FOOD INSECURITY AT HUMBOLDT STATE UNIVERSITY

By

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ABSTRACT

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This study examined the prevalence of food insecurity, along with the determinants and consequences of food insecurity among students attending Humboldt State University (HSU) in Northern California. These analyses were conducted through a Conflict Theory framework, in which power differentials contribute to inequality, and the low social position of college students. We asked the following questions: Are HSU students experiencing food insecurity? Are housing arrangements a determinant of student food insecurity? Are higher levels of mental health concerns an outcome among food insecure students? Does weight gain and/or weight loss occur among food insecure students?

The 25-question online survey consisted of ten questions adapted from the USDA Adult Food Security Survey Module, three questions to gauge health and wellness concerns, and the remainder capture respondent demographics. This survey was administered to all students attending HSU during October 2014, of which 231 responded (2.8 percent response rate). Results revealed that 35 percent of respondents reported food insecurity during the past year, and an additional 35 percent of respondents were

marginally food secure or at risk for becoming food insecure. Poor health and wellness outcomes were significantly associated with food insecurity.

The present study suggests that HSU students are significantly at risk of experiencing food insecurity. The high rate of food insecurity among HSU students highlights the struggles and powerlessness students endure in their transitions to adulthood.

Key Words: food insecurity, food security, college students, university students, students, health and wellness, Humboldt State University, Adult Food Security Survey Module, USDA

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TABLE OF CONTENTS

ABSTRACT ii

ACKNOWLEDGEMENTS iv

TABLE OF CONTENTS v

LIST OF TABLES vii

LIST OF FIGURES viii

LIST OF APPENDICES ix

INTRODUCTION 1

Definition of Food Insecurity 3

Food Insecurity in the United States 5

Food Insecurity in Humboldt County and California 6

CHAPTER ONE 9

Theoretical Framework 9

CHAPTER TWO 12

Determinants of Food Insecurity 12

Housing 13

Race and Ethnicity 18

CHAPTER THREE 22

Consequences of Food Insecurity 22

Academic Achievement 24

Health and Wellness 26

CHAPTER FOUR 32

College Students and Food Insecurity 32
CHAPTER FIVE: METHODS 35
Measures 37
Statistical Analyses 44
CHAPTER SIX: RESULTS 46
Phase I: Respondent Demographics 46
Phase II: Effects of Housing Arrangements on Food Insecurity 50
Phase III: Effects of Food Insecurity on Health and Wellness 51
Mental Health Concerns 51
Physical Health 53
CHAPTER SEVEN: DISCUSSION AND CONCLUSION 55
REFERENCES 60
APPENDIX A: Survey 67
APPENDIX B: Poster 77
APPENDIX C: Press release 78

LIST OF TABLES

Table 1: Comparison of HSU and Humboldt County Racial Demographics 7

Table 2: Food Insecurity Index Questions and Scoring 41

Table 3: Food Insecurity Score Categories 42

Table 4: Health and Wellness Index Questions and Scoring 43

Table 5: Health and Wellness Categories 43

Table 6: Physical Health Questions 44

Table 7: Location of Survey Respondent, by Community 48

Table 8: Respondent Housing Arrangements, Compared to HSU Population 48

Table 9: Food Security Status of HSU Students 49

Table 10: Proportion of Respondents Reporting Food Insecurity, by Housing Arrangements 50

Table 11: Respondent Levels of Mental Health Concerns 52

Table 12: Food Security and Mental Health 52

Table 13: Proportion of Respondents Reporting Weight Gain or Weight Loss, by Food Security Status 53

LIST OF FIGURES

Figure 1: Children at Home and Ages 47

LIST OF APPENDICES

Appendix A: Survey 67

Appendix B: Poster ……...77

Appendix C: Press Release……78

INTRODUCTION

Many households in the United States experience some level of food insecurity, meaning they do not consistently have access, to enough nutritionally adequate food to maintain and active, healthy life (Coleman-Jensen, Gregory and Singh 2014). While food insecurity has been measured and tracked for decades, from a variety of angles, there has to date, been few specific examinations of college students' hunger. Due to their age, social status and unique position in society, college students make a great case study for understanding the determinants and consequences of food insecurity.

While financial resources, and access to nutritious food are central understanding food insecurity, there are other specific factors that can also impact food insecurity status. This thesis aims to uncover and expand on possible determinants of food insecurity (cost of housing, race and ethnicity) and the consequences of food insecurity status (academic achievement, mental and physical health status, et cetera), by exploring the experiences of college students. Food insecurity negatively impacts overall well-being and health (Hampton 2007); therefore it is important to understand the factors that contribute to food insecurity, and understand the outcomes that can occur as a result of food insecurity.

There are multiple reasons that research on food insecurity should focus on college students. The "impoverished student experience" is largely accepted as a part of the college student experience. Instead of acceptance of this narrative, this should be closely examined to eventually eradicate student food insecurity. Among college students, growing costs (tuition, textbooks, housing, utilities and healthcare) can compete

with the amount of money available for food (Cliff, Moody and Abdel-Ghany 2012; Roberts and Golding 1999). College students' experiences with food security are often overlooked, despite their unique social standing, at the threshold of adulthood, but often underequipped with the resources required to navigate higher education. Ironically, the focus should be on college students, as they face the brunt of rapidly raising tuition costs among four-year public institutions for in-state students (Johnson et al. 2014; Philips 2011). This is especially true in California, where the cost of in-state tuition for schools in the California State University system (CSUs) has more than tripled in the past 20 years (Johnson et al. 2014). In 2011, there was roughly an eight percent increase in tuition for in-state students nationwide, compared to a 21 percent in-state tuition increase among CSUs (Philips 2011). Among CSUs, the cost of providing higher education has not risen dramatically, but instead tuition increases have merely shifted the cost from the state to students and their families (Johnson et al. 2014), leaving students and families relatively powerless and struggling to afford higher education. Trajectories into adulthood are anything but linear, and become increasingly determined by economics and social class (Mintz 2015). Tuition increases and other college expenses, along with race and ethnicity, and housing arrangements, may be impacting the amount of resources for students to acquire food, which can in turn produce harmful outcomes in the areas of health and wellness, have informed the following research questions: Are Humboldt State University (HSU) students experiencing food insecurity? If so, whom, and to what degree? Are housing arrangements linked to student food insecurity? Is food insecurity

linked to higher levels of mental health concerns among students? Does weight gain and/or weight loss occur among food insecure students?

There is limited research specifically examining college students and food insecurity. Our research will contribute to the small but growing body of scholarship focusing on college students and food insecurity. In the next section, I will explain how food insecurity is defined and measured in the United States, and discuss Humboldt State University, the research site. I will give a brief overview of the study, and provide a roadmap through the chapters of the paper.

Definition of Food Insecurity

There are multiple terms that exist to identify food security, but the most commonly cited definition is from the United States Department of Agriculture (USDA), defining food security as " access by all people at all times to enough food for an active, healthy life" (Coleman-Jensen, Gregory and Singh 2014:2). Access is an important term in this definition, meaning that one can acquire food in socially acceptable ways (not stealing food, no reliance on coping strategies, buying food on credit and borrowing money) at all times. Enough food for an active, healthy life implies that the food consumed is nutritionally adequate. This definition encompasses the importance of maintaining and achieving to facets of food security—access and nutrition. As I will explore in this study, having access to food, due to your housing situation or proximity to campus, can impact a student's experience with food insecurity. I will also look at how

food insecurity may be impacting the physical and mental health of the students, which may be associated with their ability to acquire adequate nutrition.

Along with their definition of food security, the USDA has a linear food security scale which measures the degree and severity of food insecurity and hunger, based on a numerical value, calculated using a variety of measures. These categories rank respondents as having high food security, marginal food security, low food security and very low food security (United States Department of Agriculture Economic Research Service 2014). In the present study, we used measures based on this scale, so we could compare our results with national patterns and trends (more about our methods, and our use of a Food Insecurity Score, will be described in Chapter Five). We did this to begin the exploration of food insecurity issues being experienced by college students generally, using Humboldt County, California as an initial case study. Humboldt State University (HSU), located in Humboldt County, was chosen based on the proximity to the researchers, but also because student access to food may be impacted by its rural location, or by the demographics of the students, providing an interesting case study. As a state school, HSU attracts many first generation college students, and students of color. As I will explore further in this study, race and ethnicity may impact experiences of food insecurity; as HSU has recently been named a “Hispanic Serving Institution,” explained in more depth below, it may be an interesting site for exploring issues of food insecurity among college students. It could be that the food insecurity of the students (with higher levels of racial diversity) mirrors, or differs from, levels of food insecurity in the broader Humboldt County community (with lower levels of racial diversity).

Food Insecurity in the United States

The annual report "Household Food Security in the United States in 2013" (Coleman-Jensen et al. 2014) provides insight of who is impacted by food insecurity. In the 2013 report, Coleman-Jensen and colleagues (2014) found 14.3 percent of households (17.5 million households) were food insecure. The prevalence of food insecurity surpassed the national average among households with children (19.5 percent), households with children headed by single women (34.4 percent) or single men (23.1 percent), households headed by African Americans (26.1 percent) and Hispanics (23.7 percent) (Coleman-Jensen et al. 2014). Geographic location also impacted the likelihood of food insecurity, with a higher probability of experiencing food insecurity in large cities and rural areas, compared to suburban areas and exurban areas around large cities (Coleman-Jensen et al. 2014). The findings from this report helped guide the literature review and research in this thesis. How do county and state levels of food insecurity compare to the national rate? I discuss the prevalence of food insecurity in Humboldt County and California next.

Food Insecurity in Humboldt County and California

Humboldt County is a densely forested, mountainous rural county situated on the Pacific coast in Northern California (California Coastal Trail Info 2003). In 2010, the population of Humboldt County and the state of California was 129,000 and 2,875,000, respectively (California Food Policy Advocates 2010). In 2010, the rate of food insecurity was 25.9 percent in Humboldt County, and 34.8 percent in California (California Food Policy Advocates 2010). While food insecurity rates for Humboldt County are lower than California as a whole, both the county and state rates are much greater than the national rate of food insecurity at 14.3 percent (Coleman-Jensen et al. 2014). The geographic location and rurality of Humboldt County may impact the food security of the community (Coleman-Jensen et al. 2014).

Additionally, racial disparities can impact student food insecurity, as I will explain below. As seen in Table 1, below, HSU has a more diverse population than the broader Humboldt County, in terms of race and ethnicity. Hispanic or Latino students are overrepresented by nearly 20 percent, while White students are underrepresented by a third, relative to the broader Humboldt County demographics. It may be that HSU students may be facing additional barriers to food security, due to higher concentrations of racial and ethnic minority students.

