Ecology of Food and Nutrition

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/gefn20

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To cite this article: Rita DeBate, David Himmelgreen, Jarett Gupton & Jacquelyn N. Heuer (2021) Food Insecurity, Well-being, and Academic Success among College Students: Implications for Post COVID-19 Pandemic Programming, Ecology of Food and Nutrition, 60:5, 564-579, DOI: 10.1080/03670244.2021.1954511

To link to this article: https://doi.org/10.1080/03670244.2021.1954511

ECOLOGY OF FOOD AND NUTRITION
2021, VOL. 60, NO. 5, 564–579
https://doi.org/10.1080/03670244.2021.1954511

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Food Insecurity, Well-being, and Academic Success among College Students: Implications for Post COVID-19 Pandemic Programming

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ABSTRACT

College students experience food insecurity at higher rates than the general population, which has been found to be directly and indirectly associated with poor mental and physical health in addition to academic success. Since the rise of the COVID-19 pandemic, mounting evidence has demonstrated an increase in food insecurity rates in the U.S. The current study assessed food insecurity and its associated impacts on health and academic success among college students at a large urban university (n = 1743). Results revealed 46.8% of students as food insecure with statistically significant differences in race/ethnicity, GPA, and hours worked per week. Students who were observed with any level of food insecurity were more likely to also experience challenges with academics, careers, procrastination, and faculty as compared to their food secure counterparts. Analysis of differences in well-being indicators by food insecurity status revealed that students with any level of food insecurity were observed with statistically significantly higher mean scores for psychological distress, loneliness, and suicide behavior, with reduced scores for flourishing and resiliency as compared to their food secure counterparts. Implications for post-COVID-19 programming to mitigate food insecurity and associated public health issues associated with the COVID-19 and future pandemics are discussed.

KEYWORDS

COVID-19; college students; food insecurity; well-being; student success

Introduction

Over the last 15 years, there has been a significant increase in the number of food and housing insecure college students in the U.S. A recent national study of nearly 167,000 college students from 227 institutions found that 39% of respondents were food insecure in the prior 30 days, 46% were housing insecure in the previous year, and 17% were homeless in the previous year (Baker-Smith et al. 2020). Among U.S. college students, rates of food insecurity range from 10% to 75%, depending on the type of institution (two- and

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four-year institutions), geographic location (rural, urban, Northeast, South, Midwest, West), and demographics (e.g., minorities, undergraduates, graduate, international students) (Broton, Weaver, and Mai 2018; Bruening et al. 2017; El Zein et al. 2019; Freudenberg, Goldrick-Rab, and Poppendieck 2019; Henry 2017; Nikolaus et al. 2020; Owens et al. 2020). Moreover, in most of these studies, the prevalence of food insecurity was higher for college students than for the entire population. According to the United States Department of Agriculture (USDA), 13.7 million Americans (10.5%) were classified as food insecure in 2019 (Coleman-Jensen et al. 2020).

Since the rise of the COVID-19 pandemic, there is mounting evidence showing a tidal wave increase in food insecurity rates in the U.S. For example, Gundersen et al. (2020) project an increase of 17 million Americans who are food insecure (16.7%) in 2020. Further, using data from "Map the Meal Gap," Feeding America offers several projections for increasing food insecurity, estimating an increase of 50.4 million individuals (15.6%) based on underlying factors such as the unemployment and poverty rate, geographic location, and sociodemographics (Feeding America 2020). In Tampa Bay, where the study to be discussed here takes place, the number of food insecure individuals has increased from 700,000 before the pandemic to 1.3 million in May 2020 (O'Donnell 2020). Moreover, data from November 2020 suggest that individuals seeking food assistance in Tampa Bay have nearly doubled, with demand at local pantries increasing by as much as 400% (Kennedy Wynne 2020).

Food insecurity is directly and indirectly associated with the psychosocial and physical health of college students. Henry (2020) notes that there is a growing body of literature that links college food insecurity with poor nutrition and negative health outcomes. Among college students at the University of North Texas, for example, limited caloric intake and poor nutrition were found to be associated with a lack of energy, with 83% of participants reporting low energy and feeling physically tired. Moreover, participants linked their poor nutrition with getting sick and struggling with weight (48% reported weight loss and 28% reported weight gain) Meanwhile, other studies (Knol et al. 2017; Patton-López et al. 2014) found that food insecure college students report poorer health outcomes compared to their food secure counterparts.

