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ASSESSMENT OF THE CAMPUS FOOD ENVIRONMENT USING COMPONENTS OF THE HEALTHY CAMPUS ENVIRONMENTAL AUDIT

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by

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ASSESSMENT OF THE CAMPUS FOOD ENVIRONMENT USING COMPONENTS OF THE HEALTHY CAMPUS ENVIRONMENTAL AUDIT

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The objective of this study was to assess whether the food environment at the University of Nebraska-Lincoln (UNL) campuses supports healthy eating behaviors using components of the Healthy Campus Environmental Audit (vending, dining, and convenience store audits). Secondary aims were to compare the UNL food environment to other regional college campuses and explore whether there are existing health promotion and obesity prevention initiatives, programs, pledges and/or policies at UNL.

Research team members accessed a secure online website to review training materials prepared by Syracuse University before data collection. All evaluators did practice trials of the audits to meet inter-rater reliability (IRR) score standards (>80%). When IRR was met, audits were conducted at designated sites and data were entered into Qualtrics. Data collection took place during 2015-2016 on and within a 1.5-mile radius of the UNL City and East campus boundary. The lead researcher at Syracuse University provided comparisons to other institutions, who were participating members of the NC1193 multi-state research group.

Analysis for the dining environmental audit included nonparametric statistics, fisher's LSD post hoc statistics, and confirmatory factor analysis. The convenience store audit used latent class analysis. Dining and convenience store audits were analyzed with

inter-class correlations (ICC) and ANOVA. The vending audit was analyzed with the Health Density Vending Machine Audit Tool snack scores (range 6-24) and beverage scores (range 6-20). The policy audit utilized a 3-point semantic differential scale to assess each policy topic (range 0-2). Statistical significance was set at $p<0.05$.

At UNL, dining halls/cafeterias had healthier foods and supports compared to fast food and sit-down venues, most convenience stores fell into the least healthy classification range (56%), and most initiatives/programs and/or policies that support healthy food environments were scored above average. In comparison to other institutions, only vending machines scored more healthfully on average compared to the total institution mean. All food environment types could benefit from positive environmental modifications. Evaluating college campuses through ongoing food environment and policy audits may provide a better understanding of the environment and lead to more informed and effective obesity prevention strategies in this setting.

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CHAPTER ONE
INTRODUCTION

Over the course of United States (US) college history, various concerns have been addressed regarding the student population. Although college student behaviors related to sex, drugs, and alcohol have been well-studied, college campuses face additional emerging concerns related to healthy lifestyle patterns.[1] According to the National College Health Assessment (NCHA), about 1 in 4 US college students are overweight, and 1 in 7 are obese.[2] The NCHA is organized by the American College Health Association (ACHA), whose mission is "to serve as the principal leadership organization for advancing the health of college students and campus communities through advocacy, education, and research."[3]

The transition to college can affect young adults not only on emotional and mental levels, but on a physical level as well. The college setting tends to be a place where many are susceptible to weight gain.[4,5,6,7] Although interventions have been conducted, there has been little progress in reducing and/or preventing obesity in college students.[1] Many factors that may contribute to student weight gain include academic stressors, changes in peer and/or family networks, various social pressures, and the college campus food environment.[6] Researchers have noted that the college campus food environment is densely populated with cheap, flavorful, large portioned, and high caloric items. These negative environmental supports may be contributing to unhealthy food behaviors and ultimately weight gain during this vulnerable time in young adult lives.[1]

To compound this issue, other studies suggest that there is an association between younger adulthood and older adulthood body weights.[8,9] College students are not only at risk of becoming overweight or obese, but also developing obesity-related disorders, such as hypertension, dyslipidemia, and Type Two Diabetes Mellitus. In the past twenty years, there has been a significant rise of persons in their teenage and young adult years developing these types of diseases.[1]

US college campuses have addressed this issue in recent years using different efforts. Common on-campus attempts focus on educational initiatives that incorporate healthy living into the curriculum in formal and informal settings.[1] These efforts may show benefits, but many may not pose as long-term solutions. According to the Institute of Medicine of the National Academies (IOM), because there are numerous influences stemming from the social, cultural, and physical environment, it is unrealistic to expect people to make sound health-related behavior changes when external forces do not align with such changes.[10] Addressing the food environment as a whole using a Policy, Systems, and Environmental (PSE) approach may better lead to lasting health improvements compared to educational approaches that target individual behavior change alone.[10]

A PSE strategy is a multi-sector, evidenced-based community effort that establishes and implements a systemic change to maximize long-term public health.[11] An obesity prevention PSE approach would focus on modifying external factors to promote healthy options for everyone in a community.[11] In a college setting, an example may be, the implementation of new policies that would ensure improvement in dining hall

selections, vending machine options, and/or convenience store items. A significant advantage to this approach includes the strengthening of public-to-private partnerships and communal engagements grounded in cultural and social assets.[10] Although, implementing a PSE change can be complicated and time extensive, it is not impossible to overcome common barriers, such as lack of external funding or various legal formalities.[12] These barriers can be overcome most notably by strengthening existing partnerships within a system.[12] Before executing a PSE change in any setting, the community must be equipped with current data reflecting the present environment.