Table 1: Comparison of HSU and Humboldt County Racial Demographics

Race	HSU Student Demographics (2014 Enrollment)	Humboldt County Demographics (2010 Census)	Difference
African American	4%	1%	+ 3%
American Indian	1%	6%	- 5%
Asian American	3%	2%	+ 1
Hispanic/Latino	29%	10%	+ 19%
Two or more	4%	5%	- 1%
White	48%	82%	- 34%

Sources: Humboldt State University Institutional Research and Planning 2014 and U.S. Census Bureau 2010.

This study explores the prevalence of food insecurity experienced by students of HSU. Chapter One provides the theoretical framework for this analysis—conflict theory. Fundamentally, conflict theory is a theory of inequality in which conflicts arise as the result of an unequal distribution of resources in social systems—including power. The more unequal the distribution of scarce resources in a system, the greater amount of conflict of interest there will be between the dominant and subordinate groups in society (Marx and Engels 1848; Turner 1975). Due to the powerlessness of college students based on their age or social status, it may be that college students experience food insecurity. Chapter Two begins with an overview of the literature on determinants of food insecurity, including housing, and race and ethnicity. While race and ethnicity were not included in this study, it is important to understand how race and ethnicity can impact the food insecurity rates of students. What we already know about college students thus far is that race and ethnicity are significant factors in influencing student food insecurity (Chaparro et al. 2009). HSU has a growing enrollment in a racially and ethnically diverse

student body population. In 2013, the campus was designated as a Hispanic-Serving Institution (universities where total Hispanic enrollment constitutes a minimum of 25 percent of the total enrollment) (Hispanic Association of Colleges and Universities 2009). While this pilot research begins to look at food insecurity in relation to race and ethnicity through prior literature and research, it is important that future research looks more closely into the complexities of this relationship in order to better serve university students.

Following my discussion of the determinants, I explore the consequences of food insecurity in Chapter Three. These include academic achievement and mental and physical health, which may be impacted by food insecurity. As with race and ethnicity, in this exploratory survey, we did not inquire about academic achievement. Still, a robust understanding of food insecurity impacts on college students requires understanding the relationship between food insecurity and academic achievement, as prior research has demonstrated (Alaimo, Olson and Frongillo 2001; Ashiabi 2005; Ashiabi and O'Neal 2007; Howard 2011; Rodgers and Milewska 2007; Winicki and Jemison 2003). In Chapter Four, I focus on research about college students and food insecurity, though to date, the research is limited. This current study will contribute to this gap in research, specifically examining college student and food insecurity, with questions that gauge student's mental and physical health issues. In Chapter Five I explain the methods we utilized to design and launch the survey of HSU college students, our measures, and our analytical plan. In Chapter Six, I display the results of the study, and lastly, in Chapter Seven, I discuss the study findings, and provide recommendations for future research.

CHAPTER ONE

Theoretical Framework

With this study, I explore the experience of food insecurity by college students, as an important but underexplored demographic. Due to the relative powerlessness of college students, due to their age and social status, it may be that college students experience food insecurity. This could be due to various determinants, such as housing and race/ethnicity (as explored in Chapter Two), and it could be that college students are experiencing the impacts of food insecurity in their health and wellness (explored in Chapter Three). To understand the social position of college students, relative to the broader U.S. society, I will use Conflict Theory. In this chapter, I will provide an explanation of Conflict Theory, and discuss how it can help to explain the lack of access of college students to consistently adequate and nutritious food.

There are many sociologists and theorists that have theorized about inequality and conflict—adopting either micro or macro sociological approaches. My analysis will focus on the contributions of theorists Karl Marx and Friedrich Engels (1848) and C. Wright Mills (1956). I utilize Conflict Theory from macro sociological perspectives; my analysis focuses on social systems and populations on a larger scale, including social structures, economics and politics in relation to conflict.

At its core, Conflict Theory is a theory of inequality stemming from the social competition for access to the unequal distribution of resources and power, which results

in societal conflict; the more unequal the distribution of scarce resources in a system, the greater conflict of interest there will be (Turner 1975).

Inequality in society has been theorized extensively, dating back to Marx and his ideas of materialism, capitalism and class stratification as contributing to the lines of division and tension among conflicting interests and classes (Marx and Engels 1848). Marxism (the political and economic philosophy of Karl Marx and Friedrich Engels 1848) posited that social classes are defined by their distinctive relationships to the means of production, which has political and economical influences (Gilbert 1998; Marx and Engels 1848). Marx's focus on economic class struggles has set the foundation of Conflict Theory for later theorists. Mills (1956) is considered the founder of modern conflict theory, with a vision similar to Marx's. In his analyses of social structures, Mills (1956) argued that said structures are created through conflict between people with differing interests and access to resources—leading to a power differential between the elite and non-elite members in society.

College students, while they may be hoping to join the ranks of the elite, inhabit a much lower social position while in school. College students have limited political and economical power, with increasing costs and few resources available to navigate higher education. Due to their position in the status hierarchy (also impacted by social status in terms of class, gender, age and race), they have to compete for their share of resources that are unequally allocated. Structures in line with the elite's ideology (which may include the education system) limit the allocation of resources to non-elites. Among essential resources for college students, food is central for the health and well-being of

the students (Hampton 2007). A combination of factors ranging from low class status to lacking influential political power may lead to food insecurity, as those with political power are able to vote and inform or change policies that are related to food insecurity.

Though the conflict perspective hones in on the negative and conflicting aspects of society, it is because of such analyses that the status quo may be challenged and promote fundamental social change. Marx believed that society was a dynamic entity constantly undergoing change driven by class conflict (1848). These conflicting interests in society can lead to social change and social movements. The Civil Rights Movements of the 1960s are examples of how activists challenged the unequal distribution of political power and economic resources based on racial differences, resulting in revolutionary change.

Food insecurity relates to Conflict Theory based on the unequal distribution of resources. A combination of factors ranging from low class status (a status held by many students), to lacking political power may contribute to food insecurity. These factors will be embedded throughout Chapters Two, Three and Four.

CHAPTER TWO

Thus far, I have introduced Conflict Theory as the theoretical framework of this thesis. Due to structural influences (housing) and socially constructed categories (race), it may be that college students are experiencing higher levels of food insecurity than other populations. In this chapter, I discuss possible determinants of food insecurity—housing and race—while incorporating Conflict Theory, to better understand the lack of access to continually adequate and nutritious food.

Determinants of Food Insecurity

To understand why college students may or may not be experiencing food insecurity, it is important to understand known determinants of food insecurity. Housing arrangements and racial identity may contribute to the food insecurity status of an individual or household, as I will explore below. College students face both of these issues, in that they have limited control over their housing, and a growing number of students of color are entering college campuses (Hayes 2006). Prior research has demonstrated that housing situations can impact food insecurity (Chaparro et al. 2009; Cutts et al. 2011; Fletcher, Andreyeva and Busch 2009; Gorton, Bullen and Mhurchu 2015; Gallegos et al. 2014; Joint Center for Housing Studies of Harvard University 2013; Joint Center for Housing Studies of Harvard University 2014; Kirkpatrick and Tarasuk 2011; Micevski, Thornton and Brockington 2014; Nolan et al. 2006; Quine and Morrell

2006), and race and ethnicity have been connected to higher levels of food insecurity (Bauer et al. 2012; Chaparro et al. 2009; Coleman-Jensen and Judith 2010; Gundersen 2008; Himmelgreen et al. 2000; Kaiser et al. 2003; Mullany et al. 2012; Pardilla 2014). I will explore both of these determinants below, separately, though it is important to note that race and housing may interact with each other through housing discrimination based on race (Chai and Kleiner 2003).

Housing

Housing expenses can impact food security by reducing the amount of money available to spend on food (Gorton et al. 2010; Joint Center for Housing Studies of Harvard University 2013; Joint Center for Housing Studies of Harvard University 2014) and the inability to secure affordable housing may be linked to food insecurity (Cutts et al. 2011; Joint Center for Housing Studies of Harvard University 2013). Renters are more prone to experience food insecurity than homeowners (Chaparro et al. 2009; Cutts et al. 2011; Edwards et al. 2007; Fletcher et al. 2009; Gallegos et al. 2014; Gorton 2010; Joint Center for Housing Studies of Harvard University 2013; Joint Center for Housing Studies of Harvard University 2013; Kirkpatrick and Tarasuk 2011; Nolan et al. 2006; Quine and Morrell 2006). College students who do not live with their family report higher rates of food insecurity than their counterparts (Chaparro et al. 2009; Gallegos et al. 2014; Micevski et al. 2014). In this section, I will discuss housing arrangements such as renting, homeownership, housing security, and living alone or with roommates in relation to food insecurity.

Rental Housing and Homeownership. Rental housing costs and availability may be impacting the food insecurity of an individual or household. Renters are more prone to food insecurity than homeowners due to increases in rental costs, especially among low-income households (Chaparro et al. 2009; Edwards et al. 2007; Fletcher et al. 2009; Gallegos et al. 2014; Gorton et al. 2010; Joint Center for Housing Studies of Harvard University 2013; Joint Center for Housing Studies of Harvard University 2014; Kirkpatrick and Tarasuk 2011; Nolan et al. 2006; Quine and Morrell 2006). Extant research has found those renting a home were at least two and a half times more likely to be food insecure than those buying or owning homes, with renters being nearly three times as likely to be food insecure compared to homeowners (Gorton et al. 2010; Nolan et al. 2006; Quine and Morrell 2006). In 2012, more than four out of five United States households with incomes below $15,000 paid more than 30 percent of those incomes for housing, with more than two-thirds paying over 50 percent (Joint Center for Housing Studies of Harvard University 2014). The inability to secure affordable housing may be linked to food insecurity (Cutts et al. 2011; Joint Center for Housing Studies of Harvard University 2013). Due to a lack of low-income rental housing available in the United States, low-income renters unable to secure low-income or subsidized housing spend on average $500 more each month on housing than their counterparts living in affordable units; and cuts in spending to accommodate their higher housing costs usually fall heavily on food (Joint Center for Housing Studies of Harvard University 2013). In 2012, low-income households spent almost 40 percent less on food when compared with otherwise similar households able to secure affordable housing (Joint Center for Housing Studies of

Harvard University 2014). Among families in market rental housing versus families in subsidized housing, 61.7 percent of families in market housing were food insecure, compared to 68.9 percent of families in market housing (Kirkpatrick and Tarasuk 2011). In some cases, people may be forced to choose between food and other living expenses when the cost of living increases (Joint Center for Housing Studies of Harvard University 2014). Among market families, a significant association was found between food insecurity and the amount of rent allocated to housing. Consistent with the previous findings of food insecurity and elevated rental costs (Edwards et al. 2007; Fletcher et al. 2009; Joint Center for Housing Studies of Harvard University 2013; Joint Center for Housing Studies of Harvard University 2014), Kirkpatrick and Tarasuk (2011) found that market families allocating over 30 percent of their incomes to housing costs had increased odds of experiencing food insecurity, compared to those allocating 30 percent or less.