In addition to impacting physical health, food insecurity has psychosocial ramifications for college students. For instance, Meza et al. (2019) conducted in-depth interviews among 25 undergraduate students and discovered several key themes related to the psychosocial effects of food insecurity: (1) the stress of food insecurity on daily life activities, (2) fear of disappointing family, (3) resentment of students that have more stable food and financial situations, (4) an inability to develop meaningful social relationships, sadness, feeling of hopelessness or undeserving of help, and frustration with their academic institution for not providing enough support. In a study of 302 students, Becerra and Becerra (2020) found that the odds of reporting

psychological distress and average-to-very poor perceived mental health status were higher in food insecure participants than in their food secure counterparts. Additionally, there were gender differences with women more likely than men to report these conditions. Meanwhile, Diamond, Stebleton, and delMas (2019) found that short- and long-term food insecurity were significantly associated with depression and perceived stress in 1,229 undergraduate students at a large public university. Similarly, Henry (2020) found that food insecurity serves as a major stressor for college students, with students with the highest self-reported rates for mental health also being the most food secure.

Studies also suggest that poorer psychosocial health resulting from food insecurity is also associated with academic performance. Food insecurity results in a mental trade-off, with students having to balance the physical effects of hunger or the monotony of eating the same foods over and over again and the mental trade-off of focusing on food or academics (Gamba et al. 2021; Henry 2020; Meza et al. 2019). Raskind, Haardorfer, and Berg (2019) used structural equation modeling (SEM) to show that food insecurity was associated with poorer psychosocial health among college students, and that psychosocial health fully mediated the association between food insecurity and academic performance. Similarly, Diamond, Stebleton, and delMas (2019) found a significant indirect effect of food security status on grade point average (GPA) as mediated by psychosocial health (Diamond, Stebleton, and delMas 2019). Finally, in a large study of 8,705 college students, Martinez et al. (2020) used SEM to examine the direct associations between food insecurity and GPA, as well as the indirect associations between food insecurity and GPA through poor mental health. They found that food insecurity was associated with lower student GPA directly and indirectly through poor mental health, with mental health serving as a mediator. Henry (2020) explores the barriers that food insecure students experience as well as the coping strategies that they employ in order to graduate. Topics including stigmatization, social isolation, depression, and stress, were identified and discussed by the students in this study. Importantly, Henry (2020) highlights student-driven ideas for addressing food insecurity on campus which contribute to both academic and student success.

The purpose of the current study is to assess differences between food security level and psychosocial and academic impacts among students in a large urban university. There is a critical need for data collection on indicators of behavioral, socio-emotional, and academic well-being among this vulnerable population that can inform public health policies and programming intended to mitigate public health issues associated with the COVID-19 and future pandemics.

Methods

Data and participants

This study encompassed a secondary analysis of the American College Health Association-National College Health Assessment III (ACHA-NCHA III) which employed a battery of validated measures and instruments (see below for description). The ACHA-NCHA III is a national population-based assessment that assists institutions of higher education in collecting data about their students' self-reported health status and health behaviors on the most prevalent topics facing college students (ACHA 2020). More specifically, the ACHA-NCHA III was implemented in the first two weeks of March 2020 at a large research university in the southeastern U.S (early on during the COVID-19 pandemic). As a result, these data reflect scores from students at the very onset of the COVID-19 pandemic in the southeastern U.S. Total sample size included 1,767 students.

Measures-survey items utilized from ACHA-NCHA III

USDA Food Security. USDA Food Security 6-item Short Scale Score (5 items when self-administered) generates a score between 0-6 – higher scores reflecting higher levels of food insecurity. Scores are then collapsed into 3 categories including a score of 0–1 for high or marginal food security, a score of 2–4 for low food security, and a score of 5–6 for very low food security (Blumberg et al. 1999).

Diener Flourishing Scale-Psychological Well-being. The Flourishing Scale is a brief 8-item scale assessing self-perceived success in relationships, self-esteem, purpose, and optimism. The scale provides a single psychological well-being score ranging from 8–56 with higher scores indicating higher psychological well-being (Diener et al. 2010).

Kessler6-Population-Based Screening for Nonspecific Mental Illness. The K6 scale is a shortened version of the K10, a 10-question scale originally developed to provide an efficient population-level screen for mental illness. A sum score is generated (0–24) and scores are collapsed for interpretation as follows: a score of 0–8 for no or low psychological distress, a score of 9–12 for moderate psychological distress, and a score of 13–24 for serious psychological distress (Kessler et al. 2003).

The Short UCLA Loneliness Scale. The scale has three items and a simplified set of responses to measure overall loneliness. The scale generates a sum score between 3 and 9 with higher scores revealing higher levels of loneliness. Scores are then categorized for interpretations including a score of 3–5 for a negative screening for loneliness and a score of 6–9 for a positive screening for loneliness (6–9).

The Connor-Davison Resilience scale (CD-RISC). The CD-RISC2 is a brief, self-rated measure of resilience with sound psychometric properties. This scale comprises 2 items, each rated on a 5-point scale (0–4). Sum scores range from 0–8, with higher scores reflecting greater resilience (Vaishnavi, Connor, and Davidson 2007).

The Suicidal Behaviors Questionnaire (SBQ-R). SBQ-R is a 4-item version of the SBQ which assesses the frequency and severity of suicidal behaviors and history of suicide attempts. Used frequently in research studies, the SBQ-R generates a score between 3 and 18, with higher scores reflecting a higher risk for suicide. The score is then collapsed into one of two categories: a score of 3–6 reflects a negative screening for suicide risk, and a score of 7–18 reflects a positive screening for suicide risk (Osman et al. 2001).

