


Article

Hunger in Higher Education: Experiences and Correlates of Food Insecurity among Wisconsin Undergraduates from Low-Income Families

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Abstract: There is growing awareness that a substantial share of undergraduates are food insecure, potentially undermining investments in higher education and hindering upward social mobility. This mixed-methods paper uses survey and interview data from low-income students at 42 public colleges and universities in Wisconsin to illuminate the day-to-day experiences of food insecurity and examine how food security status varies across background characteristics. Results indicate that students who grew up in food insecure homes, self-identify as a racial/ethnic minority, live off-campus, and attend college in an urban area are significantly more likely to report the lowest level of food security, often associated with hunger. Students explain that challenges stemming from the interrelationship of lack of time and inadequate money are their biggest barriers to food security. Most rely on friends or family for support, but few students draw on the social safety net, in part due to eligibility restrictions. In recognition of the diversity of students' experiences, we discuss the need for a multi-faceted response to promote food security and student success.

Keywords: higher education; poverty; mixed methods

1. Introduction

There is growing awareness that a substantial share of college students, and particularly those from economically disadvantaged backgrounds, attend college without first securing their basic needs (e.g., Bahrapour 2014; Dewey 2018; Eltman 2013; Reed 2017). Since 2000, the net price of college has increased while real family incomes have stagnated (Goldrick-Rab 2016). As a result, most students and their families have fewer resources, but face higher out-of-pocket costs to attend college, forcing some to encounter difficult tradeoffs between paying for college or meeting their basic needs. Recent estimates indicate that approximately half of U.S. college students experience some form of food insecurity, defined as the “limited or uncertain availability of nutritionally adequate and safe foods, or the limited or uncertain ability to acquire such foods in a socially acceptable manner” (Anderson 1990, p. 1560; Broton and Goldrick-Rab 2018; Bruening et al. 2017; Crutchfield and Maguire 2018; Martinez et al. 2016; Nazmi et al. 2018). Strong theory and a growing body of empirical evidence indicate that food insecurity is associated with poorer academic performance, potentially undermining investments in higher education and hindering upward social mobility (Broton 2017; Goldrick-Rab et al. 2018; Maroto et al. 2015; Martinez et al. 2016; Morris et al. 2016; Patton-López et al. 2014).

Scholars have long examined how individual- or household-level factors are associated with food insecurity in the U.S. population and report that those with low-incomes, racial/ethnic minorities, immigrants, households with children, and elders are particularly vulnerable to food challenges (e.g., [Coleman-Jensen et al. 2016](#); [RTI International 2014](#)). Recently, public health scholars have replicated these “risk analyses” on college students and find that many of the same background characteristics, including race/ethnicity and income, are associated with food insecurity in this population as well ([Chaparro et al. 2009](#); [Gaines et al. 2014](#); [Martinez et al. 2017](#); [Payne-Sturges et al. 2018](#)). In the U.S., however, individual characteristics work in concert with structural factors to define one’s material experiences and life chances (e.g., [Desmond 2016](#); [Desmond and Kimbro 2015](#)). Food insecurity rates also vary by contextual factors including geographic location (e.g., due to the local labor market and unemployment rates; availability of public and private supports; and the price of other expenses like housing) ([RTI International 2014](#)). Extant studies of college students, however, fail to consider contextual factors; in addition, the reliance on quantitative data inhibits our ability to understand how students’ backgrounds influence their college food insecurity experiences.

In this mixed-methods paper, we use survey data from students at 42 public two- and four-year colleges to examine which individual and contextual factors are associated with students’ food security during college and longitudinal interview data to elaborate on their food insecurity experiences, key barriers, and coping mechanisms. Consistent with prior quantitative research, we find that racial/ethnic minorities, those who grew up in food insecure homes, and those who live off campus are at greater risk of food insecurity, net of background factors ([Martinez et al. 2017](#)). Additionally, we find that those who attend colleges located in urban areas are also at an increased risk of food insecurity, all else equal. Survey data indicate that lack of time and money are major barriers to food security and in-depth interviews illustrate the interrelated nature and forms of these challenges. To help pay for food, the majority of students rely on friends and family while few use food stamps, though usage varied across groups and contexts. Finally, we draw on students’ insights to discuss potential solutions to improve food security, bolster academic success, and promote socioeconomic mobility.

1.1. Background and Literature Review

Higher education is one of the few routes to upward mobility for those wanting to break the cycle of poverty, but an extensive body of research documents barriers to college access and success for students from low-income families (e.g., [Alon 2009](#); [Bailey and Dynarski 2011](#); [Bastedo and Jaquette 2011](#); [Chetty et al. 2014](#); [Choy 2002](#); [Haskins and Sawhill 2009](#); [Perna 2006](#); [Ziol-Guest and Lee 2016](#)). Very little of that research, however, examines the daily lived experiences of students as related to their material well-being—the basic goods and services deemed necessary for decent human functioning, including adequate food and shelter ([Ouellette et al. 2004](#)). Food security is a fundamental pillar of material well-being and often considered a human right ([Alston and Tomaševski 1984](#); [Ouellette et al. 2004](#); [United Nations Centre for Human Rights 1989](#)). Human development theory holds that one’s basic needs must be met in order to pursue higher-level skills ([Maslow 1943](#)). In K-12 education, this relationship is recognized and mediated by the provision of free- or reduced-priced meals to students in need, but no such support exists in higher education ([Levine 2008](#)).

Although food security status and income are strongly associated, they are conceptually and empirically distinct. For example, fewer than half of U.S. households living below the official income poverty line are food insecure ([Coleman-Jensen et al. 2016](#)). Food secure households with limited incomes may rely on strong social networks or grow their own food, for example, to get enough to eat. Similarly, those with incomes above the official income poverty line may be food insecure; high and rising housing prices, in particular, leave little room in the budget for food expenses (e.g., [Desmond 2016](#); [Joyce et al. 2012](#)). Moreover, expenses related to particular events or circumstances such as a health problem or college attendance, for instance, may trigger food insecurity for those who

could otherwise make ends meet. Income interacts with multiple factors to influence one's odds of food security. Within the same income category, racial/ethnic minorities, for example, are at an increased risk of food insecurity due to a confluence of factors including differences in accumulated wealth, transportation, and social and community resources (Nam et al. 2015; RTI International 2014). So even among those with low incomes, there is considerable variation in food insecurity risks and experiences due to the myriad of social, environmental, and political factors that influence material well-being.