These patterns vary by state. Edwards et al. (2007) examined state level differences of housing as an influence on food insecurity. They found that “near poor” households (households with income below 100 percent of the poverty threshold in the United States) in California and Texas have higher hunger rates than comparable households in the rest of the United States (Edwards et al. 2007). In a specific examination of California, they found that 58.8 percent of Californians are homeowners, and 41.2% are renters, with food insecurity rates at 1.2 percent and 7.5 percent, respectively (Edwards et al. 2007). Their research indicated that rental-housing costs was associated with increased household food insecurity, and homeownership decreased the

likelihood of being food insecure. Connecting to the present study, almost a quarter of HSU students live on campus, and the remaining three-quarters live off of campus (Humboldt State University Institutional Research and Planning 2014). Information is not available on the percentage of HSU students that rent versus those who own homes, but many students do not buy homes while they are in school, partially due to finances but also because they may only be in the community for the duration of their education.

Housing Security. As discussed previously, the inability to secure affordable housing is linked to food insecurity (Cutts et al. 2011; Joint Center for Housing Studies of Harvard University 2013). Cutts et al. (2011) investigated the association between housing insecurity and food insecurity. They found that housing insecurity affected 46 percent of their sample, with 41 percent of households experiencing crowding (defined as two people or more in a room, or more than one family in a residence) and five percent of households experienced multiple moves (moving two or more times in the previous year) (Cutts et al. 2011). Household food insecurity was found in nine percent of families with secure housing, 12 percent of families with crowding, and 16 percent of families with multiple moves (Cutts et al. 2011). College students tend to live with multiple roommates to secure housing costs, and some are also subject to multiple moves, especially if they live in campus housing and have to move after the semesters end.

College Students and Housing. As explored above, prior research has found household expenses can impact the food security status of the general population, and that renters face increased risk of becoming food insecure (Chaparro et al. 2009; Cutts et al. 2011; Edwards et al. 2007; Fletcher et al. 2009; Gallegos et al. 2014; Gorton 2010;

Joint Center for Housing Studies of Harvard University 2013; Joint Center for Housing Studies of Harvard University 2013; Kirkpatrick and Tarasuk 2011; Nolan et al. 2006; Quine and Morrell 2006). While research is limited around college students and housing in relation to food insecurity, there are a few studies whose findings are consistent with college students. Gallegos et al. (2014) found that college students at a university in Australia who rented were two to three times more likely to experience food insecurity than their counterparts living on campus, or with friends and family. Similarly, a study at the University of Hawaii Manoa reported that students living off campus (with or without roommates), and students living off campus with unknown arrangements, were more likely to be food insecure than students living with family or relatives. These results included students that lived on campus (Chaparro et al. 2009). It is unclear in this study if the food insecure students that lived on campus lived alone or with roommates, but it is evident that college students have increased odds of becoming food insecure if they have housing arrangements that do not include living with family and relatives (Chaparro et al. 2009; Gallegos et al. 2014; Micevski et al. 2014).

The social relationship between renters and owners reveal the power dynamic owners have over renters, and the exploitation that ensues. Those who are renting may rent a residence for years, and still gain no rights or economic interest in the property because they lack the power that is associated with owning a residence.

These studies shed light on the complexity of the relationships between food insecurity and housing arrangements. Renters are more likely to be food insecure, when compared to their homeowner counterparts (Chaparro et al. 2009; Cutts et al. 2011;

Edwards et al. 2007; Fletcher et al. 2009; Gallegos et al. 2014; Gorton et al. 2010; Harvard Research 2014; Kirkpatrick and Tarasuk 2011; Nolan et al. 2006; Quine and Morell 2006). While limited, research looking specifically at college students have demonstrated that students living on or off campus without family or relatives have increased odds for being food insecure (Chaparro et al 2009) and students living off campus without family or relatives are more likely to experience food insecurity (Gallegos et al. 2014; Micevski et al. 2014). This study contributes to the limited research on college students, specifically examining the relationship between college students' housing arrangements and food insecurity.

Race and Ethnicity

Race and ethnicity are not included in our survey, but it is important to examine race and ethnicity as a determinant of food insecurity status, especially as the demographics of college campuses become more diverse (Hayes 2006). Race and ethnicity can be a determinant of food insecurity (Bauer et al. 2012; Coleman-Jensen and Judith 2010; Gundersen 2008; Himmelgreen et al. 2000; Kaiser et al. 2003; Mullany et al. 2012; Pardilla et al. 2014), including among college students (Chaparro et al. 2009). HSU has a growing enrollment in a racially and ethnically diverse student body population. Enrollment rates among the Hispanic population at HSU have increased by ten percent from 2011 to 2014 (19 percent and 29 percent, respectively) (Humboldt State University Institutional Research and Planning 2014). In 2013, the campus was designated as a Hispanic-Serving Institution (universities where total Hispanic enrollment constitutes a

minimum of 25 percent of the total enrollment). With a growing diverse student body population, it is imperative to understand how race and ethnicity impact the likelihood of students experiencing food insecurity.

The prevalence of food insecurity in the United States is higher among Hispanics/ Latinos, (Coleman-Jensen et al. 2014; Himmelgreen 2000; Kaiser et al. 2003) African Americans, (Coleman-Jensen et al. 2014), American Indians (Bauer et al. 2012; Gundersen 2008; Mullany 2012; Pardilla et al. 2014), and among college students in Hawaii identifying as Hawaiian, Filipino, and two or more races (Chaparro et al. 2009).

In a 2013 report of household food security in the United States, 14.3 percent of households were food insecure (Coleman-Jensen et al. 2014). Among African American and Hispanic households, rates of food insecurity were 26.1 percent and 23.7 percent, respectively, revealing elevated rates of food insecurity among these groups (Coleman-Jensen et al. 2014).

In a similar study of ten communities across the Navajo Nation, the largest American Indian reservation in the United States, Pardilla et al. (2014) found 76.7 percent of Navajo households experienced some level of food insecurity. Food insecurity was highest in households with children (28.9 percent), followed by adult households (25.7 percent). The prevalence of household food insecurity on the Navajo nation is more than four times the rate of food insecurity previously reported for American Indians, and more than five times that the national rate of food insecurity in the United States. Navajo households reported the highest level of food insecurity ever reported for a United States population (Pardilla et al. 2014). Consistent with these findings are evidence from three

separate studies analyzing food insecurity among American Indians (Bauer et al. 2012; Gundersen 2008; Mullany et al. 2012). At a reservation in South Dakota, 40 percent of households with young children were food insecure (Bauer et al. 2012). In two southwestern reservations in Arizona and New Mexico, the prevalence of food insecurity was 45 percent (Mullany et al. 2012). These results indicate that American Indians had higher rates of food insecurity than non-American Indians, with rates soaring past the national average of food insecurity (Bauer et al. 2012; Gundersen 2008; Mullany et al. 2012). The original inhabitants of Humboldt County include the Wiyot, Yurok, Hupa, Karuk, Chilula, Whilkit, and the Eel River Athapaskan peoples (Humboldt County Historical Society 1999). In 2010, 5.7 percent of the population identified as American Indian or Alaska Native in Humboldt County (U.S. Census Bureau 2010) therefore it is important that this population has representation in food insecurity studies, although race and ethnicity were excluded from the current study.

Among college students at the University in Hawaii Manoa, racial and ethnic minorities were at an elevated risk of experiencing food insecurity (Chaparro et al. 2009). Hawaiians, Pacific Islanders, Filipinos, and students identifying as two or more races/ethnicities had significantly higher odds of being food insecure (Chaparro et al. 2009). These results, consistent with findings from other studies, indicate that race and ethnic minority membership can be a factor of disparities in food security.

In Conflict Theory, which is fundamentally a theory of inequality, race and ethnicity is an enduring and pertinent struggle. Due to the unequal distribution of resources, groups and individuals advance their own interests while competing over

control and power of societal resources (Lipsitz 2006). Furthermore, economically disadvantaged groups are usually people of color—who are systematically denied from their share of resources (Lipsitz 2006).

While this study not look specifically at the relationship between race and ethnicity and food insecurity, previous studies have demonstrated that the prevalence of food insecurity is higher among certain minority groups than others (Bauer et al. 2012; Chaparro et al. 2009; Coleman-Jensen and Judith 2010; Gundersen 2008; Himmelgreen et al. 2000; Kaiser et al. 2003; Mullany et al. 2012; Pardilla et al. 2014). HSU has a growing enrollment in a racially and ethnically diverse student body population, and therefore it is important that future research looks more closely into the complexities of the relationship between food insecurity and race and ethnicity.

In the next chapter I will discuss possible consequences of food insecurity, including academic achievement and health and wellness concerns.

CHAPTER THREE

In the previous chapter, I explored possible determinants of food insecurity among college students, housing and race and ethnicity, connecting these issues to Conflict Theory. In this chapter I will discuss the possible consequences of food insecurity—poor academic achievement, and health and wellness concerns as an outcome of food insecurity, while tying in Conflict Theory.

Consequences of Food Insecurity

While the determinants of food insecurity, like housing and race, help us to understand *how* people may come to experience higher levels of food insecurity, exploring the consequences of that insecurity helps us understand how it is impacting individuals' quality of life, and outcomes. Even though our study did not include questions that would allow us to measure food insecurity and its impact on academic achievement, prior research has demonstrated that food insecurity may produce poor outcomes in this area (Alaimo et al. 2001; Ashiabi 2005; Ashiabi and O'Neal 2007; Howard 2011; Patton-Lopez et al. 2014; Rodgers and Milewska 2007; Winicki and Jemison 2003). These studies of the detrimental effects food insecurity on children and teenage students may be applicable to college students experiencing food insecurity, so it is important to know of any long-lasting effects.

Several studies have documented poor mental and physical health outcomes as a consequence of food insecurity (Adams, Grummer-Strawn and Chavez 2003; Alaimo et al. 2001; Bronte-Tinkew et al. 2014; Fitzgerald et al. 2011; Franklin et al. 2012; Friel et al. 2014; Hanson, Sobal and Frongillo 2007; Hilmers, Chen and Cullen 2014; Jones and Frongillo 2005; Lippert 2012; Liu et al. 2014; Martin and Ferris 2007; Melchior et al. 2012; Muldoon et al. 2013; Pan et al. 2012; Stuff et al. 2004; Townsend et al. 2001). Poor mental and physical health diminishes quality of life, and may impact one's ability to work or receive an adequate education. Mental and physical health is a growing concern on college campuses (Mowbray et al. 2006). College students are faced with many economic challenges that include paying for things like tuition, textbooks, food, and recently, cutbacks in federal aid for college students (Hopkins 2012). From a Conflict Theory perspective, economic and political structures of society create these social divisions and inequalities through domination and power, rather than through consensus. At HSU, 31 percent of students are from the Los Angeles area, far from their support system and network during their transition to adulthood, which can contribute to mental and physical health issues. It is important to understand the relationship between food insecurity and mental and physical health so that proper care is taken.

