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Review

# Food Insecurity in Higher Education: A Contemporary Review of Impacts and Explorations of Solutions

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**Abstract:** Food insecurity is a global phenomenon which impacts a variety of social, economic, and life-stage groups. One such group affected by food insecurity is college students, who tend to experience food insecurity at a prevalence which exceeds the average of their local communities. The impacts of food insecurity in this population are multifaceted and have implications for their college experience and beyond. Food insecurity has been observed to have negative effects on college student academic performance, physical health, and mental health. This review explores the impacts of and solutions for food insecurity in this population globally, with particular emphasis on the United States, and specifically California.

**Keywords:** college; food insecurity; supplemental nutrition assistance program (SNAP); COVID-19

## 1. Introduction

Food insecurity, the lack of access to nutritionally adequate food to support a healthy and active lifestyle, is a concern for a significant proportion of the United States (U.S.) population. In 2020, 89.5% of U.S. households were considered food secure; of remaining households, 6.6% experienced low food security (uncertain access to quality foods) and 3.9% of households experienced very low food security (possibly disrupted eating patterns) [1,2]. While these proportions maintained the previous year's general outlook on food security in the US, this represents over 40 million individuals experiencing some level of food insecurity throughout the year [2]. It is also a growing concern in the college student population that has garnered much attention within the last fifteen years [3–29]. In 2020, college students numbered 19.4 million students, representing 41% of 18- to 24-year-olds, making this group a nontrivial subpopulation in the US [30,31]. Food insecurity is typically described in terms of broad demographic groups: age groups including children, adults, and seniors; racial/ethnic groups including white non-Hispanic, Black non-Hispanic, Hispanic, and Other non-Hispanic; household composition, such as married couples and single-parent households; and residential characteristics, including metropolitan area and geographic region [32]. While these broad categorizations are extremely valuable, they fail to take into account subgroups of individuals whose experience may not be widely shared and thus become invisible problems in the eyes of the general public. College students have a unique set of circumstances that may alter their food security, while also sharing characteristics which may contribute to their food security status, including factors like income level, race, location, whether they are first-generation college students, and whether they transfer to a 4-year college [33–36].

The following presents a contemporary review of the literature of food security at the college level. Particular emphasis has been placed on institutions of higher education in the US and California specifically, which hosts the largest number of colleges in the US. Selection criteria for inclusion in this review includes articles published within the past 15 years, which prioritize the college experience of food security as it relates to student



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finances, academic performance, physical and mental health, food choice, the COVID-19 pandemic, and efforts to improve student food security.

## 2. The College Food Security Landscape in the US and California

College students have often been considered to be of a “privileged” or “elite” group, however many across the country, including those enrolled in private universities, struggle with food insecurity [37–41]. Students are a group which is highly impacted by food insecurity; prevalence estimates on campuses range between 19% to 56%, with many campuses reporting food insecurity prevalence around four times the national average [42–46]. Regardless of perceptions of college students, food insecurity is a pervasive issue which touches large proportions of students from all backgrounds [47].

Food insecurity in California persists regardless of the state’s large agricultural output, and this experience trickles down to affect students on the 116 campuses of the California Community Colleges (CCC), 23 campuses of the California State University (CSU), and 10 campuses of the University of California (UC) [48]. California students have been observed to experience food insecurity at the same disproportionately high prevalence as other colleges nationwide, with a study of the UC indicating that about 44% of its student population experience food insecurity [49]. Similar to the national distribution of food insecurity, prevalence changes depending on campus location [50]. The average food insecurity of all types of institutions reflect these differences, with average food insecurity prevalence at CCCs being of 52% and CSUs being estimated at 21% [50,51]. The prevalence of food insecurity at these institutions tracks generally with students who are from low-income backgrounds, with just over half of CCC students, and 40% of CSU and UC students being from low-income backgrounds [50,52]. Other students who frequently experience food insecurity are first-generation students (those whose parents did not attend a 4-year college) [53]. Consistent observations of food insecurity among these demographic groups contribute to observations of poor college readiness [48–50]. Students who are low-income and/or first-generation reportedly do not have the same level of readiness to attend college and function with autonomy in a new environment as peers who do not come from low-income backgrounds and whose caregivers attended college [54]. This lack of preparedness and ability to manage one’s basic needs, such as food procurement and preparation, can affect not only their academics, but it may also have implications for students after they leave the college setting and must support themselves outside of school [54].

## 3. Global Food Insecurity among College Students

In other countries where student food insecurity is studied, the prevalence of food insecurity on college campuses appears to mirror that of the US. Food insecurity in college remains high, with research from Australian universities indicating a food insecurity prevalence of 38–48% among students [55,56]. Similarly, a study of public and private college students in Lebanon indicated that food insecurity affected 39% of surveyed students [57]. As has been observed in US university students, food insecurity has been associated with poorer academic outcomes, with Malaysian students experiencing food insecurity having a lower GPA than food secure colleagues [58]. Regardless of university location, students who attend universities outside of their home country tend to experience higher prevalence of food insecurity, due to factors like lack of family support, culturally appropriate foods, and high costs of foods [59]. A group of international students experiencing food insecurity at a Canadian university indicated that knowledge of local and culturally appropriate foods impacted food security and thus, their overall academics [60]. International and domestic students experiencing FI both used similar coping mechanisms to deal with food insecurity including delayed bill payment, applying for loans, and working more. However, international students were less likely to ask friends or relatives for assistance [61]. A similar prevalence of food insecurity has been observed in students in Saskatchewan, with 39.5% of students experiencing food insecurity. Not dissimilar to what is seen in the US, students

experiencing food insecurity were overrepresented by students relying on student loans as their primary source of income [62]. At another university in Canada, it was observed that over 35% of students experienced food insecurity, with indigenous students in particular being more likely to experience severe food insecurity [63]. While international students are not a homogenous group, trends in food security prevalence indicate that lack of culturally appropriate foods and a robust social support system may contribute to this experience.

#### 4. Student Finances as a Factor in Food Insecurity

In the US, financial status and food insecurity have been observed to be very closely linked; students who are from low-income backgrounds are more likely to experience food insecurity [64,65]. Further, research in college students indicates that financial literacy (the knowledge and skills of personal financial management) is variable but limited [66–69]. Whether financial literacy is high in an individual to some degree is irrelevant, as the costs associated with college attendance—which include housing, health, transportation and food costs—are exceedingly high [70–72]. A student may have adequate knowledge and skills to manage their finances, but in the face of a myriad of financial constraints, this knowledge may not be enough to keep students from excessive financial burden. With the federal Pell Grant failing to cover most of the cost of college, public school budget cuts leading to more students paying higher tuition and fees, and debt being taken on to cover costs while attending school full-time, the ability to balance a personal budget is not enough to maintain financial stability [71]. In addition, a greater proportion of students are attending college from low-income backgrounds, widening the gap between financial stability and college attainment [52].

Although financial literacy is especially poignant in the context of food security and food literacy, it will not change the means that a student has available to them [73]. Food literacy (the knowledge, skills, and behaviors needed to manage one's dietary intake) and food security are both partly dependent on financial literacy [74]. The ability to procure and prepare foods is predicated on the ability to prioritize money for foods, and limited financial literacy combined with low means may inhibit food security and stymie food literacy before it is able to develop in this group [74].

#### 5. Food Insecurity and Poorer Academic Performance

College food insecurity is frequently observed to have a negative association with academic performance. In the college student population, academic performance is a critical outcome area, an idea which is supported by the plethora of research articles describing how food insecurity affects GPA [13,25,27,34,42,75–77]. Camelo and Elliot showed that food insecurity is negatively associated with GPA, both alone and when considering demographic covariates (including race/ethnicity, age, Pell grant eligibility, and academic year) [78]. Further, their study demonstrated that food insecurity was a partial mediator of race/ethnicity's association with GPA, which the authors describe as one way that achievement gaps observed among groups may persist [78]. Van Woerden et al. found that GPA differed between food secure and food insecure students by a startling 0.25 grade points [36]. Brescia and Cuite found that in addition to students experiencing low and very low food security, those experiencing marginal food security had a decrease in GPA compared to those with high food security while accounting for demographic factors like age, citizenship, race, enrollment and first generation status, and financial factors like grant receipt and family support [79]. While the most common metric is GPA, others have cited retention and neglect of academic responsibilities as other correlates with food insecurity [80,81]. Phillips et al. report that students experiencing food insecurity are about 3.5 times more likely than their food secure peers to consider dropping out of school, and about 3 times more likely to neglect academics in favor of earning a wage to support themselves, when comparing similar demographic and financial characteristics [81]. Similar results were observed by Wolfson et al., with results compounded by students who were the first in their family to attend college [80]. These

results were echoed in a survey of students experiencing food insecurity in New York, who reported a decreased ability to do schoolwork in the early months of the COVID-19 pandemic after adjusting for race/ethnicity, age, degree program, and household size [82]. Reasons behind this association are likely complex and varied; studies have pointed to the ways that food insecurity is associated with poorer physical health, poorer sleep, and poorer mental health [76,83]. Mental health in particular has been implicated for its role in academic performance. Studies have shown that food insecurity is directly correlated with poorer mental health, which is linked to subsequent decreases in GPA [76,77]. Students have described this aspect of food insecurity and poor performance as taking “a lot of mental power,” causing academic strain due to inability to concentrate and the ways that the sensation of physical hunger can impact academics by increasing fatigue and lowering stamina [75]. Stebledon et al. conducted similar qualitative evaluations of food insecurity on campuses and found sentiments from students which echoed these, with one student indicating feelings of poorer mental and physical health during times of worse food security [84].