Despite growing awareness of food insecurity and hunger on college campuses, “[college] food insecurity is faceless, has no standard image, and is often silent” (Henry 2017, p. 9). A burgeoning body of survey studies indicate that a disproportionate share of college students of color and/or those from low-income families are food insecure (Gaines et al. 2014; Payne-Sturges et al. 2018; El Zein et al. 2017). Some studies also suggest that food-insecure students are more likely to be employed than their food-secure peers, likely because they seek employment opportunities as a way to help make ends meet (Freudenberg et al. 2011; Goldrick-Rab et al. 2018; Patton-López et al. 2014). Based on the larger body of food insecurity literature, we hypothesize that additional factors—not regularly considered in prior studies of college students—may also be associated with food insecurity, including childhood experiences of food insecurity (Alaimo 2005). Although food insecurity tends to be a transient experience, rather than a persistent condition, childhood disadvantage is associated with a greater risk of food insecurity in adulthood (Martinez et al. 2017; Ryu and Bartfeld 2012; Sarlio-Lahteenkorva and Lahelma 2001; Wilde et al. 2010). Additionally, the type of college one attends, where one lives while enrolled, or the community in which their college is located may influence students' odds of food security. For instance, the two-year college sector serves a disproportionate share of students from low-income families, racial/ethnic minorities, and student parents and many of these institutions express a commitment to serving their community (Goldrick-Rab et al. 2013; Daugherty et al. 2016). As a result, these colleges may be more experienced or better equipped to serve students struggling to make ends meet. Multiple factors affect where students live during college, including housing availability or supply, but students concerned about making ends meet may be less likely to live on campus. Similarly, experiences and causes of food insecurity vary across geographic location. In Wisconsin, urban areas have higher-than-average poverty rates and greater shares of racial/ethnic minorities; the experiences and resources available to those living on the margins also varies across communities (Bishaw and Posey 2016; Isaacs et al. 2010; RTI International 2014).

While sociodemographic correlates are useful in identifying the types of individuals at increased risk of food insecurity, they provide few insights into the ways in which students experience and cope with hunger and food insecurity. Qualitative studies reveal that insufficient resources, time, transportation and kitchen facilities contribute to inadequate consumption and poor diet quality among college students (Crutchfield and Maguire 2018; Henry 2017). To cope, students not only turn to cheaper and less nutritious food options (e.g., fast food or pre-packaged noodles), but they also utilize their personal networks and some rely on food pantries or soup kitchens (Crutchfield and Maguire 2018; Henry 2017). Henry (2017) reported that food-insecure students are often reluctant to seek outside assistance, including applying for food stamps (i.e., SNAP or Supplemental Nutrition Assistance Program) due to stigma or disbelief that this public benefit was available to them. According to one estimate, just 1 in 5 eligible college students use food stamps (Bianco et al. 2016). Currently, college students must meet income and asset criteria and a supplemental criterion, including caring for a dependent child, working at least 20 h per week, receiving work-study funds, receiving TANF (Temporary Assistance to Needy Families) benefits, or participating in certain employment-related programs, to qualify for SNAP benefits (Duke-Benfield 2015).

This is the first mixed-methods study to examine food insecurity among college undergraduates. The purpose is to illuminate the day-to-day experiences of food-insecure students and examine how food security status varies across background factors. We build on prior research that focuses on student characteristics and expand to consider how college and community factors may also influence the incidence of student food security. Additionally, we analyze how these characteristics are

associated with specific types of food-related challenges and supports for students with the lowest levels of food security, often associated with hunger. Finally, we leverage this mixed-methods analysis in our assessment of implications and offer potential responses to alleviate food insecurity among college students.

1.2. Conceptual Model

Alaimo (2005) conceptual model provides our framework for understanding the predictors and consequences of food insecurity, which are mediated by various coping strategies. In this paper, we adapt the model to better fit the college context and articulate the implicit link between risk factors and food security status to understand the specific types of food-related challenges that food-insecure students experience. Specifically, food insecurity risk factors include sociodemographic background characteristics, childhood experiences of food insecurity, limited financial resources, employment status, and the college and community environment. These risk factors may manifest in challenges related to a lack of resources, time, transportation, or kitchen facilities necessary for food security. We categorize coping strategies as formal institutional supports and informal supports, and potential consequences include impaired physical and mental health and decreased academic achievement and attainment (Figure 1).

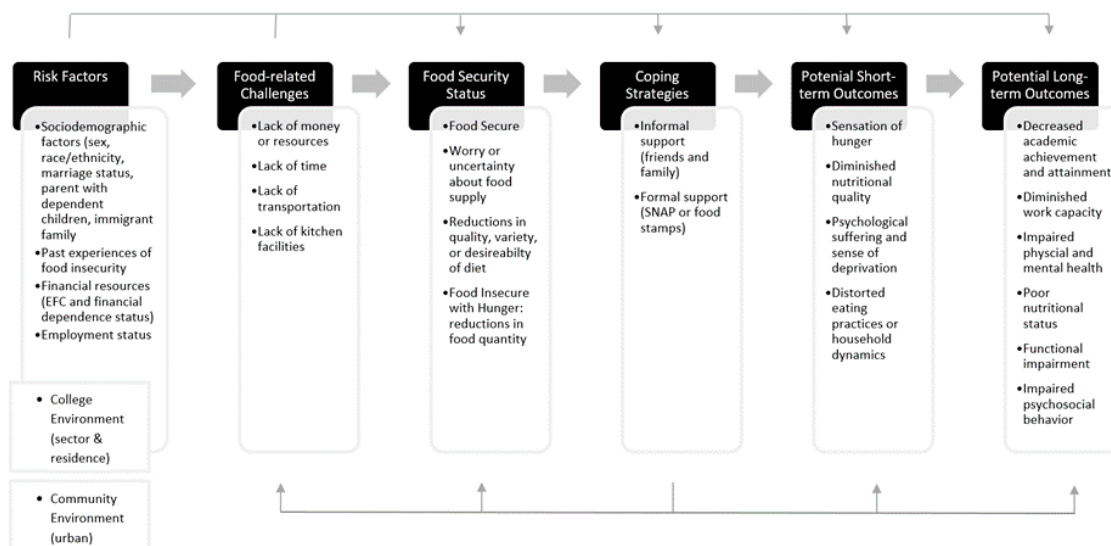


Figure 1. Conceptual Model of Food Insecurity. Note: Adapted from Alaimo (2005) for the college context.

1.3. Research Questions

This paper examines the following research questions:

1. What are the manifestations of undergraduate food insecurity, how prevalent is the problem, and how do these experiences vary across background factors?
2. What are the key barriers to food security for food-insecure students and how do these challenges vary across background factors?
3. What are food-insecure students' coping strategies and how do they vary across background factors?

For each question, we leverage survey and interview data to better understand and explain the experiences of food insecurity during college.

2. Data and Empirical Approach

We use data from the Wisconsin Scholars Longitudinal Study (WSLS), a state-wide study of 3000 undergraduates from low-income families who enrolled in one of the state's 42 public two- or four-year colleges or universities in 2008. To be eligible for the study, students had to be Wisconsin residents who attended and graduated from a state public high school or earned a Wisconsin High School Equivalency Diploma within three years of college matriculation; enroll for at least 12 credits; complete the Free Application for Federal Student Aid (FAFSA) and qualify for a federal Pell Grant, while still possessing unmet need (excluding loans). Among those who met these criteria, 3000 were randomly selected for study inclusion using administrative records.¹

In 2008, a stratified random sample of 50 study participants (blocked by race/ethnicity, gender, and institution) were invited to participate in repeated in-depth interviews from a pool of those willing to participate. The WSLS research team interviewed students approximately every six months between 2008 and 2010 and then annually through 2012. Students continued to be interviewed regardless of their college enrollment status. The interviews were semi-structured and focused on students' college experiences and in particular, any financial challenges. The interview protocol covered a range of topics including work, family, home and school life, and money. They generally did not include probing questions about food insecurity. However, since some students revealed challenges with hunger during the first wave of interviews—typically in response to an open-ended question about challenges to college success—all students were asked about their eating habits in the second wave of interviews. In this paper, we only include information from the six students who talked about their experiences of food insecurity during college in the interviews. For a summary of these students' backgrounds, food challenges, and coping strategies, see Table A1.