Challenges to Academic Performance. Challenges to academic performance were assessed via the following question: "Within the last 12 months, have you had problems or challenges with any of the following?" Response categories dichotomous (yes, no). Items included academics, career, finances, procrastination, faculty, family, intimate relationships, roommate, peers, personal appearance, the health of someone close to them, death of a family member, bullying, cyberbullying, hazing, microaggression, sexual harassment, discrimination. As the study focused on academic performance, variables used in the study included academics, career, procrastination, faculty.

Demographic variables. Demographic variables included self-reported sex, year in school, enrollment status, race, ethnicity, current residence, and current GPA (at time of survey distribution). Additional demographic variables included serving in the Armed Forces, if the participant was a parent of a child or responsible for a child under that age of 18, and leisure time hours spent working

Results

Participant demographics and food insecurity

Among survey participants (n = 1,743), 65.4% were undergraduate students and 33.4% were graduate students. The majority of students were studying full-time (84.9%), with a total of 69.2% self-reporting as female. Of the total population, the majority identified as White/Caucasian (52.9%), with the remainder identifying as Hispanic/Latinx (19.1%), Asian (14.6%), Black/African American (7.8%), or Other/Multiple Races (11.4%). Most students resided off-campus (56.6%), were not parents or responsible for a child under 18 years (92.9%), and were not currently or ever served in the military (96.8%). Almost two-thirds worked during their leisure time with about 28% reporting working over 20 hours/week. Finally, over 90% of students reported a GPA equivalent to an A or B grade overall.

Table 1. Sociodemographic characteristics and food insecurity (n = 1743).

	Total (%)	Food Insecure (%)	Food Secure (%)	p-value
Participants	100	46.8	53.2	
Sex				
• Male	30.8	47.4	52.6	.799
• Female	69.2	46.7	53.3	
Year in School				
• 1st Undergraduate	65.4	50.2	49.8	<.001
• 2nd Undergraduate		51.0	49.0	
• 3rd Undergraduate		54.6	45.4	
• 4th Undergraduate		49.5	50.5	
• 5th>Undergraduate		45.6	54.4	
• Master	33.4	41.3	58.7	
• Doctorate		34.1	65.9	
Enrollment Status				
• Full-time	84.9	48.9	51.1	<.001
• Part-time	14.5	34.9	65.1	
• Other	.6	45.5	54.5	
Ethnicity				
• Non-Hispanic/Latinx	80.9	45.6	54.4	.031
• Hispanic/Latinx	19.1	52.1	47.9	
Race				
• White/Caucasian	52.9	41.9	58.1	<.001
• Black/African American	7.8	60.4	39.6	
• Asian	14.6	48.6	51.4	
• Other/Multiple Races	11.4	47.0	53.0	
Current Residence				
• Campus Housing	20.7	52.0	48.0	.073
• Parent/family member	21.4	44.1	55.9	
• Off-campus	56.6	46.3	53.7	
• Other	1.3	31.8	68.2	
GPA				
• A	64.2	42.4	57.6	<001
• B	29.3	52.5	47.5	
• C	5.5	67.0	33.0	
• D/F	.2	75.0	25.0	
• N/A	.7	46.2	53.8	
Currently or have been in Armed Services				
• No	96.8	47.5	52.5	.007
• Yes	3.2	29.1	70.9	
Parent of a child/responsibility for a child under the age of 18				
• No	92.9	48.2	51.8	<.001
• Yes	7.1	30.1	69.9	
Leisure time hours spent working				
• 0	36.2	47.7	55.3	.006
• 1–20	35.9	51.7	48.3	
• Over 20 hours	27.9	42.7	57.3	

Table 1 shows that 46.8% of students were food insecure with about equal numbers of females (46.7%) and males (47.4%). Full-time students were more likely to be food insecure (48.9%) compared to part-time students (34.9%; $p < .001$). Interestingly, students living on campus were more likely to be food insecure (52%) when compared with those living off-campus (46.3%) or living with a parent or family member (44.1%; $p < .001$).

There were statistically significant differences in food insecurity by undergraduate year in school with third-year students experiencing the

highest level of food insecurity (54.6%; $p = .001$). Graduate students were less likely to be food insecure when compared with undergraduates. However, food insecurity was still high among master's level (41.3%) and doctoral level students (34.1%).

While food insecurity was high among all students regardless of self-reported ethnicity and race, White/Caucasian students were less likely to be food insecure (41.9%) when compared to Black/African American (60.4%), Hispanic/Latinx (52.1%), Asian (48.6%), and Other/Multiple Race (47%; $p < .001$) students. There were also statistically significant differences in food insecurity depending on whether or not students ever served/currently serve in the military ($p = .007$) or were parents/responsible for children under 19 years ($p < .001$).

