot afford food. Regarding the needs of others, several students mentioned feeling hesitant to access the campus food pantry because they believed that others needed the resource more. Very low food secure students in particular struggled with this, as 12% of these students mentioned that they did not want to be categorized as someone that relies on external resources for food. In their open-ended responses, students also mentioned not wanting to deprive other community members of the resources they needed, and that their situation was not as severe as others around them. Overall, the sentiment gleaned from these
students was that they would rather go without food than feel as though they took away a resource from someone else.

A third study that identified stigma among food pantry users was conducted by Daugherty et al. (2019). These researchers conducted a qualitative narrative study in which they interviewed 3 college students about their experiences with food insecurity and food pantries. All three participants described feelings of shame and stigma related to their use of food pantries. One of the participants described the process of using a food pantry as “miserable,” and mentioned that she “felt looked down upon” for needing to use the resource. Another participant discussed feeling embarrassed for needing to use a food pantry, because she “felt like [she was receiving] a hand-out.” The final participant described his pantry use as a “back-up plan,” and discussed avoiding the use of a food pantry initially because “[receiving free food] felt weird.” All of these experiences reported by the students highlight the stigmatizing nature of using food pantries.

Another study that identified stigma as a barrier to food pantry use among college students was completed by El Zein et al (2018). To screen students for food insecurity and assess food pantry awareness, usage, and barriers, these researchers conducted a cross-sectional survey at the University of Florida. The total sample size was 899 students. Of those surveyed, 68.5% of the students were food secure, and 32% were food insecure. In terms of food pantry awareness, most of the students (70%) knew that a food pantry operated on their campus. Though awareness of this resource was high, only 15.6% of all the students surveyed had used the food pantry before. In comparison to their food secure peers, the food insecure students surveyed reported a greater likelihood of using the food pantry. However, only 38.5% of the food insecure students
surveyed had acquired food assistance from the pantry in the past. This data suggests that while many students were aware of the food pantry and could benefit from the food assistance it provides, very few students actually use the pantry. This suggests that there are barriers that prevent the students from using the pantry’s services. Of the students surveyed, a higher percentage of food insecure students (62.8%) reported encountering barriers to food pantry access than food secure students (20.7%). One of the barriers uncovered by the researchers was logistical obstacles. Of the food secure and insecure students that had not accessed the campus food pantry before, 33.8% mentioned not having adequate information regarding the pantry and the program’s eligibility requirements. Half of these responses were reported by food insecure students. An additional 11.8% of students, half of which were food insecure students, reported that the pantry had inconvenient operation hours that did not align with their schedule. Another major barrier cited by the students was social stigma. Among the students that had not visited the campus food pantry before, 36.8% of students, half of which were food insecure, reported that stigma played a role in preventing them from using the pantry. Those that identified stigma as a barrier to food pantry use were then asked to describe how this barrier impacted their food pantry use. In this free-response portion, students reported that they would feel “…embarrassed to be seen [at the campus food pantry]” and that they were “fear[ful] of judgement.” Other students mentioned feeling “intimidated to walk in,” and said that “It is embarrassing for people to know you don’t have enough money for food.” Similar to other studies, these researchers also found that some college students (17.6%) believed that the campus food pantry was not for them. In other words, they did not believe their food situation was dire enough to warrant food assistance from the pantry. In the free-response portion for this barrier, the students mentioned feeling that
they would be “...taking resources from those who may need it more...” by using the pantry, and that they were “...not poor enough” to use the pantry. Some students also reported feeling as though their situation “...[was not] any worse than other college students.”

A final study that discussed barriers to the use of college food pantries is the work of El Zein et al. (2022). This research was carried out to better understand why college students in need of food assistance would refrain from utilizing a campus food pantry. To complete this research objective, the investigators conducted 41 semi-structured in-depth interviews with University of Florida students. The interview questions probed students to describe their perception of the campus food pantry and barriers that prevent them from using the pantry. Of the students interviewed, 82.5% were classified as food insecure, and one-third of these food insecure students had never accessed the campus food pantry before. Several barriers were mentioned by the food insecure students that discouraged them from using the campus food pantry. Like previous studies, the researchers found that logistical obstacles prevented students from acquiring food from the pantry. Lack of knowledge was the main logistical barrier reported in this study, as 50% of the food insecure, non-pantry users sampled reported this barrier. Since these students were unsure about the pantry’s location, hours, eligibility requirements, and necessary paperwork, they had refrained from using the pantry. Additionally, 50% of the food insecure, non-pantry users interviewed mentioned that perceived insufficient need was a barrier to their use of the food pantry. Like the students sampled in other studies, the students interviewed in the present study were worried that their acquisition of food from the pantry would strip others of resources they needed. Thus, even though these food insecure students needed assistance, they deemed themselves as “undeserving” of the food at the pantry. One
student reported, “…I feel like there are people worse than I am. There are people who need it [food assistance from the pantry] more so that’s one of the reasons I haven’t considered going [to the pantry.]” Overall, the overwhelming sentiment from these students was that the pantry was for people more financially deprived than them, and that they would only use the pantry as a last resort. A final common barrier reported by 75% of the food insecure, non-pantry user interviewees was feelings of stigma and shame. These students reported feeling embarrassed and ashamed about the idea of using the pantry, because they did not want to be associated with the stigma related to “taking handouts.” One student reported, “It would be pretty embarrassing if I went in there [the food pantry] and one of them [other students] saw me…. ” These students also mentioned concerns regarding being seen with food pantry bags on campus. They were worried if they were seen with the bags, their peers would automatically identify them as underprivileged. Thus, they avoided using the pantry to avoid being judged or looked down upon by their peers.

Overall, the findings from all of these studies illustrate how stigmatizing the use of food pantries can be for college students. In addition to being stigmatizing to use, there is little research to prove that food pantries are effective in reducing food insecurity (Landry et al., 2022). Based on a systematic review by Bruening et al. (2018), no studies have shown the effectiveness of food pantries in diminishing food insecurity on college campuses.

Additional Factors

It has been well established that food security status is associated with living situation. Specifically, several studies have concluded that off-campus living status is associated with food
insecurity. According to a survey conducted by El Zein et al. (2019), college students living off campus had a significantly greater likelihood of being food insecure than those living on campus. This same association was reported by Davidson & Morrell (2020), as they found that, among their survey participants, students that lived on-campus were more likely to be food secure when compared to students living off-campus. Similarly, of the college students surveyed by Raskind et al. (2019), 38% reported living in university housing, 23% reported living in their parent’s home, and 39% reported living in another form of off-campus housing. When compared to students that were living in university housing, those living off-campus had greater odds of being food insecure (Raskind et al., 2019). Phillips et al. (2018) also found that students living off-campus were more likely to be food insecure. They found that those living off campus had 2.38- or 2.92-times higher odds of being food insecure when living off campus beyond walking distance to their university and within walking distance to their university, respectively. Thus, in comparison to their peers living on campus, these students living off campus were more likely to be food insecure. A final study that established this association was a survey conducted by Weaver et al. (2020). These researchers found that commuter students had higher odds of being food insecure than non-commuter students.

In addition to the location of one’s living environment (on versus off campus), associations have also been noted regarding food security status and the individuals a college student lives with. In a survey study by Morris et al. (2016), living situation and food security status were significantly associated. Based on these survey results, students living off-campus with parents or guardians had higher food security than those living off-campus without parents or guardians. This association was also noted in a survey study by Maroto et al. (2015). After
surveying a sample of college students, it was discovered that there was a significant association between living situation and food security. Students that lived alone, with a spouse or partner, or with roommates had a higher likelihood of being food insecure than students living with their parents or relatives. Specifically, 82% of students living alone, 70% of students living with roommates, and 61% of students living with a spouse or partner reported being food insecure. These rates of food insecurity are higher than the 51% of students living with parents or relatives that reported food insecurity.

To continue, several studies have concluded that a college student’s campus meal plan enrollment status is associated with food security status. In general, prior research has found that students that are enrolled in campus meal plans are less likely to be food insecure. This was found to be true based on the survey results gathered by El Zein et al. (2019). These researchers found that, among the college students they surveyed, the students not enrolled in a meal plan had a significantly higher likelihood of being food insecure. However, it is important to note that this study did not control for income, and the researchers also found that Pell grant recipients were more likely to be food insecure (El Zein et al., 2019). A survey conducted by Weaver et al. (2020) also found this to be true, as students in this sample with no meal plan or a partial meal plan had higher odds of being food insecure than those with a comprehensive meal plan. This study did control for socioeconomic status in the form of financial aid usage (Weaver et al., 2020). Lastly, a survey by Davidson and Morrell (2020) found similar results. According to the survey responses, the students that had a campus meal plan were less likely to be food insecure. This study also did not control for income (Davidson & Morrell, 2020). Considering this data and the lack of controlling for income in two of the three aforementioned studies, it is possible
that income level, not meal plan status itself, is associated with food insecurity. It is plausible to infer that low income students may not be able to afford a meal plan, making them more likely to be food insecure. This should be considered when examining any data related to meal plan status and food security status.

