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Assessing Satisfaction with Bi-Weekly Produce Deliveries as a Means to Reduce Food Insecurity on College Campuses

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Assessing Satisfaction with Bi-Weekly Produce Deliveries as a Means to Reduce Food Insecurity
on College Campuses

By

Sophie Crosby

Submitted in Partial Fulfillment
of the Requirements for
Graduation with Honors from the
South Carolina Honors College

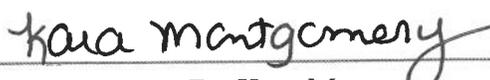
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Thesis Summary

Background: As food insecurity disproportionately affects college student and students are often unable to receive government nutritional assistance, more lasting, sustainable interventions are needed to decrease food insecurity on college campuses. The purpose of this study was to pilot FoodShare's program with adaptations to the University of South Carolina and examine participants' experience with the program. Methods: Forty-three students, faculty and staff were recruited via social media, email and paper fliers and purchased at least one box over a three month period. These boxes were purchased and delivered on a biweekly basis through the College of Social Work. Twenty-six participants completed a 13-item survey that included questions concerning demographics (age, housing status, student status), satisfaction with the program, and food security. Participants reported satisfaction with the program on six different criteria: overall satisfaction, selection of produce, ability to use the program, ease of placing an order, convenience of pickup times, and affordability. Additionally, many participants reported that they or someone they knew had trouble accessing fresh fruits and vegetables, and many reported worrying about running out of food generally, and they believed that FoodShare may be a tool to address this food insecurity. Conclusions: Satisfaction with the program's usability and convenience of pick-up times may address some existing barriers to the use of on-campus food pantries. Additionally, overall satisfaction and satisfaction with affordability may suggest that the FoodShare program may be a viable tool to addressing food insecurity on college campuses, as it may have less stigma and barriers to use than food pantries and SNAP benefits.

Introduction

Food Security is defined as access by all people at all times to enough food for an active, healthy life (Coleman-Jensen et al., 2021) According to the USDA, 10.5% of Americans were defined as Food Insecure in 2020 (Coleman-Jensen et al., 2021). Food security levels are measured through the US census data on the national level, including for a number of different demographic and family structure groups, however, there is no existing national source quantifying food insecurity levels amongst college students. Recent studies have suggested that levels of food insecurity among college students are much higher than those of the general population, creating a pressing public health dilemma (Davis et al., 2021; Landry et al., 2022; Nikolaus et al., 2020).

Food Insecurity on College Campuses

Food insecurity is a persistent issue on college campuses, with 15-75% of college students reporting experiences of food insecurity food insecure(Landry et al., 2022; McArthur et al., 2018; Miller et al., 2019; Nikolaus et al., 2020; Olfert et al., n.d.; Pia Chaparro et al., 2009; Raskind et al., 2019; Waity et al., 2020). The large range in predictions of food insecurity levels is due to the small and disjointed nature of studies measuring food insecurity on college campuses. As most studies only survey one campus, there are large variations in the food security breakdown between different student bodies. These differences may occur due to different income levels and demographic makeups of student bodies or the different regions and location of the schools. However, despite the varying estimations of food insecurity, virtually all of these studies suggest that the level of food insecure college students is significantly greater than that of the general public. Therefore, further research needs to be conducted to find solutions to close this gap in food security for these young adults.

The cause of this decreased food security amongst college students is likely due to a combination of factors. College students have unique challenges in accessing food resources, particularly in accessing fresh food like fruits and vegetables (Mirabatur et al., 2016). Grocery stores are often far from campus and many students lack the access to transportation needed to get to these stores. Campus meal plans often fail to cover all of students' food needs and may not include healthy snacks. Moreover, many students live in dorms or other housing without the necessary facilities to safely store and prepare healthy food as well. Therefore, even if these students can acquire fresh foods, they might not have the space to them fresh or the equipment to properly cook them.

Additionally, both the cost of college and the cost of living have more than doubled in the last 40 years (NCES, 2021). Therefore, students are less likely to be able to pay for college through work and may have to depend on parental support and financial aid to fund their education. This financial support is likely to fall short of the total income needed to properly meet students' academic, physical and social needs once the cost of tuition, housing and other living expenses are factored in. Additionally, college campuses are far more diverse today than they were 20 years ago (Landry et al., 2022). This diversity includes racial, ethnic and socioeconomic status. These new populations of college students also include many first-generation college students. However, students from these underrepresented groups are more likely to experience food insecurity due to their family's increased risk of food insecurity and lack of financial support from family as they move away to college (Freudenberg et al., 2019). The Pell Grant, intended to help finance the education of first-generation college students, now only covers only a third of the total cost of college (Landry et al., 2022). Therefore, while the

number first-generation college students is increasing, many of these students are not reaching the support they need to be successful.

College students also have a smaller “social safety net” than most other populations and may not receive the support that others receive, increasing their likelihood of being food insecure (Willis, 2019). Many college students are living far from home, often for the first time, and do not have the financial or social support from their parents and family members they have previously received. Often, students report feeling uncomfortable asking for support from more distant family members or their family is financially unable to support them (Hattangadi et al., 2019). However, the majority of college students who report being food insecure did not come from food insecure homes (Watson et al., 2017) . Therefore, many food-insecure college students may not be aware of what constitutes food security and how to seek out resources to help them receive more consistent sources of nutritious food.