Measuring external supports is necessary to provide informed guidance and direction of needed efforts. A gold standard approach for assessing the food environment is through a detailed audit that includes an extensive collection of objective assessments to detect environmental aids for obesity prevention and health promotion. Assessments should focus on the most crucial, evidenced-based factors that may persuade consumer behavior including health promotion, physical activity education, environmental infrastructure and food/dining culture. Not all environmental audits are this detailed. On the other end of the assessment spectrum, there are more simplified tools consisting of a checklist, which can offer a quick scan of healthy food choices and supports.

As part of a larger multi-state research effort, the Healthy Campus Environmental Audit (HCEA) assesses cafeteria/restaurants, convenience stores, vending, recreation programs/ facilities, walkability/bike-ability, and initiatives and policies. The University of Nebraska-Lincoln (UNL) took part in this environmental assessment project over the

past three years. The food-related environmental audits (vending, cafeteria/restaurants, and convenience stores) and the policy audit will be the focus of this study.

Currently, a gap in the literature exists among promising interventions that reduce college obesity prevalence. This project will propose the usage of vending, dining, and convenience store environmental audits as a way to first understand the food environment before developing and implementing obesity solutions in the college setting. The following will be analyzed: 1. The degree to which UNL's food environment supports healthy eating behaviors using components of HCEA; 2. UNL's food environment compared to other regional universities; and 3. An evaluation of existing health promotion and obesity prevention initiatives, programs, pledges and/or policies on the UNL campus.

CHAPTER TWO
LITERATURE REVIEW

Early adulthood has been identified as a high risk period for weight gain, body fat accumulation, and potential obesity.[13] Studies indicate that weight gain leading to overweight status or obesity not only affect young adults but especially those attending college.[14,15] Degree seeking students are shown to gain significantly more weight than age-matched peers not attending a college or university.[16,17] One study showed that both males and females gain an average of almost 8 pounds during their first year of college.[6] A different study found that, over a four year period, males gained an average of 15 pounds, while females gained 9.3 pounds.[7] This weight gain may appear insignificant, but these increases may contribute to many individuals falling into higher Body Mass Index (BMI) categories over time. Among 95,761 college students participating in the Spring 2016 NCHA, 22.9% were identified as overweight and 13.9% as obese.[2] To complicate matters, college students who are overweight or obese may be at a higher risk for developing certain chronic diseases such as, Type 2 Diabetes or dyslipidemia.[18]

Potential factors that contribute to college student weight gain include academic stressors, changes in peer and/or family networks, various social pressures, and the college campus food environment. Obesogenic environmental influences [abundance of high calorie, large portioned, and generally inexpensive unhealthy food items][1] especially increase the likelihood of college weight gain.[19] The typical college student consumes a diet high in fat, sugar, and sodium, but low in valuable nutrients.[20] One study found that one fifth of college weight gain is associated with all-you-can-eat college meal plans, excessive snacking, and the consumption of junk food.[19]

The literature indicates there are two staple techniques for addressing unhealthy eating behaviors among the college age population. Campuses have modified the external environment or used direct educational initiatives to encourage individual behavior change. Therefore, this literature review organizes interventions into two categories: environmental and direct education. This allows for a comparison of the effectiveness of each approach. Before specific interventions were analyzed, educational and environmental research were reviewed to clarify the direction of these tested strategies. (Table 1.)

Areas of Research that Support the Usage of an Educational Intervention

Many researchers have closely linked individual characteristics with eating behaviors. These characteristics indicate the areas where direct educational measures could be effectively integrated. Traits that have been associated with positive or negative eating patterns include race, gender, social influences, dietary knowledge, living arrangements, stress levels, sleeping patterns, and exercise routines.