The consistent observation of the association between food insecurity and academic performance indicates a clear and actionable area for colleges and universities to prioritize providing support for their populations [84]. Many institutions have recognized the utility of promoting food security on campus and have allocated resources accordingly [85]. As pointed out by Stebledon et al., food insecurity is a factor in academic performance which can be modified; by supporting students food security, institutions of higher education may improve their own rankings [84].

## 6. The Physical and Mental Health Toll of Food Insecurity

Food insecurity has been associated with health concerns like overweight and obesity, and long-term chronic diseases like type II diabetes and cardiovascular disease [86]. In the college student population, studies have indicated that students experiencing food insecurity confront similar health issues [87]. The prevalence of overweight/obesity in this population was near 40% according to the 2020 American College Health Association’s National College Health Assessment [88]. Work by Huelskamp et al. indicated that food insecurity was linked to possibly obesogenic food strategies like eating more than normal when food was plentiful, attending events that offer free food, and eating more processed and cheap food in order to eat more [89]. Students participating in a qualitative study about the experience of food insecurity corroborated these findings by indicating that the experience was associated with both weight loss and weight gain, attributed to lack of high-quality food in their on-campus dining options [90]. Additionally, a recent study by Knol et al. found that students experiencing food insecurity were more than twice as likely as food secure students to report fair/poor general health compared to excellent/good health when adjusting for demographic and lifestyle characteristics like gender, race/ethnicity, academic class level, and financial situation [91]. Additionally, Martinez et al. indicate that food insecurity is associated with poor health, increased BMI, fewer days of enough sleep, less exercise, and fewer daily servings of fruits and vegetables when considering race/ethnicity, sex, history for food insecurity, financial aid, being an undergraduate student, and campus affiliation [83].

As previously mentioned, another area of health that has associations with food insecurity is poorer mental health [42,82,92,93]. Raskind et al. showed that food insecurity was associated with higher anxiety and depression and lower hope when controlling for socioeconomic and demographic factors, including gender, age, race/ethnicity, type of school attended, parental education level, living situation, employment, and Supplemental Nutrition Assistance Program (SNAP) participation [77]. Diamond et al. described that both short- and long-term food insecurity are associated with symptoms of depression, stress, isolation, and poorer resilience when accounting for demographic variables, including identifying as a member of the LGBTQ community [94]. Zickgraf et al. found that alongside anxiety and depression, food insecurity was linked to eating disorders,



even when considering the effects of anxiety and depression, and including demographic covariates and socioeconomic background [95]. Both food insecurity and low fruit and vegetable intake were associated with depressive symptoms in a study by Wattick et al. [96]. In a study of Lebanese college students, accounting for demographic and socioeconomic factors, food insecurity was linked with higher depression and anxiety scores compared with food secure peers [57]. In a recent study, Oh et al. found links between food insecurity and substance use, including higher odds of binge drinking, cigarette smoking, and other illicit or prescription drug use after adjusting for demographic and employment factors [97]. Food insecurity has also been observed to be associated with a lack of social connection, which has been implicated in mental well-being [98]. Oh et al. found that in addition to increased loneliness, food insecurity was associated with greater odds of self-injurious behaviors, including a more than double likelihood of attempting suicide [99]. Although the literature in this area continues to grow, relatively few studies exist to show the impact of food insecurity on health in this population; more research is merited to illustrate the relationships between food insecurity and health outcomes in college students. One area of research which may build out this picture of food insecurity and health outcomes is the study of the drivers of student food choice.

## 7. Motivators of Student Food Choice

Food choice is a complicated issue, comprising many motivators that vary in importance depending on individual circumstances [100–102]. In adults, factors considered in food choice can include hunger, personal identity, social connectedness, nutrition, knowledge and skills, habits, and many others [103–106]. Time commitments for class responsibilities may limit time to prepare and eat foods [7]. Food choice constraints including convenience and cost have also been identified as motivating factors [107,108]. In the more general college population, food choice motivators are less well-understood. The lack of understanding may be compounded by the nuance of a student's background and personal preference and a new eating environment. Some students may have meal plans that allow them to eat foods on campus, but the availability and adequacy of meal plans does not guarantee that a student will have access to foods that meet their needs, nor does it guarantee their food security [109].

The dearth of literature in this area has led researchers like Vilaro et al. to work toward building a scale to assess college food decision-making [110]. This study found that food choice was influenced by a myriad of factors, including social media and advertisements, health, quality, effect on body appearance, taste, cost, convenience, familiarity, and how filling the food was [103,110]. Although this study contributes meaningful results to build out the picture of student eating patterns, it does not address how food insecurity may relate to food choice. Other work has identified differences in fruit and vegetable intake between students who are experiencing food insecurity and those who are not [111]. A study by Tallant indicated that first-year students' food choices change after taking a nutrition seminar, with a majority of students reporting healthier food choices and more nutrition label reading following a 16-week nutrition course [112]. To add to the picture of differences in food behaviors, a study by Knol et al. showed that food preparation skills and feelings of cooking self-efficacy were different between students experiencing very low food security and those considered food secure [113]. Together, these studies create an unclear but compelling picture of the ways food insecurity and food choice interact. More studies are merited to establish drivers of food choice in college students, in order to both learn more about the ways that diet quality differs and to leverage those results in building programs which support student diet quality.

## 8. Ways of Promoting Student Food Security

### 8.1. Means-Tested Financial Aid for Students in Need

One solution to promoting food security is by providing students from low-income backgrounds with financial aid to offset the costs of foods. These means-tested financial

aid sources may be distributed from the federal government or state government, and include grants like the Pell Grant and CalGrant, respectively [114,115]. In order to receive these grant funds, students must be eligible by demonstrating financial need (a student's cost of attendance compared to their expected family contribution), be a citizen or eligible noncitizen, be enrolled at least half-time, and other criteria [115].

Despite monies being distributed to students exhibiting financial need, receiving grant funds does not appear to be protective against experiencing food insecurity [116,117]. Research indicates that students who are Pell Grant eligible or Pell Grant recipients are significantly more likely to be food insecure [37]. This correlation likely points to a larger problem in student finances and the cost of college; grant funds are not enough to lift students out of financial instability and ensure their basic needs are met [72]. Students who receive need-based grants are likely still financially unstable, and those who receive these grants remain food insecure [116]. Recent research at the UC indicates that students have identified high college costs as one reason for decreased food security. Tuition and fees levied by college institutions consume student financial aid, such that students are unable to use financial aid for basic needs like food in lieu of paying for schooling costs [118]. Although means-tested financial aid is a great resource for supporting low-income and first-generation college students, these funds are not enough to support the full costs associated with college attendance, leaving students with limited resources likely to sacrifice their housing and food security as their financial aid monies are claimed by their college institution [118].

### *8.2. Campus Food Pantries as an Emergency Response to Food Insecurity*

Food pantries are expanding across the US [119,120]. The College and University Food Bank Alliance (CUFBA, now Swipe Out Hunger) is a professional organization of on-campus food pantries and support, which has consistently reported growth in its membership as student food security concerns are highlighted [121]. According to Swipe Out Hunger, membership in the organization grew from 262 pantries in 2018 to over 700 as of early 2021 [121,122]. Chief among these efforts are food pantries which are supplied through university efforts, partnerships with local food banks, purchasing foods from grocery stores, and others [122]. These exist with the aim of supporting food security in student populations, however their distribution across institutions is uneven [123]. Implementing a food pantry on a college campus can be exceptionally challenging, with cited barriers including securing staffing and volunteers, and a lack of clarity in establishing a new pantry [123]. To support campuses interested in implementing a pantry, Swipe Out Hunger has toolkits available which describe starting and running a pantry, however these resources do not solve the problem of a lack of funds, staffing, or perceived legitimacy of pantry efforts [121,123]. However, the growth of Swipe Out Hunger membership indicates that college food insecurity is becoming more visible on campuses, and that there is a growing interest in supporting students' basic needs [121,124].

