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The Factors Causing High Food Insecurity Rates in U.S. Undergraduate Students

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Abstract

The cliché of a college student surviving off ramen noodles sheds light on a deeper issue — high rates of food insecurity among undergraduate college/university students in the United States. There have been countless studies in recent years exploring the hidden causes of why an estimated 40% of students experience food insecurity as of 2022. These studies conclude three main reoccurring factors causing these high rates: costs, accessibility, and demographic characteristics. Food insecurity rates are important for higher education officials to address due to the countless physical and mental health, academic, and equity implications for the students.

Keywords

Food-Insecurity, university, college, students, food, equity, cost, accessibility, demographic

Cover Page Footnote

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1. Introduction

According to the United States Department of Agricultures, food insecurity occurs when a person reports their food to be of "reduced quality, variety, or desirability" while experiencing "disrupted eating patterns" with/or a "reduced food intake" (Coleman-Jensen, 2020). In many studies aiming to measure food insecurity, a standard 6-question food insecurity questionnaire developed by the USDA is used to ensure validity and reliability. The participant is expected to answer "often true," "sometimes true," "never true," or "DK or refused". to the six proposed questions. These questions include, "The food that (I/we) bought just didn't last, and (I/we) didn't have money to get more," "(I/we) couldn't afford to eat balanced meals," "In the last 12 months, did (you/other adults in your household) ever cut the size of your meals or skip meals because there wasn't enough money for food?"; "If yes, how often did this happen — almost every month, some months but not every month, or in only 1 or 2 months?"; "In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money for food?"; "In the last 12 months, were you ever hungry but didn't eat because there wasn't enough money for food?" (USDA, 2022).

The joke about starving students creates a perception that there's not really an issue with food insecurity in colleges (Broton, 2022). With the number of college students suffering from food insecurity on the rise, universities and health professions must acknowledge the high rates of food insecurity, and develop strategies to help. (Aslup 2023; Haskett, 2020; McCartney, 2021). Not only will university intervention help disproportionate health equity among students, but also can increase graduation rates and support student retention (Moore, 2021; Olauson, 2018). It is important to address considering that eating behaviors can negatively impact physical, mental, and cognitive/scholastic function (Reuter, 2021).

Overall, there are three main factors causing high food-insecurity rates among college/university students in the United States: costs, accessibility to food, and multiple demographic characteristics.

2. Cost of food affecting food insecurity rates

A 2018 report from Temple University and Wisconsin HOPE Lab claims that 26% of college students suffer from food insecurity (Alsup, 2023). In addition, a survey of 1,374 undergraduate students showed that cost concerns were paramount among students with low food security scores (Weaver, 2022). These both highlight the fact that financial constraints are a big source of food insecurity for many college students. The number of hours they work, meal plan costs, and a variety of other expenses during college including textbooks, tuition, loans, and personal expenses can affect a student's ability to afford food. When money gets tight, food is often the first expense to go (Kolowich, 2015). In a survey study with students at University of North Carolina, 65% indicated being food-insecure, while 40.8% of those reported skipping meals due to the lack of money to purchase food (Waity, 2020). This puts students in a difficult situation of having to make choices about how to allocate their limited financial resources — and it doesn't always get to go to food (Weaver, 2022).

2.1. Working students

In recent times there has been an increase in "non-traditional" students in college enrollment such as students who are older, have dependents, and those in minority groups. This

"non-traditional" title also includes students who work full-time to support themselves while taking classes (Bell, 2012; Nazmi, 2022). In 2015, 43% of full-time students and 78% of part-time students were working to help with the cost of tuition, rent, and food (National Center for Education Statistics, 2017). From a student health services survey of 1,359 students, the second most popular response to dealing with food-insecurity – behind getting meals from family and friends – was getting a job or increasing their work hours (Olauson, 2018). Low socioeconomic-status students were found to work more hours a week and subsequently spend less time studying, less activity involvement, lower grades and incomes, and lower educational aspirations (Walpole, 2003).

One study, which surveyed 2,634 undergraduate students at a public university, assessed the relationship between demographic and financial factors and several outcomes of interest — such as food insecurity. The study suggests that students that are actively employed were 1.44 times more likely to experience food insecurity than those who were unemployed. (Robbins, 2022). In another study with 338 undergraduate survey results at University of Mississippi, employment had a statistically significant positive association with food insecurity – especially among female students (Halfacre, 2021). An additional study conducted at multiple universities via survey also found that employed students were at higher risk for food insecurity than unemployed students (Patton-Lopez, 2014; Walsh-Dilley, 2022). However, many college students that also experience food insecurity may not have a well-defined source of income or may receive their income from multiple sources including employment, parental support, financial aid, and other loans (Zigmont, 2022). Contrastingly, a different study had undergraduate students record a 24-hour food record. The median 24-hour cost of the student's food was $12.42, but those who worked 20+ hours a week had a higher diet cost than those who worked less or were unemployed. This suggests that students that work more can afford more food and therefore are less likely to suffer from food insecurity. However, that is not always a feasible solution since working long hours can negatively impact academic performance and mental well-being (Weaver, 2022). Students that are food-insecure are also more likely to be working evening shifts, which hinders their ability to access dining halls during their open times (Mei, 2021). Yet working is sometimes necessary for food-insecure students; not only for the money, but to qualify for SNAP (Supplemental Nutrition Assistance Program) help. SNAP requires their applicants to work 20+ hours per week, which can disqualify a lot of students busy with classes or unable to find work (Snap, 2021).