Drawing from prior research, I discuss the possible outcomes of food insecurity that may occur among college students, which includes a decrease in academic performance and an increase in mental and physical health concerns.

Academic Achievement

Children and adolescents who are food insecure struggle with academic achievement (Alaimo et al. 2001; Ashiabi 2005; Ashiabi and O'Neal 2007; Howard 2011; Rodgers and Milewska 2007; Winicki and Jemison 2003). It is important to understand if food insecurity is impacting academic achievement, because poor educational outcomes can reduce quality of life through depression, anxiety, and anger (Ross and Van Willigen 1997).

Most of the scholarly research in this area has neglected college students and the relationship of academic achievement and food insecurity. An abundance of academic research has focused on food insecure children and teenagers and the negative impacts it can have on academic achievement (Alaimo et al. 2001; Ashiabi 2005; Howard 2011; Rodgers and Milewska 2007; and Winicki and Jemison 2003). However, one study at a university in Oregon found that academic achievement among college students was inversely associated with food insecurity—indicating a significant relationship between food insecurity and low academic achievement (Patton-Lopez et al. 2014).

Food insecure children exhibit lower levels of school engagement (Ashiabi 2005; Howard 2011) and as a result score lower on tests and learn less during the school year (Winicki and Jemison 2003). Among teenagers, the results remain consistent with the findings on children and school engagement. Food insecure teenagers are twice as likely to have repeated a grade and missed more school days (Alaimo et al. 2001) and experience adjustment problems (Ashiabi and O'Neal 2007).

In addition to the psychological and psychosocial effects food insecurity can have on children and teenagers, it can also impact academic achievement. One food program in Arkansas aimed to reduce food insecurity among students by distributing food in backpacks for evening and weekend meals. Program evaluators found one-third of students improved their grades as a result of the program (Rodgers and Milewska 2007). Researchers reported elevated levels of self-esteem, health, trusting relationships with school personnel, and students appeared to be less worried while in the program. "[S]chools that participate in *Food for Kids* have significantly higher odds that students will perform at or above proficiency on the standardized math exam in the 8th grade" (Rodgers and Milewska 2007:88). While the use of untrained observation and evaluation may have biased the data, these findings remain consistent with other studies looking specifically at academic achievement and food insecurity among children and adolescents (Alaimo et al. 2001; Ashiabi 2005; Howard 2011; Rodgers and Milewska 2007; Winicki and Jemison 2003).

Missing from the literature are a sufficient amount studies that examine the relationship between food insecurity and academic achievement among college students. Patton-Lopez and colleagues (2014) found academic achievement to be associated with food insecurity at an Oregon university, but more literature in this area is needed. While our study did not gather information to assess academic achievement, it is still important to look into academic achievement as a consequence of food insecurity, especially given the research on food insecurity and barriers to academic success for younger students, and the high levels of food insecurity experienced by children and teenagers (Alaimo et

al. 2001; Howard 2011; Winicki and Jemison 2003) (Ashiabi 2005; Ashiabi and O'Neal 2007; Rodgers and Milewska 2007). These consequences of food insecurity may still remain with teenagers as they continue to pursue higher education; future research should explore these connections.

Health and Wellness

Individuals or families experiencing food insecurity may additionally experience mental health issues such as psychological distress (Alaimo et al. 2001; Ashiabi 2005; Friel et al. 2014; Liu et al. 2014), psychosocial difficulties (Alaimo et al. 2001; Ashiabi and O'Neal 2007), symptoms of depression (Alaimo, Olson and Frongillo 2002; Melchior et al. 2012; Muldoon et al. 2013), thoughts of suicide (Alaimo et al. 2002) anxiety, hyperactivity and inattention (Melchior et al. 2012), poor mental or physical health status (Stuff et al. 2004), and restless sleep and mental distress (Liu et al. 2014). Coupled with the increasing rate of mental health issues being reported on college campuses (Arehart-Treichel 2014; Roberts and Golding 1999), these issues may be occurring among HSU students as an outcome of food insecurity.

Weight gain and obesity may also be related to food insecurity in children and adults (Bronte-Tinkew et al. 2007; Martin and Ferris 2007; Pan et al. 2012, Stuff et al. 2004), and in women (Adams et al. 2003; Fitzgerald et al. 2011; Hilmers et al. 2014; Jones and Frongillo 2005; Townsend et al. 2001). Hanson et al. (2007) found that weight loss occurred among men and not women, and in older adults (Hall and Brown 2005). While the USDA currently examines the effect of food insecurity on weight loss, this

study builds on that research by exploring weight gain, as well. I discuss mental and physical health concerns as a consequence of food insecurity next.

Mental Health. Food insecurity may be impacting the overall mental health of children, teenagers and adults. Food insecure children and teenagers are more likely to have seen a psychologist and face suspension (Alaimo et al. 2001) and experience psychosocial problems; such as difficulties in getting along with others and building friendships, and decreases in motivation and responsiveness to their environments (Alaimo et al. 2001; Ashiabi 2005; Ashiabi and O'Neal 2007; Howard 2011). In an analysis of national data of food insecure 15 and 16 year olds, symptoms of depression and thoughts of suicide were more likely to occur among food insecure teenagers than their counterparts (Alaimo et al. 2002). Melchior and colleagues (2012) measured family food insecurity of children aged one and a half to four and a half years old, assessing mental health symptoms. They ascertained children who have experienced food insecurity were more likely to have persistently higher levels of symptoms of depression, anxiety, hyperactivity and inattention.

Food insecurity may be impacting the psychological and psychosocial development of children and teenagers in school. In their studies of mental health issues and food insecurity in schools, Alaimo and colleagues (2001) and Ashiabi (2005) found food insecure teenagers were more likely to have seen a psychologist, three times as likely to have faced suspension, almost twice as likely to experience difficulty getting along with others, and four times as likely to not have friends (Alaimo et al. 2001).

Psychosocial difficulties including heightened anxiety, decreased motivation, and decreased responsiveness to their environments occurred in food insecure children (Ashiabi 2005; Howard 2011) and teenagers (Ashiabi and O'Neal 2007).

Among adults, the findings remain consistent with prior research on mental health and food insecurity among children and teenagers. Food insecure adults are more likely to experience poorer mental health as a consequence of food insecurity (Stuff et al. 2004), including increases in the diagnosis of depression and anxiety disorders (Muldoon et al. 2013). While just under one-quarter (23.9 percent) of food secure adults had been diagnosed with a mental illness, more than one-third (35.04 percent) of the food insecure group had received a diagnosis (Muldoon et al. 2013). Food insecure adults also face increased risk of psychological distress (Friel et al. 2014; Liu et al. 2014) and frequently report experiencing restless sleep (Liu et al. 2014).

As explored above, mental health symptoms are a consequence of food insecurity among children, teenagers and adults (Alaimo et al. 2001; Alaimo et al. 2002; Ashiabi 2005; Ashiabi and O'Neal 2007; Friel et al. 2014; Liu et al. 2014; Melchior et al. 2012; Muldoon et al. 2013; Stuff et al. 2004). There is limited research conducted on the mental health status of food insecure college students, which I aim to begin addressing with this current study. This is especially important for college students, who are already experiencing higher stress levels, and may be prone to more mental health issues generally (Mowbray et al. 2006).

Another important aspect of health and wellness is physical health. Food insecurity impacts the mental health in children, teenagers and adults; therefore it is

highly likely that physical health is impacted by food insecurity. Physical health concerns, in terms of weight loss and/or gain as a consequence of food insecurity, are explored below.

Physical Health. Understanding the relationship between food insecurity and physical health is important because physical health impacts quality of life. Research indicates weight gain and obesity are related to food insecurity in children and adults (Bronte-Tinkew et al. 2007; Martin and Ferris 2007; Pan et al. 2012; Stuff et al. 2004). A smaller body of research documents weight loss as more likely to occur among food insecure men (Hanson et al. 2007).

Food insecure children and adults are more likely to experience poorer physical health (Stuff et al. 2004) and weight gain (Bronte-Tinkew et al. 2007; Martin and Ferris 2007; Pan et al. 2012). Martin and Ferris (2007) found that over 60 percent of food insecure parents in a Connecticut study are obese and severely obese. Additionally, among their children, nearly 32 percent were overweight and almost 15 percent faced the risk of being overweight. Although the relationship between overweight status in food insecure children statistically insignificant, girls were more than twice as likely to be overweight than boys (Martin and Ferris 2007). Among food insecure children, gender can increase the odds of overweight status.

Food insecure women are at an elevated risk for weight-gain and obesity (Adams et al. 2003, Fitzgerald et al. 2011, Hilmers et al. 2014; Jones and Frongillo 2005; Townsend et al. 2001). Our study did not collect information about respondent's gender, however it is essential to understand the facets of physical health and food insecurity,

including gendered consequences since we focus on college students in this study. Women outnumber men in college attendance across, and in 2010, more than 35 percent of women had a bachelor's degree or higher, and around 27 percent of men (U.S. Census Bureau 2010). Food insecure women are at an elevated risk for being obese or overweight (Adams et al. 2003; Hilmers et al. 2014; Jones and Frongillo 2005; Townsend et al. 2001) and being diagnosed with type 2 diabetes (Fitzgerald et al. 2011). Townsend and colleagues (2001) found that the likelihood of women experiencing food insecurity is racialized as well, with around 40 percent of white women categorized as overweight, compared to African American and Native American women at rates of 57.1 percent and 64.5 percent, respectively (Townsend et al. 2001). For women, the odds of obesity are likely to increase with the severity of food insecurity (Adams et al. 2003).

Fewer cases of weight loss have been reported as a consequence of food insecurity. In their analysis of food insecurity and body weight using national data, Hanson et al. (2007) found weight loss and weight gain as a consequence of food insecurity has gendered effects. Weight loss occurred in men classified as having low food security, when compared to men that were food secure (Hanson et al. 2007). Weight loss was not a common occurrence among women in this study. In their study of food insecurity among older adults in the United States, Hall and Brown (2005) found that weight loss was likely to occur as an outcome food insecurity.