In fall 2009, nearly two-thirds of WSLS students ($n = 1879$) were invited to participate in a survey about their college experiences.² The survey included several questions about students' food insecurity experiences based on information provided in the first two interview waves and extant research. The analytic survey sample for this paper includes 1339 students who responded to all of the food security questions and for which background information was available, representing a 71% response rate.

2.1. Survey Measures

Food insecurity experiences exist on a spectrum including anxiety over food sufficiency; reductions in the quality, variety, or desirability of diet; and disrupted eating patterns resulting in reduced food intake (Coleman-Jensen et al. 2016). Furthermore, food insecurity is a multi-dimensional concept and there is significant debate regarding the best way to measure it (Carletto et al. 2013; Webb et al. 2006). Nationally, food insecurity is measured at the household level using the U.S. Department of Agriculture's (USDA) food security scale (Bickel et al. 2000). In this study, we measure food insecurity at the individual level using the USDA food screener and three additional questions from the USDA scale, which include the caveat that students' food challenges are the result of financial challenges. Specifically, we asked students to indicate (yes/no) if in the past 30 days they experienced any of the following:

- Did not eat for a whole day because there was not enough money for food
- Cut the size of your meals or skip meals because there was not enough money for food
- Ate less than you felt you should because there was not enough money to buy food

¹ A subsample of study participants were offered additional grant aid. The grant did not impact students' food security levels and so we use the full study sample in our analysis. Robustness checks that only consider students who were not offered the grant are qualitatively similar.

² Due to resource limitations, the research team invited a sub-sample of students to participate based on eligibility criteria described above and past study participation.

Additionally, students were asked to select the single best description of their food security status over the past 30 days:

- Enough of the kinds of food I want
- Enough but not always the kinds of food I want to eat
- Sometimes not enough to eat
- Often not enough to eat

From these survey items, we created a measure of food insecurity with hunger, which is conceptualized as reduced food intake. Hunger is the uneasy or painful sensation resulting from a lack of food, which we infer from an affirmative response to individual-level questions about disrupted eating patterns or reduced food intake (Anderson 1990; Bickel et al. 2000). Specifically, an affirmative response to at least one of the following indicates food insecurity with hunger: did not eat for whole day, cut or skipped meals; ate less than wanted; or often or sometimes did not eat enough.

To better understand students' food-related challenges, the 2009 survey also included the following questions that instructed students to indicate (yes/no) if any of the following posed barriers to getting enough to eat in the past 30 days:

- Not have enough time to eat because of a busy schedule
- Not have transportation to get to the store to purchase food
- Not have working appliances for storing or preparing food

We use these questions to illustrate the daily experiences and perceived barriers of students who are food insecure; they are not used to determine the prevalence of food insecurity. Finally, the survey asked students to indicate (yes/no) if in the past 30 days they had "used food stamps to purchase food" or "received help from family or friends to pay for groceries or other food". The 30-day reference period allows us to focus on students' experiences during the academic term.

Following Alaimo's conceptual model (Figure 1), the independent variables of interest include measures of sociodemographic factors; past experiences of food insecurity; financial resources and employment status; and college and community environment. With the exception of race/ethnicity and immigrant family status, information on students' sociodemographic background comes from their FAFSA completed prior to college entry including sex (female or male), whether or not a student is married, and parental status indicating at least one dependent child. Students who self-identified as African American, Latino, Southeast Asian, or Native American on a survey are considered racial/ethnic minorities according to University of Wisconsin System policy. We consider students to be part of an immigrant family if the student or a parent was born outside of the U.S. (dummy equal to 1). To capture prior experiences of food insecurity, we use the following 2009 survey question: "When I was growing up there was not enough to eat at home". We consider respondents who indicated that this was "never" true as food secure during childhood and those who reported that it was "always, often, sometimes, or rarely" true as experiencing food insecurity during childhood.

Information on students' financial resources also comes from the FAFSA, including students' expected family contribution (dichotomous; equal to 1 if EFC = 0) and financial dependency status (equal to 0 if independent and 1 if dependent). The EFC is an estimation of a students' or parents' ability to contribute to the financial costs of a college education and is used in determining applicants' eligibility for need-based federal student aid, including the Pell Grant. The EFC is minimized at zero, indicating that a family is not expected to contribute to the cost of college. Students can be considered financially independent for several reasons including if they are over age 23, married, or have dependent children. We use information from the 2009 survey to determine if students are currently employed (dichotomous equal to 1 if worked in the past week) and their current residence including living in the home of a parent or guardian, in an on-campus residence hall or apartment, in an off-campus residence, or other living situation. Finally, we include a dummy for sector of college enrollment (0 = two-year college and 1 = four-year university) and urban environment (dichotomous equal to 1), defined as attending college in a city with a population over 250,000 (Provasnik et al. 2007).

2.2. Analytic Sample

Approximately 6 in 10 survey respondents are female and 1 in 4 self-identify as African American, Latino, Southeast Asian, Native American, or multiracial and are considered racial/ethnic minorities according to University of Wisconsin System policy. Almost all (95%) students are dependent on their family for financial aid purposes, just 1% are married and 3% have children. Thirty-five percent come from families that are not expected to financially contribute to their college education due to limited resources and half reported that they grew up in homes that struggled with food insecurity. Sixty-two percent of students are currently employed. Approximately one-third live at home with a parent or guardian, one-third live on campus, and nearly one-third live off campus. Sixty-four percent attend a four-year college or university and nearly 1 in 3 attend a college that is located in an urban area. Because the full WSLs study sample was not eligible to participate in the fall 2009 survey, the analytic sample is not representative of the full study sample; it tends to be more advantaged than the typical traditional-age low-income student in Wisconsin at the time. Specifically, a smaller share come from families with a zero dollar expected family contribution, identify as a racial/ethnic minority or have a child while a greater share attend a four-year university and are financially dependent (Table 1).

Table 1. Sample characteristics.

Characteristic (%)	WSLS	Analytic Sample
<i>Sociodemographic factors</i>		
Female	58.7	60.8
Racial/ethnic minority ^a	28.3	26.1
African American	10.2	7.6
Latino	7.1	5.7
Southeast Asian	6.9	9.0
Native American	4.1	3.8
Married	4.0	0.8
Student has a child or children	13.1	3.3
Immigrant family	N/A	15.3
<i>Past experiences of food insecurity</i>		
Childhood food insecurity	N/A	50.6
<i>Financial resources and employment status</i>		
Zero dollar expected family contribution	40.7	35.4
Financially dependent	82.4	94.5
Employed	N/A	61.6
<i>College and community environment</i>		
Current residence		
Home of parent or guardian	N/A	34.1
On-campus residence hall or apartment	N/A	34.3
Off-campus residence	N/A	31.1
Other	N/A	0.5
Four-year college	50.0	64.3
Urban	26.6	30.3
<i>N</i>	3000	1339

^a Racial/ethnic minority groups include African American, Latino, Southeast Asian, and Native American according to University of Wisconsin System policy. N/A means not available. Notes: Data come from students' 2008 FAFSA and WSLs surveys. No imputation is performed for missing data items. Data from survey measures are only available for the analytic sample. The analytic sample is statistically different from the full WSLs sample for all measures listed ($p < 0.05$).