Two other studies also noted associations between campus meal plan enrollment and food security status, but these associations did not reach statistical significance. First, a survey by Payne-Sturges et al. (2018) found that enrollment in campus meal plans was different based on food security status. Of the students surveyed that reported having a meal plan, 44% were food secure, 36% were marginally food secure, and 17% were food insecure. This suggests that most students enrolled in campus meal plans are at least marginally food secure. However, this finding did not reach statistical significance once the researchers adjusted for age, gender, and family income. The other study that did not produce statistically significant results was a survey conducted by Gaines et al. (2014). Of the 28% of students that reported being enrolled in a campus meal plan, 61.81% reported high food security, 22.92% reported marginal food security, and 15.28% were food insecure. Again, these results imply that most students enrolled in campus meal plans are either marginally food secure or highly food secure, but this finding did not reach statistical significance.

Income is a final factor that has been found to be associated with food security status. For example, both Gaines et al. (2014) and Phillips et al. (2018) found that financially independent students had a higher likelihood of experiencing food insecurity than those financially supported by their family. Based on the survey results of Gaines et al. (2014), financial support from one’s family was negatively associated with food insecurity among college students. Similarly, Phillips
et al. (2018) discovered that financially independent students had 2.18 times higher odds of being food insecure than students that were financially dependent on their parents. Additionally, in a survey by Patton-López et al. (2014), having a yearly income of less than $15,000 was the strongest correlate of food insecurity among a sample of college students.
CHAPTER 3

METHODS

Research Design

A cross-sectional online survey was used for this study. The target population for this survey was undergraduate students at Northern Illinois University (NIU). As of the fall 2022 semester, 11,429 undergraduate students were enrolled at NIU (NIU Office of Institutional Effectiveness, 2023). With a population this large, it was not feasible to survey everyone. Thus, a sample of the population was surveyed, and the data gathered from this sample was used to make general conclusions about the entire population. Permission was acquired from the Northern Illinois University Institutional Review Board before survey administration.

Study Population

As mentioned previously, the target population for this study was undergraduate students at Northern Illinois University. Potential respondents were recruited with assistance from the Division of Enrollment Management, Marketing and Communications. A mass email was sent to all the undergraduate students at NIU, and this yielded a sample that represents the total population.
Inclusion and exclusion criteria were used to obtain the desired sample. Exclusion criteria included anyone under the age of 18, those enrolled in non-undergraduate programs (graduate school, law school) at NIU, and those who did not provide informed consent. Graduate students were excluded from this survey because sampling undergraduate students allows for a sample that more closely mirrors the traditional college experience (Pia Chaparro et al., 2009). Inclusion criteria included being 18 years of age or older, enrollment as an undergraduate student at NIU, access to an NIU email address, and the ability to read and respond to questions in English.

Recruitment and Sampling

Recruitment occurred during the spring 2023 semester. The Division of Enrollment Management, Marketing and Communications was contacted through the Clearinghouse to gain permission to distribute mass emails to the entire undergraduate student population. After obtaining permission, emails were sent to every undergraduate student in April 2023 to ask them to participate in the survey. Following the first email administered to NIU’s undergraduate student population, a reminder email was sent out to gain more survey responses. This reminder message was sent out two weeks after the original recruitment email. The survey remained open for a total of four weeks. In hopes of increasing the sample size for this study, the principal investigator and her thesis advisor also provided the survey link to various NIU professors that teach undergraduate classes and requested that the survey information be shared with their students.

The final sample consists of a portion of the NIU undergraduate student population. The survey was sent via email to every undergraduate student currently enrolled at NIU. According
to the power analysis completed, using a 95% confidence level, 5% margin of error, and the 11,429 undergraduate student population as of fall 2022, the ideal sample size for this study was approximately 372 participants. This sample size was calculated using the following formula:

\[(Z\text{-Score})^2 \times \text{Standard Deviation} \times (1 - \text{Standard Deviation}) / (\text{Margin of Error})^2\]

Pilot Testing of Instruments

The survey that was used for this study was pilot tested on a smaller sample of Northern Illinois University students. The pilot test was conducted with ten students and three faculty members from an NIU research workshop called “Collaborative Connections.” These students and faculty members were instructed to read the survey and share any revisions or suggestions to help improve the survey. Thus, any confusing or poorly worded questions were revised before the survey was administered to the target population.

Procedure

First, the survey instrument was pilot tested by the students and faculty of Collaborative Connections in January 2023. After the completion of the pilot test, the survey was revised using the feedback obtained from the Collaborative Connections members. Next, in March 2023, an application was completed and submitted to the Institutional Review Board at Northern Illinois University. Once IRB approval was obtained in April 2023, mass emails distributed the online survey to all NIU undergraduate students.

Data was collected using an internet survey created through Qualtrics. To maximize the number of responses collected, a reminder email was sent to NIU’s undergraduate students. This
reminder was sent two weeks after the students were initially contacted. Students were able to complete this survey using any type of technology such as smart phones, laptops, etc. This allowed students to complete the survey using any device they have access to. Data collection took place for four weeks.

Data Collection and Description of Instruments

The survey instrument that was used for this study was conducted online using Qualtrics. As previously mentioned, it was sent to NIU’s entire undergraduate student population to gauge the prevalence of food insecurity and inquire about preferred food distribution modalities. To create one survey, questions about demographics, food distribution modalities, and awareness of the campus food pantry were combined with the U.S. Household Food Security Survey Module: Six-Item Short Form (Appendix B). The survey item regarding food pantry awareness and use was adapted from El Zein et al. (2019). The demographics questions regarding gender identity and racial background were adapted from Vanderbilt University (n.d.) and the U.S. Census Bureau (n.d.).

The U.S. Household Food Security Survey Module: Six-Item Short Form was created by the United States Department of Agriculture. This instrument consists of six questions to categorize the food security status of the survey participant. This categorization is achieved through the measurement of conditions and behaviors that are common among food insecure individuals. This includes consuming a lower quality and quantity of food, and foregoing meals as a result of limited finances (USDA, 2022). This instrument has found to be reliable by the USDA (USDA, 2022). Additionally, several studies have successfully used this six-item short
form to determine the food security status of undergraduate college students. This includes studies by van Woerden et al. (2019), Raskind et al. (2019), Patton-López et al. (2014), Davidson & Morrell (2020), Phillips et al. (2018), and Bruening et al. (2018).

This short form was used for this study as opposed to the 18-item US Household Food Security Survey Module (HFSSM), because the HFSSM asks about the food security of children in a household (USDA, 2022). Since the present study was focused on food insecurity among undergraduate students, gathering information about food insecurity among children was not necessary. Also, the six-item short form was used as opposed to the 18-item HFSSM and the 10-Item Adult Food Security Survey Module (AFSSM) to minimize respondent burden. In comparison to the HFSSM and AFSSM, the short form is slightly less precise and reliable, but it still provides accurate prevalence estimates of food insecurity (USDA, 2022). Overall, the six-item short form was the best survey option for this study, because it provided reliable data without asking for unnecessary information or overly burdening the survey respondents (USDA, 2022). The survey is also available for use on the USDA website (USDA, 2022).

Data Analysis

The data collected from this survey was analyzed using IBM’s Statistical Package for the Social Sciences, also known as SPSS version 26. Descriptive statistics were used to determine the most student friendly food distribution modalities, the factors that facilitate students to access food assistance, and students’ awareness of their campus food pantry. Next, chi square and ANOVA tests were used to determine the impact of demographics on food assistance acceptance. Finally, chi square tests were used to determine if there was a difference in food
assistance acceptance and food distribution modality preferences between college students of varying food security status. These analyses are summarized in Table 1.

