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Strengthening Wellness for Food Insecure Students: Altruism, Spirituality, and Academic Performance

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STRENGTHENING WELLNESS FOR FOOD INSECURE STUDENTS: ALTRUISM, SPIRITUALITY, AND ACADEMIC PERFORMANCE

by

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ABSTRACT

STRENGTHENING WELLNESS FOR FOOD INSECURE STUDENTS: ALTRUISM, SPIRITUALITY AND ACADEMIC PERFORMANCE

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Strengthening Wellness for Food Insecure Students; Altruism, Spirituality and Academic Performance is a quantitative methods study using a mediated analysis with structural equation modeling to test the extent to which wellness dimensions mediate the relationship between food insecurity and student grade point average. Student food insecurity is a growing concern at higher education institutions across the United States (Cady, 2014; Goldrick-Rab & Cook, 2011; Maroto, Snelling & Linck, 2015) with food insecurity rates ranging from 14% to 59% in recent studies (Freudenberg, Manzo, Jones, Kwan, Tsui & Gagnon, 2011; Patton-Lopez, Lopez-Cevallos, Cancel-Tirado & Vazquez, 2014). This phenomenon on college campuses is also reporting negative impacts on students' wellness (El Zein, 2017a; Gallegos, Ramsey & Ong, 2014) and academic performance (El Zein, 2017a; Maroto, Snelling & Linck, 2015). While higher education institutions have begun to address this concern with food pantries and social services, the purpose of this study is to examine the role of student wellness in the relationship between food insecurity and academic performance.

The methodological approach for this study includes a mediation analysis with structural equation modeling as well as an exploratory factor analysis which determined factor loadings for items related to the nine dimensions of wellness in the study: social, emotional, physical, financial, occupational, environmental, cultural, spiritual, and intellectual. Findings from the study identify 48% of the sample report some type of food insecurity within the last twelve

months. The study also presents a comprehensive model demonstrating the relationship between wellness, food security, and grade point average. The outcomes from the model include the identification of four core wellness dimensions: socioemotional, altruism, spiritual, and physical (diet and exercise), which are mediated by academic/career wellness for predicting grade point average outcomes. In addition, food security is also reported as correlating with financial stress and substance use. Implications for higher education practitioners, policymakers, and future research are discussed.

Keywords: food insecurity, wellness, academic performance, mediation analysis, structural equation modeling

DEDICATION

"To grow beyond the expectations we're raised with is a radical act necessary to the claiming of one's full self." – Ann Linnea, *Deep Water Passage*

This dissertation is dedicated to students' transformation through the experience of higher education.

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TABLE OF CONTENTS

Page

LIST OF TABLES

Table Page

LIST OF FIGURES

Figure Page

CHAPTER 1

INTRODUCTION

Food insecurity is a growing concern on higher education campuses in the United States (Cady, 2014; Goldrick-Rab, & Cook, 2011; Maroto, Snelling, & Linck, 2015). Food insecurity is defined as having limited access to food or quality and variety of foods (USDA, 2018) and college campuses are reporting student food insecurity rates ranging from 14% to 59% in recent studies (Freudenberg, Manzo, Jones, Kwan, Tsui, & Gagnon, 2011; Patton-Lopez, Lopez-Cevallos, Cancel-Tirado, & Vazquez, 2014). Researchers have begun to study food insecurity's negative impact on students' collegiate experiences, including areas of their well-being (El Zein, 2017a; Gallegos, Ramsey, & Ong, 2014) and poor academic performance (El Zein, 2017a; Maroto, Snelling, & Linck, 2015). Although college campus administrators have begun to provide food pantries and social services for these students (Broton & Goldrick-Rab, 2016), the problem of food insecurity remains on college campuses and administrators need to determine additional strategies to support students in their academic success. The opportunity remains to determine if addressing student wellness could support food insecure students' academic performance. By understanding the impact of wellness on food insecure students, additional resources could mitigate this growing phenomenon on college campuses.

Food insecurity has been correlated with poor academic performance, defined as grade point average (El Zein, 2017a; Maroto, Snelling, & Linck, 2015), which impacts higher education institutions' ability to retain and graduate students. However, preliminary research findings related to the well-being of food insecure students demonstrate the need for further research regarding the role of wellness on academic performance for this population of student. Recent initiatives on college campuses that support student wellness include campaigns such as

Healthy Campus 2020 (“Heathy Campus 2020”, 2018), financial literacy programs, suicide awareness and prevention programming (“Suicide Prevention Resource Center”, 2019), wellness living communities (Sorokas, 2018), among many others. However, these initiatives have not addressed how wellness initiatives impact food insecure students and their academic performance. In addition, research has included specific areas of student wellness, such as physical, mental, social, and financial, but these findings are compartmentalized and therefore present an opportunity to evaluate a comprehensive view of wellness for students and assess its role on food insecure students and their academic performance.

Purpose of the Study

The purpose of this study is to examine the relationship between undergraduate students’ food insecurity, wellness, and their academic performance. Higher education institutions are challenged to improve student performance; the National Center for Education Statistics (2018) reported first time students attending public four-year institutions are graduating at a rate of 59% and the American Association of State Colleges and Universities (2018) reported college affordability and performance-based funding as two of the top ten issues for 2018. The pressure on higher education institutions to recruit and retain students through graduation is paramount and identifying factors that influence these student success outcomes, including academic performance, is critical to an institution’s success.

Student wellness has been a growing trend on college campuses over the past three decades as the self-care movement has captured the attention of the American society (Owen, 2002) and areas of wellness have been identified to support student academic performance and success outcomes for higher education institutions (Forrester, 2015; Robbins et al., 2009). Research has been conducted on student wellness related to self-care behaviors (Crossman,

2016; Moses, Bradley, & O'Callaghan, 2016; Myrick, Willoughby, & Verghese, 2016), socioeconomic status (Morris-Paxton, Van Lingen, & Elkonin, 2017), and individual components of wellness and student success have been studied, such as physical wellness related to retention and academic performance (Bass, Brown, Laurson, & Coleman, 2013; Brock, Wallace-Carr, & Kent, 2015; Forrester, 2015; Lindsey, Sessoms, & Willis, 2009; Robbins et al., 2009).

Universities have begun to identify and address specific dimensions of student wellness that are supported through research as well as meet the needs of their student body. The dimensions of wellness selected by an institution assist in deciding program and service offerings as well as communicate a definition of wellness to their community, due to the various wellness definitions that exist (Owen, 2002). The nine dimensions of wellness identified for the purposes of this study are: cultural, emotional, environmental, financial, intellectual, occupational, physical, social, and spiritual.

In addition to wellness, student demographics provide an understanding of a student population needs and implications for student success. While student demographics have shifted over the last half century (Goldrick-Rab & Cook, 2011), one demographic characteristic impacting student success is financial access (Robbins et al., 2009; White, 2011). Within the trend of financial access, a recent research trend gaining attention is food insecurity (Broton & Goldrick-Rab, 2016; Goldrick-Rab, 2016). Food insecurity is a potential factor that institutions can improve as it becomes more relevant on college campuses today, however there is limited research regarding its impact on student success (Cady, 2014; Dominguez-Whitehead, 2017; Miles, McBeath, Brockett, & Sorenson, 2017). In 2013, the USDA reported approximately 14.5% of U.S. households were impacted by some type of food insecurity (Cady, 2014), however

institutional leaders have only recently begun addressing this societal trend that now impacts their communities and institutional missions of supporting students. With the inclusion of food insecurity in this study, researchers can identify the role food insecurity contributes to student wellness as well as academic performance.

Lastly, research is limited on the relationship between food insecurity, wellness, and academic performance (Cady, 2014; Silva et al., 2017). Institutions may be able to improve student outcomes by studying the relationship between these constructs, therefore in this study a mediation structural equation model will be conducted to determine if each of the nine dimensions of wellness mediates the relationship between food insecurity and academic performance. The mediated structural equation model provides a pictorial representation of the variables' relationships through multiple regression analyses (Byrne, 2012). Study participants will complete a wellness survey assessment containing items for each of the nine dimensions as well as food insecurity items, demographic data and grade point average.

Significance of the Study

This study has practical value to higher education leaders because it addresses higher education outcomes related to academic performance as well as provides an understanding of these impactful variables. As a result, leaders and practitioners are able to make decisions regarding student program and service goals to support food insecure students and their academic performance, identify allocation of resources to support students of this population, and have access to a future evaluation tool to measure variables impacting students on their campuses.

Researchers are interested in the findings of this study because it provides a reliable and valid measurement tool for future research. In addition, this study contributes to the existing

body of literature on the topics of student food insecurity, wellness, and academic performance, and provides a need where there is limited literature on the relationship of all three topics.

Research Questions and Hypotheses

The research questions for the study are:

1. To what extent do each of the nine dimensions of wellness mediate the relationship between food insecurity and academic performance?
2. To what extent does food security predict academic performance?

The hypotheses based on the research questions are:

H1: Food security will predict a significant, direct, positive, small relationship with grade point average.

H2: Financial wellness is anticipated to have collinearity with food security; therefore, it is anticipated that this variable will be removed.

H3: Intellectual and occupational wellness is anticipated to have a significant, direct, positive, and small mediating relationship.

H4: Social wellness is expected to have a significant, direct, relationship, but the type of relationship, negative or positive, is unknown as well as the strength.

H5: Physical wellness will have a significant relationship mediating with a positive, medium effect between food security and GPA.

H6: Emotional wellness is anticipated to demonstrate a significant, positive, relationship between food secure students and GPA with medium strength.

H7: The wellness dimensions of cultural, environmental, and spiritual are not predicted to have a significant relationship between food security and grade point average.

Delimitations

The delimitations of the study provide appropriate boundaries for the study including participant criteria, timeframe, location of the study, and methods for data collection. The delimitations provide generalizability of the findings and appropriate methods for addressing the research questions.

Participants were selected based on their enrollment in at least one on campus course at the selected institution. In addition, the participants were classified as undergraduate students for the purpose of the study to address undergraduate student success.

The study took place during the fall and spring academic semesters when the majority of students were enrolled at the institution. Students' grade point average scores were collected at the end of the semester in which the measurement tool was administered to provide academic performance data.

The research was conducted at a doctoral research university with a diverse racial and ethnic student body and socioeconomic status. The participants were selected from this institution because more than 30% of the student population are eligible for Federal Pell Grants, therefore there was a likelihood for a socioeconomic status variance among participants. In addition, the institution is a minority-serving institution, which provides potential variance in race and ethnicity variables. The racial and socioeconomic status variance in this study supports research regarding health outcomes in that participants' different racial and socioeconomic status predict different variable outcomes (Braveman, Cubbin, Marchi, Egerter, & Chavez, 2001). Another delimitation of the location is the institution does not require students to live on campus, therefore meal plans are not required for all students and their access to food varies, this increases the potential variance of student food insecurity for this study.

The data collection was completed as a random sample and therefore supports a correlation quantitative design. In addition, the quantitative method included a mediating structural equation model to answer the research questions about the relationship between variables and the predictability of variables.

Summary

In the summary, academic performance at higher education institutions is critical for students as well as the success of the institution. With the growing concern of food insecure students on campus, institutional leaders must improve support so that students can attain successful academic performance. This study assists leaders by determining how student wellness plays a role in academic performance for food insecure students. By identifying this information, appropriate resources can be allocated to support students and the mission of higher education institutions.

This dissertation includes Chapter 1, which has provided an introduction with the problem statement, purpose statement, significance of the study, research questions and hypotheses, and delimitations. Chapter 2 includes a literature review of the topics of food insecurity, wellness, and academic performance and the relationship of these three within the literature, including the identification of limited research areas. The methodology for the study is explained in Chapter 3, comprising of the sample and population, instrument and measures, data collection procedures, data analysis, and limitations. Chapter 4 contains the findings of the data analysis, and Chapter 5 presents the discussion of the results and the conclusions of the study.

CHAPTER 2

LITERATURE REVIEW

Student food insecurity is a growing trend on college campuses as researchers and higher education leaders are uncovering this hidden burden for students (Broton & Goldrick-Rab, 2016; Cady, 2014; Dominguez-Whitehead, 2017). Researchers have confirmed significant percentages of college student populations are food insecure, stretching as high as 39.2% (Freudenberg et al., 2011). Beyond the financial implication causing student food insecurity, students' wellness is also impacted by this phenomenon. While student wellness has been found to contribute to academic success (Trockel, Barnes, & Egget, 2000), research is limited on the relationship between wellness and food insecurity on students' academic success.

Student wellness positively contributes to academic success (Trockel et al., 2000) and food insecurity negatively impacts student's academic success (Maroto, Snelling, & Linck, 2015), however research is needed to determine the extent to which student wellness can explain the relationship between food insecurity and academic success. By better understanding the role of wellness, researchers can improve assessments for their college campuses, higher education practitioners and leaders can identify and apply wellness programs and services to further support food insecure students, and federal and state policy makers can make better informed decisions.

Background

The college student body demographics have dramatically changed since the mid-twentieth century (Goldrick-Rab & Cook, 2011). The Truman Commission of 1947 promoted student access to higher education institutions for previously discriminated populations based on race, economic ability, gender, and religion. President Truman's intent for the Commission was

to ensure "the only factors that should limit enrollment were the ability and interest of the student" (Gilbert & Heller, 2013, p. 419). Following the Truman Commission in the mid-twentieth century, other federal legislation promoted student access including the Higher Education Act of 1965 and Title IX in 1972 (Education Amendments Act of 1972). The Higher Education Act promoted financial aid for students and Title IX promoted equal access for female students. Through these changes as well as other societal changes such as the Civil Rights Movement, roles of women in the workplace, and the societal support for advanced education, the access and enrollment of a diverse student population began and continues today.

