


Risk of food and housing insecurity among college students during the COVID-19 pandemic

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Abstract

The aim of this study was to assess college students' food and housing insecurity risk amidst the pandemic. Data were collected through an online survey in the summer of 2020 from 1956 graduate and undergraduate students attending a large, private, urban university in the Midwest, U.S. Food insecurity among students increased (25% before; 29% during COVID) with housing insecurity staying roughly the same (34% before; 36% during COVID). Results indicate certain student groups were at greater risk of basic needs insecurity during the pandemic compared to their counterparts. Results also suggest changes in food and housing insecurity trends. College students are burdened with basic needs insecurity, exacerbated during the pandemic. Institutions need to work toward solutions to address the needs of vulnerable populations disproportionately affected by basic needs insecurity. Recommendations on addressing the basic needs of college students are also provided.

KEYWORDS

college students, COVID-19, food insecurity, higher education, housing insecurity, vulnerable populations

1 | INTRODUCTION

1.1 | Food and housing insecurity

Food and housing insecurity is a prevalent systemic problem in the U.S. Food security is defined as having access to adequate food sources or not having to worry about the ability to obtain one's next meal (Goldrick-Rab et al., 2018). Thus, to be food insecure indicates uncertainty around attainability of one's next meal or lack of access to a nutritional diet. During 2019, 10.5% (13.7 million) of US households were food insecure at some point in time, meaning they lacked access to enough food for an active, healthy life for all household members (U.S Department of Agriculture [USDA], Economic Research Service, 2020). Food insecurity has been associated with poor dietary quality (Dixon et al., 2001) and numerous chronic diseases including mental health issues (Berkowitz et al., 2017; Jones, 2017).

Housing security is defined by the ability to pay rent/mortgage and utilities; having a stable, reliable, and safe housing situation; and not needing to move frequently (Goldrick-Rab et al., 2019). Thus, being housing insecure means one is unable to pay rent or utilities or needs to move frequently. According to Harvard Joint Center for Housing Studies (Joint Center for Housing Studies of Harvard University [JCHS], 2020), in 2019, 31.1 million households were cost burdened (i.e., spending over 30% on housing) while more than half were severely cost-burdened (i.e., spending more than half of their incomes on housing). Similar to food insecurity, housing insecurity has been associated with poor health outcomes (Kushel et al., 2006). Furthermore, research suggests those affected by housing insecurity often experience food insecurity and vice versa, creating an intersection of these basic needs (e.g., Goldrick-Rab et al., 2018).

Basic needs insecurities are a barrier associated with a variety of negative outcomes that makes personal goal progression increasingly difficult to attain. In addition to negative physical implications, other detrimental outcomes to basic needs insecurity include difficulty with academic success and gaining and maintaining employment (Baker-Smith et al., 2020; Goldrick-Rab et al., 2020; Patton-López et al., 2014; Silva et al., 2015).

The COVID-19 pandemic has impacted basic needs insecurity among individuals in the United States and continues to have a profound effect on individual and community health and economic wellbeing. In addition to loss of life, large percentages of the population are experiencing job loss, increased financial burdens, and increased mental health issues. For instance, National Public Radio, the Robert Wood Johnson Foundation, and Harvard T.H. Chan School of Public Health (2020) conducted a survey of New York, Los Angeles, Chicago, and Houston households and found over half of the households surveyed reported facing serious financial problems during the pandemic. These households were more likely to identify as Latina/o and Black, lower income, and experience employment or wage losses. Other hardships reported included inability to get medical care for serious problems.

One unique population that balances a multitude of developmental milestones which may be greatly affected by unmet basic needs are college students. The impact of basic needs insecurity on the developmental progression of college students was potentially further complicated by the onset of the COVID-19 pandemic.

1.2 | Food and housing insecurity for college students

Prepandemic food and housing insecurity were greater among college students than it was in the general population (K. Broton et al., 2014). Research suggests college students experience higher rates of food insecurity compared to their nonstudent counterparts (Bruening et al., 2017; Freudenberg et al., 2019; Henry, 2017; Mialki et al., 2021; Patton-López et al., 2014; Phillips et al., 2018; Silva et al., 2015; Wood & Harris, 2018). Prepandemic studies have also shown alarming statistics of college students struggling from lack of affordable housing, as well as lack of access to wages that reflect cost of living (e.g., K. M. Broton & Goldrick-Rab, 2017; El Zein et al., 2019; Gaines et al., 2014; Goldrick-Rab et al., 2019; Hallett & Crutchfield, 2017). When it comes to educational settings,

students experiencing basic needs insecurity may also report declined campus involvement, decreased academic performance (e.g., lower GPA), and higher drop-out rates compared to their counterparts (Allen & Alleman, 2019; K. M. Broton & Goldrick-Rab, 2017; Hickey et al., 2019; Martinez et al., 2018; Phillips et al., 2018).

1.2.1 | Vulnerable populations preCOVID

Before the onset of COVID, K. M. Broton and Goldrick-Rab (2017) argued that students in higher education institutions did not receive enough aid for housing and food, which may cause declines in academic performances and can eventually lead to students leaving school before graduating. Research suggests certain subgroups of the population have already been disproportionately affected by food insecurity (Coleman-Jensen et al., 2019; Dixon et al., 2001). Specifically, low-income communities, communities of color, individuals with lower educational levels, gender minorities, and those unemployed or under-employed were more likely to report higher food insecurity rates. For instance, in one study, adults from families with insufficient food access were more likely to be Black or Mexican American, to earn incomes below the poverty level, and to have lower education levels compared with adults from families with sufficient food access (Dixon et al., 2001). Similarly, Coleman-Jensen et al. (2019) found low and very low food insecurity was reported significantly more by non-Hispanic Black or Hispanic adults and those with less than a college education. Mialki et al. (2021) found pre-Covid food security status among college students was significantly associated with gender, race, and ethnicity with a greater proportion of students of color reporting food insecurity compared to their counterparts. Moreover, the researchers found economic characteristics such as employment status and Pell grant status were significantly associated with lower food security before the start of the pandemic (Mialki et al., 2021). A study conducted by Willis (2019) found 32% of undergraduate students at a New York State University to be food insecure, with racial and sexual minority students experiencing food insecurity at higher rates. Food and housing insecurity often affect the same groups. For instance, in Fall of 2019, Townley et al. (2020) found Black, Indigenous, and other people of color (BIPOC) students reported higher rates of basic needs insecurity. Goldrick-Rab et al. (2019) reported Latina/o and Black students reported higher rates of basic needs insecurity than White peers. The researchers also found LGBTQ+ students, students with disabilities, and students with medical conditions reported higher rates of housing insecurity, homelessness, and food insecurity. Another group at higher risk of food and housing insecurity was students with children (K. M. Broton & Goldrick-Rab, 2017).