Race, Gender, Social Influences, & Stress Levels

Research has shown that food selection and health behavior motivation tends to vary among genders, ethnicities and social groups. One study showed that white students, particularly females, were more likely to avoid a food item if it was low in nutritional value, while, males and other races were significantly more likely to avoid a food item based on its cost, inconvenience, or taste.[21] Students were also asked to name the element that caused a food item to be considered unhealthy. There was no statistical difference

among races and their answers. Almost 46% identified the leading determinant of unhealthy foods with high fat content, while, 27.4% accredited high caloric values.[21] A small number of students attributed high sugar or sodium content, although males were more likely to include high sodium content.[21] This study did not control for income or BMI level and contained more females (61%) than male participants and more whites (71.6%) than other races. [21]Another study found males consumed more fruits, vegetables, fiber, fat and fast food compared to females, but females were more likely to consider the caloric content before making food selections, read nutrition facts labels, and eat breakfast more consistently compared to males.[22] Women not only tended to choose lower calorie items, but also lower priced meals when calorie information was provided, while men's selections were unaffected, a similar study reported.[23] Authors Graham and Laska found that all students who frequently read nutrition facts labels had healthier eating behaviors compared to those who rarely or never observed food labels.[24]

Social influence was also found to play a part in maintaining healthy habits. In one study, females reported receiving more positive support in maintaining healthy eating and exercise habits compared to males.[25] Females with a male dominant peer group received significantly higher levels of encouragement about their healthy lifestyle, but received more criticism about exercise routines.[25] Males with a female dominant peer group received higher levels of support for healthy habits.[25] Regardless of social support, one study found over a seven semester progression, students' daily vegetable and fruit consumption declined over time and living off campus intensified this behavior.[26] Another study suggested that unhealthful food selections may coincide with stress levels

because healthy purchases and selections decreased by 4% in the last two weeks of the semester.[27]

Dietary Knowledge and Sleeping Patterns

Dietary knowledge and sleeping patterns in relationship to eating behaviors have also been examined. Authors, Walters and Long, found that female students studying nutrition were more likely to look at the ingredients list to determine the health of a food item.[28] In contrast, non-nutrition female majors were more likely to observe marketing labels such as "all-natural" on a package to make inferences about product health.[28] Increased knowledge of the dietary guidelines was also related to an increased likelihood of meeting recommendations for fruit, dairy, protein, and whole grains in college students.[29] This association was found from a college survey based on the MyPyramid Food Guidance System and the US Department of Agriculture Diet and Health Knowledge Survey. Scores were derived from the student's ability to identify correct serving recommendation of each food group based on their own demographic information, physical activity level, and level of importance they reported on healthy eating. As increased dietary knowledge shows a positive impact on eating behaviors, good sleeping patterns may have a similar correlation. A study observed that good sleeping patterns instill a higher eating competence, whereas overweight status was associated with poor sleep quality and low eating competence.[30] A good sleeping pattern was defined as getting more than seven hours of sleep each night and report of minimal sleep disturbances and daytime tiredness over a month-long period.[30]

Living Arrangements and Exercise Routines

Some research suggests that living arrangements impact students' health behaviors. Brunt and Rhee found that off-campus students were more likely to be overweight or obese than those who lived on campus or with parents.[31] Overall, it was found that on-campus residents consumed a larger variety of food.[31] However, access to variety may not equate with meeting recommended quantities of nutrients. One analysis that surveyed students living on campus found that the average college student only eats about 1 cup of fruit, 1.5 cups of vegetables, and 1.4 ounces of whole grain per day.[32] Findings also showed that students were only consuming half of the recommended fiber levels, and exceeding sodium level intake.[32]

Accessibility to a variety of foods is one element of the environment, whereas portion control pertains to the individual. Some research suggests that certain factors, such as the influence of exercise, may influence food consumption. In one study, researchers invited students to an ice cream social to examine this relationship. Regular exercisers (RE) consumed about 20% more ice cream than non-regular exercisers (NRE).[33] More RE compared to NRE reported that they tend to eat more on days that they exercise, their portions are affected by dishware size, and they monitor how much they eat.[33] Those who exercised the day of also were more likely to report answers similarly to RE compared to the NRE. [33] More NRE reported that they were more likely to eat until reaching the bottom of the bowl compared to RE.[33] Participants who exercised the day of the ice cream social ate 13.4% more than those who did not exercise that day.[33]

Educational Interventions Implemented on College Campuses

There were nine dietary interventions reviewed and each of them posed comparable methods to address obesity in the college population. Methodologies involved direct education provided online, on a mobile device, or in-person. They consisted of sample sizes ranging from 22 to 1689 participants with a median of 140 participants. The duration of the interventions took place over a period of 1 day to 32 weeks with a median of 12 weeks.