In addition to the diversity of enrollment, the financial assistance for students also changed. While the Truman Commission advocated for the reduction of economic barriers for students and the Higher Education Act of 1965 provided federal financial support for students, legislation began to change in the 1970s as the income threshold for need-based financial aid increased. This change provided more financial opportunities for middle class students and reduced aid previous provided to solely lower-class students (Gilbert & Heller, 2013). This reduction in aid also began to decline at the state level as state appropriations to higher education institutions reduced thus resulting in the rise of tuition and fees. Consequently, the financial burden fell to students in the form of loans. Student loan debt continues today; the American Association of State Colleges and Universities (2018) reported college affordability as one of the top ten issues of 2018.

In addition to the financial burden on students' access to higher education institutions, students' performance and completion rates are troubling. Financial aid status is a constraint on students' ability to persist at their institution (Stewart, Doo, & Kim, 2015). The National Center for Education Statistics (2018) reported first time students attending public four-year institutions

are graduating at a rate of 59% in six years and the United States is ranked thirtieth among global competitors (National Center for Education Statistics, 2018). Higher education institutions are pressured by national leaders to improve their students' performance rates, shorten students' time spent in college thus reducing cost, and increase educational objectives for students' workforce impact to support the national economy. Performance-based funding was another top ten issue for the American Association of State Colleges and Universities in 2018 (American Association of State Colleges and Universities Government Relations and Policy Analysis Division, 2018).

The changing student demographic, financial shifts burdening student access, and performance outcomes pressuring higher education institutions creates a troubling dynamic that institutional leaders and higher education researchers are challenged to solve. Food insecurity is one of the growing areas of concern resulting from the changing student demographic and changes to the financial landscape in higher education.

Food Insecurity

The U.S. Census Bureau has reported on food insecurity since 1995 and serves as a marker for the national population's well-being (USDA, 2018b). The data have been used to inform decision making related to government assistance programs and non-profit initiatives. Recently, food insecurity has been a growing area of research on college campuses as researchers have discovered that the campus population has higher percentages of food insecurity than the national levels (Broton & Goldrick-Rab, 2016). The USDA reported 11.8% of U.S households were experiencing some level of food insecurity in 2017 (Coleman-Jensen, Rabbitt, Gregory, & Singh, 2017), while college campus levels of student food insecurity ranged in studies from 19% (El Zein et al., 2017b) to 35% (Morris, Smith, Davis, & Null, 2016) to 39.2% (Freudenberg et al., 2011).

The United States Department of Agriculture (2018a) defines food insecurity in four categories: high food security, marginal food security, low food security, and very low food security. High food security is defined as "no reported indications of food-access problems or limitations" (USDA, 2018a, n.p.). Marginal food security is "one or two reported indications – typically of anxiety over food sufficiency or shortage of food in the house. Little or no indication of changes in diet or food intake" (USDA, 2018a, n.p.). Low food security is defined as "reports of reduced quality, variety, or desirability of diet. Little or no indication of reduced food intake" (USDA, 2018a, n.p.). Lastly, very low food security and also food insecure is "reports of multiple indications of disrupted eating patterns and reduced food intake" (USDA, 2018a, n.p.).

The demographic characteristics of food insecure students have been mixed in recent studies. Patton-Lopez et al. (2014) found ethnicity and gender held no significance while Maroto, Snelling, and Linck (2015) found African American and Hispanic students with higher rates of food insecurity as well as females were more likely to be food insecure. Similarly, Patton-Lopez et al. (2014) and Maroto et al. (2015) studies contradicted with income; Maroto et al. (2015) found income was not significantly associated with food insecurity and Patton-Lopez et al. (2014) found income less than $15,000 was strongly correlated with food insecurity. El Zein et al. (2017a) also found that Blacks and Hispanics were more likely to be food insecure as well as Pell Grant recipients and students with one or both parents not educated above high school.

In addition to the prevalence of student food insecurity on college campuses, researchers have recently begun to explore the impact of food insecurity on academic success and areas of student wellness as discussed in the following sections.

Student Wellness

Wellness has been a growing trend on college campuses over the past three decades as the self-care movement has captured the attention of the American society (Owen, 2002). Halbert Dunn (1959) took the first step in recognizing wellness as more than good health and recognized wellness as a dynamic state that involved the impact of environmental factors on one's wellness. Since that time the construct of wellness has continued to evolve and today it is defined as a variety of attitudes and behaviors that someone participates in to gain quality of life (Owen, 2002). In contrast, well-being, which is often misused interchangeability with wellness, focuses on one's psychological health and satisfaction with life; having a positive mental disposition to one's life (Lucia, 2014). Higher education communities have focused on the wellness multidimensional models to support their students, recognizing that a variety of campus resources can contribute to these various dimensions for students. In addition, institutions have sought to support their students' success by studying the impact of wellness on students, with the intent to better understand how students develop and to determine resources that can better support students' success at an institution.

Researchers have studied self-care behaviors and barriers to wellness participation (Crossman, 2016; Moses, Bradley & O'Callaghan, 2016; Myrick, Willoughby, & Verghese, 2016) as well as student demographic characteristics' influence on wellness behaviors (Howell, 2010), such as socioeconomic status (Morris-Paxton, Van Lingen, & Elkonin, 2017). Crossman (2016) determined areas that prevent students from engaging in wellness behaviors as well as behaviors that were helpful in their engagement. The barriers to wellness included a lack of time, laziness, discouragement, temptations, and illness for the students. The helpful behaviors for students included time management, getting help from others, visual cues, trying something

new, adjusting expectations, removing temptations, and using rewards. In addition, Myrick et al. (2016) found that students seek wellness information when they have a knowledge discrepancy or when the topic has personal relevance. Owen (2002) also found that wellness behaviors are prevented by fear, guilt, and lack of motivation but supported by social networks and self-responsibility.

There are many definitions of wellness (Owen, 2002) and models that have been created to support students in engaging in wellness behaviors. In addition, the models provide guidance to higher education practitioners when designing programs and services by identifying key wellness dimensions. The nine dimensions of wellness identified for the purposes of this study are: cultural, emotional, environmental, financial, intellectual, occupational, physical, social, and spiritual. The definition of the dimensions are as follows:

- Cultural Wellness - The culturally-well person values and actively participates in diverse experiences as a means to understand and appreciate the surrounding world.
- Emotional Wellness - The emotionally-well person can identify, express, and manage the entire range of his/her feelings and would consider seeking assistance to address areas of concern.
- Environmental Wellness - The environmentally-well person recognizes the responsibility to preserve, protect, and improve the environment and appreciates the inter-connectedness of nature and the individual.
- Financial Wellness - The financially-well person is fully aware of his/her own financial state and budgets, saves, and manages his/her finances in order to achieve realistic financial goals.

- Intellectual Wellness - The intellectually-well person values lifelong learning and seeks to foster critical thinking, develop moral reasoning, expand worldviews, and engage in education for the pursuit of knowledge.
- Occupational/Career - The professionally-well person engages in work from which he/she gains personal satisfaction and enrichment, consistent with his/her values, goals, and lifestyle.
- Physical Wellness - The physically-well person gets an adequate amount of sleep, eats a balanced and nutritious diet, engages in exercise for 150 minutes per week, attends regular medical check-ups, and practices safe and healthy sexual relations.
- Social Wellness - The socially-well person has a network of support based on interdependence, mutual trust, respect and has developed a sensitivity and awareness towards the feelings of others.
- Spiritual Wellness - The spiritually-well person seeks harmony and balance by openly exploring the depth of human purpose, meaning, and connection through dialogue and self-reflection (Ohio State University, 2014).

Food Insecurity and Student Wellness

The impact of food insecurity on students extends beyond the nutritional components of limited access to food. Researchers have demonstrated a relationship between food insecurity and variables of wellness, although studies have not been conducted with a comprehensive wellness measurement scale. The areas of wellness that relate to research conducted on food insecurity include physical, financial, emotional, social, and occupational. This limited approach to the relationship between food insecurity and wellness presents opportunity for further research.

Physical Wellness. Physical wellness includes physical exercise as well as care for one's body including eating, sleep, and avoiding harmful substances. While the term 'physical wellness' is limited in the research with food insecurity, components of physical wellness have been studied. Several studies have found that students reporting fair or poor health were more likely to be food insecure (Gallegos, Ramsey, & Ong, 2014; Hughes et al., 2011; Knol, Robb, McKinley, & Wood, 2017; Patton-Lopez, Lopez-Cevallos, Cancel-Tirado, & Vazquez, 2014). While students may report their health as fair or poor, there has not been a correlation between food insecurity and obesity (Knol et al., 2017). Sleep is another factor of physical wellness and El Zein et al. (2017a) found students' sleep quality was more likely to be lower if they were food insecure. Lastly and unsurprisingly, students' fruit and vegetable intake were statistically significant to food insecurity (Gallegos et al., 2014). While studies have found correlations between food insecurity and variables of physical wellness, a specific measurement scale for physical wellness has not been found in the literature.

Financial Wellness. Financial wellness is an obvious dimension of wellness that would have a relationship with student food insecurity. Freudenberg et al. (2011) found a significant relationship between household income and student food insecurity to the extent that students were two times as likely to be food insecure if their household income was less than $20,000 a year. In addition, studies have shown that food insecure students are more likely to be receiving financial aid (Morris et al., 2016) and specifically receive Pell Grants (El Zein et al., 2017b). The management of personal finances including budgeting and borrowing money from others was also associated with food insecurity (Hughes et al., 2011).

Occupational Wellness. Occupational wellness is a limited area of research where employment has been the primary focus; occupational wellness including participants'

relationship with future career aspirations has not been a focus of research with food insecurity. Students' efforts to increase their financial wellness through employment has mixed associations with food insecurity; Gallegos et al. (2014) found part time students were more likely to be food insecure than full time working students. Patton-Lopez et al. (2014) also found a negative correlation between employed students and food insecurity. With the varied definition of occupational wellness including employment and future career aspirations, more research is needed to determine if occupational wellness contributes to the relationship with food insecurity and academic performance.

Emotional Wellness. Students' emotional wellness is also impacted by food insecurity. Researchers have found that students' depression (Bruening, van Woerden, Todd, & Laska, 2018; Bruening, Brennhofer, van Woerden, Todd, & Laska, 2016; Payne-Sturges, Tjaden, Caldeira, & Arria, 2017) and stress are significantly related to food insecurity (Bruening et al., 2018; El Zein et al., 2017a). Like the other areas of wellness, research has not been found in the literature that includes a comprehensive measurement scale for emotional wellness as it relates to food insecurity.

Social Wellness. Social wellness is an area that includes communication with others, creating community, and sense of belonging. While research is limited on the relationship between social wellness and food insecurity, one study by Cliburn and Alleman (2017) found food insecure students avoided social interactions that involved food because of the stigma associated with being food insecure. Alternatively, students also reported bonding with other food insecure students that had similar experiences thus creating community and contributing to social wellness. These findings lead to the possibility of a significant relationship between social wellness and food insecurity; however, a positive or negative relationship is unknown.

Food Insecurity and Grade Point Average

The relationship between food insecurity and grade point average is important to understand so institutions and policy makers can better support students as they invest time and money into their education. Research has supported the relationship in school-aged children's academic performance and food insecurity, finding when food insecurity is eliminated from children's homes then their standardized test scores increase (Maroto, Snelling, & Linck, 2015). Goldrick-Rab (2016) advocates for extending the grade-school free lunch program into the higher education setting because of the known benefits.

Researchers are continuing to contribute to this area of study for college students; Patton-Lopez et al. (2014) found students with a GPA of 3.1 or higher were 60% less likely to be food insecure. El Zein et al. (2017b) found students that are food insecure are more likely to have a lower GPA. In addition, researchers have found that food insecurity impacted students' class attendance (Mercado, 2017; Silva et al., 2017) and students were 15 times more likely to fail courses if food insecure (Silva et al., 2017).

Novak and Johnson (2017) studied food insecurity with students that applied for a meal assistance program. Some of the students received the service while others were waitlisted due to funding limitations. The students who received the service had a higher persistence rate and GPA, while the waitlisted students had a lower GPA related to their previous semester. A causal relationship cannot be inferred from the Novak and Johnson (2017) study, however this study, along with others support a relationship between food insecurity and GPA (El Zein et al., 2017b; Mercado, 2017; Morris et al., 2016; Patton-Lopez et al., 2014).

Wellness and Grade Point Average

In addition to food insecurity, components of student wellness are related to academic performance. Similar to food insecurity, research is limited on a comprehensive wellness measurement scale and its relationship with academic performance. Most research is associated between variables of wellness and academic success in the areas of social wellness, financial wellness, and physical wellness.

Social Wellness. Social wellness is related to one's sense of belonging, ability to build community, and communication skills (Owen, 2002). Early research about student involvement on a college campus contributed to a foundation on the academic benefits of students' interactions with peers, faculty and staff (Astin, 1984). This research aligns closely with the social wellness dimension as noted by Owen (2002) with the importance of social networks and self-responsibility as a support for student wellness. Students' engagement in social networks has contributed to their success academically through persistence at an institution (Allen, Robbins, Casillas, & Oh, 2008). Again, research is limited regarding a social wellness scale measuring the relationship with grade point average, however social wellness outcomes found in food insecurity research (Cliburn & Alleman, 2017) also support the need for further research on the relationship of these three variables.