Food insecurity leads to adverse health, academic, psychological and social outcomes, causing these students to be less likely to complete their degrees. (Farahbakhsh et al., 2017; Hattangadi et al., 2019; Meza et al., 2019; Payne-Sturges et al., 2018; Phillips et al., 2018; Raskind et al., 2019) Students who are food insecure often report skipping meals, eating less in one sitting than they would like, or filling up on cheaper less nutritious food rather than fresher, nutrient dense food (Waity et al., 2020; Watson et al., 2017). This directly impacts their physical health as they are not getting the balanced macro and micronutrients their bodies require to function properly. Additionally, students report food insecurity affecting their mental health, whether it exacerbates existing mental health concerns or causes anxiety or depression due to the stress of worrying where they will get their food and how they will prepare it (Daugherty et al., 2019; Hattangadi et al., 2019). Hand in hand with this psychological concern is an impact on

students' social lives. Food is a largely social phenomenon. Sharing food, whether it be at home, in a dining hall, or going out to eat, is a very common and important social activity for many students. Many students may be uncomfortable sharing their struggles with food insecurity with their peers, leading them to either make irresponsible financial decisions surrounding food or miss out on socializing if they cannot afford to do so (Meza et al., 2019). This lack of social support can further this psychological strain of food insecurity. Finally, the damage food insecurity causes to physical health, psychological health, and social health can all contribute to decreased academic performance (Landry et al., 2022; Phillips et al., 2018; Watson et al., 2017). Decreased physical and psychological health can impede students' ability to focus on their studies. Decreased social support may cause students to be more likely to drop out of college, leaving their degrees incomplete. Additionally, students who work part or full time on top of their full-time course load in order to pay for food have less time to complete their schoolwork, making them less likely keep their GPAs high and graduate competitively.

Existing Interventions for Collegiate Food Insecurity

There have been several common approaches to addressing this issue on college campuses as the levels of food insecurity have become more commonly reported in recent years. However, it is important to note that there have been few interventions designed explicitly around food insecurity needs of college students. Most have been small in scale and the research on effectiveness is nascent (Davis et al., 2021). While there are some potentially promising approaches, more needs to be done and known to adequately address the magnitude of food insecurity on college campuses. These interventions include food literacy and nutrition education programs, community gardens, initiatives to encourage enrollment in the Supplemental Nutrition Assistance Program (SNAP), and on campus free food pantries (Landry et al., 2022).

On campus food pantries have emerged as the most common solution to addressing food insecurity on college campuses, with hundreds being established in the last decade (find citation). Food pantries provide an easy solution, as they are inexpensive and simple to establish. Additionally, the program can be facilitated by a local food bank or an existing campus group or nonprofit, which decreases the need for new infrastructure and funding for the program (Find citation from UNCW study) (Landry et al., 2022). However, while many colleges and universities have food pantries on campus for students, only a small portion of students identified as food insecure use the resources provided by the food pantries and there are several fundamental issues with food pantries existing as the sole response to food insecurity (el Zein et al., 2018). Although the majority of students in need were aware of the food pantries, they were not using them due to social stigma, a fear of being discriminated against or disapproved of due to receiving free food, self-identity, a students' belief about whether or not their personal situation warranted assistance, insufficient information about the pantry's operations, and inconvenient hours.(el Zein et al., 2018) Additionally, food pantries are meant to serve as emergency assistance for students in need, not the sole or sustainable solution to food insecurity. Additionally, many food pantries do not have adequate refrigeration to keep fresh food in stock. Therefore, they may only be able to provide processed, nonperishable food, which is less nutrient dense than fresh foods such as fresh fruits and vegetables, dairy products and meat.

The most common and effective intervention for reducing food insecurity in the general population of the United States today is the Supplemental Nutrition Assistance Program (SNAP), previously known as food stamps. SNAP has been shown to reduce food insecurity amongst those eligible by 30% (Ratcliffe et al., 2011). However, it is difficult for college students, particularly traditional college students to qualify for SNAP. Currently, there is a restriction on

SNAP preventing full time students from receiving benefits, as it assumed that students will be supported by their parents (Landry et al., 2022). However, this assumption is not representative of the highly diverse student bodies seen on college campuses today. Many college students come from families who are unable or unwilling to support their children financially through school. Additionally, there is an increased number of “non-traditional” students, who are older, married and/or have dependents in their care (Freudenberg et al., 2019). There are exemptions to this rule for students who full time work, have dependent children or qualify due to another one of the stated exemptions. However, these students are often deterred by complicated policy and unclear messaging from the program, and do not receive the benefits they qualify for (Freudenberg et al., 2019). Moreover, these benefits are often insufficient or come with strict working requirements that may interfere with the demands of a full academic schedule.

Assessing FoodShare South Carolina as a Potential Intervention

Given the low rates of SNAP enrollment among students, universities must use other programs to attempt to decrease food insecurity on their campuses. Foodshare SC is a low-cost fresh produce distribution system used to address food insecurity in South Carolina, which uses biweekly, fresh produce boxes to provide participants with a consistent source of affordable, healthy food (Draper & Wilson, n.d.). FoodShare SC has based their health food boxes on the Good Food Box, created by FoodShare Toronto, a program that has allowed the city of Toronto to link local farmers with food-insecure urban residents (Johnston & Baker, 2005). The program has been shown to reduce food insecurity among adult participants (Miewald et al., 2012).

The boxes contain a variety of fruits and vegetables sourced from local farmers and sold at cost, providing significant savings from the cost of produce purchased at a grocery store. Additionally, they are further discounted for SNAP participants through the Healthy Bucks

program. While there is incentive for lower income individuals to purchase the boxes, this is a paid program open to anyone, eliminating much of the stigma surrounding free food distribution programs. The boxes are distributed via pickups from their “hub,” via deliveries from volunteers and through partner sites in the community. However, the FoodShare program has not yet been used with college students. Since other programs such as on-campus food pantries and SNAP have been unable to help the majority of food insecure college students, this study explored the use of low-cost biweekly produce deliveries to provide college students with reliable and healthy sources of food. The purpose of this study was to pilot the FoodShare program with adaptations to a university campus setting and examine participants’ experience with the program.

Methods

Participants

Students, faculty and staff of the University of South Carolina were recruited to this program. During the first three distribution dates, 105 boxes were sold to 43 participants. Of the 43 participants, 26 completed the survey. Participants food security status was unknown during recruitment. This project was deemed exempt from IRB approval and informed consent was not necessary.

Setting

The University of South Carolina is located in Columbia, South Carolina on a historic, urban campus. The university has 33,551 students as of March 7, 2022. The university is the state’s flagship institution and includes 13 colleges and schools with a variety of undergraduate and graduate programs. These include a college of pharmacy, school of medicine and school of law. This project took place within the College of Social Work. At the time of this study, the college of social work had 599 students, with 437 of these students pursuing graduate degrees.