2.3. Analytic Approach

In this mixed-methods analysis, we used the quantitative and qualitative data in an iterative fashion to inform the other (Creswell and Clark 2017). First, we read the complete interview transcripts of all 50 participants and identified six students who discussed problems with food adequacy or

sufficiency. Next, we inductively coded food-related instances in these transcripts and identified several emergent themes: (a) childhood experiences of hunger, (b) experiences of living with family as they relate to food availability, (c) the receipt of food assistance, (d) the need to skip meals, and (e) challenges created by expensive prices of campus meals and food availability on campus (Charmaz 2006).

Then, we turned to the survey data and identified survey items related to these emergent themes and/or existing theoretical and empirical evidence regarding experiences of food insecurity among undergraduates. To examine the scope of the food insecurity problem, we report the share of students who answered in the affirmative to each survey item as well as the share responding in the affirmative to at least one question about food insecurity with hunger.

Next, we used multivariable logistic regression to predict food insecurity while controlling for background factors described above. We report logit coefficients and predicted probabilities to aid in interpretation. In the Appendix, we also provide a table showing the incidence of food insecurity by background factors and examine differences using chi-square tests as a reference for the reader (Table A2). Then, we turned to the longitudinal interview data to examine how food insecurity manifests in multiple ways and provide possible explanations for statistical relationships. We also supplement and elaborate on the survey findings with additional insights from the interviews and provide illustrations using students' direct quotes whenever possible.

Finally, we focus on the experiences of students who are food insecure with hunger. We used survey data and chi-square tests to examine if their particular challenges and coping strategies vary by background factors. Again, we rely on interview data to provide additional insights on the unique food security challenges of college students and to shed light on the coping strategies they employ in their struggles to get enough to eat. Given the iterative nature of our analysis, we integrate quantitative and qualitative findings in the results section.

2.4. Context and Limitations

The research team asked students about their food security challenges in 2009, shortly after the start of the Great Recession at a time when national food insecurity rates jumped sharply (Coleman-Jensen et al. 2016). Though the study took place during an economic recession, food insecurity rates have remained high even as other economic conditions have improved (Coleman-Jensen et al. 2016). Although there are no nationally representative or longitudinal studies of college students' food insecurity, the best evidence suggests that food insecurity rates among college students have not improved in recent years (Broton and Goldrick-Rab 2018). Similarly, the study only includes students attending public colleges and universities in Wisconsin, but the problem is not unique to the state (Bruening et al. 2017; Nazmi et al. 2018). Wisconsin's food insecurity rates, however, are typically below the national average (Feeding America 2018). Data limitations do not allow us to fully consider Alaimo's original conceptual model, nor all of the potential ways in which individual, college, and community environments may matter for undergraduate food security. Statistical relationships should be interpreted as associational since omitted variable bias remains a concern and the analyses do not support causal conclusions. Finally, we measure food insecurity using part of the USDA's validated scale over a single 30-day period (Bickel et al. 2000).

3. Results | Experiences of Food Insecurity

Our interviewees' experiences of food insecurity looked different from one another in ways that are both indicative of the range of experiences as categorized in the survey data, and help demonstrate the complex lived experience of these classifications. After describing the types and frequencies of food insecurity demonstrated in the survey data, we utilize excerpts from the interviews of one particular student, Cocoa, to add nuance to the quantitative data and underscore the importance of our multivariable analysis. We then use excerpts from other students to highlight particular challenges and coping strategies in regards to food insecurity. These qualitative findings both align with and add richness to our conceptual model, underscoring the importance of understanding food insecurity

as existing along a spectrum and thereby requiring the response of multifaceted research, policy, and collegiate practices.

3.1. Prevalence and Forms of Food Insecurity

From the survey, thirty percent of students experienced food insecurity with hunger as evidenced by at least one of the following non-mutually exclusive indicators: eating less than they felt they should because there was not enough money to buy food (21%), cutting or skipping meals because there was not enough money for food (21%), sometimes not getting enough to eat (9%), not eating for a whole day because there was not enough money for food (7%), and often not getting enough to eat (1%) (Table 2). Eighteen percent of respondents answered in the affirmative to two or more of these survey items.

Table 2. Indicators of food insecurity with hunger.

Measure	Analytic Sample (%)
Food insecure with hunger (at least one of the following indicators):	30.0
<i>Eat less than you felt you should because there was not enough money to buy food</i>	21.1
<i>Cut the size of your meals or skip meals because there was not enough money for food</i>	20.9
<i>Sometimes I do not get enough to eat</i> ^a	8.5
<i>Not eat for a whole day because there was not enough money for food</i>	7.0
<i>Often, I do not get enough to eat</i> ^a	1.2

N = 1339. ^a indicates mutually exclusive response options to the following question: Which of these statements best describes the food eaten by you during the past 30 days? Response options include Enough of the kinds of food I want (43.6%); Eat enough but not always the kinds of food I want to eat (46.7%); Sometimes not enough to eat (8.5%); and Often not enough to eat (1.2%). Notes: Reference period for all questions is the past 30 days.

We use multivariable logistic regression to examine relationships between the characteristics described in our conceptual model and food insecurity with hunger during college. Results indicate several statistically significant predictors including race/ethnicity, past experiences of food insecurity, current residence, and geographic location. In the adjusted model, students who grew up in a food insecure home have a 40% chance of experiencing food insecurity during college whereas those who grew up in a food secure home have a predicted probability of 19%, a difference of 21 percentage points or roughly double the chance ($p < 0.001$). All else equal, the predicted probability of food insecurity with hunger is 35% for racial/ethnic minorities and 26% for racial/ethnic majority students whereas it is 33% for those who attend college in an urban community and 26% for those in rural or suburban communities ($p < 0.05$). In addition, those who live in off-campus housing have a 37% chance of food insecurity compared to 26% for those who live at home with their parents and 23% among those who live on campus, after adjusting for background characteristics ($p < 0.01$) (Table 3).

Cocoa, who identifies as a Black woman, faced lifelong poverty, and ongoing issues of hunger that continued to manifest in her early adulthood, including her period of college enrollment. Her social identities and experiences align with our quantitative examination of variation in food security status among students from low-income families. Specifically, she is a racial minority, her past included experiences of food insecurity, she attended college in an urban area, and her residences included off-campus housing. The interconnectedness of these identities and experiences may help to explain why her material hardship challenges were among the most severe in our sample.

When we first met Cocoa, she was attending a four-year university in her urban hometown. We asked her how college was going and if she had any financial concerns. "Eating. That's my main issue—no money to eat because we so living in poverty", she replied. She explained that "living in poverty is very complicated" and lack of money causes her "a lot" of stress as she struggles to pay the bills and afford basic needs while attending college. "My phone is off because I didn't pay my bill 'cause my pay wasn't enough from my job". When we inquired, "How much would you say money

causes you stress?” she ranked her stress level as 10 out of 10: “Ten—you ain’t got no food. You ain’t got no car. You ain’t got no gas for your car. You ain’t got no transportation, period. You got to get papers done and everything”. She went on to say, “If I have money, I would not be looking at other people’s faces while they eating . . . I can’t focus”. The stress and anxiety from worrying about how to get enough food to eat as well as the outright lack of food inhibited Cocoa’s ability to do her best in school.