Financial Wellness. Students' financial ability has a direct relationship with academic success in regard to retention and persistence, because without the financial means, students cannot pay to attend college. In addition, student's socioeconomic status (SES) has also been associated with academic success, finding that students with higher SES had higher GPAs and were more likely to retain at the university (Allen et al., 2008). This same study also determined

that low SES students were more likely to leave the institution, even after holding academic performance constant (Allen et al., 2008).

Another area of financial wellness for students is the access to financial aid; research has shown that limited financial aid places a constraint on students' ability to retain at an institution (Broton & Goldrick-Rab, 2016; Stewart et al., 2015). In addition, contrary to the possibility that employment would help students financially, student employment has been found to have a negative correlation with grade point average when students worked a greater number of hours per week (Trockel et al., 2000). Therefore, research supports the importance of students' financial wellness in addition to financial aid and the importance of external funding to assist the student in persisting at an institution.

Physical Wellness. Students' participation in physical activity and care for their physical wellness has been demonstrated in research studies related to student success. Strength training and sleep have been correlated with higher GPAs in college students (Trockel et al., 2000). Middle-school participation in physical exercises has also been correlated with academic achievement (Bass, Brown, Laurson, & Coleman, 2013). In addition, student campus recreation participation is an area of research that has demonstrated associations with student success. Robbins et al. (2009) found students that participated in recreational services had an increase in GPA, strong social connections were made through recreational experiences, and even suggested possible physiological experiences as a result of exercise. Additional benefits from recreation participation also overlap with other areas of wellness including overall health, stress management, time management, respect, group cooperation, and multicultural awareness (Forrester, 2015).

Review of Methodologies

In addition to the findings in the empirical research, the methodologies are also important in determining the need for future research. Previous studies have applied correlation and regression analyses for examining the relationship among the variables of food insecurity, wellness, and academic performance. Researchers have studied the relationship between food insecurity and student outcomes, including grade point average (Maroto et al., 2015; Silva et al., 2017), self-rated health (Gallegos, Ramsey, & Ong, 2014; Knol, Robb, McKinley & Wood, 2017), mental health (Bruening, Brennhofer, van Woerden, Todd, & Laska, 2016; Bruening, van Woerden, Todd, & Laska, 2018; El Zein et al., 2017a; Payne-Sturges, Tjaden, Caldeira, & Arria, 2017), and deferring academic progress (Gallegos, Ramsey & Ong, 2014). In addition, correlation and regression analyses have been used to determine the relationship between wellness dimensions and academic performance (Cereola, Snyder, Cereloa, & Horton, 2014) and predictors of college student wellness (Baldwin, Towler, Oliver, & Datta, 2017; Cereola, Snyder, Cereloa, & Horton, 2014). Although these statistical methods have determined separate relationships among the variables of this study, research is limited on the use of a structural equation modeling (SEM) methodology for explaining the structural relationship between the variables. In addition, research is limited on mediating variables to explain the relationship between food insecurity and grade point average, therefore a mediating structural equation model is utilized in this study to demonstrate how each of the wellness dimensions explains the relationship between food security and academic performance. This methodology will expand beyond existing methods and contribute to the literature.

Summary

Student food insecurity is a current concern on college campuses and research is only beginning to better understand its implications for students and institutions. Researchers have begun to explore the impact of food insecurity on student success including areas of grade point average and demographic characteristics of students impacted (Patton-Lopez et al., 2014; Silva et al., 2017). Student wellness is another area of research that has been studied over the past few decades including areas of motivation, demographic characteristics that may predict student outcomes of wellness, and implications of different dimensions of wellness on student academic success (Allen, Robbins, Casillas, & Oh, 2008; Forrester, 2015; Trockel et al., 2000). Through further research on the relationship between student wellness and food insecurity, researchers and higher education practitioners may benefit from better understanding the relationship between these two areas and the impact on student success.

The next chapter provides the proposed methodology to study the extent to which student wellness mediates the relationship between food security and grade point average. The chapter includes participant selection, the instrumentation used in the study, design procedures, as well as how the data are analyzed.

CHAPTER 3

METHODOLOGY

The methodology for this study is a mediation analysis with structural equation modeling (SEM) to test the extent to which each of the nine dimensions of wellness mediate the relationship between food security and grade point average (GPA). The study also consists of an exploratory factor analysis to determine factor loadings for each of the nine dimensions of wellness. The SEM method assists in describing the structural relationship between the variables of food security, the nine dimensions of wellness, and academic performance.

Research Questions and Hypotheses

In addition to contributing to existing research, this methodology supports the following research questions:

1. To what extent do each of the nine dimensions of wellness mediate the relationship between food security and academic performance?
2. To what extent does food security predict academic performance?

The hypotheses based on the research questions are:

H1: Food security will predict a significant, direct, positive, small relationship with grade point average.

H2: Financial wellness is anticipated to have collinearity with food security, therefore it is anticipated that this variable will be removed.

H3: Intellectual and occupational wellness is anticipated to have a significant, direct, positive, and small mediating relationship.

H4: Social wellness is expected to have a significant, direct, relationship, but the type of relationship, negative or positive, is unknown as well as the strength.

H5: Physical wellness will have a significant relationship mediating with a positive, medium effect between food security and GPA.

H6: Emotional wellness is anticipated to demonstrate a significant, positive, relationship between food secure students and GPA with medium strength.

H7: The wellness dimensions of cultural, environmental, and spiritual are not predicted to have a significant relationship between food security and grade point average.

Research Design

The research design for this study is a mediation analysis with structural equation modeling (SEM) because it structurally explains to what extent each of the nine dimensions of wellness mediate the relationship between food security and grade point average (GPA), see Figure 1. The SEM is selected because prior empirical research exists regarding the relationship among the variables of wellness, food security and GPA and the SEM will determine the causal relationship between multiple factors. In addition, the SEM provides error variance parameters as well as model fit information to support causality, therefore providing more accuracy than other methodologies, such as regression analysis (Byrne, 2012; Gunzler, Chen, Wu, & Zhang, 2013).

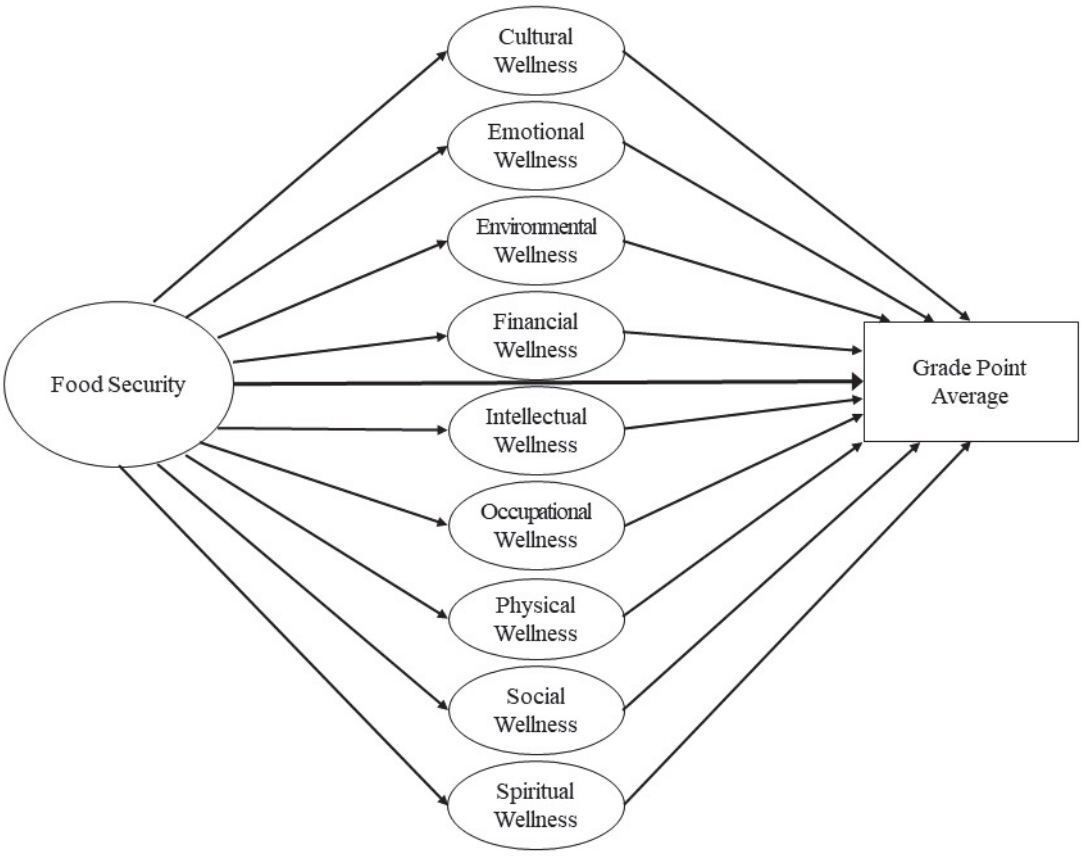

Figure 1. Mediation analysis with structural equation model for wellness dimensions on the relationship between food security and grade point average.

Participants

Participants for the study were selected from a four-year, public, minority-serving, higher education institution in the mid-Atlantic region of the United States with a campus enrollment of approximately 18,000 undergraduate students. The institution was selected because more than one-third of the student population is eligible for Federal Pell Grants, therefore increasing the probability of selecting a variety of socioeconomic status participants with the potential to experience food insecurity. In addition, as a minority-serving institution, the demographics of

the population represent a diverse college student body including 52.9% females and 47.1% males, and 42.3% White, 30.2% African-American, 8.7% Hispanic, 6.9% two or more races, 4.9% Asian, 3.9% Non-Resident Alien, and 3.1% other/unknown. The population is also a convenient site selection.

The participants selected for the study were a random sample of undergraduate students selected from the university's student database and taking at least one class at the institution's main campus. Approximately 7,000 students received the questionnaire through their university email account and participants self-selected to participate by completing the emailed questionnaire.

The sample size is another consideration for this study. SEM researchers have recommended between five and ten cases per parameter (Kline, 2016; Wolf, Harrington, Clark, & Miller, 2013), however, recent research has also demonstrated that studies with more items per factor required a smaller sample size than studies with less items per factor, specifically when items went from three to six, although increasing from six to eight items did not have the same effect (Henson & Roberts, 2006; Wolf et al., 2013). The total number of parameters for the study is seventy-four with items ranging from five to eleven. Parameters errors and power are also two influences on the strength of the sample size on the SEM, therefore the number of subjects for this study fall in the required range between 370 and 740.

Measures

The measures for this study were collected from the Wellness Assessment questionnaire and student grade point average from the university database. The questionnaire instrument was modified from Ohio State University's Wellness Assessment instrument (Ohio State University, 2014) and contains the nine wellness dimension measurement scales, the food security scales,

and some participant demographic information. This questionnaire was utilized because the psychometrics for the instrument were previously tested and confirmed valid and reliable (Ohio State University, 2014). The questionnaire was modified for the creative dimension wellness measurement scale, which was replaced with a cultural wellness measurement scale to support the participants' institution's wellness model (Old Dominion University). A study was previously conducted by the researcher for the new cultural wellness scale and analyzed with a confirmatory factor analysis. The results confirmed four of the five items and held a Cronbach alpha reliability score of 0.74. Therefore, the nine wellness dimensions included in the questionnaire are: cultural, emotional, environmental, financial, intellectual, occupational, physical, social, and spiritual. The instrument also requested student demographic information and the student's university identification number, which was used to gather the student's semester term grade point average. An exploratory factor analysis was conducted on the instrument to determine reliability coefficients with an intended score above 0.70. In addition, the questionnaire was modified to include items to measure food security from the United States Department of Agriculture's Food Insecurity Survey Module questionnaire (2012).

Wellness Dimension Measures. The wellness dimensions measurement scales included nine dimensions with a total of 72 items as listed in Table 1. Each dimension latent variable has between five and eleven observed variable items; this supports recommended research practices for exploratory factor analysis (Henson & Roberts, 2006). Each item includes a five-point Likert-type scale stating either frequency of *Never, Rarely, Sometimes, Often,* or *Always,* or a scale stating agreement as *Strongly Disagree, Disagree, Neither Agree or Disagree, Agree, Strongly Agree,* or *Not Applicable.*

Table 1. Wellness Assessment Measures.

Wellness Dimension Measures
Item
Please rate the extent to which you agree or disagree with the following: (Strongly Disagree, Disagree, Neither Agree nor Disagree, Agree, Strong Agree, Not Applicable)
Dimension: Cultural
I aspire to advocate for others.
I am committed to life-long self-evaluation and self-critique of my own cultural biases toward people who are different from me.
I desire to address issues of social injustice when I see and experience them (i.e. unequal economic, social, and political rights and opportunities)
I acknowledge that individuals are complex beings with a variety of identities (i.e. age, ethnicity, sexual orientation, religious affiliation, educational background, income, abilities, and gender expression)
I am committed to life-long learning and understanding of others' experiences.
Dimension: Emotional
I have a positive image of my body.
I feel that I am able to cope with my daily stress.
I am able to appropriately manage my feelings.
I am able to appropriately express my feelings.
I would be willing to seek help from others when I am having a difficult time.
Dimension: Environmental
I think it is important to conserve natural resources.
I take time to appreciate nature.
I take time to appreciate my surroundings.
I often feel that I have little control over my safety.
I feel safe in my living environment (residence hall, apartment, home).
I feel that I live in a stressful environment.
I feel that I live in a welcoming environment.
Dimension: Financial
I think it is important to spend less than I earn.
I am confident that I can plan a financial budget.
I have enough money saved to handle financial emergencies.
I stress about my finances.
I am able to pay my bills on time.
I am comfortable leaving a balance on my credit card(s).
I pay off the entire balance of my credit card(s) each month.
I feel stressed by the amount of money I owe (credit cards, student loans, car payments, etc.)
Dimension: Intellectual
I am able to resolve conflicts peacefully.
I am confident in my ability to find solutions to my problems.
I am confident that I can learn new skills.