1.2.2 | Vulnerable populations during COVID

Similar insecurity trends were found after the onset COVID-19, indicating students' challenges were exacerbated as a result of on-campus housing closings, loss of on campus jobs, and so forth. The impact of the pandemic has been particularly devastating to vulnerable populations, disproportionately affecting those who were already experiencing financial hardships (Soria et al., 2020a, 2020b, 2020c). Characteristics associated with changes in food security among college students included changes in housing and employment status (Mialki et al., 2021; Owens et al., 2020). Soria et al. (2020c) found during the pandemic, students from underrepresented and marginalized backgrounds reported significantly higher rates of food insecurity compared to their counterparts. The researchers also found students' employment status, affected by the pandemic, in turn affected their food security status with those students who were employed fewer hours or no longer employed reporting less food security. Additionally, changes in food security were found among international students and those who were Pell eligible (Mialki et al., 2021). Research suggests housing insecurity also disproportionately affects already marginalized groups, although the research on this topic is sparse. Soria et al. (2020a) found first-generation students, as well as

students with disabilities, were more likely to experience both food and housing insecurity compared to their counterparts after the onset of the pandemic.

1.3 | Rationale

Adequate food and housing are essential to college students' general well-being and academic achievement. However, over the past decade basic needs insecurity among college students has been an increasingly prevalent problem in the United States. In addition to existing challenges to basic needs, with the onset of the pandemic college students faced added challenges both directly and indirectly related to their academic performance and overall well-being. Researchers are just now beginning to understand how the pandemic has affected college student food and housing security status; especially for those who have already been experiencing barriers and who may be facing added hardships due to the onset of the COVID-19 outbreak. The community psychology principles of wellbeing, prevention, and action research (Jason et al., 2019) are highlighted in this study with focus on the impact of the COVID-19 pandemic on college students. Specifically, the purpose of this study was to identify the rates of food and housing insecurity of students attending a large, private, urban university, examining vulnerable subpopulations who were disproportionately at risk of food and housing insecurity during the pandemic. This paper contributes to a foundation for future intervention research for college students' well-being and the prevention of college student food and housing insecurity. As such, the research questions for this study were the following: (1) How has the pandemic impacted rates of college students' food and housing insecurity? (2) Which subpopulations of college students were at greater risk of experiencing food and/or housing insecurity when compared to their counterparts?

2 | METHOD

2.1 | Participants

Participants were undergraduate and graduate students at a large, urban, private university in the Midwest, United States. All students enrolled at the university for the 2019–2020 academic year ($N = 23,681$) were contacted with an invitation to participate in the study's online survey. A total of 2928 students completed the online survey. Nine hundred seventy-three participants were excluded from data analyses: 29 participants did not consent to have their data used and 943 participants did not complete at least 40% of the survey. The final sample size for the current study was 1956. Participant demographic information was self-reported, and is included in Table 1. Participants' ages were between 18 and 67 years old ($M = 24.55$; $SD = 6.84$). A majority of participants identified as female (64%; $n = 1244$). Participants were able to select all racial/ethnic identities that applied. Study participants identified as American Indian or Native American (2%; $n = 33$), Asian (20%; $n = 388$), Black (13%; $n = 254$), Middle Eastern or North African (3%; $n = 58$), Native Hawaiian or Pacific Islander (1%; $n = 11$), Latina/o or Hispanic (20%; $n = 390$), White (53%; $n = 1031$), or self-identified as another ethnic identity (2%; $n = 36$). Thirty-five percent ($n = 675$) were first-generation college students.

2.2 | Procedure

IRB approval of the study and procedures was granted from the institution's review board. A list of emails of qualified students (i.e., currently enrolled students) was gathered from the institution's Office of the Registrar. Students were contacted via e-mail by researchers from July through August of 2020 and were invited to participate in the online survey. These emails briefly described the purpose of the study and invited students to visit the study website to obtain more information. The online survey was located on Qualtrics and described

TABLE 1 Participant demographic information

Demographics	<i>n</i>	%
Gender identity		
Male	620	32
Female	1244	64
Cisgender	1864	96
Transgender/gender nonconforming	79	4
Sexual orientation		
Heterosexual	1468	78
Sexual minority	404	22
Race/ethnicity		
American Indian or Native American	33	2
Asian	388	20
Black	254	13
Middle Eastern or North African	58	3
Native Hawaiian or Pacific Islander	11	1
Latina/o or Hispanic	390	20
White	1031	53
Another ethnic identity	36	2
Students of color	1080	55
White only students	875	45
Student status		
International students	176	9
Domestic students	1775	91
First-generation students	675	35
Nonfirst-generation students	1279	66
Undergraduate students	1236	64
Graduate students	701	36
Full-time students	1551	87
Part-time students	231	13
Lived on campus before the pandemic	344	18
Lived off campus before the pandemic	1543	82
Student characteristics		
Students previously in foster care	24	1
Students with no experience with foster care	1931	99
Students with at least one disability	669	35
Students without disabilities	1241	65

(Continues)

TABLE 1 (Continued)

Demographics	n	%
Students with a chronic illness	203	11
Students without a chronic illness	1707	89
Students with at least one child	146	8
Students with no children	1755	92
18–24	1258	65
25+	678	35

participants' rights, risks, and benefits of participating in the study. A total of 202 participants were offered a reward for completing the survey. Students were informed that the first 100 participants to complete the survey would receive a \$25 Amazon gift card, and the following 100 to complete the survey would receive a \$10 Amazon gift card. Two participants were randomly drawn to receive a \$100 Amazon gift card each. The online survey via Qualtrics took participants an average of 46 min to complete.

2.3 | Measures

2.3.1 | Food security

Food security among participants was measured using the US Department of Agriculture-approved 10-item survey module of food security (USDA, 2012). Participants responded to survey items twice—once within the context of “The last 12 months before COVID,” and a second time within the context of “Since COVID.” Survey items included “I worried whether my food would run out before I got money to buy more” answered on a three-point scale ranging from *often true* (1) to *never true* (3); “Did you ever cut the size of your meals or skip meals because there wasn't enough money for food?” answered with a *yes* (1) or *no* (0); and “How many days did you cut the size of your meals because there wasn't enough money for food?” answered on a six-point scale ranging from *1 day* (1) to *more than 5 days* (6). Questions were asked to participants on a three-tier basis, such that if participants did not report experiences of food insecurity in the first three questions, they did not move on to the subsequent two sections, and so on. This scale typically categorized food security into four groups: high food security (a raw score of 0), marginal food security (raw score of 1–2), low food security (raw score of 3–5), and very low food security (raw score of 6–10). For this study, however, participants were considered food insecure if they had a summed score of one or higher.

2.3.2 | Housing security

Housing security was assessed using Goldrick-Rab et al. (2019) adaptation of the National Survey and Income and Program Participation Adult Well-Being Module. This module includes nine items, such as “Was there a rent or mortgage increase that made it difficult to pay?”; “Have you moved in with other people, even for a little while, because of financial problems?”; and “How many times have you moved?” Response options for questions included *yes* (1) and *no* (0) as well as a range from *none* to *more than 10 times*. Participants completed this set of questions two times, first answering the items based on “The last 12 months before COVID,” and a second time based on “Since COVID.” Participants were considered housing insecure if they answered *yes* to at least one question or specified they moved three or more times within the time period.