Online or Mobile Access Approach

The first online intervention aimed to increase knowledge of nutrition facts labels in a way that provided students with practice and repetition, followed by feedback about accuracy. Participants could complete the online training in one sitting, typically in 60-90 minutes. Researchers found that those with prior label reading skills achieved higher scores.[34] No data was reported on whether these students used label reading skills outside the intervention. The next online approach focused on increasing dairy intake through nutrition education over an 8-week period, with participants randomly assigned to an intervention or comparison group. The intervention group received online information on the importance of consuming dairy throughout young adulthood, ways to increase dairy, recommended servings per day to meet calcium needs, dairy offerings on campus, and how to make healthier dairy purchases based on reading food labels. The comparison group received education on stress management. The intervention group consumed significantly higher amounts of dairy servings per day and made efforts to increase low-fat dairy products compared to the control group.[35]

Researchers, Brown, O'Conner, and Savaiano used text messaging as a way to provide and promote fruit and vegetable consumption. For seven weeks, the intervention group received two similar texts each week about the "seven behavior-directed motivational Dietary Guideline messages."[36] These researchers had no way to control who viewed the text messages or monitor if they were viewed at all. The control group was given a brochure at the beginning of the intervention that contained the same motivational dietary messages as the intervention group received through text message over a seven-week period. During the study period, there was elevated fruit consumption with a trend toward increased vegetable consumption in the intervention group.[36]

Online Weight Management Courses

The following interventions occurred online but were specifically marketed as weight management programs that targeted interested individuals. The first study included facilitator-led weekly chat meetings, daily food journaling, exercise recommendations, and calorie and fat gram guidance over a 12-week period. Overweight/obese individuals lost an average of 5.1 ± 6.0 pounds.[37] Normal weighted participants lost an average of 1.8 ± 3.2 pounds and 23% of total participants lost more than 5% of their baseline body weight.[37] The next study was a randomized controlled trial that took place over three months with a follow up at fifteen months. A control and treatment group completed online questionnaires regarding fruit and vegetable intake and physical activity as well as participated in on-site physical assessments of anthropometric and cardiorespiratory fitness.[38] The treatment group received a 10-lesson nutrition intervention emphasizing physical activity and healthy eating patterns that included

eating competence and size acceptance. Results indicated the treatment group had significantly higher vegetable and fruit consumption (+.5 cups/day) and physical activity participation (+270 metabolic equivalent minutes per week) compared to control.[38] Those who completed the study weighed less on average compared to those who failed to complete the study at baseline.

In-Person Approaches

The next four studies took an in-person nutrition education approach that covered general nutrition, intuitive eating, and food and society issues. The studies examined whether increased knowledge in these course topics correlated with improved self-reported eating behaviors. The first intervention explored the impact of fruit and vegetable consumption from a five-month general nutrition course. Post-class, participants significantly increased consumption of total fruits and vegetables, and there was a significant decrease in French fry intake.[39] This data was deduced from a pretest/posttest dietary intake assessment, specifically a three-day dietary recall, consisting of two weekdays and one weekend day report. The same researchers conducted a similar study, except this course emphasized whole grain consumption and disease prevention. After 16 weeks, average whole grain consumption increased from 0.37 ounces to 1.16 ounces per student.[40] Training was provided throughout the course to help students identify whole grain products. For both studies, no follow-up assessments occurred; therefore, it is unknown if students continued to consume more fruits, vegetables, and whole grain products compared to baseline.

The next study analyzed health behavior modifications resulting from increased knowledge on food and society issues. Dietary intakes of study participants were compared with other students enrolled in human biology courses. The food and society course specifically addressed environmental sustainability, animal rights, social justice, labor rights, cultural movements, and agricultural reform. After the semester long class ended, results showed greatest improvements in vegetable intake and lower amounts of high-fat dairy relative to comparison groups.[41] The last study focused on the idea of Health at Every Size (HAES) in an effort to improve intuitive eating, body esteem, cognitive behavioral dieting scores, and anti-fat attitudes. The course curriculum addressed the "physical, social, psychological, and economical impact of the diet industry on individuals and society."[42] This class also involved multiple guest speakers who shared their personal experiences of overcoming disordered eating and negative body image. Improvements were found in all four categories: intuitive eating, body esteem, cognitive behavioral dieting scores, and anti-fat attitudes according to pre-test/post-test results.[42] After these two intervention periods, it is unknown whether these students had similar eating behaviors and attitudes toward food and society and HAES principles due to the lack of follow-up assessments.

Areas that Support the Usage of an Environmental Intervention

Some researchers have identified problems within the college food environment that require external modifications rather than increasing individual knowledge. These external issues indicate the areas where environmental changes could be effectively integrated. Multiple factors were correlated with an environmental change including the

frequency of purchasing patterns, food availability, meal plan options, dining area stimuli, and nutrition information displays.