Many campuses in California have developed programs to help promote student food security. At the UC, pantries have been established at all ten campuses, and funds have been dedicated from the California state budget to support these establishments [85,125,126]. The UC estimated that 52,000 students were served across its campuses in fiscal year 2017–2018, however this estimate may be only 30% of students experiencing food insecurity [126]. At the CSU, all 23 campuses offer a food pantry [127]. Although termed "vital" by students, a 2019 report of CSU basic needs programs estimated that just 16.7% of food insecure students participate in these resources [128]. At the CCC, nearly all of the 116 campuses serving nearly 2 million students across the state have an on-campus pantry [125].

Unfortunately, a campus having a food pantry does not guarantee that all students experiencing food insecurity will use the resource. Research has indicated that participation in pantries by students varies, and that barriers include factors like perceived stigma and conflicting self-identity, as well as logistical barriers including lack of knowledge about the resource and time conflicts [90,129,130]. To help address these areas, the Hope Center

recommends that lecturers add a statement about food security and available resources to their course syllabus [131]. In addition to spreading knowledge about resources, stigma surrounding food insecurity and utilizing food pantries may be reduced by normalizing the open discussion of these topics [131]. A study by Esaryk et al. supports this idea by showing that open discussion of resources by on-campus food pantry staff resulted in more visits to the pantry [132].

Although campus food pantries may help to support student's food security, it is important to note that the goal of these organizations is not to guarantee food security or be relied upon for the long term [123]. To that end, institutions seeking to improve campus food security can provide students with connections to other programs that may supplement campus resources, including federal programs like SNAP.

### *8.3. National Programs Can Promote Student Food Security*

While localized efforts are helpful, federal entitlement programs may also be beneficial. The Supplemental Nutrition Assistance Program (SNAP) is the largest social welfare program in the U.S., providing an average of \$166 monthly per each of its near 40 million participants [133,134]. Research regarding SNAP typically focuses on adults of various subgroups throughout the US, with delineations in data occurring at the demographic, geographic, and health outcome levels. College students remain a highly underrepresented group in these studies.

In California, research has indicated that many students do not participate in CalFresh (the name of SNAP in California), although eligibility requirements for college students may allow for a significant proportion of students to participate [135]. According to the California Department of Social Services, over 416,000 college students across the state are likely to be eligible to participate in the program [136]. In spite of this wide eligibility, only 127,360 students receive CalFresh benefits annually [136]. Due to an overall lack of representation of college students participating, it is unclear what the main driver of nonparticipation is. In some populations, stigma associated with welfare programs like SNAP have been cited as barriers to participation [137]. This stigma about social safety nets may include assumptions that participants are lazy, that they do not or cannot hold a job, associations of poverty with decreased quality of life, not wanting a "hand-out," concerns about outside perceptions and embarrassment, and shame [137,138].

In the college student population, a key barrier cited by researchers are unclear eligibility requirements [72,139,140]. In order to qualify for CalFresh benefits, college students must meet one of several criteria, including meeting income requirements, working an average of 20 h per week, participating in programs that increase their employability, or receiving federal Work Study [135]. These criteria are cited as being confusing for students, if they are known at all [72]. To address this barrier, colleges in California have partnered with the state in recent years to streamline student eligibility and make eligibility clearer [126]. If students at the UC participate in work study or receive the federal Pell Grant, they receive an automated message indicating their possible eligibility and a link to a verification letter to present to CalFresh eligibility workers at the county level [141]. California colleges continue to partner with the state to find solutions to make CalFresh more accessible [142]. By improving access to this program, participation rates may increase and boost food security in this population.

## **9. Food Security Concerns in Response to External Shocks: COVID-19**

The circumstances surrounding COVID-19 were unprecedented for college students [143]. Early in the pandemic, campuses nationwide closed to students, forcing many to return home or maintain housing local to the university [144,145]. Alongside this change in housing, some students also reported a change in work, as part-time work evaporated when businesses shut down in response to local lockdowns [144,146]. Literature regarding details of how this impacted students is still emerging, but early results indicate that the pandemic precipitated significant increases in food insecurity [146–148]. Barber et al.



conducted a study at UCLA examining the relationships between remote learning, food insecurity, first-generation status, and under-represented minority status, and found that the transition to remote learning due to the pandemic had significant negative impacts on food security in these groups [53]. Owens et al. conducted a study at a Texas university which indicated that changes in living arrangements and job status due to the pandemic were strong predictors of food insecurity, highlighting the tenuous position many students are in with limited resources [144]. Eating patterns were also observed to change, with dietary patterns in surveyed groups of students at universities in Texas, with results indicating fewer weekly servings of fruits and vegetables during the pandemic [149,150]. Ahmed et al. described worsening food security in New York colleges, however there were increases in students' knowledge about food resources and willingness to use the resources during the pandemic compared to pre-pandemic measurements [151].

An analysis of psychosocial health and food insecurity during the COVID-19 pandemic by DeBate et al. found that students experiencing food insecurity also experienced poorer mental health and lower levels of resilience and flourishing [152]. The authors pose that universities have a responsibility to their students to address food insecurity such that in the event of public health emergencies like the recent pandemic, these students do not struggle disproportionately more than their peers [152]. Similar calls to build emergency preparedness at the campus level were echoed in a study by Silva et al., who found that student diet quality decreased during the pandemic lockdown, and particularly so for students experiencing food insecurity [153]. Bergdahl et al. found that for students experiencing food insecurity, government supports in the form of stimulus payments to students from low-income backgrounds were most helpful for alleviating food insecurity [154]. Federal stimulus payments were also observed to be of particular benefit to students when combined with SNAP benefits at a large California university [155]. Unfortunately, resource availability was not stable for all college students nationwide; such differences in resource availability for vulnerable students may exacerbate inequities and compound negative experiences during times of acute stress or emergency [156].

## 10. Conclusions

Research in the area of food insecurity in college has expanded in vast and meaningful ways since its early explorations [5]. Dozens of studies have evaluated the prevalence of food insecurity across US college campuses and found that college students are not exempt from the negative health associations seen in other populations [47]. Students experiencing food insecurity have been observed to report poorer physical and mental health, and consume fewer foods associated with healthful eating patterns [83]. Limited research has explored associations of food insecurity with poorer quality dietary patterns by exploring food choice motivation, and of particular concern how the frequently accompanying financial insecurity may influence food choice [108].

It is imperative to find ways to fill the gaps in food security and provide students with healthful foods which support their physical health, mental health, and academic performance. Resources are available to different degrees at the campus level with expanding access to food pantries nationwide. Unfortunately, participation in these resources has not been observed to be high, even among students experiencing food insecurity. Stigma associated with food pantries may be a reason for low participation, but increasingly limited knowledge and open dialogue about food insecurity and resources appear to be a driver for low participation [130–132]. Important resources which may be of great benefit to this population are CalFresh/SNAP benefits, as the program allows participants to use funds to select foods that help meet their own needs and wants.

In the context of COVID-19, food resources were of particular importance. Due to campus closures, many students' living situations changed, and many were unable to utilize on-campus resources as they may have otherwise [156]. In this unprecedented public health emergency, the utility of CalFresh is highlighted; during the COVID-19 pandemic, program

benefits were expanded to support food security in vulnerable individuals in the face of widespread lockdown and job loss [157].

Under normal circumstances, research indicates that SNAP is effective in supporting food security in the general population, and although this research has not been conducted in college students, it logically follows that this population would experience similar benefits [158]. When considering the ebb and flow of college academic calendars, the consistent benefits available through a federal food support program are critical not only in emergencies, but also during normal times when on-campus resources are not available, such as holiday and summer breaks [148]. Considering campuses which may not have robust food support programs like pantries available to their students, promotion of federal benefits may offer another avenue through which campuses can work to promote food security for their student body [72,132].

The effects of food insecurity are far-reaching, and although much has been and continues to be done to characterize this experience in college students, relatively little has been done to examine solutions to food insecurity and how these solutions may influence student physical health, mental health, and academic performance [72]. Given the concerns of food insecurity, greater research emphasis should be put on assessing the availability of food resource programs for students and more broadly examining ways to support student food access. Moreover, promoting campus-wide food security should be a priority for college administrators, in order to meet the needs of their students, maintain their reputations, and meet missions of excellence [84].