2.2. Meal plan costs

Even with on-campus dining and meal plans helping prevent food insecurity, some students struggle to afford a meal plan and therefore end up struggling with food insecurity. In one study, out of the students identified to struggle with low food security, 69% stated the biggest obstacle was the cost of food (Weaver, 2022). Colleges and universities tend to provide three different types of meal plans. A block plan: offers a set number of meals per week, an unlimited plan: unlimited dining-hall access, or pre-paid: the cost of the meal is deducted from their card (Barger, 2015). Students that could afford higher block plans were able to obtain food with higher nutritional value. While those that couldn't consume more food from fast food restaurants (Dingman, 2014). The USDA outlines four different levels of cost for a meal plan: the thrifty meal plan ($270 a month), the low-cost meal plan ($276 a month), the moderate-cost meal plan ($342 a month), and the liberal meal plan ($425 a month) (Hanson, 2022). Which brings the average meal plan cost to be between $3,000 and $5,500 a year for students (Wood, 2022). Although, meal plan prices can get even more expensive than that. At

Wellesley College, the mandatory meal plan costs $7,442 for a year. Covering their three meals a day for around 8 months, that comes out to be about $18.75 per day (Mathewson, 2021). At the University of California, the lowest meal plan offering 10-21 meals per week would not be enough to meet dietary needs. Although, students that struggle with money, were found to be more likely to choose this limited meal plan (Quinton, 2016). These meal plan prices aren't always affordable for many students, leading them to higher food insecurity rates. A study based on student interviews found that in colleges where first-year students were required to have a meal plan, many students reported no longer being able to pay for a food plan after their first year (Kim, 2022). One participant in a study of 1,278 community college students reported that food on campus (such as in dining halls) to be more expensive than the food outside of campus (Ahmed, 2022). On top of everything, a survey at University of Ohio found that 48% of students report having insufficient money to buy enough food (Twill 2016).

2.3. Miscellaneous costs

Food insecurity is a significant issue on college campuses, and the factors that contribute to it are complex. Just the costs of meal plans and other food from off-campus restaurants or grocery stores aren't the only costs undergraduate college students are faced with. 70% of college students surveyed by the Student Financial Wellness study expressed stress over their personal finances (Weaver, 2022). These other miscellaneous costs students have can affect the amount of money they have left to spend on food. The cost of tuition, fees, rent, transportation, supplies, and enough food to get by, leaves very little left for students to purchase their required textbooks (Weaver, 2022). A report showed that textbook prices climbed by 88% between 2006 and 2016, which is a necessary cost for any college student. On average, students spend annually approximately $1,200 on books and other school supplies (Becker, 2022). Some students reported assessing the true value of the text and deciding which is more important — food to survive or buying a book for class. Yet a study found that those who reported sacrificing food for these educational expenses, reported lower grade point averages and were more likely to suspend their studies (Martinez, 2018). The cost of tuition and fees is another big problem for students in affording food. Higher education costs have continued to rise over the past several decades, even though average household incomes haven't had as much change (Goldrick, 2016). Since the last 1980s, tuition has tripled for public universities, and more than doubled for private universities. While the price of room and board has increased by 28% in the last decade at public universities (College Board, 2022).

The prevalence of food insecurity is just as prevalent in private universities as in public universities due to the costs, although private universities are less represented in research on food insecurity (Jack, 2019). A study with survey data from 359 undergraduates demonstrated undergraduates at private institutions experienced food insecurity at either similar or higher rates than students at public institutions (Keefe, 2021). Similarly, students attending college typically incur significant debt, even while struggling to afford basic necessities such as food (Weaver, 2022). Students that owe more than $10,000 in student loans were more likely to be food insecure than students owing less than $1,000 (Zigmont, 2022). A survey of 338 undergraduate students at the University at Mississippi backed this idea that loan borrowing was positively associated with very low food security (Halfacre, 2021). A Chi-Square analysis showed that students not receiving family financial support (I.e. those taking out student loans) were significantly associated with increased odds of basic needs insecurity and/or food insecurity (Robbins, 2022). Adding onto the necessary college costs, spending on non-necessary items can affect a

student's available budget for food and the chances of food insecurity. One study used a USDA 6-question food insecurity screen and New Vital Signs Food Label to measure food security and literacy in 560 university students. As a result, 35.8% of those students were characterized as food insecure, but those who prioritized spending on alcohol had higher odds of experiencing it. An even deeper finding was those who highly prioritized buying alcohol had increased odds of being food insecure than those who prioritized shopping. (Cuy, 2020). Poor shopping skills can increase the risk of food insecurity as newly-independent college students have no prior experience on how to budget, and understand bargain hunting (Adamovic, 2022; Meldrum, 2006). This showed that poor budgeting — or a lack of a budget — is a major contributor to food insecurity on college campuses (Cuy, 2020). Furthermore, in a survey conducted in the Fall of 2012, about 80% of 21.6 million college students nationwide admitted to drinking alcohol during the semester. Due to its prevalence in the college lifestyle, students spend about $42 a month on alcohol. In the extreme case of a binge drinker, this cost could expand to $75 per month or higher. Yet alcohol isn't the only fluid drug devouring college students' food budgets — so is caffeine. 92% of college students have consumed caffeine in the past year. If a student was to buy coffee every day, they would end up spending about $63 a month, or $15 a month if they exclusively made it at home (Hanson, 2022). Students that prioritize spending money on alcohol or caffeine will subsequently have less money to spend on their food.

2.4. St. John Fisher University

The cost of colleges/universities can have a significant impact on the food students can afford, and therefore their chances of food insecurity. This is a common theme among schools, including a local private university, St. John Fisher University in upstate New York. As of 2023, the average cost of tuition per year is $38,566, already imposing a significant financial burden on students. There are countless other higher-education costs including $9,182 on average for housing per year, as well as costs for transportation and textbooks, which come to $500 and $650, on average per year respectively. (University SJF, 2023). The required meal plan for on-campus residents is an additional expense coming out to be another $5,160 a year on average. All of these added costs add up quickly and lower the budgets students have to spend on food, leading to food insecurity.

The amount of money coming in from work, the cost of a meal plan, and other endless miscellaneous university costs and meal-plan prices are clearly a big issue hindering food security in college students. Although this is not the only issue; even if a student can afford the unending costs, they could have low access to this necessary and nutritious food.

3. Access to food affecting food insecurity rates

Even though those participating in meal plans are less likely to be food-insecure, lack of food options, open hours, and distance can make meal-plan use difficult for students (Zein, 2019). Not only is the increasing cost of food an issue for college students, but on and off-campus accessibility also prohibits students from obtaining the food they need.

3.1. Dining halls

Although college campuses have at least one dining hall, sometimes their accessibility or food options are poor. Dining halls often do not provide viable accessibility to nutritious food to food-insecure college students. (Wood, 2022). Participation in a meal plan was found to not prevent experiences on food security, but had similar percentages of food-insecurity to students not on an institution-sponsored meal

plan (Duke, 2023). An American College Health Association (ACHA) survey in 2018 reported that 71.8% of college students daily had two or fewer servings of fruits and vegetables. Meanwhile, the recommended daily dosage is two cups of fruit and two and a half cups of vegetables per day. This makes sense considering it was found that low food security is associated with less intake of fruit, and higher intake of sugar (Leung, 2019). From one study, an interviewed student reported no fruit at their campus dining locations on multiple occasions (Kim, 2022). These studies show that dining halls sometimes do not always provide a wide selection of nutritious foods students need (Clerkin, 2021). One participant in a mixed-method data collection of 1,278 students wrote that their campus dining lacked both healthy options and vegan/vegetarian options to accommodate different students (Ahmed, 2022). But, participation in college meal plans does increase when universities offer menus that accommodate more needs such as vegan, vegetarian, nut-free, gluten-free, and kosher (Barger, 2015).