Challenges to academic success by food insecurity status

Table 2 presents challenges to academic success by food insecurity status. Students with lower GPAs were much more likely to be food insecure than those with higher GPAs ($p < .001$). For example, 75% of students with a GPA equivalent grade of D/F were food insecure compared to 42.4% of those with a GPA equivalent grade A. The time spent working during leisure hours was also associated with food security status ($p = .006$). For example, 47.7% of students working zero hours were food insecure compared to 51.7% of those working 1–20 hours/week. However, those working over 20 hours/week reported were less likely to be food insecure (42.7%).

When reported challenges to academic success indicators were compared by food insecurity status, results reveal that students who were observed with any level of food insecurity were statistically significantly more likely to also experience challenges with academics ($p < .001$, phi = 0.18), careers ($p < .001$, phi = 0.15), procrastination ($p < .001$, phi = 0.13), and faculty ($p = .001$, phi = 0.08) as compared to their food secure counterparts (all small effect sizes).

Table 2. Comparison of challenges with student success indicators by food insecurity status.

Variable		Food Secure	Food Insecure	N	X2 (df)	p-value	Effect Size
Academic	Yes	35.4	53.3	1731	54.96 (1)	< 0.001*	.18
	No	64.6	46.7				
Career	Yes	26.5	40.4	1731	37.38 (1)	< 0.001*	.15
	No	73.5	59.6				
Procrastination	Yes	48.9	75.6	1733	28.72 (1)	< 0.001*	.13
	No	62.9	24.4				
Faculty	Yes	9.2	14.7	1730	11.79 (1)	0.001*	.08
	No	90.8	85.3				

*p-value significant at $p < 0.05$

Summary: Students who were observed with any level of food insecurity were statistically significantly more likely to also experience challenges with academics, careers, procrastination, and faculty.

Table 3. Comparison of well-being indicators between food insecurity status.

Well-being Construct	Food Security Status	Mean (SD)	p-value*
Kessler 6 (K6) Nonspecific Psychological Distress Score	Food Insecure	8.99 (5.13)	< 0.001*
	Food Secure	6.44 (4.51)	
UCLA Loneliness Scale Score	Food Insecure	5.68 (1.79)	< 0.001*
	Food Secure	4.93 (1.80)	
Suicide Behavior Questionnaire-Revised (SBQR) Screening Score	Food Insecure	5.30 (2.69)	< 0.001*
	Food Secure	4.51 (2.47)	
Diener Flourishing Score	Food Insecure	44.67 (8.47)	< 0.001*
	Food Secure	47.43 (7.88)	
Connor-Davidson Resilience Scale 2 (CD-RISC2) Score	Food Insecure	5.87 (1.50)	< 0.001*
	Food Secure	6.34 (1.41)	

*p-value is significant at $p < 0.05$

Summary: Students with any level of FI are observed with statistically significantly higher Psychological distress, Loneliness, Suicide behavior, Less flourishing and less resiliency.

Comparison of well-being indicators by food insecurity status

Analysis of differences in well-being indicators by food insecurity status revealed that students with any level of food insecurity were observed with statistically significantly higher mean scores for psychological distress ($p < .001$), loneliness ($p < .001$), and suicide behavior ($p < .001$), with reduced scores for flourishing and resiliency ($p < .001$) as compared to their food secure counterparts (see Table 3 for details).

Discussion

These analyses sought to explore the associations between food insecurity and wellness in addition to food insecurity and academic success among U.S. college students before the start of campus closures due to the COVID-19 pandemic. To that end, the data illustrate three key findings. First, food insecurity was more prevalent among the undergraduate student population than among the graduate student population. Full-time undergraduate students were significantly more likely to experience some level of food insecurity. The greater likelihood of food insecurity among full-time undergraduate students could be attributed to differences in employment and work hours between full-time and part-time students. While part-time students enroll in fewer courses, they can work more hours and maintain a full-time job. The potential increase in wages may help mediate food insecurity levels.

Food insecurity affects undergraduate students at different points in their academic tenure. While this analysis did not specifically explore the relationship between class year, housing, and food insecurity, the available data revealed that students in their first three years of college were more likely to experience food insecurity. In particular, third-year undergraduates were most likely to be food insecure (54.6%). The increased prevalence of food insecurity among third-year students could reflect that third-year students are more likely to transition to living off-campus or may incur additional expenses as

they get deeper into specific majors. Many first- and second-year students live in residence halls that provide outlets for social interaction and support. They also may have access to campus dining services and meal plans. The fact that third-year students experienced higher rates of food insecurity suggests that although they are moving toward degree completion, they may also lack similar supportive structures and be more vulnerable in terms of physical and mental wellbeing. The study did find that Black/African American, Asian, Multi-Racial, and Hispanic/Latinx students experienced higher rates of food insecurity the White/Caucasian students. A concern at the outset of the pandemic is that COVID-19 could disproportionately affect Black/African American and Hispanic/Latinx communities (Alcendor 2020; Louis-Jean et al. 2020). Further analysis would be necessary to confirm or disconfirm this pandemic's impact on students of various racial and ethnic backgrounds. Students that served in the armed forces were significantly less likely to experience food insecurity (29.1%). Although they are less likely to experience food insecurity, addressing issues of academic success and well-being among college student veteran students is still important considering that they experience higher rates of substance abuse and psychological disorders compared to nonmilitary peers (Borsari et al. 2017).