Table 1
Data Analyses Conducted for Research Questions

<table>
<thead>
<tr>
<th>Research Questions</th>
<th>Survey Item Numbers</th>
<th>Data Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>RQ 1: What are college students’ preferred food distribution modalities, what factors facilitate college students use of food assistance, and are they aware of their campus’ food pantry?</td>
<td>#1-3</td>
<td>Descriptive Statistics (frequencies, percentages)</td>
</tr>
<tr>
<td>RQ 2: Is there a difference in food assistance acceptance and food distribution modality preferences between college students of varying food security status?</td>
<td>#1-2 #4-9 (USDA 6-Item Short Form of the Food Security Survey)</td>
<td>Chi Square Test (odds ratios)</td>
</tr>
<tr>
<td>RQ 3: Does year in school, gender, race/ethnicity, first-generation status, age, living situation, meal plan status, employment status, financial aid usage, or past food assistance usage make a difference in the food assistance acceptance of college students?</td>
<td>#1 #10-22</td>
<td>ANOVA Test (for age) Chi Square Test (for all other questions, odds ratios)</td>
</tr>
</tbody>
</table>

Informed Consent, Data Safety and Data Monitoring

Each student who completed this survey provided consent for their participation. When participants first opened the survey website, they were presented with an informed consent form (Appendix B). This form briefly described the study and explained how their confidentiality would be maintained both during and after their completion of the survey. The students that responded “Yes” to the question reading, “By selecting ‘Yes’ below, you are indicating that you are providing consent to participate in this research study, and that you have read and understood the information provided above,” were advanced to the survey questions. The students that
responded “No” to that question were not presented with the survey questions. To protect the privacy of the participants, no identifiable information was linked to their survey responses. The students were not prompted to provide any personal information in the Qualtrics survey. This allowed for the maintenance of the participant’s anonymity.

Additionally, to ensure that the collected data remains confidential, the only members of the research team permitted to access this data were the principal investigator and her thesis advisor. The data collected for this study will be saved for five years following the completion and publication of the study.

Risks and Benefits

Since this study included an anonymous survey that was completed on a voluntary basis, there were no risks involved with this study. However, there were several benefits that the study provided to the overall population. The overall population may potentially benefit from this study because this study will add to the present body of literature regarding food insecurity among college students. Based on the literature review conducted by the principal investigator, no prior studies have investigated preferred food distribution modalities and motivating factors for food assistance use among college students. Determining these preferred modalities and motivators will ultimately benefit the entire college student population, as it will help universities to provide students with food assistance that meets their needs and preferences.

Additionally, every student who participated in the study was eligible to enter a raffle to win one of two $25 Amazon gift cards. These gift cards served as an incentive to participate in this research study. Following the completion of the Qualtrics survey, the participants were
prompted to click another Qualtrics link if they wanted to enter the raffle. This link asked them to provide their NIU email address so they could be contacted if they won the raffle. A link separate from the survey was used to keep the student’s contact information separate from their survey responses. Thus, their anonymity was maintained even if they entered the raffle.
CHAPTER 4

RESULTS

Introduction

The population for this study consisted of Northern Illinois University undergraduate students. After removing the survey responses of participants who did not provide informed consent, the final sample size consisted of \( n = 817 \) participants.

Participant Characteristics

The demographics of the participants are summarized in Table 2. A majority of the survey participants were white (59.1%), non-Hispanic or Latinx (67.5%) and female (64.7%). The average age of the survey participants in this sample is 23.6 years. Furthermore, about half of the survey participants (48.8%) reported being a first-generation student, and 31.4% reported living on campus in a dorm.

Table 2
Demographics Summary

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>( M )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>23.6 years</td>
</tr>
<tr>
<td>Food Security Status (per USDA screener)</td>
<td>( \text{N(%)}^1 )</td>
</tr>
<tr>
<td>High food security</td>
<td>0(0)</td>
</tr>
<tr>
<td>Low food security</td>
<td>39(24.5)</td>
</tr>
<tr>
<td>Very low food security</td>
<td>120(75.5)</td>
</tr>
<tr>
<td>Total</td>
<td>159(100)</td>
</tr>
</tbody>
</table>

(Continued on following page)
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>N(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Past/Current Food Assistance Use</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>267(50.4)</td>
</tr>
<tr>
<td>No</td>
<td>263(49.6)</td>
</tr>
<tr>
<td>Total</td>
<td>530(100)</td>
</tr>
<tr>
<td><strong>Credit Hours Completed</strong></td>
<td></td>
</tr>
<tr>
<td>0-29 hours</td>
<td>105(18.8)</td>
</tr>
<tr>
<td>30-59 hours</td>
<td>113(20.2)</td>
</tr>
<tr>
<td>60-89 hours</td>
<td>124(22.2)</td>
</tr>
<tr>
<td>90+ hours</td>
<td>217(38.8)</td>
</tr>
<tr>
<td>Total</td>
<td>559(100)</td>
</tr>
<tr>
<td><strong>First-Generation Student Status</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>272(48.8)</td>
</tr>
<tr>
<td>No</td>
<td>269(48.3)</td>
</tr>
<tr>
<td>Unsure</td>
<td>16(2.9)</td>
</tr>
<tr>
<td>Total</td>
<td>557(100)</td>
</tr>
<tr>
<td><strong>Gender Identity</strong></td>
<td></td>
</tr>
<tr>
<td>Woman</td>
<td>360(64.7)</td>
</tr>
<tr>
<td>Man</td>
<td>164(29.5)</td>
</tr>
<tr>
<td>Transgender Woman/Trans Feminine</td>
<td>0(0)</td>
</tr>
<tr>
<td>Transgender Man/Trans Masculine</td>
<td>1(0.2)</td>
</tr>
<tr>
<td>Non-Binary/Genderqueer/Gender Fluid</td>
<td>23(4.1)</td>
</tr>
<tr>
<td>Prefer to Self-Describe</td>
<td>2(0.4)</td>
</tr>
<tr>
<td>Prefer Not to Say</td>
<td>6(1.1)</td>
</tr>
<tr>
<td>Total</td>
<td>556(100)</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
</tr>
<tr>
<td>American Indian or Alaska Native</td>
<td>12(2.2)</td>
</tr>
<tr>
<td>Asian</td>
<td>49(8.9)</td>
</tr>
<tr>
<td>Black or African American</td>
<td>77(14.0)</td>
</tr>
<tr>
<td>Native Hawaiian/Pacific Islander</td>
<td>1(0.2)</td>
</tr>
<tr>
<td>White</td>
<td>325(59.1)</td>
</tr>
<tr>
<td>Two or More Races</td>
<td>31(5.6)</td>
</tr>
<tr>
<td>Prefer Not to Answer</td>
<td>55(10.0)</td>
</tr>
<tr>
<td>Total</td>
<td>550(100)</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
</tr>
<tr>
<td>Hispanic or Latinx</td>
<td>134(26.1)</td>
</tr>
<tr>
<td>Not Hispanic or Latinx</td>
<td>347(67.5)</td>
</tr>
<tr>
<td>Prefer not to answer</td>
<td>33(6.4)</td>
</tr>
<tr>
<td>Total</td>
<td>514(100)</td>
</tr>
</tbody>
</table>
Table 2 (continued)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>N(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Living Location</strong></td>
<td></td>
</tr>
<tr>
<td>On campus dorm</td>
<td>176(31.4)</td>
</tr>
<tr>
<td>Off campus apartment/house</td>
<td>353(63.0)</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td>31(5.6)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>560(100)</td>
</tr>
<tr>
<td><strong>Commute Length</strong></td>
<td></td>
</tr>
<tr>
<td>0-10 minutes</td>
<td>165(47.1)</td>
</tr>
<tr>
<td>11-20 minutes</td>
<td>41(11.7)</td>
</tr>
<tr>
<td>21-30 minutes</td>
<td>22(6.3)</td>
</tr>
<tr>
<td>31-59 minutes</td>
<td>78(22.3)</td>
</tr>
<tr>
<td>1 hour+</td>
<td>44(12.6)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>350(100)</td>
</tr>
<tr>
<td><strong>Living Situation</strong></td>
<td></td>
</tr>
<tr>
<td>Alone</td>
<td>94(16.9)</td>
</tr>
<tr>
<td>With parents</td>
<td>117(21.0)</td>
</tr>
<tr>
<td>With other family members</td>
<td>28(5.0)</td>
</tr>
<tr>
<td>With partner/spouse</td>
<td>71(12.8)</td>
</tr>
<tr>
<td>With roommate(s)</td>
<td>224(40.2)</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td>23(4.1)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>557(100)</td>
</tr>
<tr>
<td><strong>Meal Plan Status</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>202(36.2)</td>
</tr>
<tr>
<td>No</td>
<td>356(63.8)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>558(100)</td>
</tr>
<tr>
<td><strong>Employment Status</strong></td>
<td></td>
</tr>
<tr>
<td>Not employed</td>
<td>187(33.8)</td>
</tr>
<tr>
<td>1-10 hours</td>
<td>65(11.7)</td>
</tr>
<tr>
<td>11-20 hours</td>
<td>165(29.8)</td>
</tr>
<tr>
<td>21-29 hours</td>
<td>70(12.6)</td>
</tr>
<tr>
<td>30+ hours</td>
<td>67(12.1)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>554(100)</td>
</tr>
<tr>
<td><strong>Financial Aid Usage</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>440(79.7)</td>
</tr>
<tr>
<td>No</td>
<td>112(20.3)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>552(100)</td>
</tr>
</tbody>
</table>

M, mean

1Not all frequencies add up to 817 due to skipped questions
Research Question 1

Figure 1 depicts the results of the survey question “Do you use the NIU food pantry?”. A majority of the survey participants (67.5%) answered “no,” indicating that they were aware of the pantry, but did not use its services. The sample size for this question was $n=803$.