As discussed in this chapter, the effects of food insecurity can be devastating on children, teenagers, and young adults (Alaimo et al. 2001; Ashiabi 2005; Ashiabi and O'Neal 2007; Howard 2011; Patton-Lopez et al. 2014; Rodgers and Milewska 2007;

Winicki and Jemison 2003). Poor mental and physical health are also outcomes of food insecurity (Alaimo et al. 2001; Bronte-Tinkew et al. 2014; Franklin et al. 2012; Friel et al. 2014; Lippert 2012; Liu et al. 2014; Martin and Ferris 2007; Melchior et al. 2012; Muldoon et al. 2013; Pan et al. 2012; Stuff et al. 2004), which may diminish the overall well-being of individuals (Hampton 2007). This may be especially harmful for college students that lack the resources for adequate care for mental or physical concerns. Many students already struggle financially to afford school, and with over half of HSU students being first generation students (Humboldt State University Institutional Research and Planning 2014), it is important to fully understand the complexity of struggles facing college students.

In Chapter Four, I will focus on the limited research exploring the prevalence of food insecurity among college students to provide a baseline, upon which I build with this thesis.

CHAPTER FOUR

So far in this thesis, I have focused on the determinants of food insecurity (housing and race and ethnicity) (Chapter Two), and consequences of food insecurity (poor academic achievement, and lower mental and physical health) (Chapter Three) using Conflict Theory to explore how these issues may be impacting college students. In this chapter, I will focus on the emerging body of research focused on college students and food insecurity.

College Students and Food Insecurity

There is a limited scholarship that has specifically analyzed the prevalence of food insecurity among college students. However, a few studies have revealed that college students face increased odds of being food insecure (Chaparro et al. 2009; Gaines et al. 2014; Gallegos et al. 2014; Hughes et al. 2011; Meldrum and Willows 2006; Patton-Lopez et al. 2014) signaling the need for further research in this area. Housing arrangements and racial and ethnic membership impact student food insecurity, along with other political and economic factors that push students in a low social position.

The rates of food insecurity among college students often surpass national rates (14.3 percent, according to Coleman-Jensen et al. 2014) in the United States (Chaparro et al. 2009; Hughes et al. 2011; Patton-Lopez et al. 2014). Chaparro et al. (2009) found the rate of food insecurity among students at the University of Hawaii Manoa was almost

triple the rate of food insecurity among residents of Hawaii (21 percent and 7.8 percent, respectively). At a university in rural Oregon, 59 percent of students were food insecure (Patton-Lopez et al. 2014). Among a sample of 557 undergraduate students at a large public university in Alabama, the rate of food insecurity was approximately 14 percent, about the same as the national rate (Gaines et al. 2014).

Aligning with prior research on housing and food insecurity, housing arrangements can impact student's likelihood of experiencing food insecurity (Chaparro et al. 2009; Gallegos et al. 2014). Chaparro et al. (2009) found that respondent's living arrangement (coupled with ethnicity) was connected with striking differences between food secure and insecure students. Gallegos et al. (2014) found that students who rented were two or three times more likely to experience food insecurity, than compared to their counterparts who live on campus or stayed with friends and their families.

Besides housing, other economic factors can contribute to student food insecurity. Students that receive income support in the form of scholarships and financial aid have been shown to be more likely to experience food insecurity (Gallegos et al. 2014; Gaines et al. 2014; Hughes et al. 2011; Meldrum and Willows 2006). Interestingly, student employment was associated with a higher risk for food insecurity (Gallegos et al. 2014; Hughes et al. 2011), perhaps because employment made the workers ineligible for food benefits. In another study examining the role of financial factors in predicting food insecurity among university students in Alabama, Gaines et al. (2014) found financial independence and reliance on food assistance increased the likelihood that students experienced food insecurity.

The findings from these studies have provided a partial explanation for some of the factors that contribute to student food insecurity. Results from these studies indicate that a number of economical factors including housing arrangements, financial assistance and independence, and employment contribute to student food insecurity. It is common for many university students to face these economical factors and conditions. As HSU is a campus with a growing diverse student body population comprised of many first generation college students and racial and ethnic minorities, it is especially important to understand the various factors that can contribute to student food insecurity since these groups tend to be economically disadvantaged.

Additional food insecurity research specifically examining college students and food insecurity is necessary to understand the complexity and pervasiveness of food insecurity among a vulnerable and powerless population that is low in the hierarchical power structure of society. This study builds upon the limited research specifically examining college student's food insecurity, by examining housing arrangements as a determinant of food insecurity, and health and wellness concerns as consequences of food insecurity. In Chapter Five, I will explain the methods I employed in these analyses.

CHAPTER FIVE: METHODS

Prior literature has provided some insight into the determinants and consequences of food insecurity. There is a relationship between housing arrangements, especially rental housing (Chaparro et al. 2009; Cutts et al. 2011; Edwards et al. 2007; Fletcher et al. 2009; Gallegos et al. 2014; Gorton 2010; Joint Center for Housing Studies of Harvard University 2013; Joint Center for Housing Studies of Harvard University 2013; Kirkpatrick and Tarasuk 2011; Nolan et al. 2006; Quine and Morrell 2006) and food insecurity. The same is true for race and ethnicity, with rates of food insecurity higher among racial and ethnic minorities (Bauer et al. 2012; Chaparro et al. 2009; Coleman-Jensen and Judith 2010; Gundersen 2008; Himmelgreen et al. 2000; Kaiser et al. 2003; Mullany et al. 2012; Pardilla et al. 2014), even though this demographic information was not included in our study. Academic achievement was also not included in our study, but since the focus is on college students it is important to explore poor student achievement as an outcome of food insecurity. Health and wellness concerns resulted as an outcome in multiple studies. Each one of these topics relates to the power differentials that exist between students and those with influential power in society. The power differential between the powerful and the powerless result in inequality and competition for resources, and a consequence of inequality is food insecurity.

Based on this prior literature, our research team asked: Are HSU students experiencing food insecurity? If so, who and to what degree? Are housing arrangements linked to student food insecurity? Is food insecurity linked to higher levels of health and

wellness concerns among students? Does weight gain or weight loss occur among food insecure students? Based on prior literature, I developed four hypotheses for this study:

H1: Students who live alone are more likely to be food insecure than students living with others.

H2: Students who live off campus are more likely to be food insecure than students living on campus.

H3: Food insecure students will have higher mental health concerns than their food secure peers.

H4: Food insecure students are more likely to experience weight loss and/or weight gain than food secure students.

To test these hypotheses for HSU students, we surveyed current HSU students in October of 2014 (IRB 14-050). The questions in the survey were developed by a team of researchers, including the staff of the California Center for Rural Policy (CCRP), located at Humboldt State University, of which I am a part. The survey was created online using SNAP Survey, and all currently enrolled students were sent a copy of the online survey through email, distributed through the University's Institutional Review and Planning (IRP) department. The survey was sent to 8,293 respondents, 231 of whom responded (2.8% response rate). The response rate for the survey was relatively low; this was likely because of technical difficulties that occurred alongside the launch of the survey, and a problem with the campus servers that made students unable to complete the survey off of the campus network. Had we not experienced these difficulties, I anticipate that we

would have had a higher response rate. No incentives were offered to participants, which also may have contributed to the low response rate.

Measures

To explore whether or not food insecurity is being experienced by HSU students, and the effects of any food insecurity, we developed a 25-question survey. The survey instrument included questions about demographics, student housing, various measures of food security adapted from the USDA's ten-item Adult Food Security Survey Module, and questions designed to understand various aspects of the students' health and wellness. Each of the measures is explored below.

Respondent Demographics: Students were asked questions to provide information about themselves, to establish their generalizability to the campus. All of the respondent demographics were used in Phase I of the analysis (explained below), in which I explored demographic patterns among the respondents.

Age. Students were asked to provide their age, in years, with which I created the variable *Age*.

Children. Students were asked if they had children under 18 years old living in their home. From this, I created the variable *Children.* If respondents had children, they were coded 1; if they did not, I coded them as 0.

Location. Students were given a choice of towns around the campus from which to select, to represent the community in which they currently reside. I used their responses to create the variable *Community.*

Housing Arrangements: Students were asked two questions about their housing arrangements, to determine (1) if they lived on or off campus, (2) if they lived alone or with roommates. I created two variables from these questions, based on potential student vulnerabilities, given the literature on food insecurity and housing. I used these in Phase II of my analysis, comparing housing arrangements to levels of food insecurity, as discussed in more depth below.

Living Off Campus. I created an *Off Campus* dummy variable for students who reporting living on (=0) or off (=1) campus. I created this variable to see if living off campus was connected with higher rates of food insecurity.

Living Alone. I created the dummy variable *Alone* based on a student's report of living with roommates, which could include family (=0), or alone (=1). I created this variable to see if living alone was associated with higher rates of reported food insecurity.

Food Insecurity: The survey contained ten questions about various aspects of food security/insecurity, as seen in Table 2. To compare the student population to other measures of food security among adults, the questions were adapted from the USDA food security measure in the Adult Food Security Survey Module (AFSSM). In all cases, the respondents were asked to report about their food-related behaviors and conditions, based

on their last 12 months. In Phase II of my analysis, I use food insecurity measures to see if housing arrangements were impacting levels of food insecurity for students. In Phase III of my analysis, explored in more depth below, I use the food insecurity measures to see if there are associations between levels of food insecurity being reported by students, and their experiences with health and wellness.

To perform these analyses, I created dummy variables for each of the measures of food insecurity a student might have experienced, with the "1" being a marker of food *insecurity* in each case. For three of the questions, respondents were asked how often a statement was true (see Table 1). If the respondents answered "often true" or "sometimes true" I coded the responses as a "1." If the respondents answered "never true" I coded them as a "0." Two follow-up questions were included to determine how often a condition occurred. If the respondents answered "Almost every month" or "Some months, but not every month" I coded them as a "1". If the respondent answered "Only 1 or 2 months", I coded the response as a "0". With the four questions that required a "Yes" or "No" answer, for whether the student experienced that behavior in the past twelve months, I coded each variable "1" if they experienced the behavior of food insecurity, and "0" if they did not. See Table 2 for the list of questions, and how I coded them.

After creating the series of binary variables, based on different forms of insecurity, I created a *Food Insecurity Score* by indexing the ten measures together (see Table 2). Respondents could score between zero (0) and ten (10), with a higher number indicating a higher level of food insecurity. I used the *Food Insecurity Score* in Phase I in

respondent demographics, and in Phase III to calculate mean scores and standard deviations of *Health and Wellness Score* and *Gain Weight* and *Lose Weight.*

To make our results comparable to other studies of food insecurity that use similar measures, I then categorized the level of food security into “High” (0), “Marginal” (1-2), “Low” (3-5) and “Very Low” (5-10) (see Table 2). Because of the relatively low response rate, to be able to run statistical analyses I also created a dummy variable *Food Insecurity Status.* I used this *Food Insecurity Status* variable in Phase II of my analysis to test the significance of the variables *Off Campus* and *Alone*. In Phase III, I used the *Food Insecurity Status* variable to compare results of the *Health and Wellness Score*. Lastly, I test the significance of *Gain Weight* and *Lose Weight* among the food insecure and secure respondents.