Along with a poor variety of foods, dining hall hours are also widely inconvenient for students, leaving some without food. In a study of 3,000 college students across 12 states, the prevalence of food insecurity averaged 48%. One student in the study attributed this to dining hours being "awful and inconvenient" despite many students on campus holding meal plans (Weaver, 2022). Another study showed that when universities respond to the student demand for 24-hour food access, meal plan participation will increase. Students in a variety of activities, jobs, and internships want longer dining hall hours. Other universities are catching on to this idea to extend on-campus food location hours to increase food accessibility for students. Colgate University and Queens College in New York both now have 24-hour convenience store locations on campus. With a simple badge swipe, students can choose from a variety of nutritious food options at any time of day (Barger, 2015). Even still, campuses are often limited to only one of these small on-campus markets which makes those prices more expensive for students and may also have conflicting hours with student schedules (Fortin, 2021; Zigmont, 2022). Prices of the food items on these on-campus markets are between 1.3 and 6.4 times higher compared to off-campus stores. For example, a healthy option of canned green beans cost a student $3.25 at the campus market but range $0.88-$1.08 at normal grocery stores (Zigmont, 2022). These on-campus dining locations are crucial for college students since residential housing is not built to sustain students cooking or cleaning dishes. Although better access to these cooking facilities were proven to be negatively associated with very low food security among female students (Halfacre, 2021). In conjunction with on-campus dining halls and markets, typically on-campus college club meetings provide food for students during the event. Because of this, some food-insecure students rely on this source of food. One student reported going to a republican club meeting at their school, not because of their political affiliation, but because of the chance of free food (Kolowich, 2015).

3.2. On-campus resources

Dining halls aren't the only food resources on campus, but even with popular food resources – such as food pantries – it still isn't enough to fight food insecurity among students. Students reported using both formal and informal on-campus programs ranging from food pantries, campus events, and the use of SNAP (Fortin, 2021). The College and University Food Bank Alliance (CUFBA) was designed to address food insecurity on campuses. This created a network of 1,000+ campus pantries, making them the most common response to food insecurity on campuses. They are a critical way that universities manage poverty on campus but aren't able to eliminate food insecurity alone

(Broton, 2022). There are several big issues with campus food pantries. In a study of 1,359 undergraduate students, less than 1% of students had accessed their food bank in the last 12 months, and instead resorted to other ways to get food (Olauson, 2018).

According to one study, food pantries lack access to the necessary fruits and vegetables for recommended nutrition. In some cases, this could be due to a lack of donations, or because most food pantries only take in non-perishable items and not fresh produce. (Clerkin, 2021). In a study of interviews using students accessing food pantries, 5 out of the 9 students mentioned throwing away 25%-50% of the food received because it was past the expiration date (Lee, 2020). On top of this, many students from both low and high-food-security groups in a survey mentioned a stigma associated with food pantry use, creating a deterrent for students to utilize them. Another inhibitor to using food pantries is that twenty-four colleges in Texas found a 16.6% reduction in the number of campus food pantries due to the COVID-19 pandemic and campus closures in 2020 (Ahmed, 2021; Zottarelli, 2021). Many students are also unaware of their college's food pantry whereabouts, hours, and availability (Moore, 2021; Weaver, 2022). Continuing-generation college students had a decreased likelihood of food insecurity by 38% if they were aware of their campus food resources (Olfert, 2021).

Beyond food pantries, a survey of 1,278 community college students reported the most frequently used source of support with 28.20% was SNAP (Supplemental Nutrition Assistance Program; Ahmed, 2022). Another study using a regression model showed that SNAP participants experienced a 63% decrease in food insecurity in 6 months use (Nazmi, 2022). Although, universities in the CUNY system push to educate students about food stamp eligibility but worry it is still not reaching enough students (Kolowich, 2015). So even though there are plenty of food pantries and resources nationwide on college campuses, the lack of nutrition and dissemination of knowledge to students, as well as the stigma keep food insecure students from using them. Due to the noticeable issues with college food pantries, some groups of students from different colleges and universities have decided to make their own changes.

One example is the Swipe Out Hunger program which donates unused student meal swipes to students experiencing food insecurity (Wood, 2022). A further example is at Bowdoin College in Maine where three students realized the no supply of, but high demand from students for late-night eating options. They created their own food truck that has made its way to campuses across the nation, conquering the issues of lack of dining options and open hours on college campuses (Domonell, 2012). At Western Oregon, students have created and run their own food pantries where other students in need can shop for free (Kolowich, 2015). At Columbia University, students created a Facebook page called "CU Meal Share" dedicated to first-generation and low-income students. Columbia students could volunteer to connect with an in-need student from the page and swipe them into dining halls (Kolowich, 2015). Another group of students from survey results saw too much food going to waste after scheduled on-campus catered events. So, they made an app for 451 enrolled students to receive real time announcements of location and type of food left over from events for them to pick up (Frank, 2021).

3.3. Off-campus transportation

Another factor hindering food accessibility to students is transportation to off-campus food options. Food insecure students are more likely to report unstable housing, less likely to own a car, and more likely to use public transportation. Therefore, a college campus's transportation resources (typically being shuttles or buses) can dictate if a student

has access to food or not (Waity, 2020). When faced with high prices of on-campus dining options, students are likely to look off-campus for more affordable options such as fast-food restaurants. One study using negative binomial regression found that the number of meals obtained from fast food restaurants was positively associated with financial access and negatively associated with health consciousness (Dingman, 2014). Although, limited transportation options can even prohibit this option. One study concluded that food-insecure students were likely to state that transportation was a main barrier to obtaining food and/or groceries (Zigmont, 2022). Grocery stores within walking distance from college campuses were found to be more expensive than grocery stores located farther away, which needed transportation (Kim, 2022). On top of this, students in California universities reported transportation contributing to their food insecurity and poor diet intake (Crutchfield, 2018). In an additional study of California students, slightly more food secure students reported lack of transportation in a survey of 8,705 students (Martinez, 2018). Those who live off campus with a car could in theory have more access to food options, but even then will incur significant transportation costs including repair bills or gas, that could impact their food budget. Moreover, having a car was found to be associated with more financial resources, and therefore higher food security (Soldavini, 2022).