2.3.3 | Demographics

Participants also responded to a variety of demographic questions, including gender identity, sexual orientation, race/ethnicity, age, disabilities, chronic illnesses, number of children, international student status, first-generation college student status, degree pursuing, full-time/part-time student status, live off- or on-campus before the pandemic, and previous experience in the foster care system. Gender identity was grouped into two dichotomous sets of variables: (1) male and female; (2) cisgender and transgender or gender nonconforming. Sexual orientation was dichotomously grouped into straight/heterosexual and belonging to a sexual minority group (e.g., identifying as any of the following: lesbian, gay, bisexual, queer, or another sexual orientation). Participants were able to select all racial/ethnic identities that applied; options included American Indian or Native American, Asian, Black, Middle Eastern or North African, Native Hawaiian or Pacific Islander, Latina/o or Hispanic, White, or another ethnic identity. We also created a dichotomous race variable, grouping students of color (any student who identified with a racial/ethnic identity other than White) and White students (any student who identified as White and no other racial/ethnic identities) separately. Age was dichotomized as 18–24 and 25 or older. Participants who self-identified as international students based on the following yes/no questions were categorized as such: “are you an international student?” Participants were categorized as first-generation college students if the highest level of education either of their parents had completed was less than a Bachelor’s degree (e.g., Associate’s degree, some college, trade school certificate, high school, GED). Participants were asked if they lived on campus before the pandemic and during the pandemic. Students who indicated they lived on campus before the pandemic were not presented with before pandemic housing security questions.

2.4 | Data analysis

To test for significant changes in food and housing insecurity among the overall sample, we conducted two McNemar chi-square tests (McNemar, 1947). A McNemar chi-square test is a repeated measures chi-square analysis to test changes over time for cross-sectional data. Additionally, risk ratios (RR) and chi-square tests of independence were calculated for each demographic group. RR were conducted to understand the ratio of the probability of an outcome (e.g., being food or housing insecure) in one group versus a reference group (i.e., students without the specified identity unless otherwise noted; for example, Latina/o or Hispanic students vs. non-Latina/o or non-Hispanic students; Sstrom & Garvan, 2004). RR values greater than one indicate a group is at greater risk of the outcome compared to the reference group; RR values less than one indicate a group is at less risk of the outcome compared to the reference group. Chi-square tests of independence were calculated to assess the significance of the relationship between belonging to a certain demographic group and the outcome. Analyses were conducted using R 4.0.3 (R Core Team, 2020); risk ratio and chi-square calculations were conducted using the *jmv* package (v1.2.23; Selker et al., 2020).

3 | RESULTS

3.1 | Food insecurity

In the overall sample, a significantly greater number of students experienced food insecurity during the pandemic (28.6%) compared to before the pandemic (24.9%, $\chi^2 = 27.37$, $p < 0.000$). Rates of food insecurity before and during the pandemic differed based on a variety of student identities (see Table 2). To further understand group differences related to food security, risk ratios were conducted to compare the risk of food insecurity based on students’ identities (see Table 3).

TABLE 2 Rates of food insecurity before and during the pandemic

Demographics	Food insecurity			
	Before the pandemic		During the pandemic	
	%	95% CI	%	95% CI
Cisgender identity				
Male	21.62	(18.52, 25.08)	27.23	(23.83, 30.92)
Female	25.27	(22.89, 27.80)	28.03	(25.56, 30.63)
Cisgender versus transgender/gender nonconforming				
Cisgender identity	24.05	(22.13, 26.07)	27.76	(25.74, 29.87)
Transgender/gender nonconforming	41.89	(31.16, 53.45)	47.30	(36.17, 58.70)
Sexual orientation				
Heterosexual	22.21	(20.12, 24.44)	26.37	(24.14, 28.73)
Sexual minority	33.76	(29.25, 38.58)	35.78	(31.20, 40.65)
Race/ethnicity				
American Indian or Native American	51.52	(34.68, 68.01)	57.58	(40.22, 73.24)
Asian	24.06	(19.99, 28.67)	28.72	(24.37, 33.51)
Black	47.35	(41.15, 53.62)	51.84	(45.57, 58.05)
Middle Eastern or North African	21.05	(21.30, 33.65)	26.32	(16.45, 39.31)
Native Hawaiian or Pacific Islander	27.27	(8.52, 60.15)	45.45	(19.34, 74.33)
Latina/o or Hispanic	29.06	(24.71, 33.82)	35.70	(31.03, 40.65)
White	20.34	(17.96, 22.95)	21.46	(19.02, 24.11)
Another ethnic identity	47.22	(31.53, 63.48)	54.29	(37.68, 69.99)
Students of color versus White Students				
Students of color	30.34	(27.63, 33.20)	35.97	(33.12, 38.93)
White students	18.33	(15.87, 21.08)	19.53	(17.00, 22.34)
Student status				
International students	29.89	(23.53, 37.12)	40.80	(33.73, 48.28)
Domestic students	24.40	(22.43, 26.49)	27.33	(25.27, 29.48)
First-generation students	32.01	(28.55, 35.69)	38.32	(34.67, 42.11)
Nonfirst-generation students	21.26	(19.07, 23.62)	23.51	(21.23, 25.95)
Undergraduate students	26.96	(24.52, 29.55)	29.52	(26.99, 32.17)
Graduate students	21.63	(18.71, 24.86)	26.96	(23.77, 30.40)
Full-time students	25.18	(23.05, 27.44)	28.98	(26.74, 31.32)
Part-time students	25.78	(20.47, 31.91)	26.67	(21.28, 32.84)
Live off campus before the pandemic	25.16	(23.06, 27.39)	29.62	(27.39, 31.95)
Students living off campus before the pandemic	25.16	(23.06, 27.39)	29.62	(27.39, 31.95)

TABLE 2 (Continued)

Demographics	Food insecurity			
	Before the pandemic		During the pandemic	
	%	95% CI	%	95% CI
Student characteristics				
Students previously in foster care	50.00	(29.82, 70.18)	47.83	(28.41, 67.92)
Students with no experience with foster care	24.67	(22.77, 26.67)	28.37	(26.38, 30.46)
Students with at least one disability	31.29	(27.84, 34.96)	34.46	(30.90, 38.21)
Students without disabilities	21.78	(19.53, 24.20)	25.66	(23.27, 28.21)
Students with a chronic illness	40.00	(33.42, 46.96)	44.00	(37.26, 50.97)
Students without a chronic illness	23.32	(21.35, 25.42)	26.90	(24.82, 29.10)
Students with at least one child	30.82	(23.85, 38.80)	41.10	(33.38, 49.28)
Students with no children	24.44	(22.47, 26.52)	27.54	(25.49, 29.70)
18–24	23.93	(21.62, 26.39)	27.01	(24.60, 29.56)
25+	26.84	(23.61, 30.33)	31.53	(28.11, 35.17)

3.1.1 | Prepandemic

Students with the following identities were at significantly greater risk of food insecurity before the pandemic: transgender or gender nonconforming students compared to cisgender students, sexual minority students compared to straight/heterosexual students, American Indian or Native American students compared to non-American Indian or non-Native American students, Black students compared to non-Black students, Latina/o or Hispanic students compared to non-Latina/o or non-Hispanic students, students of color compared to White students, students with other ethnic identities compared to students who did not select another ethnic identity, first-generation college students compared to nonfirst generation college students, undergraduate students compared to graduate students, students who were previously in foster care compared to students without experience in foster care, students with at least one disability compared to students with no disabilities, and students with a chronic illness compared to students without a chronic illness. Additionally, White students were significantly less likely to be at risk of food insecurity before the pandemic compared to non-White students.