![Figure 1: Awareness and use of the NIU food pantry.](image)

Figure 2 depicts the results of the survey item that listed nine food distribution modality options. This item asked participants to rank them according to how beneficial they would be if implemented on NIU’s campus, with a ranking of 1 representing “most beneficial” and a ranking of 9 representing “least beneficial.” Figure 2 depicts the percentage of students that ranked each food distribution modality in their top 3. As evidenced by Figure 2, the modality with the most top 3 rankings was food pantries (68.4%), followed by hallway distribution sites (51.9%), meal swipe donation program (40.3%), and dining hall food recovery program (40%). The sample size for this question was $n=610$. 

![Figure 2](image)
Figure 2: Top 3 food distribution modality rankings.

Figure 3 depicts the results of the survey item that inquired about factors that facilitate food assistance acceptance food distribution modality features. This item presented several statements to the survey participants that listed factors that may facilitate students’ acceptance of food assistance. The participants were then asked if NIU students would be more likely to accept food assistance if these modality features were present. The answer options provided included “strongly agree,” “agree,” “neither agree nor disagree,” “disagree,” or “strongly disagree.”

Specifically, Figure 3 depicts the number of students who responded with either “strongly agree” or "agree” to each food distribution modality feature statement. As illustrated in Figure 3, 93.7% of survey respondents “strongly agreed” or “agreed” that NIU students would be more likely to accept food assistance if it was offered in a convenient location (n=600). Next, 85.4% of survey respondents “strongly agreed” or “agreed” that NIU students would be more likely to accept food assistance if fresh fruits and vegetables were offered (n=601). Third, 73.7% of survey respondents “strongly agreed” or “agreed” that NIU students would be more likely to accept food assistance if their friends or classmates took food (n=593). Fourth, 66.8% of survey respondents “strongly agreed” or “agreed” that NIU students would be more likely to accept food assistance
if canned goods were offered ($n=600$). Last, 48.3% of survey respondents “strongly agreed” or “agreed” that NIU students would be more likely to accept food assistance if it was offered in a discreet location ($n=598$).

![Figure 3: Factors that facilitate food assistance acceptance.](image)

### Research Question 2

Of the 817 participants that completed the survey, there were 658 missing or incomplete responses, leaving only 159 participants that completed the entire USDA U.S. Household Food Security Survey Module: Six-Item Short Form. Thus, food security status could only be determined for these 159 individuals. Based on their responses to the USDA survey module, all of these 159 participants were food insecure. This is shown in Table 3.

<table>
<thead>
<tr>
<th>Food Security Status</th>
<th>N(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Food Security</td>
<td>0(0)</td>
</tr>
<tr>
<td>Low Food Security</td>
<td>39(24.5)</td>
</tr>
<tr>
<td>Very Low Food Security</td>
<td>120(75.5)</td>
</tr>
</tbody>
</table>
The awareness and use of the NIU food pantry among these 159 food insecure individuals is depicted in Figure 4. The Chi Square analysis for NIU food pantry awareness and use and food security status was not significant. However, it is important to note that only 20.5% of the low food security and 24.2% of the very low food security participants reported using the NIU food pantry, and that 28.2% of the low food security and 19.1% of the very low food security participants reported being unaware that the NIU food pantry exists (Figure 4). To conclude, the Chi Square analysis for food distribution modality preference and food insecurity status was not significant.

Figure 4: Awareness and use of the NIU food pantry by food security status.

Research Question 3

Based on the results of the Chi Square analyses, there was a statistically significant difference in proportions of categories of students’ acceptance of food assistance (i.e., use of the NIU food pantry) when comparing whether they or their family had ever used food assistance ($X^2 = 12.682; df=2; p=0.002$), their first-generation student status ($X^2 = 18.361; df=4; p=0.001$),
their race ($X^2 = 37.176; \text{df}=12; p=0.000$), their commute length ($X^2 = 30.908; \text{df}=8; p=0.000$), their living situation ($X^2 = 29.954; \text{df}=10; p=0.001$), and employment status ($X^2 = 23.688; \text{df}=8; p=0.003$).

As depicted in Table 4, 20.22% of students who used food assistance previously reported that they use the NIU food pantry. Also, 9.89% of students who reported not using food assistance previously reported that they use the NIU food pantry. Thus, college students who had used or been part of a family that used food assistance before are 2.04 times as likely to use the NIU food pantry as are those who had never used food assistance before (OR = 2.04, $n=530$).

Table 4
NIU Food Pantry Use and Previous Food Assistance Use

<table>
<thead>
<tr>
<th>Have you or your family ever used food assistance?</th>
<th>No</th>
<th>Yes</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Don’t know NIU had a food pantry</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>44 (16.73)</td>
<td>50 (18.73)</td>
<td>94 (17.70)</td>
</tr>
<tr>
<td>Yes</td>
<td>193 (73.38)</td>
<td>163 (61.05)</td>
<td>356 (67.20)</td>
</tr>
<tr>
<td>Total</td>
<td>263 (100)</td>
<td>267 (100)</td>
<td>530 (100)</td>
</tr>
</tbody>
</table>

As depicted in Table 5, 16.91% of first-generation students reported using the NIU food pantry. Additionally, 13.75% of non-first-generation students reported using the NIU food pantry. Therefore, first-generation college students are 1.22 times as likely to use the NIU food pantry as are non-first-generation college students (OR = 1.22, $n=557$).
Table 5
NIU Food Pantry Use and First-Generation Student Status

<table>
<thead>
<tr>
<th>Do you use the NIU food pantry?</th>
<th>Are you a first-generation college student?</th>
</tr>
</thead>
<tbody>
<tr>
<td>I didn’t know NIU had a food pantry</td>
<td>No: 33(12.27) Uns: 6(37.50) Yes: 64(23.53)</td>
</tr>
<tr>
<td>No</td>
<td>199(73.98) 8(50.00) 162(59.56)</td>
</tr>
<tr>
<td>Yes</td>
<td>37(13.75) 2(12.50) 46(16.91)</td>
</tr>
<tr>
<td>Total</td>
<td>269(100) 16(100) 272(100)</td>
</tr>
</tbody>
</table>

As depicted in Table 6, 38.77% of students with an Asian racial background reported that they use the NIU food pantry. In addition, 24.68% of students with a Black or African American racial background reported that they use the NIU food pantry. Thus, Asian students are 1.57 times as likely to use the NIU food pantry as are Black or African American students (OR = 1.57, n=550).

Table 6
NIU Food Pantry Use and Race

<table>
<thead>
<tr>
<th>Do you use the NIU food pantry?</th>
<th>What is your race?</th>
<th></th>
<th></th>
<th></th>
<th>Two or More Races</th>
<th>White</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amer. Indian/Alaska Native</td>
<td>Asian</td>
<td>Black or African Amer.</td>
<td>Native Hawaiian or Other Pacific Islander</td>
<td>Prefer Not to Answer</td>
<td>Two or More Races</td>
<td>White</td>
<td>Total</td>
</tr>
<tr>
<td>I didn’t know NIU had a food pantry</td>
<td>2 (16.67)</td>
<td>8 (16.33)</td>
<td>8 (10.38)</td>
<td>0(0)</td>
<td>13 (23.60)</td>
<td>6 (19.30)</td>
<td>62 (19.08)</td>
</tr>
<tr>
<td>No</td>
<td>8 (66.66)</td>
<td>22 (44.90)</td>
<td>50 (64.94)</td>
<td>1(100)</td>
<td>33 (60.00)</td>
<td>22 (70.90)</td>
<td>230 (70.77)</td>
</tr>
</tbody>
</table>

(Continued on following page)
Table 6 (continued)

<table>
<thead>
<tr>
<th>Do you use the NIU food pantry?</th>
<th>What is your race?</th>
<th>N(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Amer. Indian/Alaska Native</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2 (16.67)</td>
<td>19 (38.77)</td>
</tr>
<tr>
<td>Total</td>
<td>12(100)</td>
<td>49 (100)</td>
</tr>
</tbody>
</table>

As depicted in Table 7, 34.15% of students with an 11 to 20 minute commute to campus reported that they use the NIU food pantry. Also, 7.14% of students with an hour or longer commute to campus reported that they use the NIU food pantry. Therefore, students with an 11 to 20 minute long commute are 4.78 times as likely to use the NIU food pantry as are students with an hour commute or longer (OR = 4.78, n=526).