The second key finding is that food-insecure students experienced increased challenges concerning their academic performance and well-being. Along with students' academic performance, students experiencing food insecurity had a greater propensity to exhibit challenges related to career planning, time management, and faculty engagement. The fiscal and social-emotional stress of not meeting basic needs adversely impacts academic performance (Weaver et al. 2019). Food insecure students experience difficult decisions about whether to study or to eat. This type of dilemma could adversely affect academic performance, as demonstrated in this study. The data do not present a clear answer as to why food-insecure students experienced increased academic challenges. It is important to note that food-insecure students could experience increased academic challenges for various reasons (e.g., lack of staffing, under-resourced programs, difficulty locating supportive resources, struggling with the transition to college). For example, the finding related to faculty engagement could mean that food-insecure students might have experienced difficulty accessing instructors or viewing them as a resource for academic and social support. The lack of support could prevent students from building bonds of trust with instructional faculty and student support staff, making them less likely to seek assistance. Another plausible reason for the lack of faculty engagement is that students may have had limited access to broadband internet or adequate space or time to engage in class, virtual office hours, or virtual campus events. The findings related to challenges to student success require further exploration.

The third critical finding from this study is that students with any level of food insecurity were significantly more likely to experience psychological distress, loneliness, and suicidal behavior. Also, food-insecure students scored lower on measures of flourishing and resilience. These findings indicate that students might be experiencing increased stress from a combination of factors. Experiencing food insecurity in college decreases well-being. The findings in this study suggest reasons for concern and outreach related to the well-being of food-insecure students. For example, food-insecure students measured at moderate levels of psychological distress, indicating they could need advisement, counseling, or other supportive services.

Further, food-insecure students scored just outside the positive range for loneliness. This finding suggests that food-insecure students are possibly isolated from peers, faculty, student support staff, and family. Although food insecure students scored significantly higher on the SBQ-R, they were considered at a negative risk for suicide. Continued outreach and student support could help minimize suicide risk for food-insecure students.

In terms of flourishing and resilience, food-insecure students scored significantly lower on both measures. Regarding flourishing, food-insecure may be struggling to build relationships with peers, instructors, and student service staff, negatively impacting their well-being. Moreover, the experience of food insecurity may cause students to question their place at the university. The literature demonstrates that a sense of belonging is vital to student success in college (Hurtado and Carter 1997; Strayhorn 2012). The finding related to flourishing may denote that food-insecure students are struggling to find a sense of belonging. Food insecure students also scored significantly lower on the CD-RISC2, which measures resilience. Food insecure students may have issues bolstering interpersonal, structural, or peer-based sources of resilience. This study's results suggest that food-insecure students have fewer outlets for support and diminished psychological and emotional reserves to cope with the stress of food insecurity and the academic environment. Colleges and universities should strategically increase their outreach and support efforts to food-insecure students. While this study did not explore this in-depth, the data illustrate that food-insecure students may be overextending their capacity for resilience. Further study is needed to examine the effects of the pandemic on student stress and resilience. Still, the experience of food insecurity and the inability to meet basic needs is taking a toll on college students' psychological and socioemotional health. It is vital that colleges and universities do not allow COVID-19 to create an isolating experience for students (Copeland et al. 2020; Liu et al. 2020).

Implications for policy and programming post COVID-19

Public health emergencies such as the COVID-19 present a range of unforeseen stressors to vulnerable communities such as college students who present as an Asset Limited, Income Constrained, Employed (ALICE) population (United Way of Northern New Jersey 2020). More specifically, university closures, shift to online education, and sending residential students home may negatively impact students disproportionately as many who work also experience food insecurity and those without access to housing or the meal plan would be further exposed to food and/or housing insecurity (United Way of Northern New Jersey 2020).

In the wake of the COVID-19 pandemic, understanding college food insecurity is all the more crucial, with the number of food insecure individuals in the United States increasing from 35 million to more than 50 million (Feeding America 2020). In the early weeks of the pandemic (April – May 2020), The Hope Center for College, Community, and Justice surveyed more than 38,000 students (Goldrick-Rab et al. 2020). They found that 3 in 5 students experienced basic needs insecurity, with food insecurity affecting 44% of students at two-year institutions and 38% of students at four-year institutions. In addition, two-thirds of students surveyed experienced job insecurity, which impacted their ability to meet their basic needs.