3.1.2 | Pandemic

During the pandemic, students with the following identities were at significantly greater risk of food insecurity: transgender or gender nonconforming students compared to cisgender students, sexual minority students compared to straight/heterosexual students, American Indian or Native American students compared to non-American Indian or non-Native American students, Black students compared to non-Black students, Latina/o or Hispanic students compared to non-Latina/o or non-Hispanic students, students of color compared to White students, students with other ethnic identities compared to students who did not select another ethnic identity, international students compared to noninternational students, first-generation college students compared to nonfirst generation college students, students who were previously in foster care compared to students without experience in foster care, students with at least one disability compared to students with no disabilities, students

TABLE 3 Risk ratios comparing risk of food insecurity

Demographics	Food insecure versus not food insecure			
	Before the pandemic		During the pandemic	
	RR (CI)	<i>p</i>	RR (CI)	<i>p</i>
Gender identity				
Female	1.05 (0.99, 1.11)	0.086	1.01 (0.95, 1.07)	0.720
Transgender/gender nonconforming	1.31 (1.08, 1.59)	<0.001	1.37 (1.10, 1.70)	<0.001
Sexual orientation				
Sexual minority	1.17 (1.09, 1.27)	<0.001	1.15 (1.06, 1.24)	<0.001
Race/ethnicity				
American Indian or Native American	1.56 (1.09, 2.22)	<0.001	1.69 (1.14, 2.52)	<0.001
Asian	0.99 (0.92, 1.05)	0.655	1.00 (0.93, 1.08)	0.956
Black	1.49 (1.32, 1.68)	<0.001	1.55 (1.36, 1.77)	<0.001
Middle Eastern or North African	0.95 (0.83, 1.09)	0.489	0.97 (0.83, 1.13)	0.697
Native Hawaiian or Pacific Islander	1.03 (0.72, 1.48)	0.859	1.31 (0.76, 2.25)	0.215
Latina/o or Hispanic	1.07 (1.00, 1.15)	<0.05	1.14 (1.05, 1.23)	<0.001
White	0.88 (0.83, 0.92)	<0.001	0.81 (0.76, 0.86)	<0.001
Another ethnic identity	1.43 (1.05, 1.95)	<0.01	1.57 (1.09, 2.26)	<0.001
Students of color versus White students				
Students of color	1.17 (1.11, 1.23)	<0.001	1.26 (1.19, 1.33)	<0.001
Student status				
International students	1.08 (0.97, 1.19)	0.111	1.23 (1.08, 1.39)	<0.001
First-generation students	1.16 (1.09, 1.23)	<0.001	1.24 (1.16, 1.33)	<0.001
Undergraduate students	1.07 (1.02, 1.13)	<0.01	1.04 (0.98, 1.10)	0.236
Part-time students	1.01 (0.93, 1.09)	0.848	0.97 (0.89, 1.05)	0.474
Live off campus before the pandemic	1.18 (0.93, 1.49)	0.170	1.36 (1.08, 1.72)	<0.01
Students characteristics				
Students previously in foster care	1.51 (0.99, 2.29)	<0.01	1.37 (0.93, 2.03)	<0.05
Students with at least one disability	1.14 (1.07, 1.21)	<0.001	1.13 (1.06, 1.21)	<0.001
Students with a chronic illness	1.28 (1.14, 1.44)	<0.001	1.31 (1.15, 1.48)	<0.001
Students with at least one child	1.09 (0.98, 1.22)	0.087	1.23 (1.07, 1.41)	<0.001
Students age 25+	1.04 (0.98, 1.10)	0.162	1.07 (1.00, 1.13)	<0.05

Abbreviations: CI, confidence interval; RR, risk ratio.

with a chronic illness compared to students without a chronic illness, students with at least one child compared to students without children, and students age 25 or older compared to students age 18–24. Students who were significantly less likely to be at risk of food insecurity during the pandemic were White students compared to non-White students and students who lived on campus before the pandemic compared to students who lived off campus before the pandemic.

TABLE 4 Rates of housing insecurity before and during the pandemic

Demographics	Housing insecurity			
	Before the pandemic		During the pandemic	
	%	95% CI	%	95% CI
Cisgender identity				
Male	30.89	(27.05, 35.01)	31.20	(27.59, 35.05)
Female	35.76	(32.77, 38.87)	36.75	(34.06, 39.54)
Cisgender identity	34.04	(31.65, 36.51)	34.90	(32.72, 37.15)
Transgender/gender nonconforming	35.59	(24.40, 48.62)	43.24	(32.40, 54.77)
Sexual orientation				
Heterosexual	32.51	(29.89, 35.25)	33.57	(31.14, 36.09)
Sexual minority	40.00	(34.59, 45.66)	42.09	(37.29, 47.05)
Race/ethnicity				
American Indian or Native American	62.50	(41.73, 79.51)	56.25	(38.73, 72.34)
Asian	31.80	(26.97, 37.06)	34.52	(29.81, 39.56)
Black	52.17	(44.94, 59.32)	52.97	(46.57, 59.27)
Middle Eastern or North African	41.67	(28.56, 56.07)	36.84	(25.31, 50.11)
Native Hawaiian or Pacific Islander	55.56	(23.64, 83.46)	54.55	(25.67, 80.66)
Latina/o or Hispanic	36.42	(31.26, 41.91)	38.36	(33.58, 43.37)
White	30.26	(27.13, 33.58)	32.70	(29.85, 35.68)
Another ethnic identity	42.42	(26.76, 59.78)	42.86	(27.54, 59.68)
Students of color versus White students				
Students of color	37.80	(34.63, 41.09)	39.61	(36.65, 42.64)
White students	29.75	(26.40, 33.33)	30.17	(27.16, 33.36)
Student status				
International students	36.08	(28.95, 43.88)	42.26	(34.99, 49.88)
Domestic students	34.04	(31.57, 36.59)	34.63	(32.40, 36.93)
First-generation students	35.05	(31.15, 39.16)	39.04	(35.33, 42.87)
Nonfirst-generation students	33.70	(30.82, 36.72)	33.36	(30.77, 36.06)
Undergraduate students	35.36	(32.25, 38.60)	35.43	(32.75, 38.22)
Graduate students	32.87	(29.36, 36.58)	34.80	(31.31, 38.46)
Full-time students	33.98	(31.33, 36.73)	35.15	(32.76, 37.62)
Part-time students	38.28	(31.92, 45.07)	35.02	(28.95, 41.62)
Live off campus before the pandemic	34.23	(31.89, 36.64)	35.72	(33.35, 38.16)
Students living off campus before the pandemic	34.23	(31.89, 36.64)	35.72	(33.35, 38.16)
Student characteristics				
Students previously in foster care	55.56	(32.43, 76.50)	54.55	(33.69, 73.92)

(Continues)

TABLE 4 (Continued)