Table 7
NIU Food Pantry Use and Commute Length

<table>
<thead>
<tr>
<th>Do you use the NIU food pantry?</th>
<th>How long is your commute to campus?</th>
<th>N(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Null (On-campus resident)</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>I didn’t know NIU had a food pantry</td>
<td>27 (18.44)</td>
</tr>
<tr>
<td>No</td>
<td></td>
<td>126 (69.42)</td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td>23 (12.14)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>176 (100)</td>
</tr>
</tbody>
</table>
As depicted in Table 8, 23.66% of students that live alone reported using the NIU food pantry. Additionally, 11.21% of students that live with their parents reported using the NIU food pantry. Therefore, students that live alone are 2.11 times as likely to use the NIU food pantry as are those who live with their parents (OR = 2.11, n=557).

Table 8
NIU Food Pantry Use and Living Situation

<table>
<thead>
<tr>
<th>Who do you live with?</th>
<th>N(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alone</td>
<td>22(100)</td>
</tr>
<tr>
<td>With parents</td>
<td>117(100)</td>
</tr>
<tr>
<td>With other family members (siblings, cousins, etc.)</td>
<td>28(100)</td>
</tr>
<tr>
<td>With partner or spouse</td>
<td>71(100)</td>
</tr>
<tr>
<td>With roommate(s)</td>
<td>224(100)</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td>23(100)</td>
</tr>
<tr>
<td>Total</td>
<td>557(100)</td>
</tr>
</tbody>
</table>

As depicted in Table 9, 21.50% of students that work 1 to 10 hours weekly reported not knowing that the NIU food pantry existed. In addition, 13.90% of unemployed students reported not knowing that the NIU food pantry existed. Thus, students that work 1 to 10 hours per week are 1.55 times as likely to not know about the NIU food pantry as are those that are unemployed (OR = 1.55, n=554).
Table 9
NIU Food Pantry Use and Employment Status

<table>
<thead>
<tr>
<th>Do you use the NIU food pantry</th>
<th>How many hours do you work each week?</th>
<th>N(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not employed</td>
<td></td>
</tr>
<tr>
<td>I didn’t know NIU had a food pantry</td>
<td>1-10 hours</td>
<td></td>
</tr>
<tr>
<td></td>
<td>26(13.90)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>14(21.50)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>33(20.00)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9(12.86)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20(29.85)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>102(18.40)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>138(73.80)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>38(58.50)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>97(58.80)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>51(72.86)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>44(65.67)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>368(66.43)</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>23(12.30)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>13(20.00)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>35(21.20)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10(14.28)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3(4.48)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>84(15.17)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>187(100)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>65(100)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>165(100)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>70(100)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>67(100)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>554(100)</td>
<td></td>
</tr>
</tbody>
</table>

Summary

In summary, 17.7% of the survey participants did not know NIU had a food pantry. Food pantries, hallway distribution sites, meal swipe donation programs, and dining hall food recovery programs received the most top 3 rankings from the survey participants. Most students reported that NIU students would be more likely to accept food from a food assistance program if it was placed in a convenient location, or if fresh fruits and vegetables were offered. Based on the results of the Chi Square analyses, there was a statistically significant difference in proportions of categories of students’ acceptance of food assistance (i.e., use of the NIU food pantry) when comparing whether their family had ever used food assistance, their first-generation student status, their race, their commute length, their living situation, and employment status. There was no statistically significant relationship between NIU food pantry awareness and use or food distribution modality preference and food security status. However, there were only 20.5% and
24.2% of low and very low food security participants that reported using the NIU food pantry, respectively.
CHAPTER 5

DISCUSSION

Introduction

Food insecurity is a prevalent issue among the American college student population. To address this issue and aid their students, many college campuses have begun implementing food assistance programs, with the most common program being food pantries. However, college students may not use campus food pantries due to various barriers such as inconvenient hours, insufficient information, and feelings of stigma (Daugherty et al., 2019; El Zein et al., 2018; McArthur et al., 2020; Meza et al., 2019; Waity et al., 2020; Weaver et al., 2021). Therefore, different food distribution modalities and the factors that facilitate college students’ use of food assistance must be studied further.

The present cross-sectional survey analyzed a sample of undergraduate students from Northern Illinois University to determine their awareness and use of the NIU food pantry, their preferred food distribution modalities, and which factors facilitate students’ use of food assistance. This study provides insight that can be used to improve existing food assistance programs and to guide the implementation of new food assistance programs. Thus, the information gained from this study can be implemented to encourage the use of food assistance among food insecure college students.
Demographics

The demographics of the students included in this sample are similar to the demographics of the overall undergraduate student population reported by Northern Illinois University. According to the fall 2022 student demographics reported by the university, most undergraduate students at NIU are white (43.65%), non-Hispanic (76.24%), and female (52.71%). The average undergraduate student age reported by NIU in fall 2022 was 22 years (NIU Office of Institutional Effectiveness, 2023). Per NIU’s demographics data, 50.78% of students are first-generation, and 31.4% live on campus in a dorm.

The ethnic, first-generation, and living status of the survey sample were comparable to that of NIU’s overall undergraduate students. The main areas of difference between the sampled students and the overall population lie in the racial breakdown, gender breakdown, and average age. Though the sample was comprised of 59.1% white students, the overall NIU undergraduate population consists of only 43.65% white students. Thus, the sample included a higher percentage of white students than are present in the general NIU undergraduate population. While the sample consisted of 64.7% females, the overall NIU population consists of 52.71% females. Therefore, the survey sample included more females than the overall NIU population. Additionally, the average age of the survey participants, 23.6 years, was slightly older than the average age of undergraduate students reported by NIU, 22 years (NIU Office of Institutional Effectiveness, 2023).
Research Question 1

According to the data collected in this survey, 82.3% of the students surveyed were aware that Northern Illinois University had a campus food pantry. These individuals either responded “Yes” or “No” to the question, “Do you use the NIU food pantry?” Of the 82.3% that reported being aware of the NIU food pantry’s existence, only 14.8% reported utilizing this food assistance resource. Similarly, according to the results of a cross-sectional survey administered by El Zein et al. (2018), 70% of the college students surveyed reported that they were aware of their campus’ food pantry. However, only 15.6% of the students surveyed reported using the campus food pantry. These results are consistent with the findings of the present study. Additionally, the present study and the study conducted by El Zein et al. (2018) found that while most students may be aware of the existence of food pantries, a much smaller percentage of students utilize this resource. There are several possible explanations as to why food pantry awareness does not translate into food pantry usage. As previously detailed, prior studies have established that students find the experience of using food pantries to be stigmatizing and that students associate these pantries with feelings of embarrassment, judgment, and shame (Daugherty et al., 2019; El Zein et al., 2018, 2022; McArthur et al., 2020; Weaver et al., 2021).

This is a likely explanation as to why many of the students in the present study reported food pantry awareness, but why so few reported food pantry utilization. Another potential reason why food pantry awareness did not translate to food pantry use is a lack of information and inconvenient hours of operation. As discussed in the literature review, previous research has determined that college students often do not use food pantries due to having insufficient information regarding the food pantry’s operations and eligibility requirements, and the pantry’s
hours of operation being inconvenient for their schedule (El Zein et al., 2018; McArthur et al., 2020; Meza et al., 2019; Waity et al., 2020). This could explain the findings of the present study, as the Huskie Food Pantry on NIU’s campus only operates for four hours weekly (NIU, n.d.-a). Furthermore, since 17.7% of survey participants reported being unaware of the NIU food pantry, this suggests that information about the pantry is not widely available or advertised to students. This suggests that additional marketing efforts that advertise the NIU food pantry to students may be beneficial. Overall, based on the lack of food pantry usage among the students in both the present study and previous studies, it would likely be beneficial to make efforts to reduce the stigma surrounding food pantry use, to widely disseminate information about on-campus pantry operations, and offer a wide variety of operation hours. However, due to the many issues related to lack of on-campus pantry use, it may be worthwhile to consider alternative food distribution modalities, such as those discussed below.