Table 1 (continued).

I engage in intellectually engaging activities. (Activities that increase knowledge, foster critical thinking, and expand worldviews; for example, reading, engaging discussions, seminars, brainteasers)
I am interested in learning new things.
I feel that my education is a priority.
I am confident in my academic major decisions.
I feel challenged by my academic term.
I am able to manage my academic workload during this academic term.

Dimension: Occupational
I am confident in my career decisions.
I feel that my current studies will be helpful to my future career.
I envision my future career as a means to contribute to society.
I feel that my major/career decision is an appropriate expression of my abilities and personal strengths.
I feel that my major/career decision is an appropriate expression of what I find meaningful and important in life.
I feel that my current job interferes with other aspects of my life.
I am able to balance my current job with the rest of my life.
I feel that I work in a positive environment.
I feel that I work in a stressful environment.

Dimension: Physical
I am confident that I can exercise regularly (Exercise 3-5 times per week over the course of several weeks)
I am confident that I can maintain a nutritious diet (Eating 4-8 servings of fruit or vegetables, 4 cups of dairy, choosing lean meats, including whole grains, and limiting fats and oils)

Dimension: Social
I have at least one close friend whom I can trust and confide in.
I feel supported by my family.
I feel a sense of belonging in a community.
I have a strong social network. (The connections one has to others ranging from casual acquaintance to close familial bond; a strong social network is characterized by not only the number, but the strength of the bonds.)
I feel that I am a person who people like to be around.
I feel comfortable communicating face-to-face with others.
I rarely feel lonely.

Dimension: Spiritual
I seek out meaning in my life.
I engage in self-reflection.
I feel a connection to something larger than myself.
I consider myself to be a spiritual person.
I engage in spiritual practices.

Table 1 (continued).

Reflecting on the PAST WEEK, please rate how frequently you engage in the following behaviors: (Never, Rarely, Sometimes, Often, Always)
Dimension: Emotional
I use alcohol/ nicotine/ other substances to manage stress.
I use relaxation techniques to manage stress (any method, process, or activity that helps a person to relax; for example, exercise, listening to music, meditation).
Dimension: Environmental
I take time to appreciate my surroundings.
I take time to appreciate nature.
Dimension: Physical
I use tobacco products.
I eat a nutritious diet (eating 4-8 servings of fruit or vegetables, 4 cups of diary, choosing lean meats, including whole grains, and limiting fats and oils).
I get at least 8 hours of sleep per night.
Reflecting on the PAST MONTH, please rate how frequently you engage in the following behaviors: (Never, Rarely, Sometimes, Often, Always)
Dimension: Environmental
I engage in environmentally friendly behaviors (e.g. turn off the lights, turn off faucets, walk or bike).
If given the opportunity, I recycle.
Dimension: Financial
I track my spending to stay within my budget.
Dimension: Physical
I engage in cardiovascular exercise 3-5 times per week for at least 30 minutes.
I engage in flexibility exercise/ stretching.
I engage in strength training/ resistance exercise 2-3 times per week.
I use illicit drugs (e.g. marijuana, cocaine, ecstasy).
I use prescription medication that is not prescribed to me (e.g. Adderall, Xanax, Valium).

Food Security Measures. The food security measures for the study includes two items from the United States Department of Agriculture's Food Insecurity Survey Module questionnaire (USDA, 2012). The items used in this study include *I was worried whether my food would run out before I got money to buy more* and *The food that I bought just didn't last*

and I didn't have money to get more. The items are answered on a five-point Likert-type scale for frequency, which includes *Always, Often, Sometimes, Rarely,* or *Never.*

Grade Point Average. The participants' grade point averages served as the measurement for academic performance. Each participant was asked to provide their university identification number during the questionnaire. The identification number was used to collect the grade point average for the semester term in which the participant completes the questionnaire. The grade point average is a continuous scale from 0.0 to 4.0.

Demographics. The participant demographics collected for the study are gathered from the university database by using the participant's university identification number (UIN) as well as questions within the assessment. The UIN provided participant information for gender, race/ethnicity, Federal Pell Grant eligibility, on or off campus residency, military affiliation, and first-generation status, which is reported in the descriptive statistics Table 2. Demographic information gathered through questioning includes employment status and hours worked per week, and a measurement of *money in my household* with scale measuring *is not enough, allows us to live day-by-day, allows us to have a small savings, is plenty.*

Data Collection and Procedures

Data were collected during an academic semester. Participants received an email from the researcher and were asked to select the link to complete the questionnaire. Participants were incentivized by choosing to be entered into a drawing for one of fifty twenty-five dollar credits to their student campus card. Prior to starting the questionnaire, participants agreed to an informed consent statement and then began the questionnaire. The participants were asked to provide their university identification number, which was used to import their grade point averages from the university's student database. All identifying information was be kept confidential in secure files

with access only available to the researcher. Participants completed the questionnaire through a computer software, Qualtrics, where results were exported into a SPSS file to be analyzed.

Data Analysis

The data collected were analyzed to statistically test the mediated relationship between each of the nine dimensions of wellness and food security and grade point average. The first analysis included a calculation of descriptive statistics to communicate the demographics of the sample population including gender, race/ethnicity, on or off campus residency, military affiliation, and first-generation status. In addition, a chi square analysis was conducted on the gender variable to determine if it was significant and needed to be controlled in the study.

Second, an exploratory factor analysis (EFA) was conducted on each of the nine wellness dimension factors to determine which items load with each wellness dimension factor. Each of the nine wellness subscales were tested for reliability with the Cronbach alpha analysis and required a minimum score of 0.70. A maximum likelihood method of analysis was used to determine goodness of fit for the EFA because the data are expected to distribute normally. The maximum likelihood test determined the significance of the factor loadings and factor correlations. In addition, a scree plot with an Eigenvalue set greater than 1.0 was used in reviewing factor loadings to determine the number of factor loadings and a rotation strategy was employed to contribute to decisions on factor loadings outcomes. A complete report of the EFA results is included.

After determining the EFA results, the new factor loadings were used in the mediation analysis with SEM. The mediation analysis with SEM was conducted with Amos software. The mediation analysis was used to determine if a causal relationship exists with the wellness dimensions remaining after the EFA on food security and grade point average. The relationship

between variables is measured by effect sizes of small at 0.20, medium at 0.50, and large at 0.80 (Keith, 2015). The wellness dimensions and the grade point average are endogenous variables because they are affected by other variables, while food security is an exogenous variable because it impacts the other variables but is not impacted by others (Gunzler, Chen, Wu, & Zhang, 2013). The direct effect, *c*, is determined through a regression analysis between food security and grade point average while controlling for the mediators, the wellness dimensions (see Figure 2). The indirect effect is determined with each wellness dimension mediating the relationship, where the indirect effect equals *a*b*. The total effect is the sum of the indirect and the direct effects, (*a*b*) + *c*.

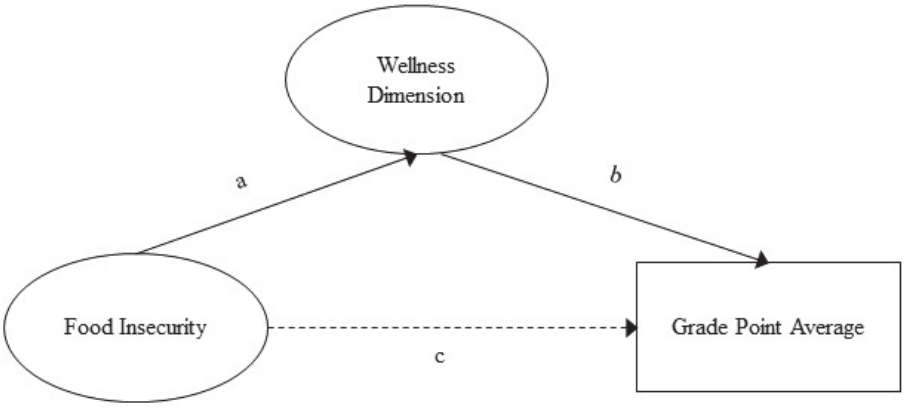

Figure 2. Mediation model for wellness dimension on food insecurity and grade point average.

In addition, a root mean square error of approximation (RMSEA) is recommended for measuring the fit of the structural equation model. The RMSEA is a standardized measure for the degree of fit measuring with a close fit at ≤ 0.05, a mediocre fit at ≤ 0.08, and a poor fit at > 0.10. effects (Kelley & Lai, 2011).

This analysis determined items that support the wellness dimension latent variables as well as determine the significance of the model and the extent to which the mediating variables explain the relationship between food security and GPA.

Limitations

This study presents limitations related to external and internal validity. The generalizability of the study results is an external validity threat because participants are selected from only one institution. In addition, the participant selection has a self-selection bias because participants can choose to participate or not when receiving the email communication. The timing within the semester that the questionnaire is administered may also impact external validity and pose a weakness because students' access to meal plans may change later in the semester when they have used most of their meal access.

Internal validity threats may exist if the sample size is smaller than anticipated and therefore increase the chance of a Type II error. Lastly, an internal validity threat is the reliability of the instrument, which may present differently during data collection and tested due to the population and limited use of the instrument in the research literature.

Summary

Chapter Three reviewed the methodology for the study including the kind of methodology proposed for the study, the sample population used for data collection, the data collection procedures, data analyses, and limitations of the study. The methodology for this study contributes to the literature by expanding on previous correlation and regression studies and providing a structural equation model to explain the relationship between food security, the wellness dimensions and grade point average. In addition, the exploratory factor analysis provides additional validity to the study by testing the measurement instrument and providing

further understanding of the factor loadings for the wellness dimensions. The next chapter will report the findings from the data analyses including descriptive statistics, results from the exploratory factor analysis, as well as the structural equation model.

CHAPTER 4

RESULTS

A mediated analysis with structural equation modeling (SEM) was conducted to determine the structural relationship between the variables of food security, the nine dimensions of wellness, and academic performance. Chapter Four provides the findings of the methodology discussed in chapter three including descriptive statistics of the participants, an exploratory factor analysis, and a mediated analysis within a structural equation model.

The Wellness Assessment survey responses (n=740) were reviewed for missing data regarding food security measurements and missing university identification numbers; those without responses were removed because grade point average could not be determined without the university identification number. The remaining surveys (n=476) were then analyzed for the methodological approaches. The following are the findings from those analyses.

Descriptive Statistics

The descriptive statistics for the sample include gender, race/ethnicity, first generation status, Federal Pell Grant eligibility, on campus residency, in-state residency, and military affiliation. Table 2 provides a summary of the participant demographic characteristics including gender and race/ethnicity.

Table 2. Summary of Participant Demographic Characteristics.

Demographic characteristics	n	%
Gender		
Female	339	71
Male	134	29
Race/Ethnicity		
African-American	99	21
Asian	40	8
Hispanic	46	10
Native American	1	< 1
Native Hawaiian/Pacific Islander	2	< 1
Non-Resident/International	18	4
Two or More Races	30	6
White	223	47
Undisclosed	14	3

Note. Missing data are not included in frequencies or percentages.

Due to the high number of female participants, a chi-square test was conducted to determine the relationship between gender and food security. The relationship between these variables was not significant, X^2 (2, N=476) = 0.082, p = 0.774, therefore future analyses did not need to control for gender.

In addition to the demographics provided above, the sample participants reflected the population of the study's institution in areas of first-generation classification, Federal Pell Grant eligibility, on campus residential status, and military affiliation. The first-generation student population was 26% (n=126) of the sample, with Federal Pell Grant eligibility at 37% (n=176) of the sample. On campus residents in the sample were 34% (n=163) and in-state residency was 90% (n=431) of the sample. The military-affiliated characteristic, meaning that the student was enlisted in the military, a veteran, or dependent of military personnel, was 21% (n=100) of the sample, also reflective of the institution's student population.

The participants identified as food insecure (n=226), 48% of the sample, indicated a frequency rating of *always, often, sometimes,* or *rarely* for one or both of the instrument's items: *I was worried whether my food would run out before I got money to buy more* and *The food that I bought just didn't last and I didn't have money to get more*. The remaining 52% of the participants (n=247), food secure, rated a frequency of *never* for both of these items. Table 3 lists additional demographic information for food secure versus food insecure participants.

Table 3. Summary of Food Secure versus Food Insecure Participant Demographic Characteristics.