3.4. St. John Fisher University

Access to food is a problem at many higher education institutions, including local private university, St. John Fisher University in upstate New York. Dining hall access and options play a significant role in food insecurity rates on campus. St. John Fisher University's main dining hall has limited hours of three meal periods per day (7:30a.m - 10:00a.m, 11:00a.m - 2:30p.m, 4:30p.m - 7:30p.m) (Dine on Campus, 2023). These dining hall hours/access makes it difficult for students to grab food on their breaks in between classes or after any late classes or work. Taking food out with you from the dining hall is also prohibited, making it impossible to plan ahead/meal prep for those times the dining hall is closed to students. This decreases the window of time students can access food, and if it doesn't line up with their schedule, they are more likely to be food-insecure.

There are several other retail locations around the St. John Fisher campus selling primarily to-go drinks, snacks, fruit, and other pre-prepared food. However, chips and junk food are significantly less expensive (average price of $1.50) than fresh fruit and vegetables (average price of $4). This makes students on a budget less likely to be able to choose the nutritious option. Furthermore, on-campus resources play a big part in food insecurity on campuses. St. John Fisher University has a food pantry located on campus that was created in 2017 from donations from faculty and staff, students, or anyone else in the community (University SJF, 2023). However, a lack of education about these resources can counteract the purpose. Personally, I was unaware of this food pantry and where to find it until I looked it up on Google – which decreases the chances of food-insecure students accessing this resource. Adding on to this, the food pantry was not advertised to students during freshman orientation (consisting of three days of information) or prospective student tours.

Access to transportation to other off-campus food locations is important to food insecurity rates. At St. John Fisher University, shuttles are offered Wednesday nights, and Saturday and Sunday afternoons to grocery stores such as Wegmans, Trader Joe's, and Target. In addition to campus-sponsored transportation, the university offers free Regional Transit Service bus passes at the campus bookstore using your student ID card to additional off-campus stores and locations (University SJF, 2023). This helps students that

don't have access to their own transportation access places to purchase groceries, decreasing the likelihood of being food insecure. Although, there is very little education on this resource and was also never mentioned at freshmen orientation. This much campus transit service isn't typically offered at all universities.

College students' overall access to dining halls, campus transportation, and other on-campus resources can really affect their food security status. This gives even more reason why higher-education implementation of better dining hall hours and options, transportation access, and expansion of college food pantries and nutrition literacy is imperative (Moore, 2021).

4. Demographics affecting food insecurity rates

Food insecurity – defined as being unable to access sufficient nutritious food – is heavily influenced by sociodemographic factors including race/ethnicity and income (Mei, 2021). The food that college students can obtain can even come down to their different demographics. Dynamics across U.S. college campuses are continuing to change, including an increase in low-socioeconomic status and first-generation students (Cooper, 2018). This increase of enrollment of marginalized students is across all institutions including private universities (Keefe, 2021). Although, college students are still primarily white or caucasian and male, making up 51.6% and 56% respectively of all students attending higher-education institutions (Hanson, 2023). Things such as minority status (in race/ethnicity, gender, and sexuality), social class, and student status (including class, first-generation status and international students) can all affect food-insecurity rates. Understanding these at-risk populations is essential to provide proper help for those in need (Cook, 2008).

4.1. Race, gender, and sexuality

On college campuses, minority communities are more commonly associated with higher food insecurity rates (Myers, 2017). Students who identified as black, indigenous, a person of color, LGBTQ+, or women, were more likely to report food-insecurity problems (Baker-Smith, 2020). Focusing on race, multiple studies found that African-American students were more likely to be food insecure than their caucasian student peers (Dubick, 2016). This food-insecurity rate increases even more when the African-American students are also first-generation students (Zigmont, 2022). Black first-generation students were 296% more likely to be food insecure than white first-generation students (Olfert, 2021). In a survey of 351 students attending historically black higher-education institutions, 3 in 4 students (72.9%) reported food-insecurity in the past year. This exceeded the estimates among students at predominantly white institutions (Duke, 2023).

Another study found significant differences in race between those in the "very low food security" group and the "high food security" group. 81.7% of African American students and 65% of Hispanic students were found in the very low food security group (Weaver, 2022). Another study of 8,705 undergraduate students found food insecurity was the highest among Hispanic students, followed by black, mixed-race, Asian, then lastly white students (Martinez, 2018). From a survey of 359 undergraduate students, Hispanic students were 4.5 times that of white students to be food insecure (Keefe, 2021). Although those from low-income families are more likely to work during college, significant labor market discrimination against Black, Latinx, Indigenous, other People of Color, women, and transgender individuals impedes their ability to work throughout college and afford food prices (Broton, 2022).

Switching focus, another study collecting a 24-hour food record from college

students, food group expenditure differed significantly by sex just as employment status and special dietary needs did (McCartney, 2021). Compared to food-secure women, food-insecure women had lower intakes of necessary food groups and nutrients (Mei, 2021). Adding onto increased rates of food insecurity in women, a cross-sectional survey study of 78 female NCAA Division 1 athletes found that one in three were food-insecure, despite even having increased university support/attention (Douglas, 2022). This difference of food security among sexes can possibly be attributed to females being more likely to report financial insecurity, and men having more positive outlooks of their well-being and financial situation (Kettley, 2008). Sexuality also plays a big role in food security since many LGBTQ+ students report experiencing a loss of family support when coming out (Walsh-Dilley, 2022). In a survey of 2,655 students at the University of New Mexico, it was found that gay, lesbian, and bisexual students were more likely than straight students to experience food insecurity. In gay and lesbian students alone, it was over twice the odds of straight students (Walsh-Dilley, 2022). A similar study of 359 undergraduate students found genderqueer or transgender identifying students have 4.1 times the odds of experiencing food insecurity as students who identify as women (Keefe, 2021).