Therefore, the College of Social Work is one of the smaller schools within the University of South Carolina.

Procedures

FoodShare, a non-profit organization based in Columbia, SC, provided participants with a biweekly fresh food box. Boxes came in two sizes, small and large, with 9 to 11 varieties of fresh fruits and vegetables, varied by the seasonal selection provided by local farmers. The boxes were \$15 and \$20, respectively, or \$5 and \$10 when utilizing SNAP benefits. Boxes were ordered and paid for through the student site coordinator via text or email the week before distribution.

Distribution occurred on alternating Wednesdays from 12 PM until 6 PM.

Students, faculty and staff were invited to order boxes through the University of South Carolina College of Social Work via printed marketing materials, email blasts and social media posts. Boxes were distributed on a biweekly basis and participants from the first three distributions were invited to participate in an online survey. After three distribution days, all participants who received at least one box were asked to complete a survey regarding their satisfaction with the program.

Outcomes/Measures

The study used to examine participant experience with the FoodShare program was created by researchers for this study and has not been used in any other studies. The survey examined three main areas: demographic information, satisfaction with the program, and food security. Demographic information including role on campus (student/faculty/staff), meal plan participation, family status and housing status, and age were collected. Family status included the options of single, married/partnered, married with children or dependents, or single with children/dependents. Housing status included the following statements: I live in a dorm, I live by

myself off campus, I live with roommates off campus, I live with my parents, I live with my partner, I live with my partner and dependents, and I live with dependents.

Participants ranked their satisfaction with the program through a written survey containing six questions assessed on a five-point scale. Categories included affordability, convenience of pickup times, ease of placing an order, ability to use the produce provided, selection of produce provided, and overall satisfaction. An open ended follow up question was asked to allow participants to elaborate their satisfaction/dissatisfaction with the program.

The final questions were focused on food insecurity. First, participants were asked if they, or students they knew had difficulty access fresh fruits and vegetables. Second, the participants were asked if they, or students they knew were worried about running out food before they could afford to buy more. Follow up questions asked participants to expand upon these experiences and relate these experiences back to the FoodShare program. These questions included a combination of multiple choice (yes/maybe/I'm not sure/no) and open-ended questions.

Analytical Strategy

Microsoft Excel was used to collate and analyze data from this study. Participants rated their satisfaction with six different aspects of the program on a 5-point Likert scale. The mean score of each criterion was then found. If the mean score for a given category was less than 3, satisfaction was considered to be negative. If the mean score was equal to 3, satisfaction was neutral. Finally, if the mean score was greater than 3, the satisfaction was determined to be positive. Results from the remaining multiple-choice questions were quantified and results from the open ended questions were analyzed and organized into common themes for each question.

Results

Demographics

Of the 43 participants recruited, 26 completed the completion survey. Of those surveyed, 21 were students, 5 were faculty or staff members, and 1 was both a student and staff member. Of the students surveyed, none of them were currently using a campus meal plan.

Figure 1: Age of Participants

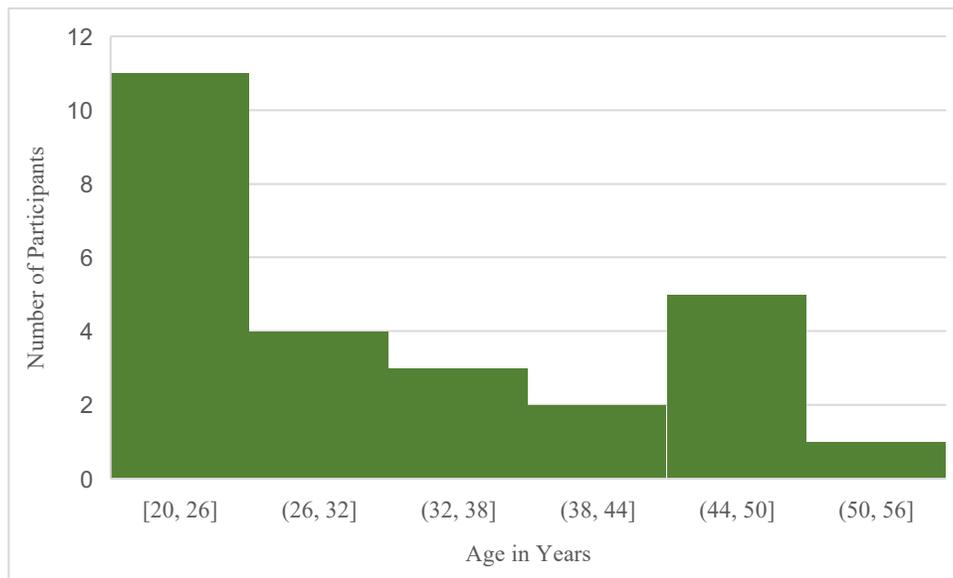


Figure 1 shows the breakdown of ages of participants. Of the 26 surveyed, 11 were under the age of 26. The mean age was 31.9 years with a standard deviation of 11.2 years.

Figure 2: Family Situations of Participants

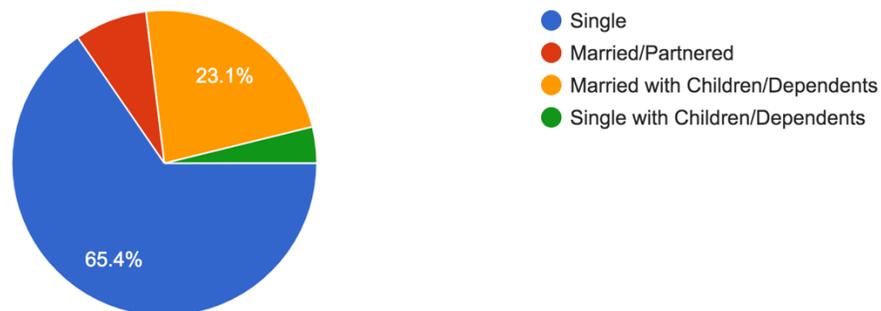


Figure 2 shows the percentages of participants in different family situations. 17 of 26 participants or 65.4% were single. However, the remaining 34.6% were married and/or had dependents, suggesting a large percentage of participants were not “traditional students.”