Demographics	Housing insecurity			
	Before the pandemic		During the pandemic	
	%	95% CI	%	95% CI
Students with no experience with foster care	33.97	(31.63, 36.40)	35.12	(32.97, 37.33)
Students with at least one disability	42.57	(38.32, 46.94)	43.39	(39.60, 47.26)
Students without disabilities	29.84	(27.07, 32.77)	30.99	(28.41, 33.69)
Students with a chronic illness	45.45	(37.74, 53.40)	47.98	(41.08, 54.95)
Students without a chronic illness	32.84	(30.37, 35.40)	33.83	(31.56, 36.16)
Students with at least one child	37.50	(29.74, 45.96)	39.01	(31.28, 47.32)
Students with no children	33.93	(31.49, 36.47)	34.91	(32.69, 37.20)
18–24	31.54	(28.58, 34.67)	34.05	(31.43, 36.77)
25+	38.07	(34.38, 41.90)	37.71	(34.07, 41.49)

3.2 | Housing insecurity

In the overall sample, a similar rate of students experienced housing insecurity during the pandemic (35.8%) compared to before the pandemic (34.2%, $\chi^2 = 1.73$, $p = 0.118$). Rates of housing insecurity before and during the pandemic differed based on a variety of student identities (see Table 4). To further understand group differences related to housing insecurity, risk ratios were conducted to compare the risk of housing insecurity based on students' identities (see Table 5).

3.2.1 | Prepandemic

Students with the following identities were at significantly greater risk of housing insecurity before the pandemic: sexual minority students compared to straight/heterosexual students, American Indian or Native American students compared to non-American Indian or non-Native American students, Black students compared to non-Black students, students of color compared to White students, students with at least one disability compared to students with no disabilities, students with a chronic illness compared to students without a chronic illness, and students age 25 or older compared to students age 18–24. Additionally, White students were significantly less likely to be at risk of housing insecurity before the pandemic compared to non-White students.

3.2.2 | Pandemic

During the pandemic, students with the following identities were at significantly greater risk of housing insecurity: female students compared to male students, sexual minority students compared to straight/heterosexual students, American Indian or Native American students compared to non-American Indian or non-Native American students, Black students compared to non-Black students, students of color compared to White students, international students compared to noninternational students, first-generation college students compared to nonfirst generation college students, students with at least one disability compared to students with no disabilities, and students with a chronic illness compared to students without a chronic illness. Additionally, White students were significantly less likely to be at risk of housing insecurity during the pandemic compared to non-White students.

TABLE 5 Risk ratios comparing risk of housing insecurity

	Housing insecure versus not housing insecure				
	Before the pandemic		During the pandemic		p
	p	RR (CI)	p	RR (CI)	
Gender identity					
Female	0.720	1.08 (0.10, 1.16)	0.060	1.09 (1.01, 1.17)	<0.05
Transgender/gender nonconforming	<0.001	1.02 (0.84, 1.24)	0.805	1.15 (0.94, 1.40)	0.141
Sexual orientation					
Sexual minority	<0.001	1.12 (1.02, 1.24)	<0.05	1.15 (1.05, 1.26)	<0.01
Race/ethnicity					
American Indian or Native American	<0.001	1.76 (1.05, 2.96)	<0.01	1.49 (1.00, 2.20)	<0.05
Asian	0.956	0.95 (0.88, 1.04)	0.286	0.98 (0.91, 1.07)	0.711
Black	<0.001	1.42 (1.22, 1.66)	<0.001	1.43 (1.24, 1.64)	<0.001
Middle Eastern or North African	0.697	1.13 (0.89, 1.44)	0.274	1.02 (0.84, 1.25)	0.811
Native Hawaiian or Pacific Islander	0.215	1.48 (0.71, 3.08)	0.178	1.42 (0.75, 2.72)	0.182
Latina/o or Hispanic	<0.001	1.04 (0.95, 1.14)	0.373	1.06 (0.97, 1.16)	0.171
White	<0.001	0.88 (0.82, 0.95)	<0.001	0.92 (0.86, 0.98)	<0.05
Another ethnic identity	<0.001	1.14 (0.85, 1.54)	0.320	1.13 (0.85, 1.51)	0.348
Students of color versus White students					
Students of color	<0.001	1.13 (1.05, 1.21)	<0.001	1.16 (1.08, 1.24)	<0.001
Student status					
International students	<0.001	1.03 (0.91, 1.17)	0.609	1.13 (0.99, 1.29)	<0.05
Firstgeneration students	<0.001	1.02 (0.95, 1.10)	0.596	1.09 (1.02, 1.18)	<0.05
Undergraduate students	0.236	1.04 (0.97, 1.12)	0.311	1.01 (0.94, 1.08)	0.783
Part-time students	0.474	1.07 (0.95, 1.20)	0.229	1.00 (0.90, 1.11)	0.970
Live off campus before the pandemic	<0.01	-	-	1.11 (0.90, 1.36)	0.332
Students characteristics					
Students previously in foster care	<0.05	1.49 (0.89, 2.49)	0.055	1.43 (0.90, 2.26)	0.058
Students with at least one disability	<0.001	1.22 (1.12, 1.33)	<0.001	1.22 (1.13, 1.32)	<0.001
Students with a chronic illness	<0.001	1.23 (1.06, 1.43)	<0.01	1.27 (1.11, 1.46)	<0.001
Students with at least one child	<0.001	1.06 (0.92, 1.21)	0.403	1.07 (0.93, 1.22)	0.328
Students age 25+	<0.05	1.11 (1.03, 1.19)	<0.01	1.06 (0.99, 1.14)	0.114

Note: Housing insecurity before the pandemic was not asked of students living on campus before the pandemic.

Abbreviations: CI, confidence interval; RR, risk ratio.

4 | DISCUSSION

Overall, findings from our study confirmed previous research which found that students from underrepresented and marginalized backgrounds were at significantly higher risk of experiencing food and housing insecurity both before and after the start of the pandemic. Specifically, sexual minority students, American Indian or Native American

students, Black students, and students of color, international students, first-generation students, students with at least one disability, and students with a chronic illness experienced a greater risk of both food and housing insecurity during the pandemic compared to their counterparts.

4.1 | Changes in basic needs insecurity

The results also provide insight into which student groups experienced changes in food and housing insecurity from pre-pandemic to during. In this study, some previously secure student groups experienced increased vulnerability from before the pandemic to during the pandemic for food and/or housing insecurity compared to their counterparts, indicating presence of newly emerged vulnerable groups. Additionally, some groups that were at increased risk of food or housing insecurity compared to their counterparts before the pandemic were no longer at increased risk during the pandemic, indicating a leveling of vulnerability.

4.1.1 | Newly emerged vulnerable groups

There are certain demographic groups of students in our sample that were not experiencing increased risk of food or housing insecurity before the pandemic, but reported significant increased insecurity compared to their counterparts during the pandemic. We term these groups of students *newly emerged vulnerable groups*.

Newly emerged vulnerable groups for food insecurity included international students, students that lived on campus before the pandemic, students with at least one child, and students aged 25 and older. This finding is supported by previous literature finding international college students experienced higher risk of food insecurity compared to noninternational students during the pandemic (Mialki et al., 2021; Soldavini et al., 2020; Soria et al., 2020c). For students with children, previous literature presents mixed results. Soria et al. (2020c) had similar results reporting students with children are experiencing greater food insecurity during the pandemic compared to students without children. However, Soldavini et al. (2020) found no change in food security from before the pandemic to during the pandemic for students with children. This study adds to the literature and offers additional findings to support the notion that students with children are experiencing increased risk of food insecurity during the pandemic compared to students without children. Furthermore, previous literature has yet to report on college student food insecurity differences based on age group demographics and students living on campus versus off campus during the pandemic; therefore, there is lack of literature to compare the results to.