The results presented in this study have multiple implications for institutions of higher education. First, given that food insecurity was prevalent among undergraduate students and graduate students, colleges and universities should devote more attention and resources to addressing food insecurity on campus. Although it is unclear to what degree or duration the pandemic might disrupt traditional functioning, campuses need to be prepared to provide outreach and virtual services instead of in-person contact. Higher education institutions should consider adapting student supportive services during the pandemic, establishing virtual academic, social, and mental health support services for students, and increasing outreach to food-insecure students. Collaborating with campus food pantries can be a way to inform students experiencing food insecurity about any transitions to virtual services. Further, colleges should work with local nonprofit food pantries to help meet the needs of food-insecure students not on campus.

The literature, along with the data presented, confirms the finding of increased academic challenges among food-insecure students. As colleges shift to virtual instruction for the remainder of spring 2020, it is critical to inform and support food-insecure students through that transition. Most academic support units (e.g., advising, career counseling, counseling services, recreation, and wellness) will need to provide virtual services in the initial stages of the pandemic. Campuses should try to have students, particularly food-insecure students, meet with an academic advisor to discuss any short- or

long-term transition to online services or instruction. Such meetings are a valuable way to connect food-insecure students to on- and off-campus services.

Another area to address for students experiencing food insecurity is social interactions with peers. College is a social and academic endeavor, and as the campuses adjust to social distancing guidelines, the social aspect can be diminished, possibly leading to isolation and hindering well-being. As the data has identified, food-insecure students are more likely to experience psychological distress, loneliness, and suicidal behavior, a component of that could be feelings of isolation and lack of in-person student interaction. While it is unclear how long the pandemic will endure, colleges should consider creating virtual or socially distant structured interaction opportunities for students. Such activities and programs help promote a sense of belonging and resilience.

The final implication is to provide information and training for staff and faculty regarding changes to campus food pantries and academic support services. Keeping staff and faculty aware of any changes to academic and supportive services will allow them to update any course or programmatic content and make it available. Some food-insecure students may not receive or read university e-mail updates, so placing information in as many places as possible is key to reaching this student population. Further, some food-insecure students may feel more comfortable meeting with faculty and instructors about their experiences. Ensuring that faculty and staff can provide accurate information about what resources are available is crucial to supporting student success and well-being.

Conclusion

The analysis presented here demonstrates the disruption created by the experience of food insecurity among college students. In particular, food insecurity increases psychological and emotional distress in undergraduate students and impairs their academic performance and well-being. Moreover, food-insecure students were significantly more likely to experience psychological distress, loneliness, and suicidal behavior. The data presented provide a picture of the disruption to student success caused by the experience of food insecurity before the onset of the COVD-19 pandemic in the US. The findings in this paper suggest that colleges and universities will need to address multiple areas to promote well-being and academic success for food-insecure students.

At the time of data collection, only a few universities had transitioned to online instruction for the remainder of the academic year. It is unclear what impact this transition will have on food-insecure students' academic performance and well-being, but there are some reasons for concern. The lack of in-person instruction could prevent students from building social support networks with students, staff, and faculty, making them less likely to seek

assistance. Another issue related to increased reliance on virtual instruction is that students may have limited access to broadband internet or an adequate computer or private space to engage in class, virtual office hours, or virtual campus events. Many of these issues will require further exploration as the pandemic endures or subsides.

It is plausible that the change in instructional format due to the pandemic might not impact student success but could also limit students' ability to build their capacity for resilience. Given the findings presented in this study related to well-being, a prolonged disruption to in-person courses and academic services could further isolate food-insecure students. Colleges and universities should strategically and actively increase their outreach and support efforts to food-insecure students. Another concern that will need further study is to what degree if at all did, food-insecure students overextend their capacity for resilience during the pandemic. The inability to meet basic needs during a growing health crisis might take a more significant toll on students' psychological and socioemotional health and require more support as students return to in-person activities. While the outlook is concerning, there are multiple opportunities for colleges and universities to adapt services and instruction as necessary to meet the needs of food-insecure students. The data and implications in this paper are a guide to help universities think through strategies to promote well-being and academic success for food-insecure students.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This study was not funded.

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References

Alcendor, D. J. 2020. Racial disparities-associated COVID-19 mortality among minority populations in the US. *Journal of Clinical Medicine* 9 (8):2442. doi:10.3390/jcm9082442.

American College Health Association. 2020. About ACHA-NCHA. https://www.acha.org/NCHA/About_ACHA_NCHA/Overview/NCHA/About/About_NCHA.aspx?hkey=75eaa64f-e82c-4cfd-a19c-4e3f9bf126ee Accessed October 13, 2020

Baker-Smith, C., V. Coca, S. Goldrick-Rab, E. Looker, B. Richardson, and T. Williams. 2020. "#RealCollege 2020: Five years of evidence on campus basic needs insecurity." *The Hope*

Center for College, Community, and Justice. https://hope4college.com/wp-content/uploads/2020/02/2019_RealCollege_Survey_Report.pdf

Becerra, M. B., and B. J. Becerra. 2020. Psychological distress among college students: Role of food insecurity and other social determinants of mental health. *International Journal of Environmental Research and Public Health* 17 (11):4118. doi:10.3390/ijerph17114118.