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## References

1. Coleman-Jensen, A.; Rabbitt, M.P.; Gregory, C.A. *Definitions of Food Security*; United States Department of Agriculture: Washington, DC, USA, 2020.
2. Coleman-Jensen, A. *Household Food Security in the United States in 2020*; Economic Research Service; U.S. Department of Agriculture: Washington, DC, USA, 2020; p. 55.
3. Reader, J.; Gordon, B.; Christensen, N. Food Insecurity among a Cohort of Division I Student-Athletes. *Nutrients* **2022**, *14*, 4703. [CrossRef] [PubMed]
4. Zigmont, V.A.; Linsmeier, A.M.; Gallup, P. Understanding the Why of College Student Food Insecurity. *J. Hunger Environ. Nutr.* **2019**, *16*, 595–610. [CrossRef]
5. Chaparro, M.P.; Zaghoul, S.S.; Holck, P.; Dobbs, J. Food Insecurity Prevalence among College Students at the University of Hawai'i at Mānoa. *Public Health Nutr.* **2009**, *12*, 2097–2103. [CrossRef] [PubMed]
6. Patton-Lopez, M.M.; Lopez-Cavillos, D.F.; Cancel-Tirado, D.I.; Vazquez, L. Prevalence and Correlates of Food Insecurity Among Students Attending a Midsize Rural University in Oregon | Elsevier Enhanced Reader. Available online: <https://reader.elsevier.com/reader/sd/pii/S1499404613007070?token=DF377E09CD874DE2046F29F6A377AB09167D29AB72DAE74FFB93A7698ABA80F70289E3FABD50770DBC7305C3CE1714D1> (accessed on 6 August 2019).
7. Broton, K.M.; Weaver, K.E.; Mai, M. Hunger in Higher Education: Experiences and Correlates of Food Insecurity among Wisconsin Undergraduates from Low-Income Families. *Soc. Sci.* **2018**, *7*, 179. [CrossRef]
8. Tu, K. *Hungry to Learn: An Analysis of the Food Insecurity Problem in the California Community College System and Implications for Public Policy Solutions*; California State University: Northridge, CA, USA, 2020.
9. Coffino, J.A.; Spoor, S.P.; Drach, R.D.; Hormes, J.M. Food Insecurity among Graduate Students: Prevalence and Association with Depression, Anxiety and Stress. *Public Health Nutr.* **2021**, *24*, 1889–1894. [CrossRef]
10. Davidson, A.; Morrell, J. Food Insecurity Prevalence among University Students in New Hampshire. *J. Hunger Environ. Nutr.* **2020**, *15*, 118–127. [CrossRef]

11. DeMunter, J.; Rdesinski, R.; Vintro, A.; Carney, P.A. Food Insecurity Among Students in Six Health Professions' Training Programs. *J. Stud. Aff. Res. Pract.* **2020**, *58*, 372–387. [CrossRef]
12. Fortin, K.; Harvey, S.; Swearingen White, S. Hidden Hunger: Understanding the Complexity of Food Insecurity Among College Students. *J. Am. Coll. Nutr.* **2021**, *40*, 242–252. [CrossRef]
13. Hagedorn, R.L.; Olfert, M.D. Food Insecurity and Behavioral Characteristics for Academic Success in Young Adults Attending an Appalachian University. *Nutrients* **2018**, *10*, 361. [CrossRef]
14. Hagedorn, R.L.; McArthur, L.H.; Hood, L.B.; Berner, M.; Anderson Steeves, E.T.; Connell, C.L.; Wall-Bassett, E.; Spence, M.; Babatunde, O.T.; Kelly, E.B.; et al. Expenditure, Coping, and Academic Behaviors among Food-Insecure College Students at 10 Higher Education Institutes in the Appalachian and Southeastern Regions. *Curr. Dev. Nutr.* **2019**, *3*, nzz058. [CrossRef]
15. Hege, A.; Stephenson, T.; Pennell, M.; Revlett, B.; VanMeter, C.; Stahl, D.; Oo, K.; Bressler, J.; Crosby, C. College Food Insecurity: Implications on Student Success and Applications for Future Practice. *J. Stud. Aff. Res. Pract.* **2021**, *58*, 44–61. [CrossRef]
16. Ilieva, R.T.; Ahmed, T.; Yan, A. Hungry Minds: Investigating the Food Insecurity of Minority Community College Students. *J. Public Aff.* **2019**, *19*, e1891. [CrossRef]
17. Keogh, B.; Kushalnagar, P.; Engelman, A. Peer Support and Food Security in Deaf College Students. *J. Am. Coll. Health J ACH* **2020**, *68*, 1–5. [CrossRef] [PubMed]
18. Leung, C.W.; Wolfson, J.A.; Lahne, J.; Barry, M.R.; Kasper, N.; Cohen, A.J. Associations between Food Security Status and Diet-Related Outcomes among Students at a Large, Public Midwestern University. *J. Acad. Nutr. Diet.* **2019**, *119*, 1623–1631. [CrossRef] [PubMed]
19. Leung, C.W.; Farooqui, S.; Wolfson, J.A.; Cohen, A.J. Understanding the Cumulative Burden of Basic Needs Insecurities: Associations With Health and Academic Achievement Among College Students. *Am. J. Health Promot.* **2021**, *35*, 275–278. [CrossRef]
20. McArthur, L.H.; Ball, L.; Danek, A.C.; Holbert, D. A High Prevalence of Food Insecurity Among University Students in Appalachia Reflects a Need for Educational Interventions and Policy Advocacy. *J. Nutr. Educ. Behav.* **2018**, *50*, 564–572. [CrossRef] [PubMed]
21. Morris, M.; Smith, S.; Davis, J.; Null, B. The Prevalence of Food Security and Insecurity Among Illinois University Students | Elsevier Enhanced Reader. Available online: <https://reader.elsevier.com/reader/sd/pii/S1499404616300586?token=AB9BA9B97FEF70B8C9662BC515AA59260753248002620B98EDD4AC809B8F04482A24CDDDB26D062A9DD1CC73B2C20517D> (accessed on 8 October 2020).
22. Soldavini, J.; Berner, M.; Da Silva, J. Rates of and Characteristics Associated with Food Insecurity Differ among Undergraduate and Graduate Students at a Large Public University in the Southeast United States. *Prev. Med. Rep.* **2019**, *14*, 100836. [CrossRef] [PubMed]
23. Taylor, L.C.; Delavega, E.; Jin, S.W.; Neely-Barnes, S.L.; Elswick, S.E. The Prevalence and Correlates of Food Insecurity among Students at a Multi-Campus University. *J. Poverty* **2019**, *23*, 621–633. [CrossRef]
24. Trawver, K.R.; Hedwig, T. Food and Housing Insecurity and Homelessness among Students in an Open-Enrollment University\*. *J. Soc. Distress Homelessness* **2020**, *29*, 57–64. [CrossRef]
25. van Woerden, I.; Hruschka, D.; Bruening, M. Food Insecurity Negatively Impacts Academic Performance. *J. Public Aff.* **2019**, *19*, e1864. [CrossRef]
26. Watson, T.D.; Malan, H.; Glik, D.; Martinez, S.M. College Students Identify University Support for Basic Needs and Life Skills as Key Ingredient in Addressing Food Insecurity on Campus. *Calif. Agric.* **2017**, *71*, 130–138. [CrossRef]
27. Weaver, R.; Vaughn, N.; Hendricks, S.; McPherson-Myers, P.; Jia, Q.; Willis, S.; Rescigno, K. University Student Food Insecurity and Academic Performance. *J. Am. Coll. Health* **2019**, *68*, 727–733. [CrossRef] [PubMed]
28. Willis, D.E. Feeding the Student Body: Unequal Food Insecurity Among College Students. *Am. J. Health Educ.* **2019**, *50*, 167–175. [CrossRef]
29. Wooten, R.; Spence, M.; Colby, S.; Anderson Steeves, E. Assessing Food Insecurity Prevalence and Associated Factors among College Students Enrolled in a University in the Southeast USA. *Public Health Nutr.* **2018**, *22*, 383–390. [CrossRef]
30. COE—College Enrollment Rates. Available online: <https://nces.ed.gov/programs/coe/indicator/cpb> (accessed on 20 August 2021).
31. The Integrated Postsecondary Education Data System. Available online: <https://nces.ed.gov/ipeds/search/ViewTable?tableId=29448> (accessed on 18 February 2022).
32. Coleman-Jensen, A.; Rabbitt, M.P.; Gregory, C.A.; Singh, A. Household Food Security in the United States in 2019. Available online: <http://www.ers.usda.gov/publications/pub-details/?pubid=99281> (accessed on 9 October 2020).
33. Tanner, Z.; Loofbourrow, B.; Chodur, G.; Kemp, L.; Scherr, R. Food Insecurity and Utilization of Campus Food Resources Differ by Demographic and Academic Group. *J. Agric. Food Syst. Community Dev.* **2023**, *12*, 63–78. [CrossRef]
34. Cuite, C.L.; Dietz, K.E.; Bates, L.R.J.; Brescia, S.A. Changes in Food Security Status During Undergraduate Enrollment. *J. Nutr. Educ. Behav.* **2023**, *55*, 86–95. [CrossRef]
35. Arnett, J.J. Emerging Adulthood: A Theory of Development from the Late Teens through the Twenties. *Am. Psychol.* **2000**, *55*, 469–480. [CrossRef]
36. Bruening, M.; Brennhof, S.; van Woerden, I.; Todd, M.; Laska, M. Factors Related to the High Rates of Food Insecurity among Diverse, Urban College Freshmen. *J. Acad. Nutr. Diet.* **2016**, *116*, 1450–1457. [CrossRef]