Demographic characteristics	Food Secure *n*	Food Insecure *n*	Food Insecure %
Gender			
Female	176	163	48
Male	71	62	46
Race/ ethnicity			
African-American	39	60	67
Asian	23	17	43
Hispanic	28	18	39
Native American	0	1	100
Native Hawaiian/ Pacific Islander	1	1	50
Non-Resident/ International	8	10	56
Two or More Races	11	19	63
White	129	94	38
Undisclosed	8	5	42
Residency			
On Campus	72	91	56
Off Campus	175	135	44
Federal Pell Grant Eligibility			
Yes	69	107	60
No	178	119	40
First Generation			
Yes	55	71	56
No	192	155	45

Three demographic variables were removed from the analysis: academic major, high school grade point average, and SAT score. Academic major data were gathered from the participants' university identification number and seventy-two academic majors were identified; due to the large variety of responses and the inability to quantify this variable in relation to the participant's grade point average, it was removed from the study. The high school grade point average and SAT scores were inconsistent in the data collection from the university database; therefore, these variables were also removed from the analysis.

Primary Analysis

The primary analysis included an exploratory factor analysis, a structural equation model, and review of the hypotheses presented in Chapter One. The exploratory factor analysis (EFA) was conducted to determine factor loadings for the wellness dimensions, which were then used for the structural equation model (SEM) to determine the relationship among the wellness dimensions, food security, and grade point average. Lastly, the findings of the EFA and SEM informed the results of the hypotheses.

Exploratory Factor Analysis. After the review of descriptive statistics, an exploratory factor analysis (EFA) was conducted to determine factor loadings for each wellness dimension's items from the participants' Wellness Assessment results. The EFA is a statistical method to determine the relationship between observed variables, the assessment items in this study, and latent variables, which are the constructs of wellness (Byrne, 2012). After conducting the exploratory factor analysis through SPSS, each factor's reliability score was also analyzed. The statistically reliable factor loadings are listed in Table 4 as well as Cronbach's alpha results. Cronbach's alpha scores were determined and held above 0.50 for reliability of the factor loadings.

Table 4. Exploratory Factor Analysis of Wellness Assessment Items.

Items/ Factor Loadings	1	2	3	4	5	6	7
Dimension: Socioemotional							
I would be willing to seek help from others when I am having a difficult time.	0.877						
I feel supported by my family.	0.876						
I feel comfortable communicating face-to-face with others.	0.875						
I have at least one close friend whom I can trust and confide in.	0.875						
I feel that I am a person who people like to be around.	0.873						
I rarely feel lonely.	0.873						
I feel that I am able to cope with my daily stress.	0.868						
I am able to appropriately express my feelings.	0.867						
I have a strong social network. (The connections one has to others ranging from casual acquaintance to close familial bond; a strong social network is characterized by not only the number, but the strength of the bonds.)	0.867						
I am able to appropriately manage my feelings.	0.866						
I feel a sense of belonging in a community.	0.865						
Dimension: Altruism							
I engage in self-reflection.		0.835					
I am interested in learning new things.		0.833					
I take time to appreciate nature.		0.830					
I aspire to advocate for others.		0.830					

Table 4 (continued).

I think it is important to conserve natural resources.	0.830	
I acknowledge that individuals are complex beings with a variety of identities (i.e. age, ethnicity, sexual orientation, religious affiliation, educational background, income, abilities, and gender expression)	0.828	
I desire to address issues of social injustice when I see and experience them (i.e. unequal economic, social, and political rights and opportunities)	0.827	
I take time to appreciate my surroundings.	0.826	
I am committed to life-long learning and understanding of others' experiences.	0.825	
I am committed to life-long self-evaluation and self-critique of my own cultural biases toward people who are different from me.	0.821	
Dimension: Academic/Career		
I feel that my education is a priority.		0.879
I envision my future career as a means to contribute to society.		0.870
I am confident in my career decisions.		0.860
I feel that my major/career decision is an appropriate expression of what I find meaningful and important in life.		0.853
I feel that my current studies will be helpful to my future career.		0.853
I feel that my major/career decision is an appropriate expression of my abilities and personal strengths.		0.849

Table 4 (continued).

I am confident in my academic major decisions.	0.843			
Dimension: Physical (diet, exercise)				
Reflecting on the past week, I eat a nutritious diet (Eating 4-8 servings of fruit or vegetables, 4 cups of dairy, choosing lean meats, including whole grains, and limiting fats and oils).		0.844		
I am confident that I can maintain a nutritious diet (Eating 4-8 servings of fruit or vegetables, 4 cups of dairy, choosing lean meats, including whole grains, and limiting fats and oils).		0.844		
Reflecting on the past month, I engage in flexibility exercise/ stretching.		0.830		
I am confident that I can exercise regularly (Exercise 3-5 times per week over the course of several weeks).		0.828		
Reflecting on the past month, I engage in strength training/ resistance exercise 2-3 times per week.		0.811		
Reflecting on the past month, I engage in cardiovascular exercise 3-5 times per week for at least 30 minutes.		0.810		
Financial Stress				
I feel stressed by the amount of money I owe (credit cards, student loans, car payments, etc.)			0.545	
I stress about my finances.			0.545	
Dimension: Spiritual				
I feel a connection to something larger than myself.				0.892
I engage in spiritual practices.				0.739
I consider myself to be a spiritual person.				0.654

Table 4 (continued).

Dimension: Physical (substance use)							
I use prescription medication that is not prescribed to me (e.g. Adderall, Xanax, Valium).							0.696
I use tobacco products.							0.601
I use alcohol/nicotine/other substances to manage stress.							0.601
I use illicit drugs (e.g. marijuana, cocaine, ecstasy).							0.572
Cronbach's Alpha	0.882	0.843	0.877	0.853	0.697	0.838	0.690
Number of Items	11	10	7	6	2	3	4

Multiple outcomes resulted from the EFA; twenty-nine of the items did not statistically load onto a factor with a loading above 0.50 or reliability scores above 0.70. In addition, three of the seven new factors include more than one of the previous wellness dimensions' items, which are socioemotional (social emotional), altruism (cultural environmental intellectual), and academic/career (occupational intellectual). Also, the financial and spiritual dimensions were reduced in the number of items loaded on the factor, thus strengthening the instrument's reliability with less items. Lastly, one wellness dimension loaded onto two separate factors: physical wellness for diet and exercise, and physical wellness for substance use.

The financial wellness items' factor loading score was 0.40 and therefore is not included in the final loadings, however two of the items loaded at 0.55 ($\alpha = 0.697$) and are included in the final factors as financial stress due to the item statements. In addition, eight of the environmental items did not load with factors scores above 0.50 and are not included. The academic/career wellness was labeled based on items related to the previous intellectual and occupational

wellness dimensions. Spiritual wellness loaded with three items from the original five items in the instrument. The total number of items reduced from 72 to 43 after conducting the EFA. The factors and items for the revised assessment and the original assessment are listed in Table 5.

Table 5. Wellness Assessment Items for Revised and Original Instrument.

Wellness Assessment (Revised)	Wellness Assessment (Original)
Dimension: Socioemotional	**Dimension: Social**
I feel supported by my family.	I feel supported by my family.
I feel comfortable communicating face-to-face with others.	I feel comfortable communicating face-to-face with others.
I have at least one close friend whom I can trust and confide in.	I have at least one close friend whom I can trust and confide in.
I feel that I am a person who people like to be around.	I feel that I am a person who people like to be around.
I rarely feel lonely.	I rarely feel lonely.
I have a strong social network.	I have a strong social network.
I feel a sense of belonging in a community.	I feel a sense of belonging in a community.
	Dimension: Emotional
I would be willing to seek help from others when I am having a difficult time.	I would be willing to seek help from others when I am having a difficult time.
I feel that I am able to cope with my daily stress.	I feel that I am able to cope with my daily stress.
I am able to appropriately express my feelings.	I am able to appropriately express my feelings.
I am able to appropriately manage my feelings.	I am able to appropriately manage my feelings.
	I use alcohol/nicotine/other substances to manage stress.
	I have a positive image of my body.
	I use relaxation techniques to manage stress.

Table 5 (continued).

Dimension: Altruism	**Dimension: Cultural**
I aspire to advocate for others.	I aspire to advocate for others.
I acknowledge that individuals are complex beings with a variety of identities.	I acknowledge that individuals are complex beings with a variety of identities.
I desire to address issues of social injustice when I see and experience them	I desire to address issues of social injustice when I see and experience them
I am committed to life-long learning and understanding of others' experiences.	I am committed to life-long learning and understanding of others' experiences.
I am committed to life-long self-evaluation and self-critique of my own cultural biases toward people who are different from me.	I am committed to life-long self-evaluation and self-critique of my own cultural biases toward people who are different from me.
	Dimension: Environmental
I take time to appreciate nature.	I take time to appreciate nature.
I think it is important to conserve natural resources.	I think it is important to conserve natural resources.
I take time to appreciate my surroundings.	I take time to appreciate my surroundings.
	I often feel that I have little control over my safety.
I am interested in learning new things.	
I engage in self-reflection.	I feel safe in my living environment.
	I feel that I live in a stressful environment.
	I feel that I live in a welcoming environment.
	I engage in environmentally friendly behaviors.
	If given the opportunity, I recycle.
	In the past week, I take time to appreciate my surroundings.
	In the past week, I take time to appreciate nature.

Table 5 (continued).

	Dimension: Intellectual
Dimension: Academic and career	I am interested in learning new things.
I feel that my education is a priority.	I feel that my education is a priority.
I am confident in my academic major decisions.	I am confident in my academic major decisions.
	I am able to resolve conflicts peacefully.
	I am confident in my ability to find solutions to my problems.
	I am confident that I can learn new skills.
	I engage in intellectually engaging activities.
	I feel challenged by my academic term.
	I am able to manage my academic workload during this academic term.
	Dimension: Occupational
I envision my future career as a means to contribute to society.	I envision my future career as a means to contribute to society.
I am confident in my career decisions.	I am confident in my career decisions.
I feel that my major/career decision is an appropriate expression of what I find meaningful and important in life.	I feel that my major/career decision is an appropriate expression of what I find meaningful and important in life.
I feel that my current studies will be helpful to my future career.	I feel that my current studies will be helpful to my future career.
I feel that my major/career decision is an appropriate expression of my abilities and personal strengths.	I feel that my major/career decision is an appropriate expression of my abilities and personal strengths.
	I feel that my current job interferes with other aspects of my life.
	I am able to balance my current job with the rest of my life.
	I feel that I work in a positive environment.
	I feel that I work in a stressful environment.

Table 5 (continued).

Dimension: Physical (diet and exercise)	**Dimension: Physical**
I am confident that I can maintain a nutritious diet.	I am confident that I can maintain a nutritious diet.
I am confident that I can exercise regularly.	I am confident that I can exercise regularly.
Reflecting on the past week, I eat a nutritious diet.	Reflecting on the past week, I eat a nutritious diet.
Reflecting on the past month, I engage in flexibility exercise/ stretching.	Reflecting on the past month, I engage in flexibility exercise/ stretching.
Reflecting on the past month, I engage in strength training/ resistance exercise 2-3 times per week.	Reflecting on the past month, I engage in strength training/ resistance exercise 2-3 times per week.
Reflecting on the past month, I engage in cardiovascular exercise 3-5 times per week for at least 30 minutes.	Reflecting on the past month, I engage in cardiovascular exercise 3-5 times per week for at least 30 minutes.
Dimension: Physical (substance use)	
I use prescription medication that is not prescribed to me (e.g. Adderall, Xanax, Valium).	I use prescription medication that is not prescribed to me (e.g. Adderall, Xanax, Valium).
I use tobacco products.	I use tobacco products.
I use illicit drugs (e.g. marijuana, cocaine, ecstasy).	I use illicit drugs (e.g. marijuana, cocaine, ecstasy).
I use alcohol/nicotine/other substances to manage stress.	I get at least 8 hours of sleep per night.
Financial Stress	**Dimension: Financial**
I feel stressed by the amount of money I owe (credit cards, student loans, car payments, etc.).	I feel stressed by the amount of money I owe (credit cards, student loans, car payments, etc.)
I stress about my finances.	I stress about my finances.
	I think it is important to spend less than I earn.
	I am confident that I can plan a financial budget.
	I have enough money saved to handle financial emergencies.

Table 5 (continued).

	I am able to pay my bills on time.
	I am comfortable leaving a balance on my credit card(s).
	I pay off the entire balance of my credit card(s) each month.
	I track my spending to stay within my budget.
Dimension: Spiritual	**Dimension: Spiritual**
I feel a connection to something larger than myself.	I engage in self-reflection.
I engage in spiritual practices.	I feel a connection to something larger than myself.
I consider myself to be a spiritual person.	I engage in spiritual practices.
	I consider myself to be a spiritual person.
	I seek out meaning in my life.
Non-significant items	
I have a positive image of my body.	
I use relaxation techniques to manage stress.	
I often feel that I have little control over my safety.	
I feel safe in my living environment.	
I feel that I live in a stressful environment.	
I feel that I live in a welcoming environment.	
In the past week, I take time to appreciate my surroundings.	
In the past week, I take time to appreciate nature.	
In the past month, I engage in environmentally friendly behaviors.	
In the past month, if given the opportunity, I recycle.	
I am able to resolve conflicts peacefully.	

Table 5 (continued).

I am confident in my ability to find solutions to my problems.
I am confident that I can learn new skills.
I engage in intellectually engaging activities.
I feel challenged by my academic term.
I am able to manage my academic workload during this academic term.
I feel that my current job interferes with other aspects of my life.
I am able to balance my current job with the rest of my life.
I feel that I work in a positive environment.
I feel that I work in a stressful environment.
I get at least 8 hours of sleep per night.
I think it is important to spend less than I earn.
I am confident that I can plan a financial budget.
I have enough money saved to handle financial emergencies.
I am able to pay my bills on time.
I am comfortable leaving a balance on my credit card(s).
I pay off the entire balance of my credit card(s) each month.
I track my spending to stay within my budget.
I seek out meaning in my life.