Table 3. Predicting food insecurity using logistic regression.

Characteristic	Predicted Probability	Food Insecure with Hunger Coef.	Standard Error	p-Value	Test
<i>Sociodemographic factors</i>					
Female	0.276	0.029	(0.131)	0.826	
Male (reference)	0.282				
Racial/ethnic minority	0.352	0.453	(0.163)	0.005	**
Non-racial/ethnic minority (reference)	0.257				
Married	0.478	0.864	(0.702)	0.218	
Not married (reference)	0.279				
Student has at least one child	0.233	−0.254	(0.518)	0.624	
No dependent child (reference)	0.282				
Immigrant family	0.318	0.212	(0.191)	0.266	
Non-immigrant family (reference)	0.273				
<i>Past experiences of food insecurity</i>					
Childhood food insecurity	0.395	1.05	(0.130)	0.000	***
No childhood food insecurity (reference)	0.186				
<i>Financial resources and employment status</i>					
Zero dollar expected family contribution	0.258	−0.177	(0.142)	0.212	
Greater than zero expected family contribution (reference)	0.293				
Financially dependent	0.277	−0.269	(0.412)	0.514	
Financially independent (reference)	0.334				
Employed	0.284	0.055	(0.133)	0.679	
Not employed (reference)	0.273				
<i>College and community environment</i>					
Home of parent or guardian	0.261	−0.506	(0.157)	0.001	**
On-campus residence hall or apartment	0.226	−0.695	(0.169)	0.000	***
Other	0.489	0.494	(0.794)	0.535	
Off-campus residence (reference)	0.369				
Four-year college	0.281	0.020	(0.149)	0.893	
Two-year college (reference)	0.277				
Urban	0.328	0.326	(0.137)	0.017	*
Rural or suburban (reference)	0.260				

N = 1339. Notes: The findings are qualitatively similar in models that only include statistically significant bivariate predictors from Table A2 and in block regressions that progressively consider sociodemographic factors, past experiences of food insecurity, financial resources, employment status, and college and community environment. If we use a more stringent definition of childhood food insecurity as evidenced by indicating “sometimes, often or always” there was not enough to eat at home, then the predicted probabilities are 0.480 for those who grew up in food insecure homes and 0.227 for those who did not ($p < 0.000$). * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

When Cocoa started college, she lived on campus and had a meal plan for the university cafeteria, “but that ran out a long time ago”, she said, “so no meal plan no more”. She could not afford to invest in a larger meal plan so if she wanted to eat in the cafeteria, she now had to pay “double”, explaining that the food items are twice as expensive for those without an active meal plan. For Cocoa, it was not worth it. Growing up, experiences of severe poverty when “there wasn’t food in the house” and being placed into foster care due to poor living conditions contributed to her complex relationship with food in adulthood, including ongoing struggles with “appetite”. Even when Cocoa had a meal plan, she had difficulty eating the food provided by her university’s cafeteria:

It’s like I’m not used to their food, really, so I have to—I have to decide like what I want to eat, when I want to eat it; and it’s going to take a long time for me to like—to really eat it because

sometimes I'm a slow eater. Sometimes when I'm hungry, I eat fast. It's different—my appetite. It's different, but I gotta adjust . . . it's gonna take me a certain time to eat . . . like my appetite build up. I guess that's why—it goes from the past.

Consistent with prior research, Cocoa's description of her early experiences with hunger and associated trauma illustrate how prior instances of food insecurity can manifest in multiple forms, including ongoing issues related to appetite and anxiety (Alaimo 2005; Hamelin et al. 2002; Radimer et al. 1990).

Due to financial problems, Cocoa moved out of the dorms and stayed with relatives before moving into a homeless shelter. When recounting her experiences living in these various places, her preoccupation with food was evident as she described the types of food available and her experiences with appetite during her stay. Thus, experiences of food insecurity not only varied across individual students in our study, they were dependent on the context and environment that students experienced throughout their college career.

3.2. Challenges for Food-Insecure Students

Understanding the particular problems that food-insecure students experience and the interrelated nature of these challenges provides essential insights to the development of potential solutions. Here, we use interview and survey data to examine the types of food-related problems that students face. For example, Tou is a Hmong American man who attends a four-year university and works at grocery store near his family home where he earns minimum wage. Given his busy schedule, his only time to eat is often on-the-job, which provides him with few nutritious and affordable options. "I just have a couple bags of chips and just eat that right there". At less than \$2, the chips are inexpensive, but they only provide temporary relief. After a few hours, Tou says, "I'm hungry again. And there's nothing to eat usually". Here, Tou explains how lack of time and lack of resources are key barriers to consistent access to nutritious food.

Survey results indicate that Tou is not alone in these challenges. Lack of time is the most commonly reported barrier among those who are food insecure with hunger. Specifically, 70% reported that they do "not have enough time to eat because of a busy schedule", but there is significant variation in self-reported challenges among those with the lowest levels of food security. Females, those who are currently employed, and four-year college students were especially likely to indicate that they "do not have enough time to eat because of a busy schedule" (74–75%, $p < 0.05$) (Table 4).

Students, like Alicia, help us understand the multiple demands and obligations that today's undergraduates often face as they juggle school, work, and family obligations. Alicia is an African American woman who attends a large-public-urban university full-time and regularly works 32 h per week in an off-campus job to support her family. She lives off campus with her daughter and has access to transportation resources and kitchen facilities. She explained that it is a struggle to find the time to eat because of her hectic work and school schedules saying, "I don't have time to cook at home" except for Sundays, which is a "big family day". "But other than that, we eat fast food. And it's, it's bad. It's bad, but... we eat a lot of fast food cause it's convenient", suggesting that she was not happy with eating so much fast food but felt that there were no other options given her limited budget. Though she "resorted to eating more fast food than she wanted", Alicia was careful to select fast food items with the highest nutritional value, saying "we like the baked chicken at the [local] gyro place . . . it's not as bad as going to McDonalds". Alicia was well aware of the strategic trade-offs that she was making with her time and financial resources each day and concluded that accessing quick affordable hot meals was the best short-term solution for her and her family.

Table 4. Variation in challenges among students who are food insecure with hunger.

Characteristic (%)	Not Enough Time to Eat	Test	Not Have Transportation	Test	No Working Appliances	Test
Full analytic sample (N = 1339)	61.1		8.3		4.0	
Food insecure with hunger (N = 401)	70.0	***	12.8	***	6.2	
<i>Variation among those who are food insecure with hunger:</i>						
<i>Sociodemographic factors</i>						
Sex						
Female	75.1	**	13.1		5.7	
Male	61.9		12.3		7.1	
Race/Ethnicity						
Targeted Minority	67.1		18.6	*	6.4	
Not Targeted	71.5		9.6		6.1	
Parental Status						
Child(ren)	64.7		5.9		11.8	
No Children	70.3		13.1		6.0	
Immigrant Family						
Yes	72.6		17.9		6.0	
No	69.3		11.4		6.3	
<i>Past experiences of food insecurity</i>						
Childhood Food Insecurity						
Yes	70.8		15.0	+	6.6	
No	68.3		7.9		5.6	
<i>Financial resources & employment</i>						
Expected Family Contribution						
Zero	68.0		14.7		6.0	
Greater than Zero	71.2		11.6		6.4	
Financial Aid Status						
Dependent	70.5		13.2		6.2	
Independent	63.3		6.7		6.7	
Employment Status						
Working	74.1	*	11.2		6.0	
Not working	63.1		15.4		6.7	

Table 4. Cont.