37. Keefe, S.; Garagiola-Bernier, A.; Kiley, E.; England, J.; Schmitt, S.R.; Shore, M. Campus Food Insecurity: Bringing Private Institutions into Conversations on Basic Needs. *J. Hunger Environ. Nutr.* **2020**, *16*, 628–642. [CrossRef]
38. Allen, C.C.; Alleman, N.F. A Private Struggle at a Private Institution: Effects of Student Hunger on Social and Academic Experiences. *J. Coll. Stud. Dev.* **2019**, *60*, 52–69. [CrossRef]
39. Cuy Castellanos, D.; Holcomb, J. Food Insecurity, Financial Priority, and Nutrition Literacy of University Students at a Mid-Size Private University. *J. Am. Coll. Health* **2020**, *68*, 16–20. [CrossRef]
40. College and the Road to Elitism. *Natl. Rev.* 2019. Available online: <https://www.nationalreview.com/corner/college-and-elitism/> (accessed on 20 August 2021).
41. Neklason, A. Elite-College Admissions Were Built to Protect Privilege. Available online: <https://www.theatlantic.com/education/archive/2019/03/history-privilege-elite-college-admissions/585088/> (accessed on 20 August 2021).
42. Bruening, M.; Argo, K.; Payne-Sturges, D.C.; Laska, M. The Struggle Is Real: A Systematic Review of Food Insecurity on Postsecondary Education Campuses- ClinicalKey for Nursing. Available online: <https://www.clinicalkey.com/nursing/#!/content/playContent/1-s2.0-S2212267217305518?returnurl=https:%2F%2Flinkinghub.elsevier.com%2Fretrieve%2Fpii%2FS2212267217305518%3Fshowall%3Dtrue&referrer=https:%2F%2Fpubmed.ncbi.nlm.nih.gov%2F28754200%2F> (accessed on 8 October 2020).
43. Adamovic, E.; Newton, P.; House, V. Food Insecurity on a College Campus: Prevalence, Determinants, and Solutions. *J. Am. Coll. Health* **2022**, *70*, 58–64. [CrossRef]
44. Becerra, M.B.; Becerra, B.J. Psychological Distress among College Students: Role of Food Insecurity and Other Social Determinants of Mental Health. *Int. J. Environ. Res. Public Health* **2020**, *17*, 4118. [CrossRef] [PubMed]
45. El Zein, A.; Shelnutt, K.P.; Colby, S.; Vilaro, M.J.; Zhou, W.; Greene, G.; Olfert, M.D.; Riggsbee, K.; Morrell, J.S.; Mathews, A.E. Prevalence and Correlates of Food Insecurity among U.S. College Students: A Multi-Institutional Study. *BMC Public Health* **2019**, *19*, 660. [CrossRef] [PubMed]
46. Maroto, M.E.; Snelling, A.; Linck, H. Food Insecurity Among Community College Students: Prevalence and Association With Grade Point Average. *Community Coll. J. Res. Pract.* **2015**, *39*, 515–526. [CrossRef]
47. Nikolaus, C.J.; An, R.; Ellison, B.; Nickols-Richardson, S.M. Food Insecurity among College Students in the United States: A Scoping Review. *Adv. Nutr.* **2020**, *11*, 327–348. [CrossRef]
48. CDFA-Statistics. Available online: <https://www.cdfa.ca.gov/Statistics/> (accessed on 22 January 2022).
49. Martinez, S.M.; Webb, K.; Frongillo, E.A.; Ritchie, L.D. Food Insecurity in California’s Public University System: What Are the Risk Factors? *J. Hunger Environ. Nutr.* **2018**, *13*, 1–18. [CrossRef]
50. California Homeless; Youth Project and Schoolhouse Connection Basic Needs Unmet: Understanding California’s College Students. 2018. Available online: <https://www.calstate.edu/impact-of-the-csu/student-success/basic-needs-initiative/Documents/5GuidesToHelpHomelessCollegeStudents.pdf> (accessed on 22 January 2022).
51. California Community Colleges #RealCollege Survey Report (March 2019). Available online: <https://www.cccstudentmentalhealth.org/california-community-colleges-realcollege-survey-report-march-2019/> (accessed on 22 January 2022).
52. California Public Higher Education: Funding Supplemental Services for Low-Income and First-Generation Students. Available online: <https://lao.ca.gov/publications/report/3724> (accessed on 22 January 2022).
53. Barber, P.H.; Shapiro, C.; Jacobs, M.S.; Avilez, L.; Brenner, K.I.; Cabral, C.; Cebreros, M.; Cosentino, E.; Cross, C.; Gonzalez, M.L.; et al. Disparities in Remote Learning Faced by First-Generation and Underrepresented Minority Students during COVID-19: Insights and Opportunities from a Remote Research Experience. *J. Microbiol. Biol. Educ.* **2021**, *22*, ev22i1-2457. [CrossRef]
54. Deng, L. The Pathway to Success: Facilitating First-Generation Student Learning in Academic Libraries Through Cross-Campus Collaborations. *J. Libr. Adm.* **2022**, *62*, 1–18. [CrossRef]
55. Whatnall, M.C.; Hutchesson, M.J.; Patterson, A.J. Predictors of Food Insecurity among Australian University Students: A Cross-Sectional Study. *Int. J. Environ. Res. Public Health* **2020**, *17*, 60. [CrossRef]
56. Murray, S.; Peterson, C.; Primo, C.; Elliott, C.; Otlowski, M.; Auckland, S.; Kent, K. Prevalence of Food Insecurity and Satisfaction with On-Campus Food Choices among Australian University Students. *Int. J. Sustain. High. Educ.* **2021**, *22*, 731–746. [CrossRef]
57. Itani, R.; Mattar, L.; Kharroubi, S.; Bosqui, T.; Diab-El-Harake, M.; Jomaa, L. Food Insecurity and Mental Health of College Students in Lebanon: A Cross-Sectional Study. *J. Nutr. Sci.* **2022**, *11*, e68. [CrossRef] [PubMed]
58. Ahmad, N.S.S.; Sulaiman, N.; Sabri, M.F. Psychosocial Factors as Mediator to Food Security Status and Academic Performance among University Students. *Int. J. Environ. Res. Public Health* **2022**, *19*, 5535. [CrossRef]
59. Shi, Y.; Lukomskyj, N.; Allman-Farinelli, M. Food Access, Dietary Acculturation, and Food Insecurity among International Tertiary Education Students: A Scoping Review. *Nutrition* **2021**, *85*, 111100. [CrossRef] [PubMed]
60. Hanbazaza, M.; Kebbe, M.; Perez, A.; Ball, G.D.; Farmer, A.P.; Maximova, K.; Willows, N.D. Food Insecurity Among International Post-Secondary Students Studying on a Canadian Campus: A Qualitative Description Study. *Can. J. High. Educ. Rev. Can. Enseign. Supér.* **2021**, *51*, 33–45. [CrossRef]
61. Hanbazaza, M.; Ball, G.D.C.; Farmer, A.P.; Maximova, K.; Farahbakhsh, J.; Willows, N.D. A Comparison of Characteristics and Food Insecurity Coping Strategies between International and Domestic Postsecondary Students Using a Food Bank Located on a University Campus. *Can. J. Diet. Pract. Res.* **2017**, *78*, 208–211. [CrossRef]
62. Olason, C.; Engler-Stringer, R.; Vatanparast, H.; Hanoski, R. Student Food Insecurity: Examining Barriers to Higher Education at the University of Saskatchewan. *J. Hunger Environ. Nutr.* **2018**, *13*, 19–27. [CrossRef]