The Frequency of Purchasing Patterns and Food Options

This area of research evaluated the prevalence of on-campus food purchasing and food option availability with unhealthy eating habits. Frequent food and/or beverage purchasing around campus was associated with unhealthier habits, including not eating breakfast and consuming higher amounts of fat and sugar.[43] In this study, approximately 45% (n=477) of students purchased food and/or beverages from at least one campus area venue at least three times per week.[43] Researchers deduced that bringing food from home was associated with healthier dietary patterns from related responses gathered from the survey data. A similar study found that unhealthy snack options offered at cafeterias or dining halls increased over four semesters.[27]

Meal Plan Options and Dining Area Stimuli

Previous research suggests that meal plan selection can make an impact on the health of the student. Dining area accommodations, such as plate size option and audio stimulus were also evaluated in its relationship to eating behavior. Students with higher "flex dollar accounts" (dollars that can be spent in dining halls or specific on and off campus fast food restaurants) ate more fast food than other students with meals plans that had less flex dollars.[44] Students who were more health conscious did not purchase as many meals from fast food restaurants with their flex dollars.[44] Health consciousness was based off of student responses from a short questionnaire where each statement was rated

from 0 “not at all like me,” to 3 “exactly like me.”[44] An example statement includes, “I try to monitor the number of calories I eat in a day.”[44] This study did not analyze the specific food item purchases made at fast food restaurants nor the selections made at the dining halls, rather only made inferences about food choices based on dining location. In a similar article, students who had unlimited-access plans consumed more fat than students with no meal plans, but also consumed more fruits, vegetables, and dairy products compared to point-plan students.[45] Regardless of meal plan option, no student in this study met the US Department of Agriculture (USDA) guidelines for dairy, fruit, and vegetable intake.[45]

Meal plans also involve a dining experience that is oftentimes overlooked, such as the auditory environment. De Castro and Stoebele found that students consumed a higher food and fluid intake and engaged in a longer meal duration with the presence of music.[46] Neither the volume nor speed of music was associated with more or less intake, although, different variables such as time of day or the number of people present were likely to affect this stimulus.[46] Plate size may also influence the amount of food consumed. A study discussed earlier showed that students self-served greater amounts (13% more) of ice cream when given a 12-ounce bowl versus an 8-ounce bowl.[33] Students with 12-ounce bowls also consumed about 14% more ice cream than those with 8-ounce bowls amounting to 33 more calories.[33] Similarly, another study found that when students were asked to draw a typical meal on paper plates, 26% more food was drawn on a 11-inch paper plate compared to a 9-inch plate.[47]

Nutrition Information Displays

Studies have also focused on the effects of calorie information or exercise equivalent displays and their impact on item selection. One study compared groups that received calorie information compared to absent information. Students were more likely to select lower calorie foods when calorie displays were given, especially if students were female and had higher levels of subjective nutrition knowledge.[48] Another research project randomized participants into three groups (the same menu with either a no-label, calorie-label, or exercise-label next to each food item). The results showed the exercise-label was associated with students ordering and consuming significantly less compared to the no-label group but not to the calorie-label group.[49] The calorie-label and no-label group did not significantly differ on purchase selection.[49]

Environmental Interventions Implemented on College Campuses

There were four dietary interventions reviewed that posed potential strategies to address environmental influences on college obesity. They involved providing dietary information in dining or store areas to motivate healthier choice selection. Three articles included sample sizes ranging from 16 to 636 participants. The last study discussed did not include an exact sample size, although 3,300 or more students could have been included in the study because of access to an on-campus convenience store. The durations took place over a period of 9 days to 9 months with a median of 9 weeks.

Student Perspectives on Nutrition Information Availability

Two studies analyzed the effects of healthy environmental supports and the influence on students' food decisions. The first study separated students into groups, regularly exposing one group to nutrition labels and not to the other. The goal was to measure the degree to which labels were used. Results indicated that college aged persons are interested in being provided with nutrition labels to use as a resource on campus.[50] Nutrition labels were usually noticed and often played a role in making food purchase decisions, as was price and convenience of the item.[50] Calories and fat appeared to be what most students noticed.[50] The second study explored the influence of healthy food advertisements in the form of large displays, table tents, and colorful photographs located in a dining hall. Advertisements were displayed for three weeks and student awareness was analyzed through a pre/post-survey design. Results showed that over 20% of participants reported an increased awareness of food availability.[51] Data showed significant increases in cottage cheese, low-fat salad dressing, and fruit consumption during and post-intervention.[51]

Point of Purchase Displays

The two other articles discussed the impact of point of decision messages. The first study displayed 35 healthy messages on a screen in a dining hall between the cookie and fruit station to see its effect on fruit consumption. A significant mean difference in daily fruit consumption was found nine days post-baseline.[52] During the intervention, the daily consumption of fruit significantly increased.[52] Approximately 71% of women and 68% of men noticed the "point of decision" messages.[52] However, women (19%) were

more likely to modify their food selection as a result of seeing messages compared to men (10%).[52] After the nine day intervention, it is not known if these messages continued, and no follow-up data was provided.