Characteristic (%)	Not Enough Time to Eat	Test	Not Have Transportation	Test	No Working Appliances	Test
<i>College and community environment</i>						
Current residence						
Home of parents	68.4		10.5		6.0	
On-campus	73.3		17.1		7.6	
Off-campus	69.0		11.4		5.7	
College Sector						
Four-year	75.3	**	14.5		5.5	
Two-year	60.7		9.7		7.5	
Geography						
Urban	70.3		18.9	**	5.4	
Rural or Suburban	69.8		9.1		6.7	

Notes: Table displays row percentages. Imputation is not performed for a missing item. We are not able to examine variation by marital status or report "other" residence due to small cell size. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

These competing responsibilities, including working to pay for college, limit the time that students are able to devote to food preparation and eating. Due to their time and resource constrictions, several of the students reported that they relied on “junk food” to quell hunger sensations. Students often expressed regret about these choices, explaining that their food choices were far from optimal and had negative consequences for their health and ability to concentrate in the classroom. For some students, these challenges were compounded by a lack of affordable food on campus. Both Alicia and Joaquin, a Latino man with a young daughter, reported that the college cafeterias at their four-year universities were prohibitively expensive. Joaquin stated that the cafeteria is “expensive, so I try to limit [eating on-campus]. I probably bring, sometimes I bring an apple and orange or something and keep it with me and just munch on it”. As a student who lives in a rural area and commutes to school and work, Joaquin estimated that he and his wife “spend about \$500 a month on gas” and often struggled to keep their cars running. So, he scheduled his classes for a few days each week and stayed on campus all day to save money on transportation; as a result, he lacked access to affordable food on those days.

Survey results indicate that lack of transportation and working appliances created barriers to food security for some students. Specifically, 13% of students who are food insecure with hunger reported that they do “not have transportation to get to the store to purchase food” though interview data, as described above, suggest that some students make tradeoffs that prioritize paying for transportation over food. A greater share of students who identify as a racial/ethnic minority (19%) or attend college in urban areas (19%) indicated that lack of transportation was a barrier to their food security ($p < 0.05$). Finally, 6% of students struggling with hunger indicated that they do “not have working appliances for storing of preparing food”. There is no evidence that this challenge varies by background characteristics and none of the students in our interview sample described problems with kitchen appliances (Table 4).

The students we interviewed each drew on distinct strengths and talents to try to make ends meet while pursuing a higher education. Rather than pinpointing a single cause, they described an ongoing balancing act with limited time and money that often resulted in going without food or eating the cheapest quickest food that they could find. Many students considered hunger a short-term sacrifice for the potential of longer-term economic success associated with a college degree and so prioritized their spending accordingly.

3.3. Coping with Food Security Challenges

While students often turn to family and friends for support, some also rely on the public social safety net for food stamps (i.e., SNAP—Supplemental Nutrition Assistance Program), healthcare, and childcare assistance. Overall, 10% of survey respondents used food stamps to purchase food while 13% of those who are food insecure with hunger drew on this formal support ($p < 0.05$). Thus, food stamps are effective in helping some students reach food security, while they are an inadequate support for others. Among those who are food insecure with hunger, student parents are the most likely to have used food stamps (59% vs. 11% without a dependent child, $p < 0.001$), likely due to eligibility criteria that provides an exception for those with young children. Similarly, 43% of financially independent students used food stamps versus 10% of students who are dependent on their families for financial aid purposes ($p < 0.001$). Students with a zero-dollar expected family contribution, indicating few financial resources, were more likely to use food stamps than those with a higher EFC (27% vs. 4%, $p < 0.0001$) and racial/ethnic minorities were more likely to report using food stamps than their majority peers (22% vs. 8%, $p < 0.001$). Food stamp usage is also associated with current residence and sector of college enrollment. Just 2% of on-campus residence students used food stamps compared to 18% who live off campus and 14% who live with their parents while 21% of two-year college students used food stamps compared to just 8% of four-year college students ($p < 0.001$). There is no statistical evidence that food stamp usage varies by students’ employment status nor by sex, immigrant family status, childhood food security level, or urban location (Table 5).

Table 5. Variation in supports among students who are food insecure with hunger.

Characteristic (%)	Use Food Stamps to Purchase Food	Test	Help from Family or Friends to Pay for Groceries or Food	Test
Full Analytic Sample (N = 1339)	9.9		59.3	
Food insecure with hunger (N = 401)	12.7	*	58.8	
<i>Variation among those who are food insecure with hunger:</i>				
<i>Sociodemographic factors</i>				
<i>Gender</i>				
Female	13.9		54.6	
Male	10.9		61.5	
<i>Race/Ethnicity</i>				
Targeted Minority	22.1	***	59.4	
Not Targeted	7.7		58.5	
<i>Parental Status</i>				
Student has a child	58.8	***	53.3	
No child or children	10.7		59.1	
<i>Immigrant Family</i>				
Yes	15.5		60.3	
No	12.0		58.5	
<i>Past experiences of food insecurity</i>				
<i>Childhood Food Insecurity</i>				
Yes	14.2		58.5	
No	9.5		59.5	
<i>Financial resources and employment status</i>				
<i>Expected Family Contribution</i>				
Zero	27.2	***	58.2%	
Greater than Zero	4.0		59.2%	
<i>Financial Aid Status</i>				
Dependent	10.2	***	58.6	
Independent	43.3		61.5	
<i>Employment Status</i>				
Working	11.6		55.6	
Not working	14.7		64.1	
<i>College and community environment</i>				
<i>Current residence</i>				
Home of parents	13.5	***	65.6	
On-campus	1.9		55.0	
Off-campus	18.2		54.9	
<i>College Sector</i>				
Four-year	8.2	***	59.8	
Two-year	20.6		56.9	
<i>Geography</i>				
Urban	12.8		65.7	*
Rural or Suburban	12.7		54.7	

Notes: Table displays row percentages. Imputation is not performed for a missing item. We are not able to examine variation by marital status or report "other" residence due to small cell size. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Joaquin and Alicia are examples of the types of student who are most likely to receive SNAP and both explained how essential this program is to helping make ends meet. Joaquin, for example, said, "We get about two hundred dollars a month, or something, so that helps out a lot. Yeah, that helps out a real lot, and that's how we get our groceries so that's really what, what we need". In both cases, a family member told Joaquin and Alicia that they might be eligible for public food assistance. Because they both care for a young dependent child, they were eligible for and received food stamps as well as health insurance and childcare resources. Together, this package of public resources provides

valuable support. “Every bit helps”, says Alicia. But even with a combination of private and public supports—including financial aid—and work, students like Joaquin and Alicia regularly cut back on food, skip meals, and struggle to eat the kinds of food that they prefer.