63. Entz, M.; Slater, J.; Desmarais, A.A. Student Food Insecurity at the University of Manitoba. *Can. Food Stud. Rev. Can. Études Sur Aliment.* **2017**, *4*, 139–159. [CrossRef]
64. Keller, M.; Von Kahle, B.; Gordon, B.; van Woerden, I. Prevalence and Demographic Profiles of Food Insecure College Students at Main and Satellite Campuses in Northwestern USA. *Nutr. Health* **2022**, 02601060221082388. [CrossRef]
65. Martinez, S.M.; Maynard, K.; Ritchie, L.D. *Student Food Access and Security Study*; University of California Office of the President Global Food Initiative; University of California: Oakland, CA, USA, 2016; p. 29.
66. Hung, A.A.; Parker, A.M.; Yoong, J.K. Defining and Measuring Financial Literacy 28. Available online: [https://www.rand.org/content/dam/rand/pubs/working\\_papers/2009/RAND\\_WR708.pdf](https://www.rand.org/content/dam/rand/pubs/working_papers/2009/RAND_WR708.pdf) (accessed on 14 May 2023). [CrossRef]
67. President's Advisory Council on Financial Literacy (PACFL). *2008 Annual Report to the President Executive Summary*; US Department of Treasury: Washington, DC, USA, 2009.
68. Study on Collegiate Financial Wellness. Available online: <https://cssl.osu.edu/research-projects/study-on-collegiate-financial-wellness> (accessed on 18 August 2021).
69. Lusardi, A.; Mitchell, O.S.; Curto, V. Financial Literacy among the Young. *J. Consum. Aff.* **2010**, *44*, 358–380. [CrossRef]
70. The NCES Fast Facts Tool Provides Quick Answers to Many Education Questions (National Center for Education Statistics). Available online: <https://nces.ed.gov/fastfacts/display.asp?id=372> (accessed on 20 August 2021).
71. Goldrick-Rab, S. *Paying the Price: College Costs, Financial Aid, and the Betrayal of the American Dream*; University of Chicago Press: Chicago, IL, USA, 2016; ISBN 978-0-226-40448-6.
72. Freudenberg, N.; Goldrick-Rab, S.; Poppendieck, J. College Students and SNAP: The New Face of Food Insecurity in the United States. *Am. J. Public Health* **2019**, *109*, 1652–1658. [CrossRef] [PubMed]
73. Moore, C.E.; Davis, K.E.; Wang, W. Low Food Security Present on College Campuses despite High Nutrition Literacy. *J. Hunger Environ. Nutr.* **2020**, *16*, 611–627. [CrossRef]
74. Vidgen, H.A.; Gallegos, D. Defining Food Literacy and Its Components. *Appetite* **2014**, *76*, 50–59. [CrossRef] [PubMed]
75. Meza, A.; Altman, E.; Martinez, S.M.; Leung, C.W. “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- ClinicalKey for Nursing. *J. Acad. Nutr. Diet.* **2019**, *119*, 1713–1721. [CrossRef] [PubMed]
76. Martinez, S.M.; Frongillo, E.A.; Leung, C.; Ritchie, L. No Food for Thought: Food Insecurity Is Related to Poor Mental Health and Lower Academic Performance among Students in California’s Public University System. *J. Health Psychol.* **2020**, *25*, 1930–1939. [CrossRef]
77. Raskind, I.G.; Haardorfer, R.; Berg, C.J. Food Insecurity, Psychosocial Health, and Academic Performance among College and University Students in Georgia, USA. *Public Health Nutr.* **2019**, *22*, 476. [CrossRef]
78. Camelo, K.; Elliott, M. Food Insecurity and Academic Achievement Among College Students at a Public University in the United States. *J. Coll. Stud. Dev.* **2019**, *60*, 307–318. [CrossRef]
79. Brescia, S.A.; Cuite, C.L. Underestimating College Student Food Insecurity: Marginally Food Secure Students May Not Be Food Secure. *Nutrients* **2022**, *14*, 3142. [CrossRef]
80. Wolfson, J.A.; Insolera, N.; Cohen, A.; Leung, C.W. The Effect of Food Insecurity during College on Graduation and Type of Degree Attained: Evidence from a Nationally Representative Longitudinal Survey. *Public Health Nutr.* **2022**, *25*, 389–397. [CrossRef]
81. Phillips, E.; McDaniel, A.; Croft, A. Food Insecurity and Academic Disruption Among College Students. *J. Stud. Aff. Res. Pract.* **2018**, *55*, 353–372. [CrossRef]
82. Berger, E.; Larsen, J.; Freudenberg, N.; Jones, H.E. Food Insecurity Associated with Educational Disruptions during the COVID-19 Pandemic for College Students and the Role of Anxiety and Depression. *J. Am. Coll. Health* **2022**, 1–4. [CrossRef] [PubMed]
83. Martinez, S.M.; Grandner, M.A.; Nazmi, A.; Canedo, E.R.; Ritchie, L.D. Pathways from Food Insecurity to Health Outcomes among California University Students. *Nutrients* **2019**, *11*, 1419. [CrossRef] [PubMed]
84. Stebleton, M.J.; Lee, C.K.; Diamond, K.K. Understanding the Food Insecurity Experiences of College Students: A Qualitative Inquiry. *Rev. High. Educ.* **2020**, *43*, 727–752. [CrossRef]
85. Bill Text—SB-106 Budget Act of 2019. Available online: [https://leginfo.ca.gov/faces/billTextClient.xhtml?bill\\_id=201920200SB106](https://leginfo.ca.gov/faces/billTextClient.xhtml?bill_id=201920200SB106) (accessed on 18 January 2022).
86. Conrad, Z.; Rehm, C.D.; Wilde, P.; Mozaffarian, D. Cardiometabolic Mortality by Supplemental Nutrition Assistance Program Participation and Eligibility in the United States. *Am. J. Public Health* **2017**, *107*, 466–474. [CrossRef] [PubMed]
87. Manchester, R. How Has the Health of College Students Changed in the Last 50 Years? *J. Am. Coll. Health* **2020**, *68*, 795–797. [CrossRef] [PubMed]
88. American College Health Association; National College Health Assessment. *Reference Group Executive Summary*; Spring: Baltimore, MD, USA, 2000; pp. 1–20.
89. Huelskamp, A.; Waity, J.; Russell, J. Effects of Campus Food Insecurity on Obesogenic Behaviors in College Students. *J. Am. Coll. Health* **2021**, *69*, 572–575. [CrossRef]
90. Kim, Y.; Murphy, J.; Craft, K.; Waters, L.; Gooden, B.I. “It’s Just a Constant Concern in the Back of My Mind”: Lived Experiences of College Food Insecurity. *J. Am. Coll. Health* **2022**, 1–8. [CrossRef]
91. Knol, L.L.; Robb, C.A.; McKinley, E.M.; Wood, M. Food Insecurity, Self-Rated Health, and Obesity among College Students. *Am. J. Health Educ.* **2017**, *48*, 248–255. [CrossRef]