Blumberg, S. J., K. Bialostosky, W. L. Hamilton, and R. R. Briefel. 1999. The effectiveness of a short form of the household food security scale. *American Journal of Public Health* 89 (8):1231–34. doi:10.2105/AJPH.89.8.1231.

Borsari, B., A. Yurasek, M. B. Miller, J. G. Murphy, M. E. McDevitt-Murphy, M. P. Martens, M. G. Darcy, and K. B. Carey. 2017. Student service members/veterans on campus: Challenges for reintegration. *American Journal of Orthopsychiatry* 87 (2):166–75. doi:10.1037/ort0000199.

Broton, K. M., K. E. Weaver, and M. Mai. 2018. Hunger in higher education: Experiences and correlates of food insecurity among Wisconsin undergraduates from low-income families. *Social Sciences* 7 (10):179. doi:10.3390/socsci7100179.

Bruening, M., K. Argo, D. Payne-Sturges, and M. N. Laska. 2017. The struggle is real: A systematic review of food insecurity on postsecondary education campuses. *Journal of the Academy of Nutrition and Dietetics* 117 (11):1767–91. doi:10.1016/j.jand.2017.05.022.

Coleman-Jensen, A., M. P. Rabbitt, C. A. Gregory, and A. Singh. 2020. Household food security in the United States in 2019. Economic Research Service, U.S. Department of Agriculture. Economic Research Report No. 47. https://www.ers.usda.gov/publications/pub-details/?pubid=99281

Copeland, W. E., E. McGinnis, Y. Bai, Z. Adams, H. Nardone, V. Devadanam, J. Rettew, and J. J. Hudziak. 2020. Impact of COVID on college student mental health and wellness. *Journal of the American Academy of Child and Adolescent Psychiatry*. doi:10.1016/j.jaac.2020.08.466.

Diamond, K. K., M. J. Stebleton, and R. C. delMas. 2019. Exploring the relationship between food insecurity and mental health in an undergraduate student population. *Journal of Student Affairs Research and Practice*, 57(5),1–15.

Diener, E., D. Wirtz, W. Tov, C. Kim-Prieto, D.-W. Choi, S. Oishi, and R. Biswas-Diener. 2010. New well-being measures: Short scales to assess flourishing and positive and negative feelings. *Social Indicators Research* 97 (2):143–56. doi:10.1007/s11205-009-9493-y.

El Zein, A., K. P. Shelnutt, S. Colby, M. J. Vilaro, W. Zhou, G. Greene, M. D. Olfert, K. Riggsbee, J. S. Morrell, and A. E. Mathews. 2019. Prevalence and correlates of food insecurity among U.S. college students: A multi-institutional study. *BMC Public Health* 19 (1):660. doi:10.1186/s12889-019-6943-6.

Feeding America. 2020. The Impact of Coronavirus on Food Insecurity in 2020. *Feeding America*, October 2020. https://www.feedingamerica.org/sites/default/files/2020-10/Brief_Local%20Impact_10.2020_0.pdf

Freudenberg, N., S. Goldrick-Rab, and J. Poppendieck. 2019. College students and SNAP: The new face of food insecurity in the United States. *American Journal of Public Health* 109 (12):1652–58. doi:10.2105/AJPH.2019.305332.

Gamba, R. J., M. T. Schmeltz, N. Ortiz, A. Engelman, J. Lam, A. Ampil, M. M. Pritchard, et al. 2021. "Spending all this time stressing and worrying and calculating": Marginal food security and student life at a diverse urban university. *Public Health Nutrition* 1–19.

Goldrick-Rab, S., V. Coca, G. Kienzl, C. R. Welton, S. Dahl, and S. Magnelia. 2020. #RealCollege during the pandemic: New evidence on basic needs insecurity and student well-being. *The Hope Center for College, Community, and Justice*. https://hope4college.com/wp-content/uploads/2020/10/Hopecenter_RealCollegeDuringthePandemic_Reupload.pdf

Gundersen, C., M. Hake, A. Dewey, and E. Engelhard. 2020. Food insecurity during COVID-19. *Applied Economic Perspectives and Policy*. doi:10.1002/aepp.13100.

Henry, L. 2017. Understanding food insecurity among college students: Experience, motivation, and local solutions. *Annals of Anthropological Practice* 41 (1):6–19. doi:10.1111/napa.12108.

Henry, L. 2020. *Experiences of Hunger and Food Insecurity in College*. Cham, Switzerland: Palgrave Macmillan.

Hurtado, S., and D. F. Carter. 1997. Effects of college transition and perceptions of the campus racial climate on latino college students' sense of belonging. *Sociology of Education* 70 (4):324–45. doi:10.2307/2673270.