To continue, based on the data collected, the food distribution modalities with the most top 3 rankings included food pantries (68.4%), hallway distribution sites (51.9%), meal swipe donation programs (40.3%), and dining hall food recovery programs (40%). These findings are similar to the findings of other researchers. For example, like the participants in the present study, the college students interviewed by Henry (2017) were asked to rank their food distribution modality preferences. Like the NIU students surveyed in this study, these students also included food pantries and dining hall food recovery programs in their top 5 preferred modalities. Additionally, Henry (2017) found that 85% of the food insecure students believed that a campus food pantry would be a valuable resource. This is similar to the present study which found that, regardless of food insecurity status, a high percentage of NIU students (68%)
ranked food pantries in their top 3 food distribution modalities. Additionally, a survey by Jesch et al. (2021) found that 68% of their sample of college students reported that a meal swipe donation program would be beneficial. This is comparable to the findings of the present study, as 40.3% of the NIU students surveyed ranked meal swipe donation programs in their top 3 food distribution modalities. Unfortunately, based on the research examined in the literature review, no researchers have examined the use of a hallway food distribution modality. Therefore, no comparisons between the present study and other research can be drawn for this modality.

Ultimately, food pantries were the most preferred food distribution modality according to the results of the present study, but due to the various issues associated with pantry usage detailed earlier, it may be beneficial for universities to implement other food distribution modalities. Per the results of this study and that of prior researchers, hallway distribution sites, meal swipe donation programs, and dining hall food recovery programs are preferable to students. All these modalities could be beneficial additions to the food assistance interventions already present on campuses.

As discussed previously, the students surveyed in this study most often “strongly agreed” or “agreed” that providing food assistance in a convenient location (93.7%) and making fresh fruits and vegetables available (85.4%) would make NIU students more likely to accept food assistance. This is congruent with the current literature for several reasons. First, a survey by El Zein et al. (2019) also found that college students prefer food assistance to be offered in convenient locations. Of the college students surveyed by these researchers, 44.6% reported that they preferred that their campus food pantry be located “in the center of campus” (El Zein et al., 2019). The findings of the present study and that of El Zein et al. (2019) are unsurprising, as
inconvenience is a barrier that prevents college students from accessing food assistance. Particularly, this barrier has been found to prevent students from accessing food pantries, as inconvenient hours of operation keep many college students from utilizing these resources (El Zein et al., 2018; McArthur et al., 2020; Meza et al., 2019; Waity et al., 2020). This is likely the reason why many students in the present study responded that having food assistance resources in a convenient location would facilitate students’ use of food assistance resources. Limited pantry hours require students to travel to specific pantry locations at specific times. However, by providing food assistance in a convenient location, students likely would not have to carve time out of their schedule to access food assistance. In summary, by providing food assistance in convenient locations, students may obtain food assistance as part of their typical daily activities on-campus, thus avoiding the food pantry use barrier of inconvenient hours of operation.

In addition, food insecurity has been linked to significantly lower fruit and vegetable consumption among college students. One study by Zigmont et al. (2020) found that food insecure students were significantly more likely to consume fewer than 3 servings of fruits and vegetables per day than their food secure peers. Thus, based on previous research, fruit and vegetables are lacking in the diets of food insecure individuals, and it makes sense why the survey participants in the present study would desire more fresh fruits and vegetables to be offered by food assistance programs. Furthermore, the findings of the present study are congruent with the discoveries of Jesch et al. (2021). Of the college students surveyed by these researchers, 74% reported that greater on-campus availability of healthy food options would help to alleviate food insecurity among students. This is consistent with the findings of the present study, which found that 85.4% of the students surveyed “strongly agreed” or “agreed” that
having more fresh fruit and vegetables available would make NIU students more likely to accept food assistance. Therefore, according to the findings of this study and previous researchers, making fresh fruits and vegetables available should be a top priority when implementing food assistance programs on college campuses.

**Research Question 2**

The results of the data analysis comparing food pantry use and food insecurity status suggests that only a fraction of NIU’s food insecure students utilize the campus food pantry. Of the 39 “low food security” students, only 8 (20.5%) reported using the NIU food pantry. Similarly, of the 120 “very low food security” students, only 29 (24.2%) reported using the NIU food pantry. Based on the existing literature on this topic, other researchers have reported varying levels of campus food pantry use among food insecure college students. According to the literature review included in the present study, the lowest level of campus food pantry use was reported by McArthur et al. (2020). Among the food insecure college students surveyed by these researchers, only 17.4% reported using their campus food pantry (McArthur et al., 2020). On the contrary, two other studies reported higher food pantry usage among food insecure college students. El Zein et al. (2018) reported that 38.5% of the food insecure college students they surveyed used their campus food pantry. Lastly, El Zein et al. (2022) reported the highest food pantry usage, as 66.6% of the food insecure college students included in this study reported using their campus food pantry. After analyzing the findings of various researchers as well as the findings of the present study, it is evident that the food pantry usage of food insecure students varies on each college campus. In the context of the existing literature, the food pantry usage of the food insecure NIU students in the present study falls on the lower end (20.5% to 24.2%).
closer to the findings of McArthur et al. (2020). The low use of NIU’s on-campus food pantry by food insecure students underscores the aforementioned need to either address the barriers that prevent pantry use, or to implement different food distribution modalities to provide food assistance to college students.

Finally, per the results of the present study, 28.2% of the low food security and 19.1% of the very low food security participants reported being unaware that the NIU food pantry exists. These results are comparable to that of El Zein et al. (2018), who found that 28.3% of the low food security college students surveyed were unaware of the campus food pantry. However, El Zein et al. (2018) found that 38.6% of the very low food security students in their sample were unaware of the campus pantry, much higher than the 19.1% in this study. Additionally, Mitchell and Prescott (2022) reported that among the college students they surveyed, only 23% of the food insecure students were aware of their campus food pantry, leaving 77% of food insecure students unaware of the pantry. These varying levels of food pantry awareness among food insecure students indicate that, similar to the food pantry use of food insecure students, food pantry awareness differs on every campus. In the context of the two studies mentioned above, the findings of the present study fall closer to El Zein et al. (2018). Regardless, it is evident that on any college campus (including NIU), there will be food insecure students that are unaware of their campus food pantry. Thus, in an effort to increase food pantry awareness among food insecure students, diligent advertising efforts should be made to inform students of on campus food assistance programs.
Research Question 3

To review, based on the results of the Chi Square analyses, there was a statistically significant difference in proportions of categories of students’ acceptance of food assistance (i.e., use of the NIU food pantry) when comparing whether they or their family had ever used food assistance, their first-generation student, their race, their commute length, their living situation, and employment status.

First, in the present study, college students who had used or been part of a family that used food assistance before are 2.04 times as likely to use the NIU food pantry than those who had never used food assistance before. According to the literature review conducted by the principal investigator, no prior studies have outright studied the association between previous food assistance use and college food pantry use. However, based on the results of interviews conducted by Broton et al. (2018), it was determined that college students that grew up in a food insecure household have a 40% likelihood of struggling with food insecurity in college. These results indicate that many students who grew up with food insecurity are likely to be food insecure in college. This connects to the results of the present study, as it is reasonable to infer that those who grew up in a food insecure family likely accessed food assistance. It is also plausible to infer that if this food insecurity continued into their college years, these individuals would likely seek food assistance from on-campus food pantries. Thus, it might be beneficial to survey incoming college students about their previous food assistance usage, as this could help university administrators better determine who may benefit from on-campus food assistance.

Additionally, the present study found that first-generation college students are 1.22 times as likely to use the NIU food pantry as are non-first-generation college students. This finding is
congruent to that of Esaryk et al. (2021). The results of their survey indicated that being a first-generation student was associated with more campus food pantry visits (Esaryk et al., 2021). Another study with similar findings was conducted by Ullevig et al. (2021), which found that over 45% of on-campus food pantry users reported being a first-generation student. Both the present study and that of previous researchers suggest that first-generation students are more likely to frequent on-campus food pantries than non-first-generation students. Consequently, future food assistance efforts should be well advertised to first-generation students.