92. Bruening, M.; van Woerden, I.; Todd, M.; Laska, M.N. Hungry to Learn: The Prevalence and Effects of Food Insecurity on Health Behaviors and Outcomes over Time among a Diverse Sample of University Freshmen. *Int. J. Behav. Nutr. Phys. Act.* **2018**, *15*, 9. [CrossRef]
93. Payne-Sturges, D.C.; Tjaden, A.; Caldeira, K.M.; Vincent, K.B.; Arria, A.M. Student Hunger on Campus: Food Insecurity Among College Students and Implications for Academic Institutions. *Am. J. Health Promot.* **2018**, *32*, 349–354. [CrossRef]
94. Diamond, K.K.; Stebleton, M.J.; delMas, R.C. Exploring the Relationship Between Food Insecurity and Mental Health in an Undergraduate Student Population. *J. Stud. Aff. Res. Pract.* **2020**, *57*, 546–560. [CrossRef]
95. Zickgraf, H.F.; Hazzard, V.M.; O'Connor, S.M. Food Insecurity Is Associated with Eating Disorders Independent of Depression and Anxiety: Findings from the 2020–2021 Healthy Minds Study. *Int. J. Eat. Disord.* **2022**, *55*, 354–361. [CrossRef] [PubMed]
96. Wattick, R.A.; Hagedorn, R.L.; Olfert, M.D. Relationship between Diet and Mental Health in a Young Adult Appalachian College Population. *Nutrients* **2018**, *10*, 957. [CrossRef]
97. Oh, H.; Smith, L.; Jacob, L.; Du, J.; Shin, J.I.; Zhou, S.; Koyanagi, A. Food Insecurity and Substance Use Among Young Adult College Students in the United States. *J. Addict. Med.* **2003**, *17*, 163–168. [CrossRef]
98. Story, C.R.; Smith, E.A.; Harvey, I.S.; Thareja, G.; Hayes, J. Exploration of How Emotional Social Support Predicts Food Insecurity among College Students. *J. Am. Coll. Health* **2022**, 1–5. [CrossRef] [PubMed]
99. Oh, H.; Smith, L.; Jacob, L.; Du, J.; Shin, J.I.; Zhou, S.; Koyanagi, A. Food Insecurity and Mental Health among Young Adult College Students in the United States. *J. Affect. Disord.* **2022**, *303*, 359–363. [CrossRef] [PubMed]
100. Brug, J.; Debie, S.; van Assema, P.; Weijts, W. Psychosocial Determinants of Fruit and Vegetable Consumption among Adults: Results of Focus Group Interviews. *Food Qual. Prefer.* **1995**, *6*, 99–107. [CrossRef]
101. Jones, S.A.; Walter, J.; Soliah, L.; Phifer, J.T. Perceived Motivators to Home Food Preparation: Focus Group Findings. *J. Acad. Nutr. Diet.* **2014**, *114*, 1552–1556. [CrossRef]
102. Larson, N.I.; Neumark-Sztainer, D.; Hannan, P.J.; Story, M. Family Meals during Adolescence Are Associated with Higher Diet Quality and Healthful Meal Patterns during Young Adulthood. *J. Am. Diet. Assoc.* **2007**, *107*, 1502–1510. [CrossRef]
103. Chen, P.-J.; Antonelli, M. Conceptual Models of Food Choice: Influential Factors Related to Foods, Individual Differences, and Society. *Foods* **2020**, *9*, 1898. [CrossRef]
104. Hua, J.; Howell, J.L.; Olson, D. Eating Together More but Feeling Worse: Discrepancies between Observed and Reported Well-Being of Latino(a/x) Students at a Hispanic-Serving Institution. *J. Am. Coll. Health* **2021**, 1–5. [CrossRef] [PubMed]
105. Tabatabai, M.; Holland, J.; Curtis, L.; Morris, M.N. The Relationship Between Intuitive Eating and Diet Quality in a College Population. *Calif. J. Health Promot.* **2021**, *19*, 34–43. [CrossRef]
106. Lopez, T.D.; Hernandez, D.; Bode, S.; Ledoux, T. A Complex Relationship between Intuitive Eating and Diet Quality among University Students. *J. Am. Coll. Health* **2021**, 1–7. [CrossRef] [PubMed]
107. Zigmont, V.A.; Anziano, J.; Schwartz, E.; Gallup, P. Captive Market Pricing and Lack of Transportation: A Survey of Undergraduate Food Insecurity at a Public University in New England. *Am. J. Health Promot.* **2023**, *37*, 313–323. [CrossRef] [PubMed]
108. Brauman, K.; Achen, R.; Barnes, J.L. The Five Most Significant Barriers to Healthy Eating in Collegiate Student-Athletes. *J. Am. Coll. Health* **2021**, 1–7. [CrossRef] [PubMed]
109. van Woerden, I.; Hruschka, D.; Vega-López, S.; Schaefer, D.R.; Adams, M.; Bruening, M. Food Insecure College Students and Objective Measurements of Their Unused Meal Plans. *Nutrients* **2019**, *11*, 904. [CrossRef]
110. Vilaro, M.J.; Zhou, W.; Colby, S.E.; Byrd-Bredbenner, C.; Riggsbee, K.; Olfert, M.D.; Barnett, T.E.; Mathews, A.E. Development and Preliminary Testing of the Food Choice Priorities Survey (FCPS): Assessing the Importance of Multiple Factors on College Students' Food Choices. *Eval. Health Prof.* **2017**, *40*, 425–449. [CrossRef]
111. Mirabitor, E.; Peterson, K.E.; Rathz, C.; Matlen, S.; Kasper, N. Predictors of College-Student Food Security and Fruit and Vegetable Intake Differ by Housing Type. *J. Am. Coll. Health* **2016**, *64*, 555–564. [CrossRef]
112. Tallant, A. Full Article: First-Year College Students Increase Food Label-Reading Behaviors and Improve Food Choices in a Personal Nutrition Seminar Course. Available online: <https://www.tandfonline.com/doi/full/10.1080/19325037.2017.1343160> (accessed on 20 January 2022).
113. Knol, L.L.; Robb, C.A.; McKinley, E.M.; Wood, M. Very Low Food Security Status Is Related to Lower Cooking Self-Efficacy and Less Frequent Food Preparation Behaviors Among College Students. *J. Nutr. Educ. Behav.* **2019**, *51*, 357–363. [CrossRef]
114. State Aid | Federal Student Aid. Available online: <https://studentaid.gov/help-center/answers/article/state-aid> (accessed on 3 January 2022).
115. Grants | Federal Student Aid. Available online: <https://studentaid.gov/understand-aid/types/grants> (accessed on 3 January 2022).
116. Loofbourrow, B.M.; Jones, A.M.; Chodur, G.M.; Martinez, S.M.; Kemp, L.C.; Scherr, R.E. Evaluating Knowledge, Attitudes, and Practices Regarding CalFresh Participation in University Students. *Nutrients* **2023**, *15*, 192. [CrossRef]
117. Gaines, A.; Robb, C.A.; Knol, L.L.; Sickler, S. Examining the Role of Financial Factors, Resources and Skills in Predicting Food Security Status among College Students. *Int. J. Consum. Stud.* **2014**, *38*, 374–384. [CrossRef]
118. Martinez, S.M.; Esaryk, E.E.; Moffat, L.; Ritchie, L. Redefining Basic Needs for Higher Education: It's More Than Minimal Food and Housing According to California University Students. *Am. J. Health Promot. AJHP* **2021**, *35*, 818–834. [CrossRef] [PubMed]
119. Cady, C.; White, C.C. Food Pantries on Campus to Address Student Hunger. *New Dir. Community Coll.* **2018**, *2018*, 73–82. [CrossRef]