Part of the reason why food stamp usage varies by individual-level characteristics is due to the complex SNAP eligibility criteria discussed above. Students who met the standard income and asset criteria, but not the supplemental criterion, were often frustrated by the lack of public support. Cocoa explained that she is not eligible for Food Share, Wisconsin’s version of SNAP due to her college enrollment. “Food . . . that’s a big issue for me . . . I was hungry, and you can’t get like Food Share. Since I’m 20, I’m old enough to get it . . . but while I’m in college I can’t get it . . . They don’t give you like a Quest [food stamp debit] card if you’re a full-time student”. At a subsequent interview, Cocoa considered herself underweight. “I’m probably like ninety-two pounds right now . . . [down from] one-hundred-and five”, she said, though her goal weight was “one fifteen”. For students, like Cocoa, who do not have a strong social network to rely on for support, the lack of public food assistance was particularly consequential.

In addition to formal support, nearly six in ten students reported that they “get help from family or friends to pay for groceries or other food” on the survey. There is no evidence that students who are food insecure with hunger are more or less likely to draw on this informal support in comparison to their food secure peers ($p > 0.10$). Indeed, there is no evidence that use of this informal support varies across individual background characteristics though students who attend college in urban areas were more likely to report help from friends and family (66% vs. 55%) ($p < 0.05$) (Table 5).

Receiving help from one’s family—and offering it in return—was a common theme in our interviews with students. As noted in prior research, students who grew up in poverty were especially likely to discuss the importance of family reciprocity or “collective labor expected within family networks to ensure its survival” (Roksa and Kinsley 2018; Kinsley 2014; Stack and Burton 1993, p. 7). Ian, an African American man who attends an urban four-year university, lives with his family who also struggles with food insecurity and hunger. He explained that when there’s not enough food to eat “we just divide it amongst us, you know, so we didn’t get too greedy. You already knew, like, what to do ‘cause we already in the situation so many times. So we just divide [the food] amongst each other, you know, and let each other know like don’t eat too much”. He credits this approach to sharing scarce food resources to the way he was raised:

You’re supposed to always look out for your family no matter how much money you got. If you got a dollar or something, you know, if there’s four of them and they need something, [then] you give them a quarter a piece. That’s how we supposed to be raised. That’s how [my father] raised us actually and that’s how—ever since then—that’s how I’ve been trying to do it, you know, whenever I come across a—it don’t have to be much as long as I come across a certain amount [of] money that can benefit me and my family I’m going to try to do that as much as possible, yeah.

Even though Ian cuts and skips meals due to a lack of money, he says that it is a “relief” whenever he is able to help his parents or siblings financially. “[I] want to do more for them, you know, that’s what pushes me through college and everything, so I can help them out a lot”. In this way, Ian and his family provide essential material and emotional resources for one another.

Ian, like many of the students we talked with, explained that making ends meet is a full family affair, rather than the sole responsibility of parents. When someone is able to pitch in and pay for basic necessities like groceries, they do so for the entire family. In Ian’s case, his brothers “help out a lot” and “look out” for each other. Alicia had a similar upbringing. She says that she could always call on her father when money was tight. “Yes, whenever the food got low he was the first one to call, you know, we knew that he was going to help us out”. For Tou, he describes his family as “communal” and explains that they all support one another financially, “[I] give up a [pay]check or two every time I get one to help my parents”. Indeed, he chose not to take interim classes so that he could “help pay off the

bills". While Tou would like to work fulltime to help his family, he says, "my dad makes me work part time . . . he says it'll be too hard" to balance college with a full-time job. Tou says his dad "just wants [us kids] to go to school, but sometimes he has to [let us work]" in order to make ends meet. Similarly, Bethany, an African American woman who lives on campus describes how she would call her mom when she ran out of food. Rather than explicitly ask for help, Bethany could call her mom and say, "I just love you so much" and her mom will respond, "You ran out of food?" When she says yes, her mom will say, "Okay, I'll be there in 15 minutes" so that's usually how it goes". Bethany says her mom is her "best friend" and they provide a significant amount of financial, social, and emotional support for one another. Across cultural backgrounds and throughout Wisconsin, the food-insecure students in our study described how reciprocal financial and material support was essential to their survival.

Of course, the extent to which students' social networks could meet their basic needs and ensure food security varied dramatically. Ian's family, for example, regularly struggled to make ends meet and went without food despite sharing resources. Joaquin's family, on the other hand, provided substantial levels of financial and in-kind support to him, his wife, and daughter. He says, my wife's "mom came up with the idea to stay at their [retirement] house, you know, and just take care of the house there—maintain it or whatever—and we just pay them the bills and stuff so we actually pay like almost no rent". With additional help from Joaquin's family for babysitting, house maintenance, and car repairs, Joaquin has one of the strongest and most robust social support networks in our sample.

Though students explained how they relied on family, friends, and the social safety net to help make ends meet, they did not explicitly discuss employment, wages, or financial aid as a way to cope with food insecurity. It appears that working and receiving financial aid are taken-for-granted parts of the college experience for students in our sample. Even with financial aid, work, assistance from friends and family, and public food assistance, substantial shares of students are food insecure with hunger.

4. Discussion and Conclusions

The declining affordability of college and its implications for higher education stratification are much discussed and researched, but these conversations rarely consider the daily material experiences of students (e.g., Alon 2009; Bailey and Dynarski 2011; Bastedo and Jaquette 2011; Chetty et al. 2014; Pfeffer 2018; Ziol-Guest and Lee 2016). Food insecurity is associated with adverse outcomes including poorer academic achievement and attainment, undermining investments in higher education (Broton 2017; Goldrick-Rab et al. 2018; Maroto et al. 2015; Morris et al. 2016; Patton-López et al. 2014). Prior research consistently indicates that students from low-income and racial/ethnic minority families are at an increased risk of food insecurity during college (e.g., Payne-Sturges et al. 2018). As conceptualized by Alaimo (2005) and demonstrated in our study, however, there is a diversity of food experiences within income and racial/ethnic groups. Among undergraduates from low-income families, we find that those who grew up in food-insecure homes, identify as racial/ethnic minorities, live off campus, and attend colleges in urban areas are especially likely to report the lowest level of food security, often associated with hunger. Unlike some prior work, we did not find any evidence of variation by employment status, perhaps because most students were working (e.g., Patton-López et al. 2014). The students who grew up in food insecure homes—which were also marked by substantial family and economic instability in some cases—explained that college attendance did not dramatically improve their financial situation nor relieve them of significant family responsibilities. Consistent with prior research, students in our study often attended the closest public college or university and remained integrated with their family and community, drawing on the strengths and battling the challenges associated with these institutions and places (Desmond and Turley 2009; Goldrick-Rab 2016; Hillman 2016; Turley 2009). Additional research that further examines the role of the college and community environment, including students' net price of college attendance and urban location, is needed to improve our understanding of the ways in which contextual factors may influence undergraduates' food security levels.