Kennedy Wynne, S. 2020. Food insecurity in Tampa Bay has doubled during pandemic. *Tampa Bay Times*, November 25, 2020. https://www.tampabay.com/news/health/2020/11/25/food-insecurity-in-tampa-bay-has-doubled-during-pandemic/

Kessler, R. C., P. R. Barker, L. J. Colpe, J. F. Epstein, J. C. Gfroerer, E. Hiripi, M. J. Howes, S.-L. T. Normand, R. W. Manderscheid, E. E. Walters, et al. 2003. Screening for serious mental illness in the general population. *Archives of General Psychiatry* 60 (2):184–89. doi:10.1001/archpsyc.60.2.184.

Knol, L. L., C. A. Robb, E. M. McKinley, and M. Wood. 2017. Food insecurity, self-rated health, and obesity among college students. *American Journal of Health Education* 48 (4):248–55. doi:10.1080/19325037.2017.1316689

Liu, C. H., S. Pinder-Amaker, Hyeouk, C. Hahm, and J. A. Chen. 2020. Priorities for addressing the impact of the COVID-19 pandemic on college student mental health. *Journal of American College Health* 1–3. doi:10.1080/07448481.2020.1803882.

Louis-Jean, J., K. Kenney Cenat, C. V. Njoku, J. Angelo, and D. Sanon. 2020. Coronavirus (COVID-19) and racial disparities: A perspective analysis. *Journal of Racial and Ethnic Health Disparities* 7 (6):1039–45. doi:10.1007/s40615-020-00879-4.

Martinez, S. M., E. A. Frongillo, C. Leung, and L. Ritchie. 2020. No food for thought: Food insecurity is related to poor mental health and lower academic performance among students in California's public university system. *Journal of Health Psychology* 25 (12):1930–39. doi:10.1177/1359105318783028.

Meza, A., E. Altman, S. Martinez, and C. W. Leung. 2019. "It's a feeling that one is not worth food": A qualitative study exploring the psychosocial experience and academic consequences of food insecurity among college students. *Journal of the Academy of Nutrition and Dietetics* 119 (10):1713–21. doi:10.1016/j.jand.2018.09.006.

Nikolaus, C. J., R. An, B. Ellison, and S. M. Nickols-Richardson. 2020. Food insecurity among college students in the United States: A scoping review. *Advances in Nutrition* 11 (2):327–48. doi:10.1093/advances/nmz111.

O'Donnell, C. 2020. 1.3 million local people now "food insecure," warns feeding Tampa Bay. *Tampa Bay Times*, May 26, 2020. https://www.tampabay.com/news/health/2020/05/26/13-million-local-people-now-food-insecure-warns-feeding-tampa-bay/

Osman, A., C. L. Bagge, P. M. Gutierrez, L. C. Konick, B. A. Kopper, and F. X. Barrios. 2001. The suicidal behaviors questionnaire-revised (SBQ-R):Validation with clinical and nonclinical samples. *Assessment* 8 (4):443–54. doi:10.1177/107319110100800409.

Owens, M. R., F. Brito-Silva, T. Kirkland, C. E. Moore, K. E. Davis, M. A. Patterson, D. C. Miketinas, and W. J. Tucker. 2020. Prevalence and social determinants of food insecurity among college students during the COVID-19 pandemic. *Nutrients* 12 (9):2515. doi:10.3390/nu12092515.

Patton-López, M. M., D. F. López-Cevallos, D. I. Cancel-Tirado, and L. Vazquez. 2014. Prevalence and correlates of food insecurity among students attending a midsize rural

university in Oregon. *Journal of Nutrition Education and Behavior* 46 (3):209–14. doi:10.1016/j.jneb.2013.10.007.

Raskind, I. G., R. Haardorfer, and C. J. Berg. 2019. Food insecurity, psychosocial health and academic performance among college and university students in Georgia, USA. *Public Health Nutrition* 22 (3):476. doi:10.1017/S1368980018003439.

Strayhorn, T. L. 2012. *College students' sense of belonging: A key to educational success for all students*. New york, USA: Routledge.

United Way of Northern New Jersey. 2020. COVID-19 and ALICE: Understanding the impact on America's ALICE Families. https://www.unitedforalice.org/covid19 Accessed April 11, 2020.

Vaishnavi, S., K. Connor, and J. R. T. Davidson. 2007. An abbreviated version of the connor-davidson resilience scale (CD-RISC), the CD-RISC2: Psychometric properties and applications in psychopharmacological trials. *Psychiatry Research* 152 (2–3):293–97. doi:10.1016/j.psychres.2007.01.006.

Weaver, R. R., N. A. Vaughn, S. P. Hendricks, P. E. McPherson-Myers, Q. Jia, S. L. Willis, and K. P. Rescigno. 2019. University student food insecurity and academic performance. *Journal of American College Health, 68*(7), 1–7.