Newly emerged vulnerable groups for housing insecurity included female students, international students, and first-generation students. As previously mentioned, there is a lack of research that reported on experiences with housing insecurity for college students during the pandemic. This study adds important and novel findings around college student subgroups' risk of housing insecurity during the pandemic.

4.1.2 | Leveling vulnerability

There were two demographic groups of college students that, compared to their counterparts, experienced significantly greater risk of food or housing insecurity before the pandemic but showed similar risk during the pandemic. This indicated that the pandemic may have leveled vulnerability for certain student groups. Undergraduates were significantly more likely to be food insecure than graduate students before the pandemic. However, during the pandemic there was no significant difference in food insecurity between undergraduate and graduate students. The results indicate that while both groups experienced food

insecurity before the pandemic with undergraduate students experiencing significantly higher rates, following the onset of the pandemic, the rates of food insecurity for both groups increased to similar proportions. Therefore, both groups experienced high rates of vulnerability following the onset of the global pandemic, including those with lower levels previously (e.g., graduate students). Thus, assistance with food insecurity should extend to both undergraduate and graduate students during the pandemic to ensure student well-being and academic success. Soria et al. (2020c) also found similar rates of food insecurity between undergraduate and graduate students during the pandemic, further suggesting food insecurity vulnerability was leveled between undergraduate and graduate students during the pandemic.

Additionally, students aged 25 and older experienced increased risk of housing insecurity before the pandemic compared to students 18–24 years old. However, during the pandemic there was no significant difference in risk of housing insecurity for students of certain age groups. These results reflect that students aged 18–24 experienced increased rates of housing insecurity, leveling the differences in housing insecurity rates between students aged 25 and older and students aged 18–24 to similar proportions. Therefore, both groups experienced higher levels of housing insecurity following the global pandemic, including younger college students (ages 18–24) who previously had lower rates of housing insecurity (i.e., had more stable housing). Thus, housing insecurity assistance should extend to students of all ages. This study adds to the literature and offers an additional understanding of how housing insecurity during the pandemic impacted students in different age groups.

4.2 | Consequences of food and housing insecurity for college students

When it comes to basic needs, even before the pandemic, students experiencing food and housing insecurity were at greater risk for a variety of negative outcomes including declined campus involvement, decreased academic performance (e.g., lower GPA), and not completing their studies (Allen & Alleman, 2019; K. M. Broton & Goldrick-Rab, 2017; Hickey et al., 2019; Martinez et al., 2018; Phillips et al., 2018, Silva et al., 2015). While this study does not assess academic success or dropout rates for this particular sample, it is important to note that increased rates of food and housing insecurity negatively impact academic success for students; thus newly insecure students are at higher risk for poor academic outcomes during COVID than previously. More specifically, literature before the pandemic indicated students from low-income families often experience additional material hardships and have to make sacrifices to afford college, including less participation in social activities, increased credit card use, not paying bills, limited utility usages, not buying a computer, and skipping certain educational supplies like textbooks to pay rent (K. M. Broton & Goldrick-Rab, 2016).

Higher education systems and those within have not been spared by the negative effects of the COVID-19 outbreak. In addition to food and housing insecurity, college students experienced challenges such as the need to adapt to online learning, lost wages from family members, lost wages from both on- and off-campus employment, and increased living and technology expenses (Soria et al., 2020a). Additionally, the pandemic negatively impacted the number of students enrolling and continuing in higher education. Since the start of the pandemic and throughout 2020 nationwide, fewer students have completed the Free Application for Federal Student Aid (FAFSA; DeBaun, 2020). According to the National Student Clearinghouse's Fall (2020) report, undergraduate enrollment was down at all types of institutions, except for private for-profit 4-year colleges. Similar to our findings in food and housing insecurity, negative impacts of the pandemic hurt certain groups of students more than others. For example, financial hardships, including lost wages and increased expenses associated with living arrangements and technology, have disproportionately affected first-generation students (Soria et al., 2020a).

4.3 | Limitations

This study included limitations as follows. All data were cross-sectional and self-reported. Therefore, although we refer to two timepoints in our data (e.g., before and during COVID), the data are vulnerable to possible inaccuracies due to potential recall bias. Additionally, contrary to the original USDA scale, risk ratio analysis of food insecurity required a dichotomous food insecure versus food secure variable. Using the scale dichotomously in this way reduced the variability of food insecurity compared to the scale's standard use. Furthermore, participants self-selected to be a part of the study. It may be the case that certain students were more or less likely to participate in the survey, therefore, making the sample less representative of the university population. Additionally, data were collected from July to August of 2020, which includes a limited timeframe during the pandemic and may not reflect experiences during the pandemic overall. Furthermore, while the sample's demographic distribution (e.g., 53% of the sample was White and female) is relative and applicable to our university as it fits the general university enrollment, it may not be generalized to other institutions. Finally, this study was conducted at one large, urban, private university; subsequently, the findings may not generalize to the overall college student population.

4.4 | Recommendations for future directions

We recommend future work focus on a combined research *and* action approach. To understand the lasting impacts of this phenomena further research must be conducted, as this body of literature is currently in its infancy. Additionally, while research is helpful for understanding the context, scope, and impact of the problem, action oriented by research findings must also swiftly be taken to mitigate the harmful effect the COVID-19 pandemic has had on vulnerable university student populations.

4.4.1 | Next steps for research

Future research would benefit by examining longitudinal changes in food and housing security for various demographic groups across time, while controlling for various related factors such as income or employment. Using alternative analyses to preserve the intended format and structure of the food insecurity scale would also be beneficial. Furthermore, having multiple modes of data collection (e.g., online, paper format, and phone call) would allow for and make the study more accessible to a more representative sample. Moreover, it is imperative that research on food and housing insecurity is done through a person–environment interaction lens to evaluate potential environmental or societal changes that can be made in addition to individual support. One approach to researching basic needs insecurity through a person–environment interaction lens would be to employ an ecological systems theory (Bronfenbrenner, 1977). This entails critically researching each ecological level from the perspective of a college student; namely, the microsystem (e.g., roommates, advisors, and clubs), mesosystem (e.g., interactions between microsystem and exosystem), exosystem (e.g., department structure, college major, university administration, communities surrounding university, and locality of university), macrosystem (e.g., social class, culture, federal higher education laws, and federal financial aid), and chronosystem (e.g., socio-historical conditions, societal shifts over time; Renn & Arnold, 2003). For example, we cannot simply focus on assessing experiences and planning interventions at the exosystem level (e.g., higher education institutions). For future action, a holistic approach that centers students' needs and experiences should be utilized when seeking to address food and housing insecurity within higher education systems. Using an ecological perspective may offer researchers and higher education administrators a better understanding of students' challenges and ways to address food and housing security in a more comprehensive way. For example, by implementing an ecological perspective we may understand and intervene at the meso and macrosystem levels in which many barriers affecting students' basic

securities typically occur. Furthermore, special attention needs to be paid to specific subgroups at a higher risk for basic needs insecurities and those who have been disproportionately burdened by the pandemic. While special attention on populations at greater risk of food and housing insecurity is necessary, resources should be accessible to all within higher education regardless of status.