Furthermore, the present study discovered that Asian students are 1.57 times as likely to use the NIU food pantry as are Black or African American students. According to Mitchell & Prescott (2022), the demographic attributes, including racial background, of on-campus food pantry users differ immensely from campus to campus. For example, per the study conducted by El Zein et al. (2018), non-white students in general were more likely to use the campus food pantry. In studies by Ullevig et al. (2021) and Twill et al. (2016), it was found that most campus food pantry users identified as African American. On the contrary, McArthur et al. (2020) found that most of the on-campus food pantry users in their sample were white. After analyzing the data of the present study and that of prior studies, it is evident that the racial breakdown of on-campus food pantry users varies on each college campus. Therefore, the unique data collected regarding the racial breakdown of NIU’s food pantry users should be utilized to improve the food assistance offerings on NIU’s campus. Specifically, since many Asian students report using the NIU food pantry, advertising food assistance resources in NIU’s Asian American Resource Center could be beneficial. It is also possible that this resource center is already more proactive.
about sharing food assistance information with Asian students. This may be why there were more Asian students that reported utilizing the Huskie Food Pantry.

The results of the present study demonstrate that students with an 11 to 20 minute long commute are 4.78 times as likely to use the NIU food pantry than students with an hour commute or longer. According to the literature review conducted by the principal investigator, no prior studies have examined food pantry use among varying levels of commute length. However, a variety of studies have connected off-campus residence to higher prevalence of food insecurity and/or food pantry usage. The results of studies by Davidson & Morrell (2020), El Zein et al. (2018), Phillips et al. (2018), Raskind et al. (2019), and Weaver et al. (2020) all demonstrate that students living off campus (commuters) are more likely to be food insecure than those that live on campus. Furthermore, according to a study by Twill et al. (2016), a majority (53.3%) of the students that utilize the food pantry on their campus reported living off campus. These results are similar to that of the present study, as it is evident that commuter students are in need of food pantry assistance. As a result of these findings, future food assistance efforts should ensure that they are inclusive of commuter students and their needs.

Lastly, the present study discovered that students that live alone are 2.11 times as likely to use the NIU food pantry than those who live with their parents. This is comparable to the findings of Twill et al. (2016), who found that most on-campus food pantry users reported living with a roommate (42.2%), followed by living alone (22.5%). On the contrary, only 4% of on-campus food pantry users reported living with their parents or other relatives (Twill et al., 2016). Also, a study by Morris et al. (2016) found that students that lived off-campus with their parents or guardians had higher levels of food security than those living off-campus independent of their
parents or guardians. Similarly, a study by Maroto et al. (2015) found that students that lived alone, with a spouse or partner, or with roommates had a higher likelihood of being food insecure than students living with a parent or relative. Overall, according to data from the present study and previous studies, it is evident that those who live independent of their parents have lower food security, and they use campus food pantries more often. In response to these results, future food assistance efforts should be offered in spaces on college campuses that are accessible to both commuter and non-commuter students. For example, this could involve offering food assistance in student centers or academic buildings accessible to all students as opposed to dorm buildings only accessed by on-campus students.

Conclusion

In conclusion, this cross-sectional, online survey yielded helpful insight regarding food insecurity among college students. This includes information regarding food pantry awareness and use among college students, the food distribution modalities preferred by students, the factors that facilitate students’ utilization of food assistance, and the demographic characteristics of food pantry users.

Recommendations

Based on the results of this study, several recommendations could be made specifically to NIU’s administration to improve future food assistance efforts. First, though pantry awareness in the overall sample was high (82.3%), 28.2% and 19.1% of low and very low students respectively were unaware of the NIU food pantry. Therefore, the administration should consider improving the advertising for the NIU food pantry. The food insecure students that were unaware
of the pantry could likely benefit from this resource, thus underscoring the necessity of widespread food pantry advertising. To hone their advertising efforts even further, NIU administrators should also consider the demographics data gathered in this study. Previous food assistance use, first-generation student status, Asian race, 11-20 minute commuter status, and living alone were all associated with greater food pantry usage. This data suggests that the NIU campus food pantry has been marketed successfully to these groups. Therefore, NIU should focus on pantry marketing efforts to reach other demographic groups.

Additionally, based on the reported food distribution modality preferences, NIU should consider expanding its existing food assistance programs as well as implementing new ones. In the present study, the four food distribution modalities with the most top three rankings included food pantries, hallway distribution sites, meal swipe donation programs, and dining hall food recovery programs. Currently, NIU has both a food pantry (The Huskie Food Pantry) and a food recovery program (Huskie Harvest) on its campus. Since these modalities are preferred by students per the data collected, NIU should consider investing further resources into these programs to expand and improve their operations. On the other hand, NIU does not presently have any hallway distribution sites or a meal swipe donation program in place. Moving forward, NIU should contemplate implementing these modalities on its campus, as many students reported preference for these modalities as well.

Furthermore, students reported interest in food assistance programs located in a convenient location, and programs that offer fresh fruits and vegetables. NIU administration should consider both of these factors when implementing new food assistance programs and expanding existing programs. Fortunately, NIU has already begun providing fresh fruits and
vegetables to its students through the Edible Campus program (NIU, n.d.-b). However, there is currently only one garden available where students may freely take produce. Therefore, NIU should consider expanding the number of free to pick Edible Campus gardens, as well as other programs that would provide fresh fruits and vegetables to students. Overall, by catering to student preferences, this will hopefully facilitate access to food assistance among more NIU students, and ultimately reduce the prevalence of food insecurity among the student body.

**Strengths**

A strength of this study is its large sample size. A total of 817 individuals participated in the present cross-sectional survey. This largely exceeded the ideal sample size of 372 participants calculated using a 95% confidence level, 5% margin of error, and the 11,429 NIU undergraduate student population as of fall 2022. The large sample size of this study suggests that an accurate depiction of the overall target population was obtained.

Another strength of this study is that it adds to the literature regarding the preferred food distribution modalities and factors that facilitate college students’ use of food assistance. The existing research in this area is limited, so the present study helps to fill that gap in the research.

Lastly, food insecurity is a sensitive subject, so many students would likely prefer to keep this information private. An anonymous survey design allowed students to be honest in their responses without attaching a name to their answers. Additionally, administering an online survey is cost-effective, and allows respondents to complete the survey at their convenience (Van Horn & Beto, 2019). The time flexibility of online surveys is also advantageous because college
students are busy and may not have time to stop and complete a survey in person. These benefits of online surveys demonstrate why this method of data collection was selected.

Limitations

One limitation of this survey is that it was completed on a volunteer basis, so the final sample was a self-selected sample (McKenzie et al., 2016). Since no randomization was used to obtain the sample, the final sample may not have been completely representative of the target study population. Despite the study sample being representative of the university’s student population in terms of racial and ethnic background, first-generation, and living status, selection bias related to food insecurity status limited the analyses that were able to be conducted. Since all of the participants that fully completed the USDA food insecurity screening tool ($n=159$) were food insecure, no comparisons between food insecure and food secure students were able to be made in the context of this study.

Though the target population for this survey was NIU undergraduate students, it is possible that some graduate students were included in the sample. During the survey administration period, the principal investigator received several emails from confused graduate students who had been sent the survey link. Based on these emails, it appears that some graduate students mistakenly received the link from the NIU Clearinghouse and/or from one of their professors that was assisting the research team in survey participant recruitment. As a result, the principal investigator sent out follow-up emails to clarify that the survey was intended for undergraduates. However, this was several days after the survey had been administered, so it is plausible that some graduate students may have already participated in the survey.
Additionally, since 59.1% of the sample reported a white racial background, this study may not have accurately measured the number of students that are interested in Cultural Resource Center food distribution. White students likely do not frequent the Center for Black Studies, the Asian American Resource Center, or the Latino Resource Center. This could explain why the Cultural Resource Center distribution modality was ranked so low by the present sample, with only 14.8% of participants ranking this modality in their top 3. Therefore, to better gauge interest in food assistance distributed through these centers, it might be beneficial to conduct future research with the students that use these centers.

Lastly, the research team intended to administer the survey in the middle of the spring 2023 semester. This is because food insecurity among college students seems to increase towards the end of the semester (Bruening et al., 2018). This often occurs, because by the end of the semester, students may have exhausted any food supplies provided by their parents as well as their dining hall meal plans (Bruening et al., 2018). Therefore, the goal was to collect data in the middle of the semester to provide a more accurate estimate of prevalence of food insecurity among the sample. However, due to changes in the research team, this goal was not met, and the survey was administered at the end of the spring 2023 semester. Thus, the food insecurity estimations in this study may not have been as accurate as they might have been.