Figure 3: Housing Situations of Participants

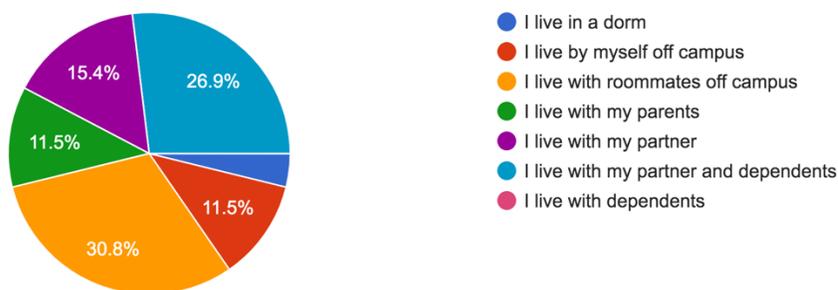


Figure 3 shows the percentages of students in different living situations. The most common were living with roommates off campus and living with a partner and dependents. The least common situation was living in a dorm.

These demographic results suggest that the participants of this program were not solely traditional college students. While some faculty and staff were included, the median age of participants was 31.9 years. There were several participants with spouses and dependents and nearly all participants lived in an off-campus setting. Therefore, this program reached a diverse group of students, faculty and staff with a variety of different living situations.

Satisfaction

Figure 4: Participant Satisfaction with Different Aspects of the FoodShare Pilot

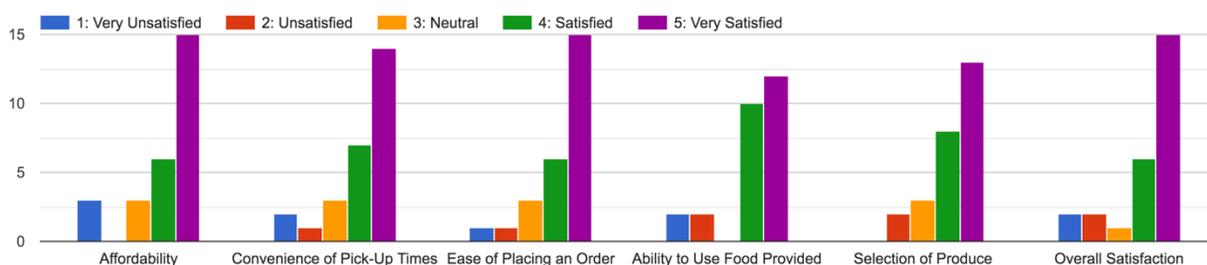


Figure 4 shows the breakdown of satisfaction ratings of the participants for each of the six measures of satisfaction on a five-point scale.

Figure 5: Participant Satisfaction with the FoodShare Pilot

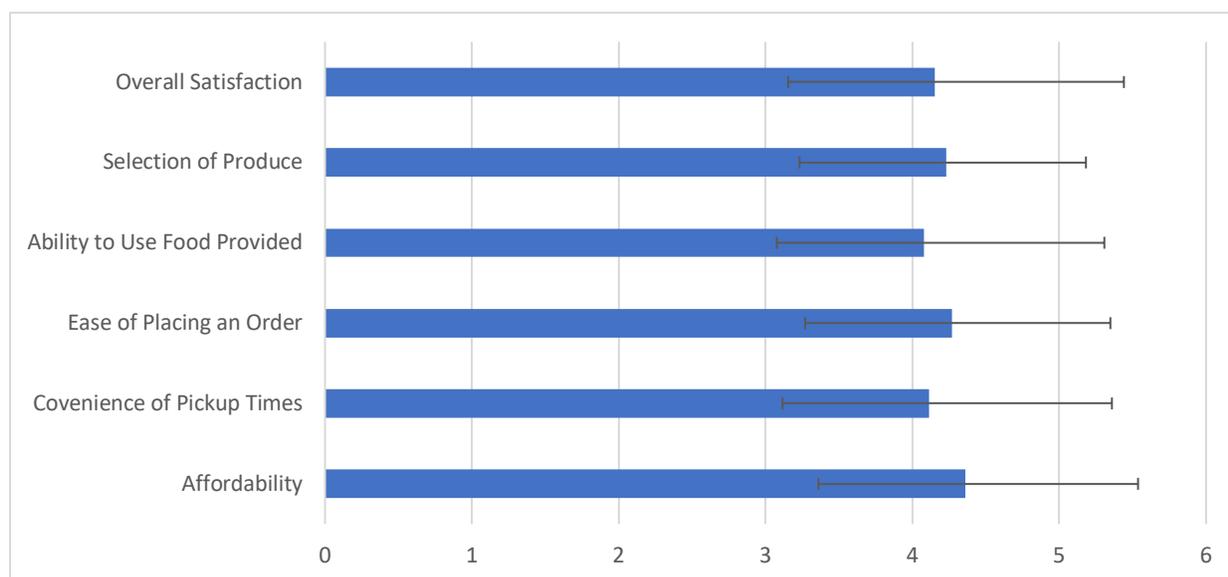


Figure 5 shows the mean satisfaction score of each category along with their standard deviations. The mean scores were extremely consistent for each category. Ability to use the food provided had the lowest mean score of 4.08 and affordability had the highest mean score of 4.36. Standard deviations were also very consistent for each category, with standard deviations ranging from 0.95 to 1.29.

As the mean scores of each category were all four or greater, satisfaction is considered positive for all six categories: affordability, convenience of pickup times, ease of placing an order, ability to use the food provided, selection of produce and overall satisfaction.