Table 2: Food Insecurity Index Questions and Scoring

Item	Potential Responses	Response score
In the last 12 months, I worried whether my food would run out before I got money to buy more. Was that often true, sometimes true or never true for you in the last 12 months?	Often true Sometimes true Never true	1 1 0
The food I bought just didn't last, and I didn't have money to get more.	Often true Sometimes true Never true	1 1 0
I couldn't afford to eat balanced meals. Was that often true, sometimes true or never true for you in the last 12 months?	Often true Sometimes true Never true	1 1 0
In the last 12 months, did you ever cut the size of your meals or skip meals because there wasn't enough money for food? If yes, how often did this happen?	Yes No Almost every month Some months, but not every month Only 1 or 2 months	1 0 1 1 0
In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money for food?	Yes No	1 0
In the last 12 months, were you ever hungry but didn't eat because there wasn't enough money for food?	Yes No	1 0
In the last 12 months, did you lose weight because there wasn't enough money for food?	Yes No	1 0
In the last 12 months, did you ever not eat for a whole day because there wasn't enough money for food? If yes, how often did this happen?	Yes No Almost every month Some months, but not every month Only 1 or 2 months	1 0 1 1 0

Source: Adapted from the United States Department of Agriculture Economic Research Service 2014

Table 3: Food Insecurity Score Categories

Affirmative responses	Food Security Score	Food Security Status	Household conditions
0	High food security	Food Secure	No food access problems
1-2	Marginal food security		Anxiety over household food shortage
3-5	Low food security	Food Insecure	Reduced diet quality
>5	Very low food security		Reduced food intake and disrupted eating patterns

Source: Adapted from Chaparro et al. (2009) and the United States Department of Agriculture Economic Research Service (2013).

Health and Wellness: We included three questions in the survey to gauge the mental health of the students, to explore the impacts of food insecurity on those measures (see Table 3). I used these variables in Phase III of my analysis, as described below. I recoded each of the variables into zero (0) and one (1) to count affirmative responses to each condition (see Table 3), signaling the respondent is experiencing that possible mental or physical health concerns. After creating the series of binary variables, based on different forms of mental health conditions occurring in the past 30 days, I created a *Health and Wellness Score* by indexing the three measures together (see Table 4). Respondents could score between zero (0) and three (3), with a higher number indicating a higher level of mental health concerns. I then categorized the level of mental health into “Very” (0), “Low” (1), “Moderate” (2), and “High” (3) (see Table 4). I used *Health and Wellness Score* to determine mean scores and standard deviations of food security categories food insecure, and food secure. Additionally, mean scores and standard deviations were calculated for each variable of mental health score: *Sadness, Unhappiness,* and *Restless Sleep.*

With two questions we inquired about respondent's physical health, including weight gain and weight loss occurring in the past 12 months (see Table 6). The responses to the variables *Gain Weight* and *Lose Weight*, were recoded into zero (0) and one (1). *Gain Weight* and *Lose Weight* were used to test hypothesis four, explained below.

Table 4: Health and Wellness Index Questions and Scoring

Item	Potential Responses	Response Score
Sadness: How much of the time during the past 30 days have you felt sad?	All of the time Most of the time Sometimes Not at all	1 1 1 0
Unhappiness: In general, how happy have you been within the last 30 days?	Not at all happy Rarely happy Sometimes happy Almost always happy Always happy	1 1 1 0 0
Restless Sleep: How much of the time during the past 30 days has your sleep been restless?	Always restless Almost always restless Sometimes restless Rarely restless Never restless	1 1 1 0 0

Table 5: Health and Wellness Categories

Affirmative Responses	Mental Health Score	Conditions
0	Very low mental health concerns	No mental health concerns.
1	Low mental health concerns	Symptoms of unhappiness, sadness, and restless sleep.
2	Moderate mental health concerns	Reduced mental health.
3	High mental health concerns	Increase in sadness, unhappiness and restless sleep.

Table 6: Physical Health Questions

Item	Potential Response	Response Score
Lose Weight: In the last 12 months, did you lose weight because there wasn't enough money for food?	Yes No	1 0
Gain Weight: In the last 12 months, did you gain weight because there wasn't enough money for food?	Yes No	1 0

To understand the prevalence of food insecurity and health and wellness concerns among HSU students, I used these measures in three phases of statistical analyses. An explanation of statistical analyses I conducted in Phases I, II and III is in the next section.

Statistical Analyses

I conducted my analysis in three phases, using SPSS Statistical Software. In Phase I, I explored the demographic information of the respondents, to compare the sample with the broader HSU population, and this provided a baseline demographic profile of the respondents to give context to the other phases of the analysis. I used descriptive statistics, including frequencies and cross tabulations, to conduct these analyses. In Phase II, I tested hypotheses one and two by comparing levels of food insecurity by the different aspects of the respondents' housing arrangements. I used chi square to test the strength of the association between housing and food insecurity. In Phase III of my analysis, I examined the impact of student food insecurity on the mental and physical health of the respondents. I conducted an independent sample t test to show the levels of mental health issues in hypotheses three. To test the likelihood of weight loss or weight

gain among food insecure students in hypothesis four, I used a chi square significance test. The results of those hypotheses tests, as well as the demographic profile of the respondents, are in Chapter Six of this paper.

The aims of this study are to determine if HSU students are experiencing food insecurity, the possible causes and outcomes associated with food insecurity, and to what extent students experience food insecurity. The following research questions provide insight into causes and consequences of student food insecurity among HSU students: Are HSU students experiencing food insecurity? If so, whom and to what degree? Are housing arrangements linked to student food insecurity? Is food insecurity linked to higher levels of mental health concerns among students? Does weight gain and/or weight loss occur among food insecure students? In Chapter Six, I discuss the results of my analyses in Phases I, II and III.

CHAPTER SIX: RESULTS

Thus far, I have provided an overview of factors that may contribute to college students' food insecurity in the areas of housing and race and ethnicity (as explored in Chapter Two) and academic achievement and mental and physical health (explored in Chapter Three) through a Conflict Theory lens.

In this chapter, I will describe the results of all three phases of my analyses, as described in Chapter Five. I will explore the results of my hypotheses testing, and explain the demographics of the respondents in Phase I. I start with the latter, showing the age and location of the respondents, as well as the community in which they reported living, if they have children under 18 in their household, and their housing arrangements. In Phase II, I used chi square tests to determine the significance of hypotheses one and two, testing the impact that housing arrangements might have on student food insecurity. In Phase III, I used an independent sample t test and chi square tests to test hypotheses three and four, which are the levels of mental health concerns including increased sadness and restless sleep and decreased happiness, and the likelihood of physical health issues such as gaining and/or losing weight as a consequence of experiencing food insecurity, respectively. These results examine HSU student's food insecurity, as well as the impact of housing arrangements on food insecurity, and the consequences of food insecurity in the forms of mental and physical health issues.

Phase I: Respondent Demographics

The age range of the 231 respondents was between 18 and 58 years old, with an average age of 22.6 years. Three-quarters of respondents (168) were between the ages of 18-24, with the remaining 53 respondents (24 percent) were between the ages of 25-58 (see Figure 1). Ten respondents (5.4 percent) had children living at home, and 175 (94.6 percent) did not have children living at home (see Figure 1).

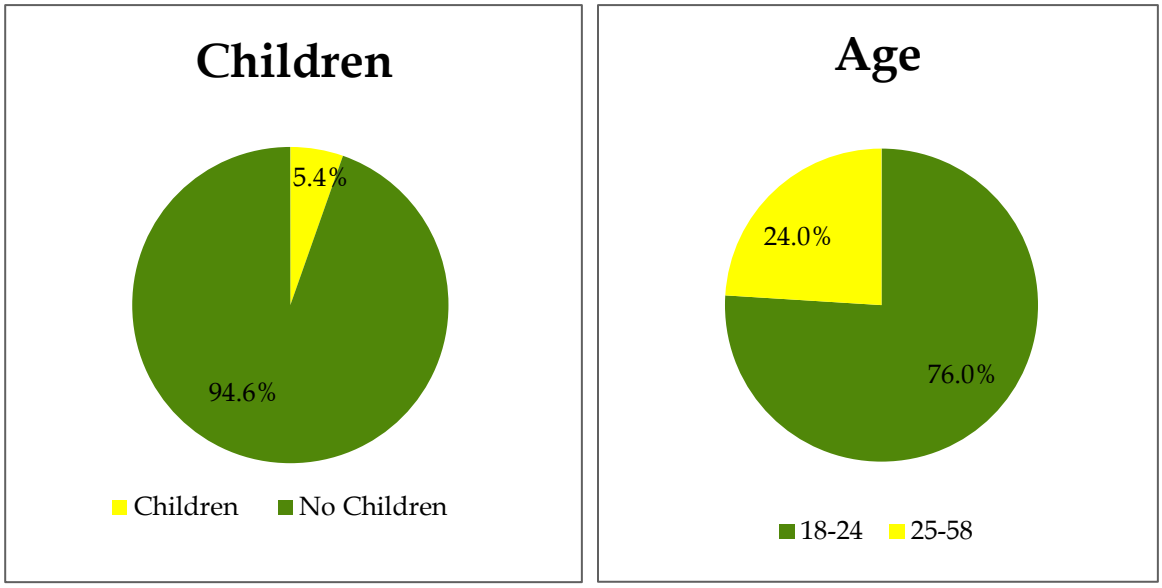

Figure 1: Children at Home and Ages

The largest proportion of respondents were concentrated in Arcata, California (the location of the campus), with the remainder of respondents living in other communities in Humboldt County, detailed in Table 7 below.

Table 7: Location of Survey Respondent, by Community

Community of Respondent	Respondents	Proximity to Campus (in Miles)*
Arcata	69 (29.9%)	0.6
Blue Lake	2 (0.9%)	8.2
Eureka	23 (10.0%)	8.3
Fortuna	1 (0.4%)	25.6
Manila	2 (0.9%)	6.0
McKinleyville	8 (3.5%)	5.5
N=106		

*Source: Google maps.

Nearly one-third of the respondents live in Arcata; the next largest proportion of respondents reported living in Eureka (ten percent), south of campus, and almost four percent of respondents reported living north of campus in McKinleyville. Around two percent of students live in the smaller communities of Blue Lake, Manila and Fortuna.