4.2. Social background

A student's social background can also determine what type of food they are able to access in college. Low-income students have now surpassed middle-income students by 3% in college enrollment rates (NCES, 2017). Although financial aid and scholarships can help cover the cost of food and other expenses for them, scholarships have been unable to keep up with rising college costs. These lower-income students receiving this financial aid were found in survey results to be significantly more likely to be food insecure (Adamovic, 2022). In different survey data, Pell Grant recipients (awarded based on income) had twice the odds of being food insecure (Keefe, 2021). Assuming generability to U.S. colleges, a study from China looked at students' canteen consumption and found it was feasible to classify the students in the study into different economic levels and financial aid needs by analyzing their consumption data (Yang, 2022). Additionally, the rates of food insecurity are proven to be higher among those with low incomes, or those who grew up in poverty or foster care (Broton, 2022).

In a study of undergraduate students, 83% were below the poverty line, in which 49.5% of those students experienced food insecurity (Keefe, 2021). In a study with University of California students, about ⅕ of the students reported a childhood history with food insecurity. Students that reported this were more often in the food-insecure category (Martinez, 2018). Of first-generation students, those that also experienced childhood food insecurity due to poverty are 214% more likely to be food insecure during college than first-generation students that didn't experience food insecurity in their childhood (Olfert, 2021). Another factor determining a student's social class are those with dependent children; which make up 26% (or 4.8 million) of college undergraduates in the U.S. (Lero, 2007; Noll, 2017). Specifically, community colleges enroll nearly half the amount of these student-parents (Noll, 2017). Fifty-three percent of these students with dependents were found from a student health services survey to experience high rates of food insecurity (Olauson, 2018). A reason for this is many food bank dependent students reported shielding their children from the negative effects from food insecurity, and instead sacrificing their own needs (Lee, 2020).

4.3. First-generation, international, and class statuses

Statuses at the student's college such as being a first-generation college student, international student, or class (freshman-senior)

can affect their food security status. First-generation college students typically come from difficult socioeconomic backgrounds, which are similar factors that influence food security status (Olfert, 2021). In 2019, it was reported that 10.5% of U.S. households experienced food security, but among first-generation college students, that percentage was about 16% higher (Zigmont, 2022). Furthermore, first-generation college students' food insecurity rate is 15.7% higher than continuing-generation students (Olfert, 2021). Another study showed that of students with at least one parent with some college but no degree, 19% of them were food insecure (Dubick, 2016). In another study, it was found that first-generation students were more often found in the “very low food security” group at 66.3% than in the “high food security group” (Weaver, 2022). First-generation students are less likely to receive financial support from their families than their peers, and instead rely on financial aid. Yet students who receive financial aid do not have enough money to finance their own education while covering the cost of food and living, resulting in food insecurity (Meldrum, 2006).

International students also experience high rates of food insecurity. From a questionnaire to 5,430 students at U.S. Southeastern universities, ¼ of international students were found to be food insecure (Soldavani, 2022). A possible reason for this is international students typically are required to pay the full cost of tuition to attend US universities/colleges, leaving little money left over for other expenses such as food (Hegarty, 2014). In the student health services survey at UofS, 58% of their international students reported experiencing food insecurity in the last 12 months, and were 2x more likely than non-international students to experience this (Olauson, 2018). A student's class at the school is also significantly associated with worrying food would run out. Compared to having Freshman status, being a senior was associated with significantly increased odds of food-insecurity (Duke, 2023). Another study found increased odds of food insecurity among third-year students, alluding that upperclassmen are more likely to experience food insecurity (Martinez, 2018). A possible explanation for this is that more college upperclassmen live off-campus, which is associated with increased odds of food insecurity. This is due to being away from on-campus food, and higher housing costs resulting in competition with food costs (Halfacare, 2021). Other explanations could include higher amounts of meals eaten off campus, travel costs, and more likely to be in unpaid internships (Duke, 2021).

Several demographic qualities such as race, gender, sexuality, their families' prior social status, and student status can all hinder the ability of college students to obtain proper food security. But this raises a bigger question of is this really the case for all students in this situation?

5. College helping students escape food insecurity

Cost, accessibility, and certain demographic characteristics can all create higher rates of food insecurity among undergraduate college students in the United States. Although for some students, college is the first time in their lives they don’t suffer from food insecurity; it actually helps their ability to get food.

In 2013, college students enrolled in a meal plan were asked to participate in a survey about their fast food consumption. This survey concluded that a person who purchased a high flex dollar allowance had LESS prior financial access than someone who purchased a low flex dollar allowance. This showed that college meal plans give students more opportunities to obtain food than before (Dingman, 2014). Part of the reason for this is meal plans – like tuition and housing – are part of the total cost of attendance at a college. This means that their meal plan prices can be significantly reduced or covered

under financial aid for those who come from a poverty and/or food-insecure background (Wood, 2022). In a survey of undergraduate students, more often than not, food-insecure students received financial aid and/or need-based grants, scholarships, or loans (Martinez, 2018). Since 2010, first-time college students have been receiving enough of this financial aid to cover their tuition and fees (College Board, 2022). Many universities including Columbia also have many assistance programs for low-income and first-generation students to increase their ability to get food, tutoring, stipends, and wardrobe; all which could have been impossible for them to access before (Kolowich, 2015). Additionally, since the middle of the twentieth century, colleges have made significant improvements for groups that are historically marginalized or excluded. For example, specific financial aid programs have helped women, racial/ethnic minorities, and those with low incomes enroll in college (Broton, 2022).

6. Conclusion

In conclusion, there are three main factors causing high-rates of food insecurity in undergraduate students. The first main factor is cost which includes the effect of jobs, meal-plan prices, and other miscellaneous university costs. The second factor includes accessibility issues such as inconveniences of dining halls, access to other on-campus resources, and transportation to off-campus food places and grocery stores. Lastly, demographic factors such as minority status in race, ethnicity, gender, and sexuality; as well as prior financial status, and student status. Although, it was found this isn't the case for every student – in some cases students actually escaped food insecurity thanks to college.