Food Insecurity

Figure 6: Access to Fresh Fruits and Vegetables

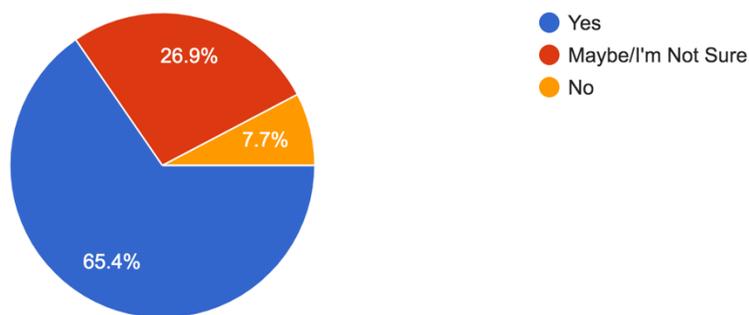


Figure 6 shows the breakdown of students who had or known someone who had struggled to access fresh fruits and vegetables in response to the question, “Have you, or students you know, had a hard time getting enough fresh fruits and vegetables?” This figure suggests that 24 of 26 participants either knew or may have known of a student struggling to have access to healthy food.

Figure 7: Worries about Running Out of Food

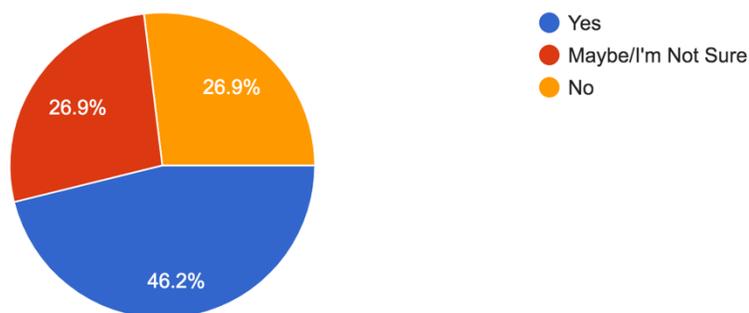


Figure 7 categorizes responses to the question, “Have you, or students you know, worried that your food would run out before you could afford to buy more?” It illustrates that nearly half of participants surveyed either have run out of food or known students who have run out of food before they could afford to buy more. This suggests that a significant proportion of our students may be struggling with food insecurity.

For students who answered “yes” or “maybe/I’m not sure” to the question “Have you, or students you know, had a hard time getting enough fresh fruits and vegetables?” they were asked to describe why in an open-ended follow-up. Participants responses were categorized into three main themes: the cost of produce, the distance of grocery stores from campus/lack of transportation to get to the store, and the time commitment to travel and shop. In relation to cost of produce, participants referenced “the price of fresh produce at the grocery store” and “the lack of sales at the grocery store.” In reference to the distance of grocery stores from campus, one participant stated, “A lack of a grocery store on campus and the availability of free public transportation like the Comet prevents students from accessing fresh fruits and vegetables. While the Comet does provide free transportation to students, it only operates on weekdays when many students are in class.” Finally, two participants directly referenced the time it takes to grocery shop, stating the “ability to find time to shop between high priority obligations” and “the travel time to get the grocery store and too much time spent at the grocery store” make it hard to get enough fruits and vegetables.

For students who answered “yes” or “maybe/I’m not sure” to the question “Have you, or students you know, worried that your food would run out before you could afford to buy more?” they were then asked, “How have those food worries impacted you/students you know?” Participants reported this food insecurity causing anxiety and embarrassment, negatively

impacting their health and negatively impacting their academic success. One participant stated, “We sometimes have to eat less often, or choose less healthy foods like items from the convenient store or gas station. When grocery shopping, we tend to purchase the canned items because those are usually on sale or there are coupons. No one usually has coupons for fresh fruit and vegetables.” Another referenced embarrassment and negatively impacted academics, stating, “It has worried me because I feared I would not be in a place healthy enough to perform my best at school and it made me embarrassed to admit that I am out of money.” Finally, two more participants directly referenced increased anxiety, stating, “I have to think a lot of how I am going to eat, and it adds stress on top of the academic stress I already feel” and “It adds another level of stress and anxiety. I've seen students that have had to make the hard decision of deciding to buy food or pay a utility bill.”

Lastly, participants were asked “Do you think FoodShare would be a good resource for students who don’t have easy access to fresh fruits and vegetables? Why or why not?” and “Do you think FoodShare would be a good resource for students who are struggling to afford all the food they need? Why or why not?” The majority of participants responded positively to both questions, with 92.3% of participants stating that FoodShare would be a good resource for students who don’t have easy access to fresh fruits and vegetables and 84.6% of participants stating that FoodShare would be a good resource for students struggling to afford all the food they need. The common positive themes expressed by participants included the program’s accessibility on campus, the affordability of the food, and the accessibility to utilize SNAP benefits. One participant stated, “having it on campus at a great price is really amazing. the recipes and nutrition info in the box related to the produce in the box is especially helpful.” Another stated, “I think FoodShare is a great resource for students who are struggling to afford

all the food they want, because the distribution days on campus allow students who do not have access to a private vehicle pick up the food boxes and bring them to their apartments.” There were some negative responses to these questions. Common themes among these responses were the inability of these boxes to create balanced meals as they did not include a protein source and the belief that fast food may be more affordable. When referencing whether FoodShare would be a good solution for students struggling to afford all the food they needed participants stated, “Maybe if they eat veggies and fruit like me, but otherwise fast food can be cheaper” and “I think the boxes lack sources of protein and will be a supplement at best.”

Discussion

The purpose of this study was to pilot the FoodShare program at the University of South Carolina, adapt it to a university campus setting, and examine participate experiences with the program. After a three-month trial, students at the University of South Carolina reported satisfaction with the FoodShare program, including with the program’s affordability, selection of produce, and usability. The majority of participants stated that they or someone they knew both had trouble accessing fresh fruits and vegetables and had worried about running out of food before they could afford to buy more. Additionally, many participants felt that FoodShare may be a potential tool in combating these food insecurity concerns.

Demographic Considerations

The wide range of reported ages, family situations and housing situations suggests that the students utilizing this program are not all classified as “traditional” college students. Therefore, they are at a higher risk for experiencing food insecurity (Beam, 2020; Goldrick-Rab et al., 2018). However, due to this “non-traditional” participant pool, it is important to note that

these findings may not be generalizable to a traditional, undergraduate, on-campus, residential population.