In our survey, we asked respondents to provide information about their housing arrangements, including living on or off campus, and if they lived alone or with others. HSU housing demographics are shown for comparison to the demographics of the sample (see Table 8).

Table 8: Respondent Housing Arrangements, Compared to HSU Population

Housing Arrangement	Survey Sample	HSU Population*
Living alone	37 (16.0%)	Data not available
Living with others	188 (84.0%)	Data not available
Living on campus	112 (49.8%)	1,999 (24.0%)
Living off campus	113 (50.2%)	6,486 (76.0%)
N	Sample Size	Population Size

*Source: Humboldt State University Institutional Research and Planning 2014

Nearly half of the respondents live on campus, and the other half live off campus. The majority of respondents live with others (84 percent), and the remaining 16 percent live alone. When compared to campus-wide data, over three-quarters of students live off campus and less than a quarter live on campus. Data about living alone or with others is not available at the campus-wide level.

As seen in Table 9 below, 35 percent of respondents were classified as food insecure during the previous year. More than one third (35 percent) of students reported one or two indicators of food insecurity, classifying them as marginally food secure or at risk for food insecurity. The mean *Food Insecurity Score* for all respondents was 2.40, with 2.70 standard deviations.

Table 9: Food Security Status of HSU Students

Food Security Score*	Frequency	Food Security Status	Frequency
High food security	43 (30.0%)	Food Secure	93 (65.0%)
Marginal food security	50 (35.0%)		
Low food security	28 (19.0%)	Food Insecure	51 (35.0%)
Very low food security	23 (16.0%)		
N	144 (100.0%)		144 (100.0%)

*Source: Adapted from Chaparro et al. (2009) and the United States Department of Agriculture Economic Research Service (2013).

Phase II: Effects of Housing Arrangements on Food Insecurity

My first hypothesis was that students who live alone would be more likely to be food insecure than students who live with others. My second hypothesis was that students living off of campus would be more likely to be food insecure than students living on campus. Due to a small sample size that contributed to a low cell count for statistical testing, I used the dichotomous *Food Insecurity* variable. To test hypotheses one and two, I conducted chi square tests significance tests to compare proportions of students who reported food insecurity, as displayed in Table 10.

Table 10: Proportion of Respondents Reporting Food Insecurity, by Housing Arrangements

	Living Alone	Living with Others	*p value (chi square)
Food Insecure	28 (75.7%)	73 (68.2%)	.26
	Off Campus	On Campus	p value (chi square)
Food Insecure	51 (76.1%)	50 (64.9%)	.10*

* $p < 0.10$

As I hypothesized, the frequency of food insecurity is higher among respondents that live alone and respondents that live off campus. The results from the chi square tests indicate that living alone is *not* statistically significantly related to student food insecurity, despite a higher proportion of reported food insecurity reported, compared to their counterparts living with others. The results of the hypotheses testing may have been impacted by the low response rate. Students living off campus were statistically significantly more likely to report food insecurity, providing support for my second hypothesis. As seen in Table 8, this survey oversampled students living on campus; it may be that these results would have been stronger if we had secured a more

representative sample. While the first hypothesis was not statistically significantly supported, future research is warranted to more closely examine the relationship between housing and student food insecurity.

Next, in Phase III I will look at the consequences of food insecurity on mental and physical health and wellness.

Phase III: Effects of Food Insecurity on Health and Wellness

In this phase, I tested my third and fourth hypotheses; that food insecure students would have higher levels of mental health concerns than food secure students, and that food insecure students would be more likely to have physical health issues, including weight gain and/or weight loss, than food secure students. I explain the results of the hypothesis testing below.

Mental Health Concerns

Table 11 below illustrates the mental health concerns categories into which students were grouped, based on self-reported conditions from the past thirty days. Over 90 percent of respondents reported moderate or high mental health concerns. This is high, though should be understood as part of a larger trend of rising mental health concerns on college campuses (Arehart-Treichel 2014). Using the *Health and Wellness Score* on a scale of zero to three, the mean score for all respondents was 2.40.

Table 11: Respondent Levels of Mental Health Concerns

Mental Health Categories	Frequency
Very low mental health concerns	1 (0.4%)
Low mental health concerns	17 (7.6%)
Moderate mental health concerns	131 (58.2%)
High mental health concerns	76 (33.8%)
N	225 (100%)

To see if these scores varied by food insecurity status, to test the effect of that status, I compared the *Health and Wellness Score*, and the frequency with which respondents reported each component of the score. In Table 12, below, I outline the mean scores and standard deviations for the overall health and wellness score of respondents, and a breakdown by category of mental health concerns (sadness, restless sleep and unhappiness). I used an independent sample t test to see if the comparison is statistically significant.

Table 12: Food Security and Mental Health

Mental Health Score Variables	Food Insecure Mean (S.D.)	Food Secure Mean (S.D.)	*p value T test
Mental Health Score	2.40 (0.55)	2.07 (0.74)	.00*
Sadness	1.34 (0.77)	1.09 (0.61)	.06*
Unhappiness	1.80 (0.67)	1.51 (0.63)	.02*
Restless sleep	2.30 (0.89)	1.70 (1.06)	.00*

* $p < 0.10$

The mean scores are greater in each variable among the food insecure group, indicating a higher level of mental health concerns among food insecure respondents. This provides support for hypothesis three; food insecurity is associated with higher mental health concerns for HSU students. Results from the independent sample t tests

show higher mean scores among the food insecure respondents, when compared to their food secure counterparts, in all mental health concern variables.

Due to the significance of the mental health concerns overall among food insecure respondents, and the possibility that these mental health concerns may be impacting students at other universities, future research is recommended to more closely examine health and wellness concerns as an outcome of food insecurity.

Physical Health

Along with hypothesizing food insecurity would be associated with higher levels of mental health concerns, in my fourth hypothesis, I posited that food insecure students would have an increased likelihood of either losing weight or gaining weight when compared to food secure students. To test this hypothesis, I used chi square significance tests to compare weight loss and weight gain among the food insecure and food secure groups. The results are displayed in Table 13.

Table 13: Proportion of Respondents Reporting Weight Gain or Weight Loss, by Food Security Status

Variable	Food Insecure Frequency	Food Secure Frequency	*p value (chi square)
Gain weight	19 (82.6%)	4 (17.4%)	.05*
Lose weight	10 (100.00%)	0 (0.0%)	.01*

* $p < 0.05$

As seen in Table 13, weight loss and weight gain are both statistically significant as an outcome of food insecurity. Among the food insecure group, respondents reported higher rates of both weight gain and weight loss than their food secure counterparts.

There were no reported cases of weight loss among the food secure group, and less than a quarter of respondents reported weight gain in that group, demonstrating the relationship between physical health and food insecurity. This provided support for my fourth hypothesis, that food insecure students would be more likely to report physical health concerns, such as gaining/losing weight.

In Phase II, I found higher frequencies of food insecurity occurred among respondents that reported living alone and respondents that reported living off campus, when compared to their counterparts living with others and living on campus. However, only living off campus was significantly associated with food insecurity. These findings provide partial insight into the determinants of food insecurity and shed light on the structural, economic and political forces that can impact food insecurity.

In Phase III, poor health and wellness outcomes, both mental and physical, were significantly associated with food insecurity. The health and wellness disparities between the food insecure and food secure respondents are troublesome and may indicate that students at other universities are facing the similar health disparities as the respondents in this sample.

In Chapter Seven, I further discuss the results through the lens of Conflict Theory, along with recommendations for future directions of research of college student food insecurity.

CHAPTER SEVEN: DISCUSSION AND CONCLUSION

In this thesis, using prior research on food insecurity and the subject position of college students, I asked the following: Are HSU students experiencing food insecurity? If so, whom, and to what degree? Are housing arrangements linked to student food insecurity? Is food insecurity linked to higher levels of mental health concerns among students? Does weight gain and/or weight loss occur among food insecure students? To answer these questions, the following hypotheses were tested:

H1: Students who live alone are more likely to be food insecure than students living with others.

H2: Students who live off campus are more likely to be food insecure than students living on campus.

H3: Food insecure students will have higher mental health concerns than their food secure peers.

H4: Food insecure students are more likely to experience weight loss and/or weight gain than food secure students.

Using an online survey, administered to respondents in October 2014 (n=231), I found more than one-third of HSU student respondents are experiencing food insecurity. Along with this, parallel to prior research on determinants of food insecurity (Chaparro et al. 2009; Gallegos et al. 2014; Micevski et al. 2014), I found that students living off campus, and those living alone, reported higher rates of food insecurity. This was

associated with higher rates of mental and physical health issues, which have been associated with food insecurity in previous research (Arehart-Treichel 2014; Roberts and Golding 1999). I explore these findings, below.

Using USDA methodology to determine the prevalence of food insecurity, 35 percent of respondents were food insecure in this study, equal to the rate in California of nearly 35 percent (California Food Policy Advocates 2010). The rate of food insecurity in this study surpasses the rate of food insecurity in Humboldt County (25.9 percent) (California Food Policy Advocates 2010), and is more than twice the national rate (14.3 percent) (Coleman-Jensen et al. 2014).

In addition to determining the prevalence of food insecurity, I have also examined the relationship and impact of students' housing arrangements as a determinant of food insecurity. While chi square significance testing has determined that respondents living off campus were statistically significant as a determinant of food insecurity and living alone did not impact student's food insecurity, our sample demographics were not representative of the true housing demographics at HSU in the case of living on versus off campus. Furthermore, the technical difficulties we encountered in which students could only take the survey on the campus network server may have skewed the data of on campus versus off campus respondents. I anticipate that had this issue not occurred, our sample would have been much larger and we would have been able to examine more in depth the relationship between housing arrangements and food insecurity.

In addition to examining the relationship between housing and food insecurity, I sought to determine the impact food insecurity has on health and wellness, including

mental and physical health. Overall, about one-third of students exhibited high mental health concerns, followed by over half of respondents falling into moderate concern. Independent sample t tests and a comparison of means determined that overall mental wellness, unhappiness, sadness and restless sleep were significantly associated as an outcome of food insecurity. It is important to note that the health and wellness questions inquiring about respondents experience are self-reported data and may not be a completely accurate tool to measure health and wellness.

To understand the relationship of food insecurity and weight loss and/or weight gain as a consequence of food insecurity, I used chi square tests to determine the significance. Results from both tests indicate a significant relationship between weight loss and/or weight gain as a consequence of food insecurity. While there was a high frequency of weight loss, this was also the case for weight gain.

Prior research has consistently reported weight gain and obesity as an outcome of food insecurity. A weight gain question was not included in the USDA's AFSSM, but was added by CCRP staff. Based on prior research and results from the current study, I strongly recommend that a weight gain question be added into the USDA's AFSSM, to further understand the complexity of physical health and food insecurity.