Food insecurity is important to address on higher education campuses due to its extreme effects on students. Eating behaviors can negatively impact physical, mental, and cognitive/scholastic function (Reuter, 2021). In the physical sense, food insecurity has been linked to numerous risk factors including cardiovascular disease, obesity, and poor sleep (Mendy, 2018; Weaver, 2022). In the mental sense, it results in lower self-perception and more likely to suffer from mental health issues such as anxiety, depression, and eating disorders (Clerkin, 2021; Kolowich, 2015; Mendy, 2018; Weaver, 2022). In the cognitive/scholastic sense, food-insecurity can play a significant role in academic progression and performance causing things like slower degree progression and lower GPAs (Hale, 2020; Weaver, 2022)

Overall these findings are significant for higher education officials to address and attempt to create change on campus. In order to help students struggling with physical, mental, and cognitive/scholastic function, food problems need to be acknowledged and fixed first. The issues that contribute to food insecurity addressed in the essay also serve as ideas for change for higher education officials. For example: better dining hall and food pantry access, more food locations, food financial aid, greater off-campus transportation, equity practices, etc. Higher education has always been a strong influencer of social change, and a place of increased opportunity for students. So, why is the current conversation on food insecurity among their undergraduate students different?

6.1. Resources

If you are struggling with food insecurity, please consider visiting the following resources:

Food Pantries - Find food pantries nearby:

https://www.foodpantries.org/

Feeding America - Find food banks nearby:

https://www.feedingamerica.org/find-your-local-foodbank

Why Hunger - Find meals nearby:

https://networks.whyhunger.org/

USDA - Supplementary Nutrition Assistance Program (SNAP):

https://www.fns.usda.gov/snap/recipient/eligibility

USDA - Food assistance programs by state:

https://www.fns.usda.gov/fns-contacts?f%5B1%5D=program%3A32

SUNY - NY Campus Food Resources:

https://www.suny.edu/foodinsecurity/campus-resources/

Meals on Wheels America - Find Meals:

https://www.mealsonwheelsamerica.org/find-meals

References

Adamovic, E., Newton, & House, V. (2022). Food insecurity on a college campus: Prevalence, determinants, and solutions. *Journal of American College Health*, *70*(1), 58–64. https://doi.org/10.1080/07448481.2020.1725019

Ahmed, T., Ilieva, R. T., Clarke, A., & Wong, H. Y. (2021). Impact of a student-led food insecurity intervention on diverse community college students. *Journal of Hunger & Environmental Nutrition*. https://doi-org.pluma.sjfc.edu/10.1080/19320248.2021.1985030

Ahmed, T., Shane, J., Ilieva, R., Reader, S. M., Aleong, C., Chu, C., Wong, H. Y., Brusche, D., Jiang, K., Edwards, A., Lopez, D., & Yan, A. (2022). "I cannot afford lunch": How students' narratives of food insecurity reveal difficulties and coping strategies before and during the COVID-19 pandemic. *Community College Journal of Research and Practice*, 1–19. https://doi.org/10.1080/10668926.2022.2135636

Alsup, M. (2023). Monday night meal plan. *Christian Century*, *140*(1), 72–75.

Barger, T. S. (2015) The meal deal. *University Business*, *18*(12):42-47. Accessed February 28, 2023. https://searchebscohostcom.pluma.sjfc.edu/login.aspx?direct=true&db=aph&AN=111524192&site=ehost-live&scope=site

Becker, K. L, Safa, R., Becker, K. M. (2023). High-priced textbooks' impact on community college student success. *Community College Review*. *51*(1):128-141. doi:10.1177/00915521221125898

Bell, S., (2012). Nontraditional college students are the new majority. From the *Bell tower*. Retrieved from http://lj.libraryjournal.com/2012/03/opinion/nontraditional-students-are-the-new-majority-from-the-belltower/#_

Broton, K. M., Lenkaitis, C., & Henry, S. (2022). Universities as producers, managers, and opponents of poverty: The case of food insecurity on campus. *Georgetown Journal on Poverty Law & Policy*, *29*(3), 337+.https://linkgalecom.pluma.sjfc.edu/apps/doc/A713670774/AONE?u=nysl_ro_stjohnc&sid=bookmark-AONE&xid=a01eed74

Baker-Smith, C., et al. (2020). #Real.college: Five years of evidence on campus basic needs insecurity. 18-22 https://hope4college.com/wp-content/uploads/2020/02/2019_RealCollege_Survey_Report.pdf;

Clerkin, K. D., Pohl, C. J., Shupe, E. R., Kim, M.J. (2021). Influencing nutritional habits of college students using a food pantry. *Journal of American College Health*. *69*(8):937-941. doi:10.1080/07448481.2020.1721506

Coleman-Jensen, A., Rabbitt, M., Gregory, C., & Singh, A. (2020). Household food security in the united states in 2019, ERR-275, *U.S. Department of Agriculture*, Economic Research Service.

College Board. (2022). Highlights from the 2021 trends in college pricing report. Retrieved February 27, 2023, from https://research.collegeboard.org/trends/college-pricing/highlights

Cook, J., Frank, D. (2008). Food security, poverty, and human development in the United States. Annals of the New York Academy of Sciences 1136 (1): 193–209. doi:10.1196/annals.1425.001.

Cooper, P. (2018). College enrollment surges among low-income students. *Forbes*. https://www.forbes.com/sites/prestoncooper2/2018/ 02/26/college-enrollment-surges-among-low-income-students/ #530403f2293b.

Crutchfield, R., Maguire, J., (2018). Study of student basic needs, *The California State University*.

Cuy, Castellanos, D., Holcomb, J. (2020). Food insecurity, financial priority, and nutrition literacy of university students at a mid-size private university. *Journal of American College Health*. *68*(1):16-20. doi:10.1080/07448481.2018.1515762

Douglas, C., Camel, S., & Mayeux, W. (2022). Food insecurity among female collegiate athletes exists despite university assistance, *Journal of American College Health*, DOI: 10.1080/07448481.2022.2098029

Dine on campus | Hours of Operation. *St. John Fisher University Dining Services.* (n.d.). Retrieved March 14, 2023, from https://dineoncampus.com/sjf/hours-of-operation

Dingman, D. A., Schulz M. R., Wyrick, D.L., Bibeau D.L., & Gupta S.N. (2014). Factors related to the number of fast food meals obtained by college meal plan students. *Journal of American College Health*, *62*(8):562-569. doi:10.1080/07448481.2014.945456

Domonell, K. (2012). Food trucks pull into campus. *University Business*, *15*(9), 20.

Dubick, J., Mathews, B., & Cady, C. (2016). Hunger on campus: The challenge of food insecurity for college students. Retrieved from http://studentsagainsthunger.org/wp-content/uploads/2016/10/Hunger_On_ Campus.pdf Education, 62(11), 7.