Structural Equation Model. The second step in the analysis was testing the mediated relationship within the structural equation model (SEM). Amos software was used to create the

SEM with the seven factors identified from the exploratory factor analysis. In addition, the latent variable of food security was used in the model with a reliability of 0.875 as well as the observed variable of grade point average. The first SEM analysis included the hypothesized model from chapter three, however the findings did not demonstrate a significant relationship, therefore the model was modified.

The second SEM analysis modified the model to demonstrate the relationship of financial stress with food security ($\beta = -0.43$, $p < 0.001$) and the academic/career latent variable with grade point average ($\beta = 0.20$, $p < 0.001$). By demonstrating the relationship of these two wellness dimensions with the other variables of the SEM, this placed the remaining four core wellness variables in alignment with a more direct relationship. The four core wellness variables had a direct relationship with the wellness latent variable and was tested to include socioemotional wellness ($\beta = 0.51$, $p < 0.001$), physical wellness (diet and exercise) ($\beta = 0.50$, $p < 0.001$), spiritual wellness ($\beta = 0.38$, $p < 0.001$), and altruism wellness ($\beta = 0.23$, $p < 0.001$). In addition to realigning the wellness variables to different parts of the SEM, a correlation was conducted from food security to grade point average ($\beta = 0.14$, $p = 0.004$). The root mean square error of approximation (RMSEA) was used as the fit model with a result of 0.070, indicating a result between a mediocre fit (≤ 0.08) and a close fit (≤ 0.05) (Kelley & Lai, 2011). The SEM is reported in Figure 2.

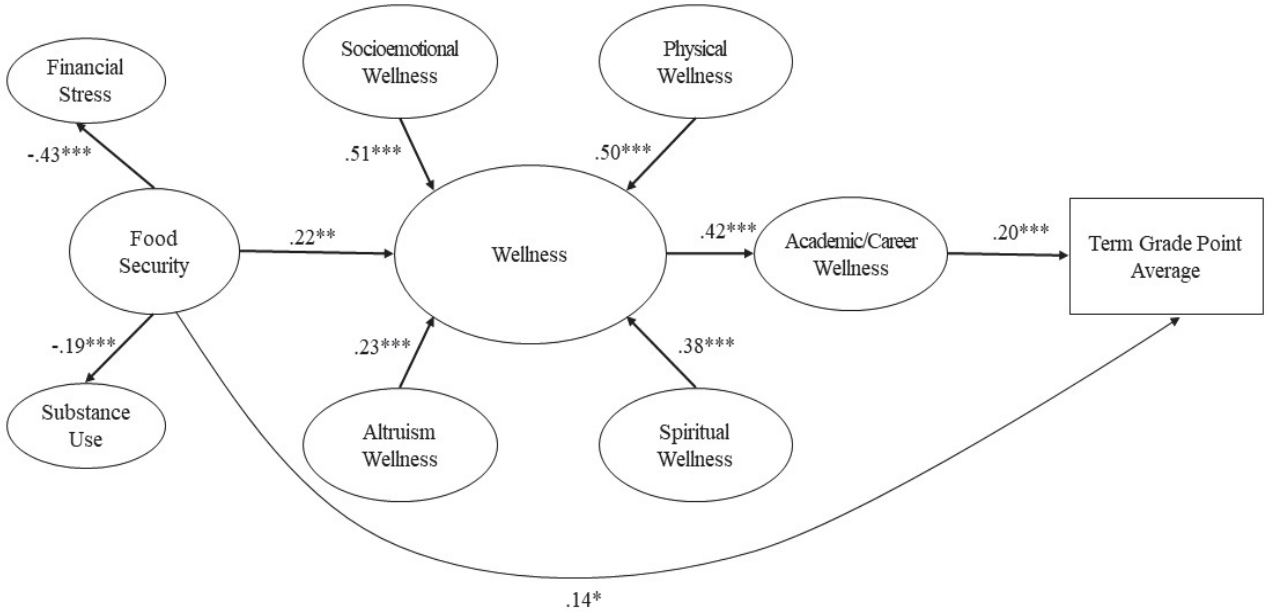

Figure 2. Structural equation model of the mediated analysis of wellness on food security and term grade point average. Model does not include items found not significant. *p = 0.004, **p = 0.002, ***p < 0.001

The findings of the mediated analysis demonstrate that the four core wellness dimensions, mediated by academic/career wellness, explains the relationship between food security and grade point average, however the direct effect between food security and GPA is larger than the indirect effect of wellness. The indirect effect of wellness on the relationship between food security and grade point average is less than the direct effect of food security on grade point average, with the indirect effect at 0.019 and the direct effect at 0.14 with a total effect of 0.159. The relationships among the variables remain significant when testing correlations between variables, therefore this is a partial mediation (Keith, 2015).

Hypotheses Findings. The findings of the hypotheses are confirmed as well as present unpredicted results. The relationship between variables is measured by effect sizes of small at 0.20, medium at 0.50, and large at 0.80 (Keith, 2015). The first hypothesis was confirmed: *Food*

security will predict a significant, direct, positive, small relationship with grade point average. Food security was found to have a significant, direct, positive, small relationship with grade point average. The second hypothesis predicted collinearity with financial wellness and food security, however financial wellness was redefined as financial stress through the exploratory factor analysis and this variable demonstrated a medium, direct, and negative relationship with food security.

The third hypothesis predicted a significant, direct, positive and small mediating relationship of intellectual and occupational wellness with food security and grade point average. The analysis for intellectual and occupational wellness loaded these two factors together and found the latent variable to mediate a significant, medium, and positive relationship between the other four core dimensions of wellness and grade point average.

The fourth hypothesis predicted social wellness to have a significant, direct relationship but the type of relationship, negative or positive, was unknown as well as the strength. The exploratory factor analysis loaded social with emotional variables creating a socioemotional wellness latent variable, which had a medium, positive, indirect relationship mediated by academic/career wellness.

The fifth hypothesis predicted to mediate physical wellness between food security and GPA with a significant, direct, medium relationship, however physical wellness for diet and exercise items, demonstrated a positive, medium, indirect effect mediated by academic/career wellness. In addition, the physical substance use variable was found significant and negatively correlated with food security with a small effect size; separate from the physical wellness dimension of diet and exercise.

Similarly, the sixth hypothesis predicted emotional wellness to mediate between food security and GPA with a significant, direct, medium relationship, however emotional wellness items loaded with social and demonstrated a positive, medium, indirect effect mediated by academic/career wellness.

Lastly, the seventh hypothesis predicted that cultural, environmental, and spiritual would not predict a significant relationship, however these variables were found to have significant, medium, positive, indirect effects mediated by academic/career wellness.

Summary

The findings of the study provided descriptive statistics regarding the study participants, exploratory factor analysis results strengthening the validity of the study, and a mediated structural equation model explaining the relationship between wellness, food insecurity and grade point average. The mediated structural equation model demonstrated an unpredicted result with identifying four core wellness variables that are mediated by a relationship with academic/career wellness between the relationship of food insecurity and grade point average. The mediated structural equation model also provided results of a larger direct effect between food security and grade point average; however, the SEM explained the strong correlation of wellness between food security and grade point average. In addition, the exploratory factor analysis resulted in multiple outcomes including a reduction of the number of wellness dimensions, reducing the number of items for the assessment instrument, and strengthening the validity of the study. Chapter Five provides a summary of the results, a discussion of the findings, limitations of the study, and finally implications for future research and higher education practices.

CHAPTER 5

DISCUSSION

Summary of Results

Food insecurity is a growing concern on college campuses and the results from this study stress this concern with 48% of the sample reporting some type of food insecurity in the last twelve months. While the range of responses include a frequency from always to rarely within the last twelve months, the population of students impacted by some frequency of food insecurity is remarkable. Contrasting this alarming result, the study also reports findings to support food insecure students through wellness measures to ultimately impact their grade point average. The results from this study demonstrate the extent and relationship of the wellness dimensions mediating the relationship between food insecurity and grade point average. Demonstrated through an exploratory factor analysis (EFA) and a mediated structural equation model (SEM), four core wellness dimensions are identified with an indirect effect, mediated through academic/career wellness, on grade point average for food insecure students. The four core wellness dimensions are socioemotional, physical (diet and exercise), altruism, and spirituality. In addition, food security is explained through financial stress and physical wellness related to substance use. The comprehensive model demonstrates the complexity of wellness and factors mediating the relationship for food insecure students and their academic performance. Chapter Five provides a discussion of these results, limitations with the study, and implications for higher education practitioners, future research, and federal and state policy makers.

Discussion of the Research Findings

The first major finding of this study is the development of a comprehensive model explaining the relationship between student wellness, food insecurity, and grade point average.

The second major finding within the comprehensive model is the addition of empirical research into wellness dimensions not previously discussed in the food insecurity literature. Lastly, the third major finding is an enhancement to the Wellness Assessment instrument through the reduction of items from 72 to 43 and the redefinition of wellness dimensions within the instrument.

The first major finding of this study is a comprehensive model explaining the relationship between student wellness, food insecurity, and grade point average. The model identifies new findings that demonstrate the relationship of wellness variables within food insecurity as well as findings providing new insights into the roles of spiritual wellness, altruism, and substance use, not previously discussed in literature for food insecurity and grade point average. Previous research identified factors contributing to student wellness, food insecurity, and academic success including the value of social networks (Allen, Robbins, Casillas & Oh, 2008; Crossman, 2016; Owen, 2020), motivation (Myrick et al., 2016), financial access (Broton & Goldrick-Rab, 2016; Freudenberg et al., 2011; Stewart et al., 2015), and strength training and sleep (Trocket et al., 2000), however this study provides a comprehensive model to explain how multiple variables of wellness relate to food insecurity and grade point average.

The comprehensive model provides definition to the latent variable of food insecurity. While previous research identified financial wellness as a dimension within a wellness model, the relationship between financial viability and food insecurity has also been documented as significant (Freudenberg et al., 2011; Hughes et al., 2011). The findings of this study support a medium, significant relationship between financial stress and food security ($\beta = -0.43$, $p < 0.001$). In addition, substance use is also significantly correlated with food security ($\beta = -0.19$, $p < 0.001$), an item typically related to physical wellness due to its relationship with nutrition.

Based on these findings, food insecure students are more likely to have financial stress and also use substances, which can have a compounding, negative impact on their circumstances to overall wellness, as demonstrated in the model. The relationship also negatively impacts grade point average, as food security is positively correlated to grade point average ($\beta = 0.14$, $p = .004$). Beyond the current literature that demonstrates food insecurity negatively correlated with grade point average (Maroto, Snelling, & Linck, 2015; Patton-Lopez et al., 2014; El Zein et al., 2017b), these findings contribute and provide additional information into variables impacting students with food insecurity, financial stress, and substance use.

The second major finding within the comprehensive model is the addition of empirical research into wellness dimensions not previously discussed in the food insecurity literature. These dimensions include spiritual wellness, altruism (cultural/environmental wellness), and academic/career (intellectual/occupational wellness). The model demonstrates the significant and moderate correlation of spiritual wellness and altruism wellness in relation to the latent wellness variable. An example of the spiritual wellness item included *I feel a connection to something greater than myself* and an altruism wellness item included *I aspire to advocating for others*. (The cultural/environmental wellness items theme around common terms of advocating for others, conserving natural resources, and understanding others; therefore, the term altruism is used to capture this dimension of wellness in a single, inclusive term. Further details about the redefinition of wellness dimension terms is discussed later in this chapter.) Previous research supports social wellness and food insecurity through findings of students bonding with others through sharing a similar experience (Cliburn & Alleman, 2017) or social wellness and grade point average with strong social networks leading to higher likelihood for academic persistence (Allen, Robbins, Casillas, & Oh, 2008), however there is limited research on spiritual or altruism

wellness factors related to food insecurity. With this additional finding, connecting food insecure students with resources to connect them with something larger than themselves and addressing social injustices or issues broader than their own, may contribute to their wellness and in return their grade point average. Also, this finding provides the opportunity for further research to learn more about students experiencing food insecurity and identify how their spiritual practices and beliefs as well as their support of their community influences their wellness and perhaps academic performance. This finding was a major contribution to the food insecurity literature as previous research has not demonstrated this relationship.

The academic/career wellness is another wellness dimension in the comprehensive model that contributes to the literature related to food insecurity and grade point average. The items loading on the factor of academic/career wellness are related to academic major listed within the original intellectual wellness dimension, and future career aspirations listed within the original occupational wellness dimension, not the participant's current employment status. Examples of the items for this dimension of wellness included *I feel that my education is a priority*, *I am confident in my career decisions*, and *I feel that my current studies will be helpful to my future career*. The literature regarding occupational wellness has been limited to employment status (Galleog et al., 2014; Patton-Lopez et al., 2014) and intellectual wellness is more closely related to the grade point average outcome variable, however this study identifies a moderate, significant correlation between academic/career wellness and grade point average. The strength of this correlation demonstrates the need to remove this wellness dimension from the overall wellness latent variable to strengthen the relationship with GPA and wellness, as it stands alone in the model. This finding highlights the positive relationship between a student prioritizing their education, identifying confidently with their academic major, academic abilities, and future

career choices with their grade point average outcome. When academic/career wellness is combined with the four core wellness dimensions, students' GPA is likely to be influenced. Therefore, when positively combining food insecure students' core wellness dimensions with academic/career wellness their grade point average is expected to improve.