4.4.2 | Call for action

Many higher education systems attempted to buffer the impact of the pandemic, utilizing already existing resources such as student emergency funds and food pantries, including the university where the data were collected. However, moving forward there is a need to generate more creative and collaborative solutions beyond the ones that already exist to address the needs of students exacerbated by the pandemic. Such examples include *Edquity*, Single Stop USA, and college community gardens. Higher education institutions can also work collaboratively with other universities and community-based organizations to address the food and housing crisis by sharing resources. An example of an initiative that includes collaborative partnership across multiple organizational stakeholders is the Addressing Homelessness and Housing Insecurity initiative put forth by the Coalition of Urban and Metropolitan Universities (CUMU). Furthermore, changes need to occur on the macro level, such as policies that will make college students eligible for COVID-19-related economic relief programs, and other programs that will buffer basic need insecurities.

5 | CONCLUSION

This study has brought to light vulnerable subgroups of college students at higher risk for food and housing insecurities and their negative impacts. Results also emphasize that higher education systems are currently unable to sufficiently and equitably support certain historically marginalized groups both before and during this global health crisis. The results raise awareness that certain BIPOC students, sexual and gender minority students, first-generation students, and students with chronic illness or disabilities are disproportionately represented among needs-insecure students during the pandemic; which as extant literature has noted, often leads to reduced academic success (Baker-Smith et al., 2020; Goldrick-Rab et al., 2020; Patton-López et al., 2014; Silva et al., 2015). This study challenges university systems and higher education in the United States to do the work necessary to ensure students have safe, stable, and secure learning environments. The COVID-19 pandemic has exacerbated college students' experiences with food and housing insecurity. Much work needs to be done both now and in the future to address student needs and inequities to allow for academic progression and to mitigate prevalence of basic needs insecurity among college students moving forward.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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REFERENCES

- Allen, C. C., & Alleman, N. F. (2019). A private struggle at a private institution: Effects of student hunger on social and academic experiences. *Journal of College Student Development*, 60(1), 52–69. <https://doi.org/10.1353/csd.2019.0003>
- Baker-Smith, C., Coca, V., Goldrick-Rab, S., Looker, E., Richardson, B., & Williams, T. (2020). #RealCollege 2020: Five years of evidence on campus basic needs insecurity. https://hope4college.com/wp-content/uploads/2020/02/2019_RealCollege_Survey_Report.pdf
- Berkowitz, S. A., Berkowitz, T. S. Z., Meigs, J. B., & Wexler, D. J. (2017). Trends in food insecurity for adults with cardiometabolic disease in the United States: 2005–2012. *PLoS One*, 12(6), e0179172. <https://doi.org/10.1371/journal.pone.0179172>
- Bronfenbrenner, U. (1977). Toward an experimental ecology of human development. *American Psychologist*, 32(7), 513–531. <https://doi.org/10.1037/0003-066X.32.7.513>
- Broton, K., Frank, V., & Goldrick-Rab, S. (2014). *Safety, security, and college attainment: An investigation of undergraduates' basic needs and institutional response*. Wisconsin HOPE Lab.
- Broton, K. M., & Goldrick-Rab, S. (2016). The dark side of college (un)affordability: Food and housing insecurity in higher education. *Change: The Magazine of Higher Learning*, 48(1), 16–25. <https://doi.org/10.1080/00091383.2016.1121081>
- Broton, K. M., & Goldrick-Rab, S. (2017). Going without: An exploration of food and housing insecurity among undergraduates. *Educational Researcher*, 47(2), 121–133. <https://doi.org/10.3102/0013189X17741303>
- Bruening, M., Argo, K., Payne-Sturges, D., & Laska, M. N. (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), 1767–1791. <https://doi.org/10.1016/j.jand.2017.05.022>
- Coleman-Jensen, A., Rabbit, M. P., Gregory, C. A., & Singh, A. (2019). Household food insecurity in the United States in 2018 U.S Department of Agriculture. *Economic Research Service*, 270, 1–47. <https://www.ers.usda.gov/webdocs/publications/94849/err-270.pdf?v=8728.9>
- DeBaun, B. (2020). FormYourFuture FAFSA tracker: How has FAFSA completion changed nationally and in different kinds of high schools during the COVID-19 pandemic? <https://public.tableau.com/app/profile/bill.debaun.national.college.access.network/viz/COVID-19andFAFSACompletion/COVID-19FAFSA>
- Dixon, L. B., Winkleby, M. A., & Radimer, K. L. (2001). Dietary intakes and serum nutrients differ between adults from food-insufficient and food-sufficient families: Third national health and nutrition examination survey, 1988–1994. *The Journal of Nutrition*, 131(4), 1232–1246. <https://doi.org/10.1093/jn/131.4.1232>
- El Zein, A., Shelnett, K. P., Colby, S., Vilaro, M. J., Zhou, W., Greene, G., Olfert, M. O., Riggsbee, K., Morrell, J. S., & Mathews, A. E. (2019). Prevalence and correlates of food insecurity among U.S college students: A multi-institutional study. *BMC Public Health*, 19(2019), 660. <https://doi.org/10.1186/s12889-019-6943-6>
- Freundenberg, N., Goldrick-Rab, S., & Poppendieck, J. (2019). College students and SNAP. The new face of food insecurity in the United States. *American Journal of Public Health*, 109, 1652–1658. <https://doi.org/10.2105/AJPH.2019.305332>
- Gaines, A., Robb, C. A., Knol, L. L., & Sickler, S. (2014). Examining the role of financial factors, resources and skills in predicting food security status among college students. *International Journal of Consumer Studies*, 38, 374–384. <https://doi.org/10.1111/ijcs.12110>
- Goldrick-Rab, S., Baker-Smith, C., Coca, V., Looker, E., & Williams, T. (2019). *College and university basic needs insecurity: A national #RealCollege Survey report*. https://hope4college.com/wp-content/uploads/2019/04/HOPE_realcollege_National_report_digital.pdf
- Goldrick-Rab, S., Coca, V., Kienzl, G., Welton, C. R., Dahl, S., & Magnolia, S. (2020). *New evidence on basic needs insecurity and student well-being*. https://tacc.org/sites/default/files/2020-12/hopecenter_realcollegeduringthepandemic.pdf
- Goldrick-Rab, S., Richardson, J., & Hernandez, A. (2017). *Hungry and homeless in college: Results from a national study of basic needs insecurity in higher education*. <https://hope4college.com/wp-content/uploads/2018/09/Hungry-and-Homeless-in-College-Report.pdf>
- Goldrick-Rab, S., Richardson, J., Schneider, J., Hernandez, A., & Cady, C. (2018). *Still hungry and homeless in college*. <https://hope4college.com/wp-content/uploads/2018/09/Wisconsin-HOPE-Lab-Still-Hungry-and-Homeless.pdf>
- Hallett, R. E., & Crutchfield, R. (2017). Homelessness and housing insecurity in higher education: A trauma-informed approach to research, policy, and practice. *ASHE Higher Education Report*, 43, 7–118. <https://doi.org/10.1002/cc.20326>
- Henry, L. (2017). Understanding food insecurity among college students: Experience, motivation, and local solutions. *Annals of Anthropological Practice*, 41, 6–19. <https://doi.org/10.1111/napa.12108>
- Hickey, A., Shields, D., & Henning, M. (2019). Perceived hunger in college students related to academic and athletic performance. *Education Sciences*, 9(3), 242. <https://doi.org/10.3390/educsci9030242>