Duke, N. N., Campbell, S. D., Sauls, D. L., Stout, R., Story, M. T., Austin, T., Bosworth, H. B., Skinner, A.C., & Vilme, H. (2023). Prevalence of food insecurity among students attending four historically black colleges and universities, *Journal of American College Health, 71*:1, 87-93, DOI:10.1080/07448481.2021.1877144

El Zein, K.P. Shelnutt, S. Colby, et al. (2019). Prevalence and correlates of food insecurity among U.S. college students: a multi-institutional study *BMC Public Health*, 19, p. 660

Fortin, K., Harvey, S., & White, S. (2021). Hidden hunger: Understanding the complexity of food insecurity among college students, *Journal of the American College of Nutrition, 40*:3, 242-252, DOI: 10.1080/07315724.2020.1754304

Frank, L., Finkbinder, E., & Powell, V. (2021). "Free Food on campus!": A novel use of instructional technology to reduce university food waste and feed hungry students, *Journal of Hunger & Environmental Nutrition, 16:*5, 706-724, DOI: 10.1080/19320248.2020.1850389

Goldrick-Rab, S. (2016). Paying the price: college costs, financial aid, and the betrayal of the american dream. *Chicago, IL: University of Chicago Press*

Goldrick-Rab, S., et al. (2022). Self-reported covid-19 infection and implications for mental health and food insecurity among american college students, 119 Proc. of the Natl Acad of Scis. 1,1-2 (2022); J. Luke Wood & Frank Harris III, Experiences with "acute" food

Hale, J. A. (2020). Campus food pantries: An emergent student resource. *Community College Enterprise, 26*(1), 58+.https://linkgalecom.pluma.sjfc.edu/apps/doc/A630335647/AONE?u=nysl_ro_stjohnc&sid=bookmark-AONE&xid=b8ba6f5b

Halfacre, K., Chang, Y., Holben, D., & Roseman, M. (2021). Cooking facilities and food procurement skills reduce food insecurity among college students: A pilot study. *Journal of Hunger & Environmental Nutrition, 16*:5, 650-663, DOI: 10.1080/19320248.2021.1949423

Hanson, M., & Checked, F. (2023). College enrollment statistics [2023]: Total + by demographic. *Education Data Initiative,* Retrieved from https://educationdata.org/college- enrollment-statistics

Hanson, M. "Average Cost of Food per Month for a College Student" EducationData.org, December 19, 2022, https://educationdata.org/average-monthly-food-spend-college-student https://link-gale-com.pluma.sjfc.edu/apps/doc/A305081800/AONE?u=nysl_ro_stjohnc&sid=boo insecurity among college students, 47 Educ. Researcher 142, 142-45 (2018); Econ. Res. Serv., supra note 2.)

Haskett, M. E., Majumder, S., Kotter- Grühn, D., & Gutierrez, I. (2020). The role of university students' wellness in links between homelessness, food insecurity, and academic success. *Journal of Social Distress and Homelessness*, *30*(1), 59–65. https://doi.org/10.1080/10530789.2020.1733815

Hegarty, N. (2014). Where are we now: The presence and importance of international students to universities in the united states. *The Journal of International Students*, *4*(1), 223–235. https://doi-org.pluma.sjfc.edu/10.32674/jis.v4i3.462

Jack, A. (2019). The privileged poor: How elite colleges are failing disadvantaged students. Cambridge, MA: *Harvard University Press.*

Keefe, S., Garagiola-Bernier, A., Kiley, E., England, J., Schmitt, S. R., & Shore M. (2021). Campus food insecurity: Bringing private institutions into conversations on basic needs, *Journal of Hunger & Environmental Nutrition, 16*:5, 628-642, DOI: 10.1080/19320248.2020.1838984

Kettley, N., Whitehead, J., Raffan, J. (2008). Worried women, complacent men? Gendered responses to differential student funding in higher education. *Oxford Rev Educ*, *34*(1), 111–129. doi:10.1080/03054980701565360.

Kim, Y., Murphy, J., Craft, K., Waters, L., Gooden, B. I. (2022). "It's just a constant concern in the back of my mind": Lived experiences of college food insecurity. *Journal of American College Health*, 1–8. https://doi.org/10.1080/07448481.2022.2064714

Kolowich, S. (2015). How many college students are going hungry? *Chronicle of Higher Education, 62*(11), 7.

Lee, S., Ball, G. D. C., Farmer A., & Willows N. D. (2020). Exploring the experience of food insecurity among university students caring for children: A qualitative descriptive study, *Journal of Hunger & Environmental Nutrition, 15*:3, 360-371, DOI: 10.1080/19320248.2018.1557093

Lero, D., Smit, Quosai, T., Van Rhijn, T. (2007). Access to post-secondary education for student parents: final report. *Human Resources & Social Development Canada.*

Leung, C. W., Wolfson, J.A., Lahne, J., Barry, M.R., Kasper, N., Cohen, A.J. (2019). Associations between food security status and diet-related outcomes among students at a large, public Midwestern university. *J Acad Nutr Diet*. 119(10):1623-1631. doi:10.1016/j.jand.2019.06.251.

Martinez, S. M., Webb, K., Frongillo E. A., & Ritchie, L. D. (2018). Food insecurity in california's public university system: What are the risk factors?, *Journal of Hunger & Environmental Nutrition, 13*:1, 1-18, DOI: 10.1080/19320248.2017.1374901

Mathewson, T. G. (2021, April 8). A tough-to-swallow reason college keeps costing more: The price of meal plans. *The Hechinger Report*. Retrieved from https://hechingerreport.org/tough-swallow-reason-college-keeps- costing-price-meal-plans/

McCartney, D., Desbrow, B., Khalesi, S., & Irwin, C. (2021). Analysis of dietary intake, diet cost and food group expenditure from a 24-hour food record collected in a sample of australian university students. *Nutrition & Dietetics, 78*(2), 174–182. https://doi-org.pluma.sjfc.edu/10.1111/1747-0080.12662

Mei, J., Aarohee, P., Fulay, J. A., Wolfson, Leung, C. W. (2021). Midwestern University, *Journal of the Academy of Nutrition and Dietetics, Volume 121*, Issue 11, Pages 2267-2274, ISSN 2212-2672, https://doi.org/10.1016/j.jand.2021.04.009.

Meldrum, L. A., & Willows, N. D. (2006). Food insecurity in university students receiving financial aid. *Canadian Journal of Dietetic Practice and Research, 67*, 43–46.