The second study took place in an on-campus convenience store. Food sales were recorded for the first six weeks. Then for the next five weeks, "Eat Smart Program" materials were placed directly beneath tagged food items, as well as free brochures at the checkout counters. Items were tagged if they were deemed as healthy by the Eat Smart nutrient criteria. For example, tagged items in the cereal category had at least 3 grams of fiber and no more than 5 grams of fat per serving. Although numerous foods were available for purchase, only four healthy categories were tagged because these items were frequently purchased and had identical prices. The categories tagged included cereal, soup, crackers and bread. Follow-up data showed that after the five-week intervention period, there were increased sales of the tagged items in the cereal, soup, and cracker categories, while bread sales decreased.[53] The study concluded that this type of advertising may promote healthful food choices among college students.

Summary

There were thirty-three articles reviewed in total. Twenty-two studies reflected research and interventions that supported the need for behavior change to occur from a direct educational measure. The other thirteen articles promoted the need for factors in the environment to motivate behavior change. Two studies occurred in both categories. A summary of the findings is described below.

Areas that Support the Usage of an Educational Intervention

Articles discussed above on race, gender, social influences, dietary knowledge, living arrangements, stress levels, sleeping patterns, and exercise routines involved a solution that required a direct educational measure. This approach would rely on the individual to implement lasting behavior change based on knowledge obtained. Non-Caucasian races and some white males were influenced to decrease consumption of certain foods based on factors other than nutrition. Women consumed less fruits, vegetables and fiber compared to men, but males were more likely to skip breakfast, not use nutrition labels, and consume high fat items including fast food. Men and women who have heterogeneous peer groups tend to offer more social support of healthy behaviors to each other. As students advance in their college careers, they tend to make unhealthier dietary choices, especially around stressful times, such as the end of the semester. Non-nutrition majors may need more label reading education compared to nutrition majors. Similarly, those with a better understanding of the dietary guidelines tend to eat nutritious foods more often. Healthy sleeping patterns are associated with students who have a good relationship with food. Regardless of living arrangements, all students may benefit from reminders on daily fruit and vegetable serving recommendations. Regular and non-regular exercisers may benefit from education pertaining to portion control and usage of smaller dishware.

Educational Interventions Implemented on College Campuses

Colleges appear to offer broader nutrition education to larger groups of people rather than targeting individuals by their specific needs. It is likely that campuses utilize

this approach to ensure a wider reach. All interventions reviewed were implemented on a one-time basis and eight of the nine studies lacked a follow-up period. Only two out of the nine studies were grounded in theory, specifically the social cognitive theory, whereas the remainder were based on exploratory research. In addition, much of the research collected was limited to the reliance upon self-reported data and convenience sample usage that mainly included students who were interested in nutrition and/or weight loss and; therefore, may have been biased. Many of the participants were female, Caucasian, and educated. Another common theme was a high participation dropout rate, which may have skewed the data.

Areas that Support the Usage of an Environmental Intervention

Articles discussed above on the frequency of purchasing patterns, food availability, meal plan options, dining area stimuli, and nutrition information displays involved a solution that required an environmental measure. Implementing environmental interventions would require a college campus to support and advocate healthy eating behaviors through the application of an environmental change. A structural, lasting change would likely require faculty, community, and environmental supports. Bringing food from home rather than purchasing food on campus was associated with healthier eating behaviors; thus, efforts to increase healthier food options may need to be a focus of campus initiatives. The types of snack and cafeteria items purchased became increasingly unhealthier as the semester progressed. Although students with more flexible meal plans consumed more fast food and dietary fat, restricted plans - such as point meal plans - may discourage healthy food intake. The lack of music in a dining room and use of smaller

plates were associated with healthier eating behaviors. Access to nutrition information including caloric amounts and exercise equivalents helped students make healthier decisions.

Environmental Interventions Implemented on College Campuses

The interventions reviewed showed that campuses were mainly focused on offering nutrition information or calorie displays in dining areas and at the point-of-purchase. These approaches may be common because of implementation ease, low-cost, time effectiveness, and appreciation by individuals using these facilities. All interventions were implemented on a one-time basis and three of the four studies lacked a follow-up assessment. All four studies were based on exploratory research. In addition, much of the research collected was limited to a short duration of intervention, self-reported data, small sample size, potentially confounding factors, and convenience sample usage. In one study, there were more female participants than males. These studies also did not account for social desirability of food, which may have been a factor in a participant's choices and/or purchases.

Conclusion

The research presented comprised many promising techniques that could be incorporated on campuses to lessen weight gain in young adult populations. Strengths of literature reviewed included the use of validated dietary assessment tools, providing inexpensive means to increase positive health behaviors, and considering consumer preferences. Along with these strengths, there were also shortcomings. The interventions

employed demonstrated small-scale positive results over a short-term period. Longer examinations that include follow-up assessments need to be conducted to examine long-term impacts. The interventions did not consistently utilize available research to target certain groups of persons or to maximize potential outcomes.