- Jason, L. A., Glantsman, O., O'Brien, J. F., & Ramian, K. N. (2019). *Introduction to Community Psychology: Becoming an agent of change*. Rebus Foundation. <https://press.rebus.community/introductiontocommunitypsychology/>
- Joint Center for Housing Studies of Harvard University. (2020). *The state of the nation's housing 2020*. https://www.jchs.harvard.edu/sites/default/files/reports/files/Harvard_JCHS_The_State_of_the_Nations_Housing_2020_Report_Revised_120720.pdf
- Jones, A. D. (2017). Food insecurity and mental health status: A global analysis of 149 countries. *American Journal of Preventive Medicine*, 53(2), 264–273. <https://doi.org/10.1016/j.amepre.2017.04.008>
- Kushel, M. B., Gupta, R., Gee, L., & Haas, J. S. (2006). Housing instability and food insecurity as barriers to health care among low-income Americans. *Journal of General Internal Medicine*, 21(1), 71–77. <https://doi.org/10.1111/j.1525-1497.2005.00278.x>
- Martinez, S. M., Frongillo, E. A., Leung, C., & Ritchie, L. (2018). 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), 1930–1939. <https://doi.org/10.1177/1359105318783028>
- McNemar, Q. (1947). Note on the sampling error of the difference between correlated proportions or percentages. *Psychometrika*, 12(2), 153–157.
- Mialki, K., House, L. A., Matthews, A. E., & Shelnett, K. P. (2021). Covid-19 and college students: Food security status before and after the onset of a pandemic. *Nutrients*, 13(9), 628. <https://doi.org/10.3390/nu13020628>
- National Public Radio, Robert Wood Johnson Foundation, & Harvard T. H. Chan School of Public Health. (2020). *The impact of the Coronavirus on households in major U.S. cities*. <https://media.npr.org/assets/img/2020/09/08/cities-report-090920-final.pdf>
- National Student Clearinghouse Research Center. (2020). *Fall 2020 undergraduate enrollment down 4% compared to same time last year*. <https://www.studentclearinghouse.org/blog/fall-2020-undergraduate-enrollment-down-4-compared-to-same-time-last-year/>
- Owens, M. R., Brito-Silva, F., Kirkland, T., Moore, C. E., Davis, K. E., Patterson, M. A., Miketinas, D. C., & Tucker, W. J. (2020). Prevalence and social determinants of food insecurity among college students during the COVID-19 pandemic. *Nutrients*, 12(9), 2515. <https://doi.org/10.3390/nu12092515>
- Patton-López, M. M., López-Cevallos, D. F., Cancel-Tirado, D. I., & Vazquez, L. (2014). Prevalence and correlates of food insecurity among students attending a midsize rural university in Oregon. *Journal of Nutrition Education and Behavior*, 46(3), P209–P214. <https://doi.org/10.1016/j.jneb.2013.10.007>
- Phillips, E., McDaniel, A., & Croft, A. (2018). Food insecurity and academic disruption among college students. *Journal of Student Affairs Research and Practice*, 55(4), 353–372. <https://doi.org/10.1080/19496591.2018.1470003>
- R Core Team. (2020). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing. <https://www.R-project.org/>
- Renn, K. A., & Arnold, K. D. (2003). Reconceptualizing research on college student peer culture. *The Journal of Higher Education*, 74(3), 261–293.
- Selker, R., Love, J., & Dropmann, D. (2020). *jmv: The "jamovi" Analyses*. R package version 1.2.23. <https://CRAN.R-project.org/package=jmv>
- Silva, M. R., Kleinert, W. L., Sheppard, A. V., Cantrell, K. A., Freeman-Coppadge, D. J., Tsoy, E., Roberts, T., & Pearrow, M. (2015). The relationship between food security, housing stability, and school performance among college students in an urban university. *Journal of College Student Retention: Research, Theory & Practice*, 19(3), 284–299. <https://doi.org/10.1177/1521025115621918>
- Sistrom, C. L., & Garvan, C. W. (2004). Proportions, odds, and risk. *Radiology*, 230(1), 12–19. <https://doi.org/10.1148/radiol.2301031028>
- Soldavini, J., Andrew, H., & Berner, M. (2020). Characteristics associated with changes in food security status among college students during the COVID-10 pandemic. *Translational Behavioral Medicine*, 11(2), 295–304. <https://doi.org/10.1093/tbm/ibaa110>
- Soria, K. M., Horgos, B., Chirikov, I., & Jones-White, D. (2020a). *First-generation students' experiences during the COVID-19 pandemic*. <https://conservancy.umn.edu/bitstream/handle/11299/214934/First-Generation%20Students.pdf?sequence=1%26isAllowed=y>
- Soria, K. M., Horgos, B., Chirikov, I., & Jones-White, D. (2020b). *The experiences of undergraduate students with physical, learning, neurodevelopmental, and cognitive disabilities during the pandemic*. https://conservancy.umn.edu/bitstream/handle/11299/216715/_Students%20With%20Physical%2c%20Learning%2c%20Neurodevelopmental%2c%20or%20Cognitive%20Disabilities.pdf?sequence=1%26isAllowed=y
- Soria, K. M., Horgos, B., Jones-White, D., & Chirikov, I. (2020c). *Undergraduate, graduate, and professional students' food insecurity during the COVID-19 pandemic*. https://escholarship.org/content/qt761144mh/qt761144mh_noSplash_b1b6383236868d967f61f2d56f87da4f.pdf?t=qfxb2t

- Townley, G., Stewart, K., Greene, J., & Petteni, M. (2020). *Housing and food insecurity at Portland State University*. https://www.pdx.edu/homelessness/sites/g/files/znlchr1791/files/2020-09/PSU%20Housing%20%26%20Food%20Insecurity_Final%20Report.pdf
- U.S Department of Agriculture (USDA), Economic Research Service. (2012). *U.S adult food security survey module: Three-stage design, with screeners*. <https://www.ers.usda.gov/media/8279/ad2012.pdf>
- U.S Department of Agriculture (USDA), Economic Research Service. (2020). *Key statistics and graphics*. <https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/key-statistics-graphics.aspx>
- Willis, D. (2019). Feeding the student body: Unequal food insecurity among college students. *American Journal of Health Education, 50*(3), 167–175. <https://doi.org/10.1080/19325037.2019.1590261>
- Wood, J. L., & Harris, F. (2018). Experiences with “acute” food insecurity among college students. *Educational Researcher, 47*(2), 142–145. <https://doi.org/10.3102/0013189X17752928>

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