None of the students surveyed were currently utilizing a meal plan. This suggests that the students that chose to participate in the FoodShare did not have a consistent source of food provided but rather had to manage their own food needs and buy each food source and meal separately. These challenges are somewhat different than those of traditional, residential undergraduates. Since most students lived off campus, were over the age of twenty, and did not utilize a meal plan suggests that the students using FoodShare were not first year students and were most likely upperclassmen or graduate students. Therefore, care should be taken to ensure that this program is marketed to students living off campus and in graduate programs in the future. This includes channels such as marketing through classes, advising, and online platforms such as email listservs and social media, as these modalities are accessed by all students. As this sample was small and contained mostly older, graduate students, this study was not able to explore how FoodShare might be utilized by traditional, residential students. However, future studies should examine the experiences of students living on campus with FoodShare.

Addressing Food Insecurity

This study suggested that food insecurity is are many students at the University of South Carolina, and within the College of Social Work, dealing with issues of food insecurity. Since the majority of participants had both struggled with, or known someone who had struggled with, access fresh fruits and vegetables and worried about running out of food before they could afford to buy more, steps need to help students become more food secure. Participants stated that they believed that FoodShare may be a valuable resource in combating food insecurity on the Univesity of South Carolina's campus due to its accessibility and affordability. Additionally,

participants satisfaction with different aspects of the program further reinforce that FoodShare may be a tool to counteract food insecurity.

Participants showed satisfaction with the program's usability and pickup times. This suggests that this program might be a viable alternative to reliance on food banks for food insecure students, as many students at a similar university cited inconvenient pick-up times and lack of information about the pantry's operating hours as barriers to use (el Zein et al., 2018). Currently, there is no other literature concerning the satisfaction of food delivery boxes among collegiate populations, however, school-based food insecurity interventions for children in kindergarten through twelfth grade such as backpack programs and the national school lunch program, have improved food insecurity among students and their parents in some cases (Arteaga & Heflin, 2014; Burke et al., 2021; Dalma et al., 2020). Therefore, university-based interventions, where students already spend a large amount of time, could be important in effectively distributing food and information about available assistance.

Additionally, satisfaction with affordability and overall satisfaction with the program suggest this program may be a viable tool to addressing food insecurity on college campuses. Satisfaction with affordability not only supports the longevity of the program, it also may suggest that this program lacks the social stigma surrounding food banks, as it is a paid-for program, and may not be perceived as a "hand out." The FoodShare boxes are professionally packaged, like many other food subscription services. Therefore, this program may not appear to be a free donation, but rather, a sustainable, paid for product. Future research should be conducted to compare the stigma associated with the FoodShare program compared to that of food pantries.

Considerations for FoodShare in the Fall

Three themes emerged from participant feedback for modifications to the FoodShare program in the fall. These themes mirrored ideas that had already been considered by researchers as possible future modifications. First, was a no-cook box option. This box would be slightly smaller in size and contain fruits and vegetables that could be easily consumed without preparation. Potential items would include apples, avocados, bananas, cantaloupe, baby carrots, clementines, cucumbers, grapefruit, grapes, kiwi, lemons, lettuce, mangoes, oranges, pears, bell peppers, plums, spinach, strawberries, grape tomatoes, roma tomatoes, broccoli crowns, blackberries, blueberries, cauliflower, celery, mushrooms, zucchini, and yellow squash. This box would be beneficial to students who live in dorms or do not have regular access to a kitchen. Additionally, this box may help students who do not have equipment to cook with, do not have cooking experience, or are living on their own for the first time eat fresh, healthy on a more consistent basis.

Second, many participants requested a reduced cost for students, perhaps like the discount that is given via the Healthy Bucks program for SNAP participants. If the cost was reduced for students, the price would only be \$5, which may be significantly more affordable for students that have limited funds. A reduced cost, rather than a free box, may also encourage students to receive the box without the stigma of accepting free food. Further research into grant funding to pay for the difference in cost of the boxes should be explored.

Third, participants requested more pickup points around campus, including a pickup location that was easily accessible via car. Potential pickup locations for the fall could include the University of South Carolina School of Law, Hamilton College, the Gamecock Pantry and the Carolina Coliseum. The UofSC School of Law has already expressed interest in creating a

distribution site and would expand access to the FoodShare program to the over 600 students in their facility. Hamilton College is easily accessible to students in the College of Social work, both undergraduate and graduate. Additionally, Hamilton College is located relatively centrally on the main campus and can be accessed by most students. The Gamecock Pantry is a location that many food-insecure students may already be familiar with and is a central location on campus that most students should be able to access. Finally, the Carolina Coliseum has a large parking lot that may be useful to participants that are using cars to transport their boxes. It is also located next to the Darla Moore School of Business, which houses over 6000 of the university's students.

Moreover, there are a few other small considerations that need to be taken into account for the FoodShare program in the fall. First, a more permanent payment process needs to be put in place, most likely an option to pay with Carolina Card. Second, more labor and transportation will be needed as the program expands. More volunteers could be used to assist customers in carrying their boxes out to cars if they have mobility concerns. Additionally, only 15 to 25 boxes will fit in a car, so more cars and drivers will be needed to get boxes to various distribution locations around campus.

Strengths, Weaknesses and Needs for Further Research

This study had two notable strengths. First, the FoodShare program is well established, as it has been operating in the community since 2015. Therefore, it has established vendors and staff, allowing for consistently high-quality produce which is delivered on time in a professional manner twice a month. Food is packaged professionally, and staff are available five days a week to address customer service concerns. Second, this program was marketed through the College of Social Work's social media, email listservs and physical building, ensuring that every student,

faculty and staff member was aware of the opportunity to participate in this program. Therefore, students and faculty who may have been food insecure were aware of this program and able to participate.