The current financial aid system fails to acknowledge the reciprocal relationship between dependent students and their families, assuming a one-way flow of resources from parent to undergraduate (Kinsley 2014). As a result, students from the most vulnerable families are allotted fewer financial resources than they need to make ends meet, as expressed in our data and prior research (Dancy and Fishman 2016; Goldrick-Rab 2016). Changes to the financial aid system—such as assigning a negative expected family contribution, rather than artificially truncating it at zero dollars—are necessarily to more accurately reflect and respond to students' financial situation and promote degree attainment (Goldrick-Rab 2016; Kelchen 2017).

Given the scope and depth of the problem of food insecurity, however, the financial aid system is unlikely to address the problem alone. A multi-sector approach that includes private philanthropic support and public benefits is needed to help students and their families get enough to eat (College and University Food Bank Alliance CUFBA; Duke-Benfield 2015; Goldrick-Rab et al. 2013). Indeed, students explained that they pieced together money and resources from multiple sources and shifted their budgets to try to make ends meet. Importantly, resources that are not necessarily earmarked for food can enhance students' food security. If students or their families have an unexpected car expense, for example, that could reduce their food budget as they shift funds to pay for transportation; but if they received utility assistance, for instance, they could then shift money toward food purchases. Given this fungibility, financial or in-kind support for students full cost of college attendance (i.e., tuition and fees, room and board, education supplies, and personal expenses) can reduce food insecurity and promote college attainment (Castleman and Long 2016; Goldrick-Rab et al. 2016b).

Some colleges connect students to existing resources including food pantries and SNAP (College and University Food Bank Alliance CUFBA; Daugherty et al. 2016; Goldrick-Rab et al. 2013). SNAP is the largest program in the domestic hunger safety net, but college students must meet the means-tested criteria and an exception in order to qualify for support (Duke-Benfield 2015). Consistent with the complex eligibility criteria, we find that student parents are significantly more likely to use SNAP than their peers; student parents experiencing hunger are also more likely to be financially independent, identify as a racial/ethnic minority, have a zero EFC, and attend college in the two-year sector, suggesting that variation across these factors is, at least in part, a reflection of parental status. However, there is no evidence that SNAP usage varies by student employment status.³ It may be that students who meet the SNAP criteria via the work exemption do not believe in using public benefits or they do not know about this potential benefit (Hernanz et al. 2004). In our study, students reported learning about potential public benefits from friends and family. The birth of a child, for example, prompted students to seek out additional resources, including SNAP, whereas prior research shows that one-stop offices with case managers, which are more common on community college campuses, can help connect eligible students to the public social safety net (Goldrick-Rab et al. 2013). While there is public resistance to such efforts, policy changes that expand SNAP eligibility or extend the National School Lunch Program to higher education are likely cost-effective responses since undergraduates who receive public benefits are more likely to persist than observably similar peers (Duke-Benfield 2015; Goldrick-Rab et al. 2016a; Price et al. 2014).

Finally, food-insecure students also rely on philanthropic and institutional support to help make ends meet. Today, over 600 colleges have on-campus food pantries and countless others provide cafeteria meal vouchers, food scholarships, nutrition classes, cooking demonstrations, and gardening projects to help hungry students (Canedo and Galarneau n.d.; College and University Food Bank Alliance CUFBA; Goldrick-Rab et al. 2017a). While prior research indicates that these types of interventions can promote food sufficiency, health, social belonging, and academic success

³ There is no evidence that students who worked 20 or more hours per week were more likely to use SNAP than students who do not meet this SNAP exception. Results not shown.

among K-12 children (e.g., Andersen et al. 2015; Blair 2009; Frisvold 2015; Jaime and Lock 2009; Oncini and Guetto 2017; Wills et al. 2018), we know very little about the efficacy of these increasingly popular initiatives in a higher education setting. Rigorous research is necessary to examine the impact of programmatic and policy interventions on undergraduates' material well-being and college success (Daugherty et al. 2016; Goldrick-Rab et al. 2017b).

Efforts to address inequality in higher education must be expanded to consider the lived experiences of 21st century college students and their struggles to make ends meet. Among a sample of traditional-age students from low-income families, we found that nearly 1 in 3 are cutting or skipping meals, eating less than they should and going without food due to limited resources. All of the students received financial aid and most worked and received support from family, but they still struggled to get enough to eat. Students identified a lack of money and time—rather than a lack of knowledge regarding cooking or budgeting—as major barriers to their food security. Efforts to bolster students' financial and material resources may not only reduce food insecurity, but also promote academic success and economic stability.

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Appendix A

Table A1. Characteristics of interview sample.

Pseudonym	Alicia	Bethany	Cocoa	Ian	Joaquin	Tou
Sex	Female	Female	Female	Male	Male	Male
Race/Ethnicity	African American	African American	African American	African American	Hispanic	Southeast Asian
Childhood Food Insecurity	Yes	Yes	Yes	Yes	Yes	Yes
Immigrant Family	No	No	No	No	Yes	Yes
College Type	4-Year	2-Year	4-Year	4-Year	4-Year	4-Year
College Pseudonym	A	B, D	A	A	E	B
Current Residence	Off-campus	On-campus	On-campus	With parents	Off-campus	With parents
Urban	Yes	No	Yes	Yes	No	No
Not Eat for Whole Day	No	No	No	No	No	No
Cut Size/Skip Meals	No	No	No	Yes	Yes	No
Eat Less than Should	No	No	No	Yes	No	Yes
Not Enough Money	No	No	No	No	Yes	No
Not Enough Time	Yes	No	Yes	Yes	No	Yes
No Transportation	No	No	Yes	No	No	No
No Appliances	No	No	Yes	No	No	No
Used Food Stamps	Yes	Yes	Yes	No	Yes	No

Note: These students are not representative of the full interview sample ($N = 50$), which was 54% female, 39% white, 16% African American, 22% Hispanic, and 16% Asian; six percent had dependent children and 26% enrolled in a 2-year college.

Table A2. Food insecurity with hunger by subgroup.

Characteristic (%)	Food Insecure with Hunger	Test
Analytic Sample	30.0	
<i>Sociodemographic factors</i>		
Sex		
Female	30.1	
Male	29.7	
Race/Ethnicity		
Targeted Minority	40.1	***
Not Targeted Minority	26.4	
Marital Status		
Married	54.6	+
Not Married	29.7	
Parental Status		
Student has at least one child	38.6	
Student does not have a child	29.7	
Immigrant Family		
Yes	41.0	***
No	28.0	
<i>Past experiences of food insecurity</i>		
Childhood Food Insecurity		
Yes	40.6	***
No	19.0	
<i>Financial resources and employment status</i>		
Expected Family Contribution		
Zero dollars	31.9	
Greater than zero dollars	28.9	
Financial Aid Status		
Dependent	29.3	*
Independent	40.5	
Employment Status		
Currently working	30.4	
Currently not working	29.2	
<i>College and community environment</i>		
Current residence		
Home of parents	29.1	***
On-campus	22.9	
Off-campus	38.2	
Other	57.1	
College Sector		
Four-year institution	30.5	
Two-year institution	29.6	
Geography		
Urban	36.5	***
Rural or suburban	27.1	

N = 1339. Notes: Table displays row percentages. Results regarding food insecurity with hunger are qualitatively similar regardless if the measure requires one or two affirmative indicators of hunger. + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

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