Future Research

Future research is required to evaluate the effectiveness of various food distribution modalities. While this study and many previous studies have examined student’s awareness and use of food pantries, these studies have not been conducted for other modalities. Based on the results of this study, hallway distribution sites, meal swipe donation programs, and dining hall
food recovery programs specifically should be researched further. Specifically, researchers should implement these programs and evaluate their effectiveness in terms of student awareness and use.

Additionally, future research is warranted to determine the best ways to address and overcome common barriers to food pantry use among college students. Barriers of particular interest in this population include stigma and insufficient information.
REFERENCES


APPENDIX A

DEFINITION OF TERMS
Food security- the absence of any food access problems or limitations

Food insecurity- insufficient or uncertain access to food that is safe and satisfies nutritional needs, and the inability to obtain food in a socially acceptable manner

Food distribution modalities- different ways in which food assistance can be provided to individuals

  Food pantry- distribution centers that provide food to community members

  Classroom distribution site- when college professors make food available to students within their classroom

  Hallway distribution site- free food is made available to students within the hallways of buildings on college campuses

  Campus pop-up- a food distribution program on college campuses that rotates locations

  Meal swipe donation program- when college students are permitted to donate their extra meal swipes to allow other students to eat in the dining hall

  Dining hall food recovery program- extra dining hall food is provided to students at no cost

  Congregate meal program- meals are provided to community members at a community location

  Cultural resource center distribution- free food made available to students within the Center for Black Studies, Asian American Resource Center, and Latino Resource Center
APPENDIX B

INFORMED CONSENT AND QUALTRICS SURVEY
Informed Consent

You are invited to participate in a research study. This study consists of answering questions on a survey regarding your food security status and your use of food assistance resources. Taking part in this study is voluntary. You may choose not to take part or may leave the study at any time. If you feel uncomfortable with any of the questions on the survey, you may skip them. Your participation in this study will take approximately 10 minutes.

The privacy of the participants will be protected by not linking their identity to their survey responses. The investigators will not know which participant filled out each survey, because the survey does not ask for any identifying information (name, student ID number, etc.).

For the duration of the study, the virtual survey data will be stored in protected files to ensure that a breach of confidentiality will not occur. When the study is over, the survey data will be deleted after seven years. The only members of the research team permitted to access information about participants are the principal investigator (Amy Martin) and her thesis advisor (Dr. Nancy Prange).

If you participate, you can opt to enter into a raffle to win a gift card upon the completion of the survey. Your NIU email will be collected through a form separate from the survey for the purposes of the raffle. Your contact information will be kept separate from your completed survey to maintain confidentiality.

Questions about this study may be directed to the research team in charge of this study: Amy Martin at Z1934925@students.niu.edu.
You are voluntarily making a decision to participate in this study. Your submission of the survey means that you have read and understand the information presented and have decided to participate. Your submission of the survey also means that all of your questions have been answered to your satisfaction. If you think of any additional questions, you should contact the researcher(s).

If you can certify the following, please begin the questionnaire:

- I am an undergraduate student currently enrolled at Northern Illinois University
- I am at least 18 years old
- I can read and respond to questions in English
- I agree to participate in this study

Qualtrics Survey

1. *Do you use the NIU food pantry?*
   a. Yes
   b. No
   c. I didn’t know NIU had a food pantry

2. NIU is considering expanding the food assistance programs it offers to its students.
   Which of the following programs would be most beneficial to NIU’s students? Please rank the following program concepts from 1 to 9, with 1 being "most beneficial" and 9 being "least beneficial.
   
   a. Food pantry: Distribution centers that provide food to community members
b. Classroom distribution site: Professor making food available to students within their classroom

c. Hallway distribution site: Free food made available to students within the hallways of on-campus buildings

d. Campus pop-up: On-campus food distribution program that rotates locations

e. Meal swipe donation program: Students donate dining hall meal swipes to allow other students to eat in the dining hall

f. Dining hall food recovery program: Extra dining hall food is provided to students

g. Congregate meal program: Meals provided to community members at a community location

h. Cultural Resource Center Distribution: Free food made available to students within the Center for Black Studies, Asian American Resource Center, and Latino Resource Center

i. Other (please specify): ________

3. For the following statements, please indicate whether you strongly agree, agree, neither agree nor disagree, disagree, or strongly disagree with the statement: NIU students would be more likely to accept food from a food assistance program if…

a. It was placed in a convenient location on campus.

   i. Strongly Agree

   ii. Agree

   iii. Neither Agree nor Disagree

   iv. Disagree
v. Strongly Disagree

b. It was placed in a discreet location on campus.
   i. Strongly Agree
   ii. Agree
   iii. Neither Agree nor Disagree
   iv. Disagree
   v. Strongly Disagree

c. Fresh fruits and vegetables were offered.
   i. Strongly Agree
   ii. Agree
   iii. Neither Agree nor Disagree
   iv. Disagree
   v. Strongly Disagree

d. Canned goods were offered.
   i. Strongly Agree
   ii. Agree
   iii. Neither Agree nor Disagree
   iv. Disagree
   v. Strongly Disagree

e. My friends or classmates took food.
   i. Strongly Agree
   ii. Agree
iii. Neither Agree nor Disagree

iv. Disagree

v. Strongly Disagree

f. Other (please specify): __________

4. For the following statement, please indicate whether the statement was often true, sometimes true, or never true for you or your household in the last 30 days—that is, since March 14th: The food that I/we bought just didn’t last, and I/we didn’t have money to get more.

   a. Often true
   b. Sometimes true
   c. Never true
   d. Don’t know or refused

5. For the following statement, please indicate whether the statement was often true, sometimes true, or never true for you or your household in the last 30 days—that is, since March 14th: I/we couldn’t afford to eat balanced meals.

   a. Often true
   b. Sometimes true
   c. Never true
   d. Don’t know or refused

6. In the last 30 days, since March 14th, did 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?

   a. Yes
b. No

c. Don’t know

7. **If they answered “yes” to question #6:** In the last 30 days, how many days did this happen?
   a. 1 day
   b. 2 days
   c. 3+ days
   d. Don’t know

8. In the last 30 days, did you ever eat less than you felt you should because there wasn’t enough money for food?
   a. Yes
   b. No
   c. Don’t know

9. In the last 30 days, were you ever hungry but didn’t eat because there wasn’t enough money for food?
   a. Yes
   b. No
   c. Don’t know

10. Have you or your family ever used food assistance? (i.e., Food pantries, Supplemental Nutrition Assistance Program aka “SNAP” or “food stamps,” Special Supplemental Nutrition Program for Women, Infants, and Children aka “WIC,” School Breakfast Program, National School Lunch Program)
11. How many credit hours have you completed?
   a. 0-29 hours
   b. 30-59 hours
   c. 60-89 hours
   d. 90+ hours

12. Are you a first-generation college student (i.e., your parent(s) did not complete a 4-year college or university degree, regardless of other family members)?
   a. Yes
   b. No
   c. Unsure

13. **What is your gender identity?**
   a. Woman
   b. Man
   c. Transgender Woman / Trans Feminine
   d. Transgender Man / Trans Masculine
e. Non-Binary / Genderqueer / Gender Fluid

f. Prefer to self-describe: ________________

g. Prefer not to say

14. ***What is your race?

   a. American Indian or Alaska Native

   b. Asian

   c. Black or African American

   d. Native Hawaiian or Other Pacific Islander

   e. White

   f. Two or More Races

   g. Prefer not to answer

15. What is your ethnicity?

   a. Hispanic or Latinx

   b. Not Hispanic or Latinx

   c. Prefer not to answer

16. What is your age in years? ________________

17. Where do you live?
a. On campus in a dorm

b. Off campus in an apartment or house

c. Other (please specify): _______________

18. **If they respond to #17 that they live off campus:** How long is your commute to campus?

   a. 0-10 minutes

   b. 11-20 minutes

   c. 21-30 minutes

   d. 31-59 minutes

   e. 1 hour+

19. Who do you live with?

   a. Alone

   b. With parents

   c. With other family members (siblings/cousins)

   d. With partner or spouse

   e. With roommate(s)

   f. Other (please specify): _______________

20. Do you have a meal plan?
21. What is your employment status?
   a. Not employed
   b. 1-10 hours
   c. 11-20 hours
   d. 21-29 hours
   e. 30+ hours

22. Do you receive any form of financial aid to pay for your NIU tuition?
   a. Yes
   b. No

*Question 1 modified from (El Zein et al., 2019)

**Question 13 modified from (Vanderbilt University, n.d.)

***Question 14 modified from (U.S. Census Bureau, n.d.)