This study also had several notable limitations. First, the study contained a relatively small sample size, with only 26 students/faculty/staff members surveyed to represent more than 36,000 students, faculty and staff at the University of South Carolina. Second, the survey measuring satisfaction of the program was created by the researchers and has not been tested by other studies. Additionally, participants were primarily recruited through the College of Social Work, which may not be demographically or financially representative of the entire university. Therefore, this study might not have reached the most at-risk populations on campus, who do not have the time or are unaware of the wellness resources the campus already provides. Further research should aim to expand this program to different programs within the University of South Carolina campus. Further studies should examine the demographic differences between different programs and colleges within the University of South Carolina and between the University of South Carolina and other colleges and universities.

Additionally, further research should be included to link FoodShare participation and its direct effect on food security. Resources such as the USDA's US Adult Food Security Survey Module could be used to establish baseline levels of food security. After boxes were purchased for a period of time, food security could be reassessed to establish if FoodShare had a direct impact on the food security status of the students surveyed. Further research could also be conducted to examine whether participation in the FoodShare program increased consumption of fruits and vegetables amongst collegiate participants.

Conclusion

This study shows promising evidence to support the use of the FoodShare program, or other forms of affordable produce deliveries, as a tool to address food insecurity on college campuses. This study suggested that many “nontraditional” students and students living off campus could greatly benefit from this program. The program’s accessibility and affordability were satisfactory to students electing to participate in it. Further considerations for the continuation of this program in the fall include the inclusion of a “no-cook box” option, reduced price for students, multiple pick-up locations and the utilization of Carolina Card payments. In the future, larger studies should be conducted to confirm satisfaction with FoodShare amongst different populations of students, within and outside of the University of South Carolina. Additionally, studies should be conducted to measure if changes in food security occur for students who purchase FoodShare boxes over long periods of time.

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Institutional Review Board Statement

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References

- Arteaga, I., & Heflin, C. (2014). Participation in the National School Lunch Program and food security: An analysis of transitions into kindergarten. *Children and Youth Services Review*, 47(P3), 224–230. <https://doi.org/10.1016/j.childyouth.2014.09.014>
- Beam, M. (2020). Nontraditional Students' Experiences With Food Insecurity: A Qualitative Study of Undergraduate Students. *Journal of Continuing Higher Education*, 68(3), 141–163. <https://doi.org/10.1080/07377363.2020.1792254>
- Burke, M., Cabili, C., Berman, D., Forrestal, S., & Gleason, P. (2021). A Randomized Controlled Trial of Three School Meals and Weekend Food Backpacks on Food Security in Virginia. *Journal of the Academy of Nutrition and Dietetics*, 121(1), S34–S45. <https://doi.org/10.1016/j.jand.2020.10.026>
- Coleman-Jensen, A., Rabbitt, M. P., Gregory, C. A., & Singh, A. (2021). *Household Food Security in the United States in 2020*. www.ers.usda.gov
- Dalma, A., Petralias, A., Tsiampalis, T., Nikolakopoulos, S., Veloudaki, A., Kastorini, C. M., Papadimitriou, E., Zota, Di., & Linos, A. (2020). Effectiveness of a school food aid programme in improving household food insecurity; A cluster randomized trial. *European Journal of Public Health*, 30(1), 171–178. <https://doi.org/10.1093/eurpub/ckz091>
- Daugherty, J. B., Birnbaum, M., & Clark, A. (2019). 'Having Enough': Students' Understanding of Food Insecurity and Campus Food Pantry Use. *Journal of Poverty*, 23(7), 600–620. <https://doi.org/10.1080/10875549.2019.1652721>
- Davis, H., Sisson, S. B., & Clifton, S. (2021). A call for evidence to support food security interventions on college campuses. *Journal of American College Health*, 69(6), 693–695. <https://doi.org/10.1080/07448481.2019.1705829>
- Draper, C., & Wilson, B. (n.d.). *FoodShare Columbia: A Case Study of a Produce Box Program with a SNAP Healthy Incentives Component*. <http://www.sc.edu/nutrition/policy.shtml>
- el Zein, A., Mathews, A. E., House, L., & Shelnutt, K. P. (2018). Why are hungry college students not seeking help? Predictors of and barriers to using an on-campus food pantry. *Nutrients*, 10(9). <https://doi.org/10.3390/nu10091163>
- Farahbakhsh, J., Hanbazaza, M., Ball, G. D. C., Farmer, A. P., Maximova, K., & Willows, N. D. (2017). Food insecure student clients of a university-based food bank have compromised health, dietary intake and academic quality. *Nutrition and Dietetics*, 74(1), 67–73. <https://doi.org/10.1111/1747-0080.12307>
- Freudenberg, N., Goldrick-Rab, S., & Poppendieck, J. (2019). College students and SNAP: The new face of food insecurity in the United States. *American Journal of Public Health*, 109(12), 1652–1658. <https://doi.org/10.2105/AJPH.2019.305332>
- Goldrick-Rab, S., Richardson, J., Schneider, J., Hernandez, A., & Cady, C. (2018). *STILL HUNGRY AND HOMELESS IN COLLEGE*.
- Hattangadi, N., Vogel, E., Carroll, L. J., & Côté, P. (2019). "Everybody i know is always Hungry.. But nobody asks why": University students, food insecurity and mental health. In *Sustainability (Switzerland)* (Vol. 11, Issue 6). MDPI AG. <https://doi.org/10.3390/su11061571>
- Johnston, J., & Baker, L. (2005). Eating outside the box: FoodShare's good food box and the challenge of scale. In *Agriculture and Human Values* (Vol. 22, Issue 3, pp. 313–325). <https://doi.org/10.1007/s10460-005-6048-y>