The study did face some limitations. The campus network server certainly impacted our response rate, and may have skewed the data for respondents living on campus versus off campus, as it was not a true representation of the actual housing demographics on campus. A larger sample would be helpful in identifying the determinants of food insecurity. Further demographic information to better understand

the sample would be useful to understand how the determinants of food insecurity may be racialized or gendered. Since we focus on college students, additional questions to measure the impact of food insecurity on academic success would be important in understanding the severity and pervasiveness of food insecurity. Still, the results have demonstrated that food insecurity at HSU is an important case study.

The high rate of food insecurity among HSU students highlights the struggles and powerlessness students endure during their transitions to adulthood. It also brings attention to the need to reject the "impoverished student experience" narrative that is largely normalized in society, when in fact students are impacted by economic and political influences and must juggle competing costs for basic student necessities (tuition, textbooks, housing, food, utilities and healthcare). With limited resources there is constant competition and conflict. However, the conflict perspective posits that the struggle of many may influence social justice movements striving toward equality.

Although there is already a Food Cupboard at HSU that has provided hundreds of students with food, this relief is only short-term. Long-term solutions include signing up for food assistance programs such as CalFresh, but there are also barriers for qualifying for this assistance. Currently, there are stakeholders in the campus community and in the greater community that have identified the issue of student food insecurity and are working to eradicate student hunger through short-term solutions such as the Food Cupboard, and long-term solutions that include health and wellness education and working with policymakers (Humboldt State University 2015).

Future research with a more robust sample could build on these findings by gathering additional demographic information (gender and race and ethnicity) of students, along with an analysis of poor academic achievement as an outcome of food insecurity. It would be interesting to see how these results compare to local community colleges in Humboldt County. HSU could implement a longitudinal analysis of this case study to better understand patterns of food insecurity, and possibly how the patterns relate to current economic or political influences (tuition increases, new policies). This current study, along with future research could inform policy to alleviate food insecurity among college students.

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APPENDIX A: SURVEY

HUMBOLDT STATE UNIVERSITY

CCRP California Center for Rural Policy

The Student Food Security Survey

Purpose of this Survey
You are invited to participate in a survey that will help us better understand issues concerning Food Security with Humboldt State University students.

Confidentiality Statement
The confidential data will be shared with the University community to help create programs that can help students get better access to healthy foods. Your identity will not be linked to any information you provide as part of this study and will remain confidential. The information that you share with us in this survey will be combined with others; your individual responses will not be shared.

Process for Survey
The survey should take less than 10 minutes to complete and will ask you questions about your access to healthy food. For specific questions about this study, you may contact the principal investigator, Connie Stewart, California Center for Rural Policy, HSU (707-826-3402).Your participation is voluntary and you may stop at any time.

If you have any concerns with this study, contact the Chair of Institutional Review Board for the Protection of Human Subjects, Dr. Ethan Gahtan, at eg51@humboldt.edu or (707) 826-4545.

If you have questions regarding your rights as a participant, report them to the Humboldt State University Dean for Research, Dr. Rhea Williamson at Rhea.Williamson@humboldt.edu or (707) 826-4189.

Please print this informed consent form now and retain it for your future reference. If you agree to voluntarily participate in this research as described, please click on the "Next Button" below to begin the online survey. Thank you for your participation in this research.

THANK YOU for sharing your opinion.

We hope this information will improve access to healthy foods for all students at Humboldt State University.

Statement of Informed Consent

I have read and understood what it means to be a part of this project. I understand that the investigator or program coordinator will answer any questions I may have concerning the investigation or the procedures at any time. I also understand that my participation in any study is entirely voluntary and that I may decline to enter this study or may withdraw from it at any time without jeopardy. I understand that the investigator may terminate my participation in the study at any time.

Please indicate whether or not you consent to take this survey.

- ◯ I do **not** consent, please take me to the end of the survey.
- ◯ I have read the terms and consent to participate in this survey.

Please begin by answering some questions about your home situation.

Age:

Have you declared a major? If so, what is it?

- ◯ Yes
- ◯ No

Please specify:

Do you have a faculty advisor?

- ◯ Yes
- ◯ No
- ◯ Don't know

Please specify your faculty advisor's name:

Do you live on or off campus?

- ◯ On campus
- ◯ Off campus

Which community do you live in?

What is your zip code?

Do you live alone?

- ◯ Yes
- ◯ No

Do you have children under the age of 18 living in your home?

- ◯ Yes
- ◯ No

How many children do you have living at home?

Do you share food with other adults in your household?

◯ Yes
◯ No

Which of these statements best describes the food eaten in your household in the last 12 months:

◯ I have enough of the kinds of food I want to eat.
◯ I have enough but not always the kinds of food I want.
◯ I sometimes do not get enough to eat.
◯ I often do not get enough to eat.
◯ I don't know or I decline to state.

Which of these statements best describes the food eaten in your household in the last 12 months:

◯ We have enough of the kinds of food we want to eat.
◯ We have enough but not always the kinds of food we want.
◯ We sometimes do not get enough to eat.
◯ We often do not get enough to eat.
◯ We don't know or we decline to state.

The next set of questions include statements individuals have made about their food situation. For these statements, please choose whether the statement was **often** true, **sometimes** true, or **never** true for you or your household in the last 12 months.

In the last 12 months, I worried whether my food would run out before I get money to buy more.

- ◯ Often True
- ◯ Sometimes True
- ◯ Never True
- ◯ I don't know/ I decline to state

In the last 12 months, we worried whether our food would run out before we get money to buy more.

- ◯ Often True
- ◯ Sometimes True
- ◯ Never True
- ◯ I don't know/ I decline to state

In the last 12 months, the food that I bought just didn't last, and I didn't have any money to get more.

- ◯ Often True
- ◯ Sometimes True
- ◯ Never True
- ◯ I don't know/ I decline to state

In the last 12 months, the food that we bought just didn't last, and we didn't have any money to get more.

- ◯ Often True
- ◯ Sometimes True
- ◯ Never True
- ◯ I don't know/ I decline to state

In the last 12 months, I couldn't afford to eat balanced meals:

- ◯ Often True
- ◯ Sometimes True
- ◯ Never True
- ◯ I don't know/ I decline to state

In the last 12 months, we couldn't afford to eat balanced meals:

- ◯ Often True
- ◯ Sometimes True
- ◯ Never True
- ◯ I don't know/ I decline to state

In the last 12 months, did you ever cut the size of your meals or skip meals because there wasn't enough money for food?

- ◯ Yes
- ◯ No
- ◯ Don't Know

In the last 12 months, did your household ever cut the size of your meals or skip meals because there wasn't enough money for food?

- ◯ Yes
- ◯ No
- ◯ Don't Know

How often did this happen?

- ◯ Almost every month
- ◯ Some months but not every month
- ◯ Only 1 or 2 months
- ◯ Don't Know

In the last 30 days, how many days did this happen?

- [ ] Don't Know

Please specify number of days:

[ ]

In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money for food?

- ◯ Yes
- ◯ No
- ◯ Don't Know

In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money for food?

- ◯ Yes
- ◯ No
- ◯ Don't Know

In the last 12 months, were you ever hungry but didn't eat because there wasn't enough money for food?

- ◯ Yes
- ◯ No
- ◯ Don't Know

In the last 12 months, were you ever hungry but didn't eat because there wasn't enough money for food?

- ◯ Yes
- ◯ No
- ◯ Don't Know

In the last 12 months, did you lose weight because there wasn't enough money for food?

- ◯ Yes
- ◯ No
- ◯ Don't Know

In the last 12 months, did you lose weight because there wasn't enough money for food?

- ◯ Yes
- ◯ No
- ◯ Don't Know

In the last 12 months, did you gain weight because there wasn't enough money for food?

- ◯ Yes
- ◯ No
- ◯ Don't Know

In the last 12 months, did you ever not eat for a whole day because there wasn't enough money for food?

- ◯ Yes
- ◯ No
- ◯ Don't Know

In the last 12 months, your household ever not eat for a whole day because there wasn't enough money for food?

- ◯ Yes
- ◯ No
- ◯ Don't Know

How often did this happen?

- ◯ Almost every month
- ◯ Some months but not every month
- ◯ Only 1 or 2 months
- ◯ Don't Know

In the **last 30 days**, how many days did this happen?

- ☐ Don't Know

Please specify number of days:

☐

Health and Wellness

How much of the time during the past 30 days have you felt sad?

- ◯ All of the time
- ◯ Most of the time
- ◯ Sometimes
- ◯ Not at all

In general, how happy have you been within the last 30 days?

- ◯ Always Happy
- ◯ Almost always happy
- ◯ Sometimes happy
- ◯ Rarely happy
- ◯ Not at all happy

How much of the time during the past 30 days has your sleep been restless?

- ◯ Always restless
- ◯ Almost always restless
- ◯ Sometimes restless
- ◯ Rarely restless
- ◯ Never restless

Thank you for participating! Please press "Submit."

APPENDIX B: POSTER

ARE HSU STUDENTS GETTING ENOUGH NUTRITIOUS FOOD? WE WANT TO KNOW!

October 15-31
Take the HSU Student Food Security Survey

Check your university email or go to www.humboldt.edu/ccrp to take the survey! Every student's feedback matters!

For more information, contact the California Center for Rural Policy at 707-826-3400.

Persons who wish to request disability related accommodations should contact Kristina Bollmann at 707-826-3400, or email at ccrp@humboldt.edu as soon as possible. Some accommodations may take up to several weeks to arrange.

OH SNAP!

Want to find out more about food resources on campus? Go to the HSU Oh SNAP! Campus Food Pantry in Recreation and Wellness 122. Tuesdays, Thursdays 9-11am and 2-5 pm, and Fridays from 9-11 am and 4-6 pm. For more information, contact 707-826-4565.

CCRP
California Center for Rural Policy

HUMBOLDT
STATE UNIVERSITY

APPENDIX C: PRESS RELEASE

CCRP
California Center for Rural Policy

HUMBOLDT
STATE UNIVERSITY

October 15-31: Take the HSU Student Food Security Survey

The California Center for Rural Policy (CCRP) is conducting the HSU Student Food Security Survey to learn if students have access to adequate food. Students can help us address student food security on our campus by completing the web survey that will be sent to their university email account on October 15. All students are encouraged to take the survey, because every student's feedback matters! Campus improvement will be based on your input. For more information, contact CCRP at (707) 826-3400.

Want to find out more about food resources on campus? Go to the HSU Oh SNAP! Campus Food Pantry in Recreation and Wellness 122. It is open Tuesdays, Wednesdays, Thursdays from 9-11am and 2-5pm, and on Fridays from 9-11am and 4-6pm. For more information, contact 707-826-4565.

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