In addition to the wellness dimensions discussed, the remaining wellness dimensions also contribute to existing literature and confirm the role of wellness in the relationship between food insecurity and grade point average. The model demonstrates the strong correlations of socioemotional wellness and diet and exercise physical wellness. The socioemotional and diet and exercise physical wellness dimensions are heavily supported in the literature for their relationship with food insecurity and grade point average (Cliburn & Alleman, 2017; Gallegos, Ramsey, & Ong, 2014; Trockel et al., 2000). Overall these findings present a comprehensive model that demonstrates the relationship of the four core wellness dimensions, academic/career wellness, food insecurity affected by behaviors of substance use and circumstances of financial stress, and grade point average outcomes.

Instrument Enhancements. In addition to the major finding of a comprehensive model, results of the study contribute to enhancements with the Wellness Assessment instrument. Prior to creating the mediated structural equation model (SEM), an exploratory factor analysis (EFA) was conducted, which enhanced the instrument by reducing the number of survey items, strengthened the psychometrics of the instrument, reduced instrument completion time, and provided further definition for each wellness dimension. Lastly, the instrument is enhanced by the redefinition of four core wellness dimensions that are mediated by academic/career wellness for GPA. The redefinition of wellness dimensions provides statistically significant application to the topic of wellness.

The research findings enhanced the Wellness Assessment instrument with the EFA providing factor loadings that reduced the number of wellness dimensions as well as the number of overall items for the instrument. The wellness dimensions reduced from nine to seven and the items reduced from 72 to 43. The reliability of the instrument is also strengthened through this study with the measured Cronbach alpha's for each factor, which provided further empirical evidence of the psychometrics for this instrument. This research also enhanced the instrument by reducing the time needed for a participant to complete the assessment, thus potentially improving future participant response rates. Due to the identified items for each wellness dimension, participants were provided further clarity and explanation of what each wellness dimension consists of thus helping to guide participants toward strategies for improvement.

Another outcome from the results are the new wellness dimensions and their relationship to each other. The results of the EFA factor loadings provided new definitions and confirming definitions for the wellness dimensions used in the structural equation model. The instrument has items that are very useful for measuring the wellness dimensions. Statistically, it was found that some items loaded with strong standardization scores and reliability scores, however others did not and were removed from the model. The dimensions after the EFA are socioemotional, altruism, academic/career, physical diet and exercise, financial stress, spiritual, and physical substance abuse. Through this research redefined labels are provided for each dimension that capture the commonalities of the items within the factor. Socioemotional included items from the Wellness Assessment from the two previous wellness dimensions, social and emotional. The results promote the close connection of these items together and highlight the importance of social support for an individual's emotional wellness. Due to socioemotional having eleven

items, the largest number of items within the survey, these items could be reduced to strengthen content validity and reduce time for completing the questionnaire.

Altruism was another new factor that emerged from the analysis. This factor included primarily items from the previous wellness dimensions of cultural, environmental, and intellectual, however one spiritual item was also included: *I engage in self-reflection*. Commonalities among this factor included advocating for others and self, therefore the identification of this wellness dimension is recommended to be labeled as altruism. This finding is a major contribution to the food insecurity literature because previously literature has not reported the role of altruism in students' wellness. Previous literature highlights included wellness areas of social (Allen, Robbins, Casillas, & Oh, 2008; Owen, 2020), financial (Trockel et al., 2000), and physical (Robbins et al., 2009) when correlating wellness with grade point average, however altruism has not been included. This finding provides insight into how students' views and participation in altruistic behaviors can influence their wellness and when combined with academic/ career focuses could influence their academic performance.

Two separate dimensions emerged from the data for physical wellness; one factor included items related to diet and exercise while the second factor included items related to substance use. These two factors are recommended to focus on the items loaded with the separate factors and be identified as such; diet and exercise physical wellness dimension and substance use physical wellness. The diet and exercise physical wellness is correlated within the four core wellness dimensions, which the substance use is correlated to financial stress.

The next dimension is spiritual wellness, which reduced the number of items from five to three and still contain only spiritual items. It is recommended that this wellness dimension remain the same as spiritual wellness. The role of spiritual wellness in a student's wellness is

important to food insecurity literature as this dimension has not been previously discussed. Like the role of altruism in students' wellness, spiritual wellness also demonstrates a relationship with students' overall wellness and the influence on academic performance with combined with academic/career wellness. Spiritual wellness is also included as one of the four core wellness dimensions to the model.

The relationship of the four core wellness dimensions, socioemotional, physical diet and exercise, altruism, and spiritual, are correlated together to create the latent wellness variable. These four represent wellness as it is mediated with a medium correlation to academic/career wellness in the relationship between food security and grade point average. The instrument is enhanced with measuring the relationship of these four core wellness dimensions within the comprehensive model of food security and grade point average.

Academic/career was a new wellness dimension that emerged from the EFA as the items loaded from the previous wellness dimensions of occupational and intellectual. Only two intellectual items loaded as well as five occupational items, however all items either related to academic education or future career alignment with their academics. Due to the items' commonalities, the recommended wellness dimension is identified as academic/career wellness. This result also highlights the college student population for this research and identifies that the relationship with this wellness dimension and grade point average is moderately correlated because students perceiving their academics to be in good standing would most likely be performing well academically.

The last wellness dimension that resulted from the EFA was financial stress. In the original Wellness Assessment the wellness dimension most closely related was financial wellness, however the EFA demonstrated that only two of the eight items loaded together, *I feel*

stressed by the amount of money I owe and *I stress about my finances;* the other items did not load on a factor. Due to these items, this wellness dimension could better be identified as financial stress instead of implying a broader range of items related to financial wellness. Financial stress demonstrates a medium, negative correlation to food security.

A major outcome of this study is the enhancement of the Wellness Assessment instrument. Through the exploratory factor analysis, the instrument's items were reduced, the psychometrics were statistically strengthened, and the time to complete the instrument was reduced. In addition, the instrument was enhanced by the identification of the four core wellness dimensions demonstrated in the structural equation model. This instrument now provides improved service for the use by practitioners and researchers.

Limitations

Limitations for the study should be considered when reviewing the results. Academic major data were gathered from the participants' university identification number and seventy-two academic majors were identified. Due to the variance and inability to accurately categorize this quantity of majors, these data were removed from the study. In addition, high school grade point averages and SAT scores were inconsistent among participants with missing data; these data were also removed from the study, therefore this is a major limitation as prior academic performance may influence students' current academic performance. The study was also conducted at one institution, therefore results are not generalizable to all college student populations

Lastly, the measurement for food security was limited with only two items from the USDA Food Security questionnaire (United States Department of Agriculture, 2012). The study

would be strengthened by increasing the number of items as well as expanding on food accessibility items by including measurements related to food quality.

Implications

The implications of this research apply to higher education administrators, practitioners, federal and state legislation decision-makers, and researchers. This study explains the role of wellness in the relationship between food insecurity and grade point average. As a result of the findings, each group of stakeholders can make informed decisions that support students in attaining greater academic performance.

Implications for Practice. The seven wellness dimensions identified in this study provide the opportunity for higher education administrators and practitioners to allocate human, financial, and programmatic resources to support students in these areas. Specifically understanding the relationship between the four core wellness dimensions and academic/career wellness is important when practitioners assist students in their academic performance. Practitioners should implement programs and services that support students in the four core wellness areas of socioemotional, physical with diet and exercise, altruism, and spirituality, when working on academic/career wellness. By addressing these multiple areas of wellness, students will also benefit academically. It is important to note that not one solution or area of wellness independently improves students' outcomes.

In addition, practitioners should understand the role of substance use for food insecure students and assist these students with education and strategies to prioritize their health and find alternatives for the misuse of substances. In addition, when practitioners identify students experiencing substance use they should also ask about their experience with food insecurity to identify if this is another area of concern for the students. This potential indicator for

practitioners can assist them in supporting students in additional areas of wellness that may not otherwise be apparent.

Practitioners can also utilize the Wellness Assessment instrument to assess the needs of food insecure students on their campus. With the reduced length of the assessment, the instrument completion rate may improve, therefore practitioners may receive larger data samples to inform campus decision-makers. Also, if students are more likely to complete the instrument then more students will benefit from receiving their results of wellness scores, which can inform student decision making.

The next step after collecting data for campuses is to develop educational campaigns, provide facility space, and programs to engage with students and advance their wellness in the seven wellness dimensions. An example for the diet and exercise physical wellness is to provide healthy food options through dining services along with education campaigns, nutritional instruction programming, recreation spaces that are accessible to students, and incentivize students to participate. An example for spiritual wellness is to incorporate inclusive language, increase awareness of spiritual practices, and align current programming with the opportunity for students to connect with a concept larger than themselves. Increasing a sense of belonging on campuses as well as in other communities in which students interact would benefit students' socioemotional wellness, support altruistic behaviors, and therefore contribute to positive outcomes in academic performance. These recommendations for incorporating the findings from this study serve to promote wellness among students on college campuses and support their academic achievements.

Implications for Policymakers. Implications of this research also apply to federal and state policymakers. This study highlights the rise of food insecurity on college campuses with

48% of the sample reporting some level of food insecurity. With this rise and the correlation of this phenomenon with grade point average, the federal and state contributions to students' financial aid is necessary. If students are stressed by their financial means then it is highly correlated that they will be food insecure, therefore recognizing the financial needs of our students is critical by our legislative decision-makers to support students.

Additional measures by policymakers should include specific funding allocations within students' financial aid for campus meal plans based on the estimated family contribution through the FASFA application process. This strategy would assist students qualifying for Federal Pell Grants by ensuring financial resources are allocated specifically for food during their academic enrollment. Financial Aid distribution requirements should also include training on budget management explaining the importance of prioritizing food within students' financial planning.

In addition, legislators can support student wellness by financially incentivizing higher education institutions that support students' wellness needs. Federal and state funding opportunities would create a call to action for institutions to support student wellness. Legislators promoting food insecurity educational campaigns and funding future research is also needed to increase awareness and resource allocation for this important topic.

Implications for Research. The implications for future research include both quantitative and qualitative research designs. The opportunity to study a national student sample will contribute to the generalizability of the results as well as a qualitative interview study using case study analysis to better understand the phenomenon of food insecurity on college campuses. A national survey with the modified 43-item scale is proposed to provide generalizability of the results as well as report on national trends across higher education institutions. The study also provides benefits to the empirical research by including specific food insecure student

demographics in the survey, such as students receiving Federal Pell Grants, students with financial indicators of low socioeconomic status, and students identified as first generation in higher education. By researching these student populations, additional correlations can be explored between wellness, food insecurity, and grade point average. In addition, information about the higher education institutions including geographical location, public versus private institutions, the enrollment size of the institutions, and resources available for students would provide information for federal and state policy makers when determining the scale of impact across the nation. The national study would also increase confidence in the validity and reliability of the instrument.

Another area of future research includes a recommendation for a qualitative case study analysis. The case study research should address how food insecure students experience altruism, spirituality, and their academic performance in their time enrolled on a college campus. A multiple-case study approach is recommended to include carefully selected participants that support comparing and contrasting food insecure students' experiences. This type of research contributes to a further understanding of the phenomenon of food insecurity in the context of a college campus. Through additional research studies, the understanding of food insecure students can improve, empirical research can be used to inform decision makers, and valuable resources and strategies can be increased to support students' success in higher education institutions.

Conclusion

Food insecurity is a growing concern on higher education campuses across the country (Cady, 2014; Goldrick-Rab & Cook, 2011; Maroto, Snelling, & Linck, 2015) as the demographics of students enrolling in higher education have diversified over the past decades

(Goldrick-Rab & Cook, 2011). In addition, federal and state appropriations to higher education institutions have decreased (Gilbert & Heller, 2013), thus causing an increase concern in the financial strain on students attending higher education institutions. As a result of these trends, it is important that higher education administrators and practitioners better understand the needs of food insecure students in order to support their academic success. Student wellness contributes to students' academic success (Trockel, Barnes, & Egget, 2000) and indirectly, various wellness factors of food insecure students have been studied (Bruening, van Woerden, Todd, & Laska, 2018; Cliburn & Alleman, 2017; El Zein et al., 2017b; Gallegos, Ramsey, & Ong, 2014), however through this study a comprehensive model demonstrates the extent to which wellness dimensions explain the relationship between food insecurity and grade point average. The model highlights the importance of financial stress and substance use for students in relation to food insecurity and students' perceived confidence in their academic and career aspirations also influence their grade point average outcomes. Also, the wellness dimensions of socioemotional, spiritual, diet and exercise physical wellness, and altruism are also correlated to the grade point average of food insecure students and provide valuable insight for supporting students in need. With the findings of this study, students can be assisted through a variety of strategies that promote wellness and ultimately support their academic success.

REFERENCES

Allen, J., Robbins, S., Casillas, A., & Oh, I. (2008). Third-year college retention and transfer: Effects of academic performance, motivation, and social connectedness. *Research in Higher Education, 49*, 647-664.

American Association of State Colleges and Universities Government Relations and Policy Analysis Division. (2018). *Top 10 higher education state policy issues for 2018*. Retrieved from https://aascu.org/policy/publications/policy-matters/Top10Issues2018.pdf

Astin, A. (1984). Student involvement: A developmental theory for higher education. *Journal of College Student Personnel, 25,* 297-308.