- Landry, M. J., Gundersen, C., & Eicher-Miller, H. A. (2022). Food Insecurity on College and University Campuses: A Context and Rationale for Solutions. In *Journal of the Academy of Nutrition and Dietetics* (Vol. 122, Issue 3, pp. 519–524). Elsevier B.V. <https://doi.org/10.1016/j.jand.2021.10.021>
- McArthur, L. H., Ball, L., Danek, A. C., & Holbert, D. (2018). A High Prevalence of Food Insecurity Among University Students in Appalachia Reflects a Need for Educational Interventions and Policy Advocacy. *Journal of Nutrition Education and Behavior*, 50(6), 564–572. <https://doi.org/10.1016/j.jneb.2017.10.011>
- Meza, A., Altman, E., Martinez, S., & Leung, C. W. (2019). “It’s a Feeling That One Is Not Worth Food”: A Qualitative Study Exploring the Psychosocial Experience and Academic Consequences of Food Insecurity Among College Students. *Journal of the Academy of Nutrition and Dietetics*, 119(10), 1713-1721.e1. <https://doi.org/10.1016/j.jand.2018.09.006>
- Miewald, C., Holben, D., & Hall, P. (2012). Role of a food box program: In fruit and vegetable consumption and food security. *Canadian Journal of Dietetic Practice and Research*, 73(2), 59–65. <https://doi.org/10.3148/73.2.2012.59>
- Miller, M., Middendorf, G., Wood, S., Lutter, S., Jones, S., & Lindshield, B. (2019). Food Insecurity and Assistance on Campus: A Survey of the Student Body. *Online Journal of Rural Research & Policy*, 14(2). <https://doi.org/10.4148/1936-0487.1097>
- Mirabitur, E., Peterson, K. E., Rathz, C., Matlen, S., & Kasper, N. (2016). Predictors of college-student food security and fruit and vegetable intake differ by housing type. *Journal of American College Health*, 64(7), 555–564. <https://doi.org/10.1080/07448481.2016.1192543>
- Nces. (2021). *Chapter: 3/Postsecondary Education Section: Finances and Resources*.
- Nikolaus, C. J., An, R., Ellison, B., & Nickols-Richardson, S. M. (2020). Food Insecurity among College Students in the United States: A Scoping Review. In *Advances in Nutrition* (Vol. 11, Issue 2, pp. 327–348). Oxford University Press. <https://doi.org/10.1093/advances/nmz111>
- Olfert, M. D., Hagedorn, R. L., & Walker, A. E. (n.d.). *Food insecurity risk among First-generation college students at an aPPalachian university*.
- Payne-Sturges, D. C., Tjaden, A., Caldeira, K. M., Vincent, K. B., & Arria, A. M. (2018). Student Hunger on Campus: Food Insecurity Among College Students and Implications for Academic Institutions. *American Journal of Health Promotion*, 32(2), 349–354. <https://doi.org/10.1177/0890117117719620>
- Phillips, E., McDaniel, A., & Croft, A. (2018). Food Insecurity and Academic Disruption Among College Students. *Journal of Student Affairs Research and Practice*, 55(4), 353–372. <https://doi.org/10.1080/19496591.2018.1470003>
- Pia Chaparro, M., Zaghloul, S. S., Holck, P., & Dobbs, J. (2009). Food insecurity prevalence among college students at the University of Hawai’i at Mānoa. *Public Health Nutrition*, 12(11), 2097–2103. <https://doi.org/10.1017/S1368980009990735>
- Raskind, I. G., Haardörfer, R., & Berg, C. J. (2019). Food insecurity, psychosocial health and academic performance among college and university students in Georgia, USA. *Public Health Nutrition*, 22(3), 476–485. <https://doi.org/10.1017/S1368980018003439>
- Ratcliffe, C., McKernan, S. M., & Zhang, S. (2011). How much does the supplemental nutrition assistance program reduce food insecurity? *American Journal of Agricultural Economics*, 93(4), 1082–1098. <https://doi.org/10.1093/ajae/aar026>

- Waity, J. F., Huelskamp, A., & Russell, J. (2020). Collaborating to Assess and Address Food Insecurity on a College Campus: a Case Study at a Mid-Sized, Regional University. *Innovative Higher Education*, 45(5), 405–417. <https://doi.org/10.1007/s10755-020-09512-y>
- Watson, T. D., Malan, H., Glik, D., & Martinez, S. M. (2017). College students identify university support for basic needs and life skills as key ingredient in addressing food insecurity on campus. *California Agriculture*, 71(3), 130–138. <https://doi.org/10.3733/ca.2017a0023>
- Willis, D. E. (2019). Feeding the Student Body: Unequal Food Insecurity Among College Students. *American Journal of Health Education*, 50(3), 167–175. <https://doi.org/10.1080/19325037.2019.1590261>

Appendix 1: FoodShare Satisfaction Survey

1. Please choose the role that best describes you:
 - Student
 - Faculty
 - Staff
2. If you are a student, do you use a meal plan?
 - Yes
 - No
3. Please choose the family situation that best describes you:
 - Single
 - Married/Partnered
 - Married with Children
 - Single with Children
4. Please choose the housing situation that best describes you:
 - I live in a dorm
 - I live by myself off campus
 - I live with roommates off campus
 - I live with my parents
 - I live with my partner
 - I live with my partner and dependents
 - I live with dependents
5. Please state your name in years:
6. Please rate your satisfaction with different aspects of the FoodShare Program on the following scale:
 - 1: Very Unsatisfied
 - 2: Unsatisfied
 - 3: Neutral
 - 4: Satisfied
 - 5: Very Satisfied

	1	2	3	4	5
Affordability					
Convenience of Pick-Up Times					
Ease of Placing/Paying for an Order					
Ability to Use Food Provided					
Selection of Produce					
Overall Satisfaction					

7. For this program to be really helpful to students, is there anything you would change?
8. Have you, or students you know, had a hard time getting enough fresh fruits and vegetables? [yes, maybe/I'm not sure, no]
 1. IF yes or maybe/I'm not sure: What has made it hard to get enough fresh fruits and vegetables?
9. Have you, or students you know, worried that your food would run out before you could afford to buy more? [yes, maybe/I'm not sure, no]
 2. IF yes or maybe/I'm not sure: How have those food worries impacted you/students you know?
10. Do you think FoodShare would be a good resource for students who don't have easy access to fresh fruits and vegetables? Why or why not?
11. Do you think FoodShare would be a good resource for students who are struggling to afford all the food they need? Why or why not?
12. Do you know of any other resources that exist on campus for students struggling with Food Insecurity?
13. Please include any additional comments/suggestions here.