There were numerous articles supporting the need for educational interventions to make an impact on the individual level, but few addressed a need for a more systemic and environmental change. According to the McKinsey Global Institute, direct education and personal responsibility are helpful components of any weight management program, but are not sufficient on their own and more efforts need to target the "environment and societal norms."[54] Furthermore, recent evidence suggests that complex public health concerns can be effectively confronted by using PSE approaches that reinforce health behaviors on a population level.[12] PSE strategies are known to have aided tobacco prevention and decrease smoking prevalence by utilizing taxes and smoke-free air laws.[12] Before executing a food-based PSE change in any setting, the community must be equipped with current data reflecting the present food environment.

Measuring external food supports allows for investments and targets to be made at the core problem(s). A gold standard approach for assessing the food environment is through a comprehensive audit that includes a collection of objective assessments to detect environmental aids for obesity prevention and health promotion. Although literature was found on direct education and environmental interventions that target college weight-gain and obesity, minimal data exist on the long-term success of these strategies. The usage of an environmental audit can serve as a first step to understand the

food environment before developing and implementing possible obesity solutions in a college campus setting.

CHAPTER THREE
METHODOLOGY

Study Design

Syracuse University was the lead institution who developed the HCEA in 2008 and refined it in 2014. A regional research group consisting of fifteen states, including Nebraska, enhanced the HCEA analysis by evaluating their own campuses using the series of comprehensive audits. Each food environment and policy audit was reviewed by experts, pilot-tested, and had acceptable inter-rater reliability (IRR). Institution Review Board deemed all aspects of this study to be Exempt. Audits are continuing to be validated. City and East Campus were included for UNL results. Comparative results came from participating institutions that were members of the NC1193 multi-state research group and participated in these evaluations. The lead researcher from Syracuse University worked with a statistician at her institution to develop appropriate methodology and analysis of the results; therefore, the same analysis was used for UNL data. Level of statistical significance was set at $p<0.05$. The following audits were examined:

Food Environment Audits

- The Full Restaurant Evaluation Supporting a Healthy (FRESH) Dining Environment Audit evaluates the food and preparation descriptions to determine healthfulness of menu items and the availability/extensiveness of other supports for making healthy decisions in dining establishments of many kinds.
    - Observing UNL data and comparing results to 14 other states.
- The Convenience Store Supporting Healthy Environment for Life-promoting Food (SHELF) Audit evaluates the presence of healthier foods and the

availability/extensiveness of other environmental supports for making healthy food purchasing decisions in the food store environment.

  - Observing UNL data and comparing results to 14 other states.

- Healthfulness VENDING Evaluation for Nutrient-Density (VENDING) Audit evaluates the nutrient density healthfulness and the availability of environmental supports for making healthy vending purchase decisions.
  - Observing UNL data and comparing results to 11 other states.

Policy Audit

- Healthy Environment Policies, Opportunities, Initiatives and Notable Topics Survey (POINTS) Audit evaluates the extensiveness and quality of existing health promotion or obesity prevention initiatives, programs, pledges and/or policies on a campus.
  - Only observing UNL data.

Food Environmental Audit Procedures (FRESH, SHELF, and VENDING)

Across all three audits, the following procedures were used. A campus research team was established consisting of evaluators and one team leader who organized all activities. All team members were required to access a secure online website to review written instructions and training videos prepared by Syracuse University prior to data collection. Venue selection was done by the collective campus research team that represented at least 30% of each venue type on and within a 1.5-mile radius of the campus boundary. Student evaluators practiced the audit on 2-3 establishments/vending machines before online data submission. A practice trial operated as such: one location was selected by the team and each evaluator independently assessed the same environment within a 24-hour period. The team leader assessed the practice trials until all evaluators reached an IRR score no less than 80% (a consistency of answers). Once IRR

was met, data collection could begin. A PDF version of the survey was printed off for each establishment visited and for each evaluator. Once the survey was completed, information gathered was entered into Qualtrics (Qualtrics Labs Inc., Provo, UT, Version 2015) by the evaluator.

FRESH Audit

To begin the audit, the evaluator completed a series of general questions including, evaluator name, date and time of evaluation, audit type, state, environment type, organization name, campus location (on or off), establishment type, venue organization, facility name, zip code, average number of hours open per day, data entry location, and facility ID number. An enumeration sheet was used as a tracking document with each venue identified by a facility ID number, which consisted of venue structure, type, location, and the number evaluated. Dining venue structure included free-standing, dining hall, and food court (Table 2.). Dining venues included fast food/cafe, sit-down restaurant, delivery, dining hall/cafeteria/buffet (Table 3.). Prior to visiting each establishment, it was advised by the training materials to look up menu options online for nutrient information and answers to other questions as applicable. All evaluators brought a letter to each manager describing the research project with the team leader's contact information included.