Mendy, V. L., Vargas, R., Cannon-Smith, G., Payton, M., Enkhmaa, B., Zhang L. (2018). Food insecurity and cardiovascular disease risk factors among mississippi adults *Int J Environ Res Public Health*, 15.

Moore, C., Davis, K., & Wang, W. (2021). Low Food security present on college campuses despite high nutrition literacy, *Journal of Hunger & Environmental Nutrition, 16*:5, 611-627, DOI: 10.1080/19320248.2020.1790460

Myers, McCormick, A., and Painter, M. (2017). Food insecurity in the united states of america: An examination of race/ethnicity and nativity. *Food Security, 9* (6): 1419–32. doi:10.1007/s12571-017-0733-8.

National Center for Education Statistics (2017). College student employment. The Condition of Education, 1–4. Retrieved from https://nces.ed.gov/programs/coe/pdf/coe_ssa.pdf

Nazmi, A., Condron, K., Tseng, M., Volpe, R., Rodriguez, L., Lopez, M. L., Martinez, S. M., Freudenberg, N., Bianco, S. (2022). SNAP participation decreases food insecurity among california public university students: A quasi-experimental study. *Journal of Hunger & Environmental Nutrition, 18*(1), 123–138. https://doi.org/10.1080/19320248.2022.2099777

NCES. (2017). Percentage of recent high school completers enrolled in college, by income level: 1975 through 2016. https://nces. ed.gov/programs/digest/d17/tables/dt17_302.30.asp?current=yes.

Noll, E., Reichlin, L., Gault, B. (2017). College students with children. Retrieved from https://files.eric.ed.gov/fulltext/ED612519.pdf

Olauson, C., Engler-Stringer, R., Vatanparast, H., & Hanoski, R. (2018). Student food insecurity: Examining barriers to higher education at the University of Saskatchewan*, Journal of Hunger & Environmental Nutrition*, *13*:1, 19-27, DOI: 10.1080/19320248.2017.1393365

Olfert, M. D., Hagedorn, R. L., & Walker, A. E. (2021). Food insecurity risk among first-generation college students at an appalachian university. *Journal of Appalachian Studies, 27*(2), 202–219. https://doi-org.pluma.sjfc.edu/10.5406/jappastud.27.2.0202

Patton-Lopez, M., Lopez-Cevallos, D. F., Cancel-Tirado, D. I., & Vazquez, L. (2014). Prevalence and correlates of food insecurity among students attending a midsize rural university in Oregon. *Journal of Nutrition Education and Behavior, 46,* 209–214.

Quinton, S. (2016). The high cost of higher education. Available at: http://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2016/01/25/the-high-cost-of-higher-education. Accessed September 1, 2016.

Reuter, P.R., Forster, B.L., Brister, S.R. (2021). The influence of eating habits on the academic performance of university students. *Journal of American College Health, 69*(8):921-927. doi:10.1080/07448481.2020.1715986

Robbins, M.K., Spence, M., Steeves, E.A. (2022). A cross sectional assessment of basic needs insecurity prevalence and associated factors among college students enrolled at a large, public university in the Southeastern U.S. *BMC Public Health, 22*(1):1-11. doi:10.1186/s12889-022-12817-6)

Snap eligibility. (2021, October 1). *Food and Nutrition Service U.S. Department of Agriculture.* Retrieved March 14, 2023, from https://www.fns.usda.gov/snap/recipient/eligibility

Soldavini, J., Andrew, H., Berner, M. (2022). Campus-based food insecurity: The case of international students at a southeastern university. *Journal of Student Affairs Research and Practice, 59*(3), 338–351. https://doi.org/10.1080/19496591.2021.1997755

Tarasuk V, Vozoris N. (2003). Household food insufficiency is associated with poorer health. *J Nutr.* 2003;1(133):120–126.

Twill, S E., Bergdahl, J. & Fensler, R. (2016). Partnering to build a pantry: A university campus responds to student food insecurity. *J. Poverty 20,* 340-358

University, S. J. F. (n.d.). Cost of attendance for 2023-24. Financial aid | Cost of attendance - *St. John Fisher University.* Retrieved March 14, 2023, from https://www.sjf.edu/admissions-aid/financial-aid/cost-of-attendance/

University, S. J. F. (2019) Grocery run helps stock food pantry | *St. John Fisher University.* Retrieved March 14, 2023, from https://www.sjf.edu/news-and-events/news-archive/fall-2019/grocery-run-helps-stock-food-pantry/

University, S. J. F. (n.d.). Shuttles and Transportation. Safety and Security | Shuttles and Transportation - *St. John Fisher University.* Retrieved March 14, 2023, from https://www.sjf.edu/services/safety-and-security/shuttles-and-transportation/#

USDA. (2022). Survey tools. Retrieved from https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-u-s/survey-tools/

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.pluma.sjfc.edu/10.1007/s10755-020-09512-y

Walpole, M. (2003). Socioeconomic status and college: how SES affects college experiences and outcomes*. Rev High Educ 27*(1): 45–73. doi:10.1353/rhe.2003.0044.

Weaver, R. R., Hendricks, S. P., Vaughn, N. A., McPherson-Myers, P. E., Willis, S. L., & Terry, S.N. (2022). Obstacles to food security, food pantry use, and educational success among

university students: a mixed methods approach, *Journal of American College Health, 70*:8, 2548-2559, DOI:10.1080/07448481.2021.1873789.

Wood, S. Paying for Meals at College: What to Know About Costs. *U.S News,* 2022, https://www.usnews.com/education/best-colleges/paying-for-college/articles/paying-for-meals-at-college-what-to-know-about-costs.

Yang, C., Wen, H., Jiang, D., Xu, L., Hong, S. (2022). Analysis of college students' canteen consumption by broad learning clustering: A case study in Guangdong province, china. *PLoS ONE, 17*(10):1-18. doi:10.1371/journal.pone.0276006

Zigmont, V.A., Anziano, J., Schwartz, E., Gallup, P. (2023). Captive market pricing and lack of transportation: A survey of undergraduate food insecurity at a public university in new england. *American Journal of Health Promotion, 37*(3):313-323. doi:10.1177/08901171221127006)

Zottarelli, L. K., Moreno, A., Miranda, A., Xu, X., & Sunil, T. S. (2021). Associations between civic engagement and community college completion in a nationally representative sample of young adults. *Community College Journal of Research and Practice, 45*(7), 479–497. Advance online publication. https://doi-org.pluma.sjfc.edu/10.1080/10668926.2021.1973611