Baldwin, D. R., Towler, K., Oliver, M. D. II, & Datta, S. (2017). An examination of college student wellness: A research and liberal arts perspective. *Health Psychology Open, July-December*, 1-9.

Bass, R. W., Brown, D. D., Laurson, K. R., & Coleman, M. M. (2013). Physical fitness and academic performance in middle school students. *Acta Paediatrica*, *102*(8), 832-837.

Braveman, P., Cubbin, C., Marchi, K., Egerter, S., & Chavez, G. (2001). Measuring socioeconomic status/position in studies of racial/ethnic disparities: maternal and infant health. *Public Health Reports*, *116*(5), 449-463.

Brock, M., Wallace Carr, J., & Kent T. M. (2015). An examination of campus recreation usage, academic performance, and selected health indices of college freshmen. *Recreational Sports Journal*, *39*(1), 27-36.

Broton, K., & Goldrick-Rab, S. (2016, January/February). The dark side of college (un)affordability: Food and housing insecurity in higher education. *Change,* 16-24.

Bruening, M., Brennhofer, S., van Woerden, I., Todd, M., & Laska, M. (2016). Factors related to

the high rates of food insecurity among diverse, urban college freshmen. *Journal of the Academy of Nutrition and Dietetics, 116*(9), 1450-1457.

Bruening, M., van Woerden, I., Todd, M., & Laska, M. (2018). Hungry to learn: The prevalence and effects of food insecurity on health behaviors and outcomes over time among a diverse sample of university freshmen. *International Journal of Behavioral Nutrition and Physical Activity, 15*(9), 1-10.

Byrne, B. (2012). *Structural equation modeling with Mplus.* New York, NY: Routledge.

Cady, C. L. (2014). Food insecurity as a student issue. *Journal of College and Character, 15*(4), 265-271.

Cereola, S. J., Snyder, C. S., Cereola, R. J., & Horton, B. W. (2014). Holistic wellness and its impact on first-semester grades. *Journal of the First-Year Experience & Students in Transition, 26*(2), 89-106.

Cliburn, C. C., & Alleman, N. F. (2017). A private struggle at a private institution: Effects of student hunger on social and academic experiences. Paper presented to the Association for the Study of Higher Education (ASHE).

Coleman-Jensen, A., Rabbitt, M. P., Gregory, C. A., & Singh, A. (2017). Household food security in the United States in 2017. Report for the United States Department of Agriculture. Retrieved from https://www.ers.usda.gov/webdocs/publications/90023/err-256.pdf?v=0

Crossman, J. M. (2016). Planning, practising and prioritizing wellness through an integrative behavior change plan. *Health Education Journal, 75*(7), 823-832.

Dominguez-Whitehead, Y. (2017). Conceptualising food research in higher education as a matter

of social justice: philosophical, methodological and ethical considerations. *Cambridge Journal of Education, 47*(4), 551-565.

Dunn, H. (1959). What high-level wellness means. *Canadian Journal of Public Health, 50*(11), 447-457.

Education Amendments Act of 1972, 20 U.S.C. §§1681 – 1688.

El Zein, A., Shelnutt, K., Colby, S., Olfert, M., Kattelmann, K., Brown, O., Kidd, T., Horacek, T., White, A., Zhou, W., Vilaro, M., Greene, G., Morrell, J., Riggsbee, K., & Mathews, A. (2017a). The prevalence of food insecurity and its association with health and academic outcomes among college freshmen. *Advances in Nutrition, 8*(1), 4.

El Zein, A., Shelnutt, K., Colby, S., Olfert, M., Kattelmann, K., Brown, O., Kidd, T., Horacek, T., White, A., Zhou, W., Vilaro, M., Greene, G., Morrell, J., Riggsbee, K., & Mathews, A. (2017b). Socio-demographic correlates and predictors of food insecurity among first year college students. *Journal of the Academy of Nutrition and Dietetics, 117*(10), A146.

Forrester, S. (2015). Benefits of collegiate recreational sports participation: Results from the 2013 NASPA assessment and knowledge consortium study. *Recreational Sports Journal*, *39*, 2–15.

Freudenberg, N., Manzo, L., Jones, H., Kwan, A., Tsui, E., & Gagnon, M. (2011). Food insecurity at CUNY: Results from a survey of CUNY undergraduate students. The Campaign for a Healthy CUNY. Retrieved from https://www.gc.cuny.edu/CUNY_GC/media/CUNY-Graduate-Center/PDF/Centers/Center%20for%20Human%20Environments/cunyfoodinsecurity.pdf

Gallegos, D., Ramsey, R., & Ong, K. W. (2014). Food insecurity: Is it an issue among tertiary students? *Higher Education*, *67*(5), 497-510.

Gilbert, C. K., & Heller, D. E. (2013). Access, equity, and community colleges: The Truman Commission and federal higher education policy from 1947 to 2011. *The Journal of Higher Education, 84*(3), 417-443.

Goldrick-Rab, S. (2016). *Paying the price: College costs, financial aid, and the betrayal of the American dream.* Chicago, IL: University of Chicago Press.

Goldrick-Rab, S., & Cook, M. A. E. (2011). College students in changing contexts. In P. G. Altbach, P. J., Gumport & R. O. Berdahl (Eds.), *American higher education in the twenty-first century: Social, political, and economic challenges* (pp. 254-278). Baltimore, MD: Johns Hopkins University Press.

Gunzler, D., Chen, T., Wu, P., & Zhang, H. (2013). Introduction to mediation analysis with structural equation modeling. *Shanghai Arch Psychiatry, 25*(6), 390-394.

Healthy Campus 2020. (2018). Retrieved from https://acha.org/healthycampus

Henson, R. K., & Roberts, J. K. (2006). Use of exploratory factor analysis in published research: Common errors and some comment on improved practice. *Educational and Psychological Measurement, 66*(3), 393-416.

Higher Education Act of 1965, Pub. L. No. 89-329, 79 Stat. (1965).

Howell, C. A. (2010). *Relationship of second-year college student wellness behaviors to academic achievement by gender, race/ethnicity, and socioeconomic status.* (Doctoral dissertation). Retrieved from ProQuest https://search.proquest.com/openview/c688823d3a88e191a59694bb6ebbeb8d/1?pq-origsite=gscholar&cbl=18750&diss=y

Hughes, R., Serebryanikova, I., Donaldson, K., & Leveritt, M. (2011). Student food insecurity: The skeleton in the university closet. *Nutrition & Dietetics, 68*, 27-32.

Kelley, K., & Lai, K. (2011). Accuracy in parameter estimation for the root mean square error of approximation: Sample size planning for narrow confidence intervals. *Multivariate Behavioral Research, 46*, 1-32.

Keith, T. (2015). *Multiple regression and beyond: An introduction to multiple regression and structural equation modeling.* New York, NY: Routledge.

Kline, R. B. (2016). *Principles and practice of structural equation modeling.* New York, NY: The Guilford Press.

Knol, L. L., Robb, C. A, McKinley, E. M., & Wood, M. (2017). Food insecurity, self-rated health, and obesity among college students. *American Journal of Health Education, 48*(4), 248-255.

Lindsey, R., Sessoms, E., & Willis, G. (2009). Impact of campus recreational sports facilities and programs on recruitment and retention among African American students: A pilot study. *Recreational Sports Journal, 33,* 25-34.

Lucia, D. (2014). *Yoga and psychological wellness, physical wellness, and subjective well-being.* (Doctoral dissertation). Retrieved from ProQuest https://media.proquest.com/media/pq/classic/doc/3307455941/fmt/ai/rep/NPDF?_s=waJS9Azr23yq05ff4WP6KTSBD5Y%3D

Maroto, M. E., Snelling, A., & Linck, H. (2015). Food insecurity among community college students: Prevalence and association with grade point average. *Community College Journal of Research and Practice, 39*(6), 515-526.

Mercado, V. (2017). *Food and housing insecurity among students at a community college district.* (Doctoral dissertation). Retrieved from ProQuest https://search-proquest.com.proxy.lib.odu.edu/docview/2150116449/?pq-origsite=primo

Miles, R., McBeath, B., Brockett, S., & Sorenson, P. (2016). Prevalence and predictors of social work student food insecurity. *Journal of Social Work Education, 53*(4), 651-663.

Morris, L. M., Smith, S., Davis, J., & Null, D. B. (2016). The prevalence of food security and insecurity among Illinois university students. *Journal of Nutrition Education and Behavior, 48*(6), 376-382.

Morris-Paxton, A. A., Van Lingen, J. M., & Elkonin, D. (2017). An evaluation of health information and wellness priorities among socioeconomically disadvantaged students. *Health Education Journal, 76*(3), 271-281.

Moses, J., Bradley, G. L., & O'Callaghan, F. V. (2016). When college students look after themselves: Self-care practices and well-being. *Journal of Student Affairs Research and Practice, 53*(3), 346-359.

Myrick, J. G., Willoughby, J. F., & Verghese, R. S. (2016). How and why young adults do and do not search for health information: Cognitive and affective factors. *Health Education Journal, 75*(2), 208-219.

National Center for Education Statistics. (2018). *Fast facts: Graduation rates*. Retrieved from https://nces.ed.gov/fastfacts/display.asp?id=40.

National Center for Education Statistics. (2011). *Youth Indicators 2011 America's Youth: Transitions to Adulthood*. Retrieved from https://nces.ed.gov/pubs2012/2012026/chapter2_23.asp

Novak, H., & Johnson, J. J. (2017). Students against hunger: An approach to food insecurity at a large public land grant university. *Journal of Student Affairs*, *26*, 99-107.

Ohio State University (2014). Wellness Assessment.

Old Dominion University (2018). Monarch Wellness Wheel. Retrieved from https://www.odu.edu/life/health-safety/health/monarch-wellness

Owen, T. R. (2002). *Student and employee wellness in higher education: A literature review.* Retrieved from https://eric.ed.gov/?id=ED462051

Patton-Lopez, M. M., Lopez-Cevallos, D. F., Cancel-Tirado, D. I., & Vazquez, L. (2014). Prevalence and correlates of food insecurity among students attending a midsize rural university in Oregon. *Journal of Nutrition Education and Behavior, 46*(3), 209-214.

Payne-Sturges, D. C., Tjaden, A., Caldeira, K. M., & Arria, A. M. (2017). Student hunger on campus: Food insecurity among college students and implications for academic institutions. *American Journal of Health Promotion, 32*(2), 349-354.

Robbins, S., Allen, J., Casillas, A., Akamigbo, A., Saltonstall, M., Campbell, R., Mahoney, E., & Gore, P. (2009). Associations of resource and service utilization, risk level, and college outcomes. *Research in Higher Education*, *50*(1), 101-118. doi 10.1007/s11162-008-9106-7

Silva, M. R., Kleinert, W. L., Sheppard, A. V., Cantrell, K. A., Freeman-Coppadge, D. J., Tsoy, E., Roberts, T., & Pearrow, M. (2017). The relationship between food security, housing stability, and school performance among college students in an urban university. *Journal of College Student Retention: Research, Theory & Practice, 19*(3), 284-299.

Smith, D. G. (2011). The diversity imperative: Moving to the next generation. In P. G. Altbach, P. J. Gumport & R. O. Berdahl (Eds.), *American higher education in the twenty-first century: Social, political, and economic challenges* (pp. 465-490). Baltimore, MD: Johns Hopkins University Press.

Sorokas, K. (2018, March-April). Healthy halls. *Talking Stick, 35*(4), 24-27.

Stewart, S., Doo, H. L., & Kim, J. (2015). Factors influencing college persistence for first-time students. *Journal of Developmental Education, 38*(3), 12-20.

Suicide Prevention Resource Center. (2019). Retrieved from https://www.sprc.org/settings/colleges-universities

Trockel, M. T., Barnes, M. D., & Egget, D. L. (2000). Health-related variables and academic performance among first-year college students: Implications for sleep and other behaviors. *Journal of American College Health, 49*, 125-131.

United States Department of Agriculture. (2018). *Definitions of food insecurity*. Retrieved from https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/definitions-of-food-security.

United States Department of Agriculture. (2018). *History & background*. Retrieved from https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/history-background/.

United States Department of Agriculture. (2012, September). *U.S. household food security survey module: Six-item short form*. Retrieved from https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/survey-tools/.

White, C. (2011). Access without support is not opportunity – But stop singling them out! *Journal of the Australia and New Zealand Student Services Association*, *37*, (April), 1–8.

Wolf, E. J., Harrington, K. M., Clark, S. L., & Miller, M. W. (2013). Sample size requirements for structural equation models: An evaluation of power, bias, and solution propriety. *Educational and Psychological Measurement, 76*(6), 913-934.

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Assistant Director, Outdoor Adventure Program, ODU — March 2011 – March 2013
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Event Specialist, Activities, New Jersey — August 2006 – August 2008
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"Building Collaborations", NIRSA School of Collegiate Recreation, May 2019

"Equity, Diversity, and Inclusion in Higher Education Policies", NIRSA School of Collegiate Recreation, June 2018

"Leveraging Outdoor Recreation to Serve the Bigger Picture", NIRSA National Conference, April 2016

"Evolving Entrepreneurialism through Campus Bike Share", AORE National Conference, November 2015

"Talking Trends: The Future of Recreation and Wellness", NIRSA Region 11 Conference, October 2014

"The Perfect Fit", NIRSA National Conference, April 2014

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