120. College & University Food Bank Alliance | Character Clearinghouse. Available online: <https://characterclearinghouse.fsu.edu/article/college-university-food-bank-alliance> (accessed on 1 January 2022).
121. CUFBA | About, Us. Available online: <https://cufba.org/about-us/> (accessed on 18 January 2022).
122. Goldrick-Rab, S.; Cady, C.; Coca, V. *Campus Food Pantries: Insights from a National Survey*; The Hope Center for College, Community and Justice: Philadelphia, PA, USA, 2018; Volume 12.
123. Gupton, J.T.; Trost, J.L.; Collins, K. Food Pantries as a Gateway for Academic Enhancement and Basic Needs Support. *New Dir. Community Coll.* **2018**, *2018*, 61–71. [CrossRef]
124. Davis, H.; Sisson, S.B.; Clifton, S. A Call for Evidence to Support Food Security Interventions on College Campuses. *J. Am. Coll. Health* **2021**, *69*, 693–695. [CrossRef]
125. Petek, G. *The 2020–21 Budget: Higher Education Analysis*; California Legislative Analyst’s Office: Sacramento, CA, USA, 2020; Volume 80.
126. Regents of the University of California; Special Committee on Basic Needs. *The University of California’s Next Phase of Improving Student Basic Needs*; University of California: Oakland, CA, USA, 2020; pp. 1–59.
127. Providing Virtual and Remote Basic Needs Support to CSU Students | CSU. Available online: <https://www.calstate.edu:443/impact-of-the-csu/student-success/basic-needs-initiative/Pages/virtual-and-remote-support.aspx> (accessed on 18 January 2022).
128. Study of Student Service Access and Basic Needs. 127. Available online: [https://www.calstate.edu/impact-of-the-csu/student-success/basic-needs-initiative/Documents/BasicNeedsStudy\\_Phase\\_3.pdf](https://www.calstate.edu/impact-of-the-csu/student-success/basic-needs-initiative/Documents/BasicNeedsStudy_Phase_3.pdf) (accessed on 18 January 2022).
129. Anderson, A.; Lazarus, J.; Anderson Steeves, E. Navigating Hidden Hunger: An Exploratory Analysis of the Lived Experience of Food Insecurity among College Students. *Int. J. Environ. Res. Public Health* **2022**, *19*, 12952. [CrossRef]
130. El Zein, A.; Mathews, A.E.; House, L.; Shelnut, K.P. Why Are Hungry College Students Not Seeking Help? Predictors of and Barriers to Using an On-Campus Food Pantry. *Nutrients* **2018**, *10*, 1163. [CrossRef]
131. Goldrick-Rab, S. *Beyond the Food Pantry: Spreading the Word- Supporting Students’ Basic Needs with a Syllabus Statement and Welcome Survey*; The Hope Center for College, Community and Justice: Philadelphia, PA, USA, 2019. Available online: [https://hope.temple.edu/wp-content/uploads/2019/06/BTFP\\_SyllabusStatement\\_WelcomeSurvey.pdf](https://hope.temple.edu/wp-content/uploads/2019/06/BTFP_SyllabusStatement_WelcomeSurvey.pdf) (accessed on 18 January 2022).
132. Esaryk, E.E.; Jiménez Arriaga, E.E.; Kalaydjian, S.; Martinez, S.M. Campus Food Pantry Use Addresses a Gap Among California Public University Students. *J. Nutr. Educ. Behav.* **2021**, *53*, 921–930. [CrossRef]
133. SNAP Data Tables | USDA-FNS. Available online: <https://www.fns.usda.gov/pd/supplemental-nutrition-assistance-program-snap> (accessed on 4 December 2019).
134. The CalFresh Food Assistance Program. Available online: <https://www.ppic.org/publication/the-cal-fresh-food-assistance-program/> (accessed on 21 January 2022).
135. Special Rules for Students. *LSNC Guide CalFresh Benefits*. 2015. Available online: <https://calfresh.guide/special-rules-for-students/> (accessed on 22 January 2022).
136. Senate Bill 77 CalFresh Student Data Report. Available online: <https://www.cdss.ca.gov/Portals/9/Leg/202006-SB-77-CalFresh-Student-Data-Report.pdf> (accessed on 18 January 2022).
137. Signing up for Food Stamps: The Choice and the Stigma. Available online: <https://www.npr.org/2013/04/25/179038260/signing-up-for-food-stamps> (accessed on 10 January 2021).
138. Haynes-Maslow, L.; Auvergne, L.; Mark, B.; Ammerman, A.; Weiner, B.J. Low-Income Individuals’ Perceptions About Fruit and Vegetable Access Programs: A Qualitative Study. *J. Nutr. Educ. Behav.* **2015**, *47*, 317–324.e1. [CrossRef]
139. Esaryk, E.E.; Moffat, L.F.; Ritchie, L.D.; Martinez, S.M. Helping College Students Get Supplemental Nutrition Assistance Program: Facilitators of and Barriers to Students Accessing the Federal Nutrition Assistance Program. *J. Nutr. Educ. Behav.* **2022**, *54*, 422–431. [CrossRef]
140. Dickinson, M. SNAP, Campus Food Insecurity, and the Politics of Deservingness. *Agric. Hum. Values* **2022**, *39*, 605–616. [CrossRef] [PubMed]
141. Admin, S.F. Economic Crisis. Available online: <https://financialaid.ucdavis.edu/wellness/ECRT> (accessed on 22 January 2022).
142. University of California Office of the President. *Review of University of California Basic Needs Efforts*; University of California Office of the President: Oakland, CA, USA, 2019.
143. Bountress, K.E.; Cusack, S.E.; Conley, A.H.; Aggen, S.H.; Vassileva, J.; Dick, D.M.; Amstadter, A.B. Unpacking the Impact of the COVID-19 Pandemic: Identifying Structural Domains. *Eur. J. Psychotraumatol.* **2021**, *12*, 1932296. [CrossRef]
144. Owens, M.R.; Brito-Silva, F.; Kirkland, T.; Moore, C.E.; Davis, K.E.; Patterson, M.A.; Mketinas, D.C.; Tucker, W.J. Prevalence and Social Determinants of Food Insecurity among College Students during the COVID-19 Pandemic. *Nutrients* **2020**, *12*, 2515. [CrossRef] [PubMed]
145. Davitt, E.D.; Heer, M.M.; Winham, D.M.; Knoblauch, S.T.; Shelley, M.C. Effects of COVID-19 on University Student Food Security. *Nutrients* **2021**, *13*, 1932. [CrossRef]
146. Mialki, K.; House, L.A.; Mathews, A.E.; Shelnut, K.P. COVID-19 and College Students: Food Security Status before and after the Onset of a Pandemic. *Nutrients* **2021**, *13*, 628. [CrossRef]
147. Hagedorn, R.L.; Walker, A.E.; Wattick, R.A.; Olfert, M.D. Newly Food-Insecure College Students in Appalachia During the COVID-19 Pandemic. *J. Nutr. Educ. Behav.* **2022**, *54*, 202–210. [CrossRef] [PubMed]
148. Soldavini, J.; Andrew, H.; Berner, M. Characteristics Associated with Changes in Food Security Status among College Students during the COVID-19 Pandemic. *Transl. Behav. Med.* **2021**, *11*, 295–304. [CrossRef] [PubMed]

149. Levy, T.M.; Williams, R.D.; Odum, M.; Housman, J.M.; McDonald, J.D. Impact of COVID-19 Stress on Food Insecurity and Fruit and Vegetable Consumption among College Students. *J. Am. Coll. Health* **2022**, 1–8. [[CrossRef](#)]
150. Matthews, C.R.; Rodriguez, A.X.; Kabiri, L.S.; Perkins-Ball, A.M.; Perkins, H.Y.; Diep, C.S. Dietary Behaviors and Food Insecurity among Houston College Students during the COVID-19 Pandemic. *J. Am. Coll. Health* **2022**, 1–7. [[CrossRef](#)]
151. Ahmed, T.; Ilieva, R.T.; Shane, J.; Reader, S.; Aleong, C.; Wong, H.Y.; Chu, C.; Brusche, D.; Jiang, K.; Lopez, D.; et al. A Developing Crisis in Hunger: Food Insecurity within 3 Public Colleges before and during the COVID-19 Pandemic. *J. Hunger Environ. Nutr.* **2022**, 1–20. [[CrossRef](#)]
152. DeBate, R.; Himmelgreen, D.; Gupton, J.; Heuer, J.N. Food Insecurity, Well-Being, and Academic Success among College Students: Implications for Post COVID-19 Pandemic Programming. *Ecol. Food Nutr.* **2021**, *60*, 564–579. [[CrossRef](#)] [[PubMed](#)]
153. Silva, F.B.; Osborn, D.E.; Owens, M.R.; Kirkland, T.; Moore, C.E.; Patterson, M.A.; Tucker, W.J.; Miketinas, D.C.; Davis, K.E. Influence of COVID-19 Pandemic Restrictions on College Students' Dietary Quality and Experience of the Food Environment. *Nutrients* **2021**, *13*, 2790. [[CrossRef](#)] [[PubMed](#)]
154. Bergdahl, J.; Steele, T.; Twill, S. Time to Change the Usual Response to College Students' Food Insecurity. *J. Poverty* **2022**, 1–19. [[CrossRef](#)]
155. Loofbourrow, B.M.; Jones, A.M.; Martinez, S.M.; Kemp, L.C.; George, G.L.; Scherr, R.E. Understanding the Role of CalFresh Participation and Food Insecurity on Academic Outcomes among College Students during the COVID-19 Pandemic. *Nutrients* **2023**, *15*, 898. [[CrossRef](#)] [[PubMed](#)]
156. Zottarelli, L.K.; Moreno, A.; Miranda, A.; Xu, X.; Sunil, T.S. Basic Needs Initiatives at Texas Community College Hispanic-Serving Institutions: Changes in Service Offerings during the Covid-19 Pandemic. *Community Coll. J. Res. Pract.* **2022**, *46*, 138–144. [[CrossRef](#)]
157. Benefit Increases Because of COVID-19. *LSNC Guide CalFresh Benefits*. 2020. Available online: <https://calfresh.guide/benefit-increase-because-of-covid-19/> (accessed on 21 January 2022).
158. Chart Book: SNAP Helps Struggling Families Put Food on the Table. Available online: <https://www.cbpp.org/research/food-assistance/chart-book-snap-helps-struggling-families-put-food-on-the-table> (accessed on 30 June 2021).

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