Scoring and Analysis

This audit was composed of 31 questions (excluding general questions) with criterion scored using a five-point semantic-differential scale ranging from limited to extensive healthfulness or environmental support/evidence. A score of 1 indicated the

unhealthiest option or limited environmental support for making healthy decisions, while 5 represented the healthiest option or the highest level of environmental support for making healthy decisions. The extensive range of questions are listed in Table 4. The types of questions and an example of the scoring are provided in Table 5. Question 2 in Table 5 provides an example of further instructions listed for clarity for the evaluator. Twelve out of the thirty questions listed further instructions. Data analysis included using confirmatory factor analysis, inter-class correlations (ICC) for IRR, and non-parametric statistics and ANOVA with Fisher's LSD post hoc statistics.

SHELF Audit

As with the previous audit described, the evaluator first completed a series of general questions (e.g. evaluator name, date and time facility evaluated, institution name, facility address, type and name, environment type, campus location, data entry location, and facility ID number). An enumeration sheet was used as a tracking document for each venue evaluated with a facility ID number, which consisted of venue structure, venue type, location, and the number evaluated. Convenience venues included minimart/convenience store, drug store, dollar/discount store, bodega/corner store, and food cart (Table 6.). Prior to visiting establishments, training materials advised evaluators to look up store item options online for nutrient information and answers to other questions as appropriate. All evaluators brought a letter to each manager describing the research project with the team leader's contact information included.

Scoring and Analysis

This audit was composed of 21 questions (excluding general questions) with criterion scored using a five-point semantic-differential scale ranging from limited to extensive healthfulness or environmental support/evidence. A score of 1 indicated the unhealthiest option or limited environmental support for making healthy decisions, while 5 represented the healthiest option or the highest level of environmental support for making healthy decisions. The extensive range of questions are listed in Table 7. The types of questions and an example of the scoring are provided in Table 8. Question 2 in Table 8 provides an example of further instructions listed for clarity for the evaluator. Fourteen of the twenty questions listed further instructions. Data analysis included usage of ICC, Latent class analysis and ANOVA.

VENDING Audit

To begin the audit, the evaluator completed general questions including, evaluator name, time evaluated, audit type, state, environment type, organization name, building name and type, data entry location, and machine ID number. An enumeration sheet was used as a tracking document to keep track of machines evaluated with a facility ID number. Building structure included residential, recreation facility, academic, library, manufacturing, office, shopping, and outside. Vending machine types included snack, beverage, prepared food, and mixed. Training materials directed evaluators to assess vending machines with the highest flow of student traffic and to evaluate at least one snack machine and one beverage machine per building. Photographs were taken of machine contents to allow the evaluator to complete the assessment at another time. It was suggested that the evaluator check the photographs to ensure that the product name,

label, package size, and price were visible. Closer pictures were taken if one of these factors were not clear.

Scoring and Analysis

This audit was composed of 25 questions with criterion scored using a novel nutrient-density scoring system. The range of questions are listed in Table 9. Snack and beverage item scores were predetermined and categorized by healthfulness based on analyses conducted by the lead researchers at Syracuse University. Snack scores were between 1 to 7, whereas beverage scores were between 0 to 2. Healthy snack scores received a score of 5, 6, or 7, while unhealthy snack scores had a score of 2, 1, or 0 (Table 10.). Healthy beverages equaled a score of 2, while unhealthy beverages equaled a score of 0. Each category had a list of snacks or beverages that were evaluated if present in the machine. Many items from each category were not evaluated due to not being present in the machines. If a snack or beverage was found in the machine but not on the survey, the evaluator listed the snack item name, brand, size, and price in the "unlisted snack list" table. The survey also composed a snack/beverage price analysis, which required the evaluator to select three healthy snacks (healthy dense snack score ≥ 5) and beverages (healthy dense beverage score = 2) and compare them to three unhealthy snacks (unhealthy dense snack score ≤ 2) and beverages (unhealthy dense beverage score = 0) of comparable type and package/bottle size. Data analysis included usage of the Health Density VENDING Machine Audit Tool (HDVMAT) snack scores (range 6-24) and HDVMAT beverage scores (range 6-20), which are comprised of the weighted average nutrient-density VENDING machine snack or beverage score plus the scores for

machine accessibility, pricing, and promotion for all snack or beverage machines within a building.

POINTS Audit Procedures

Student evaluators were required to access a secure online website to review written instructions and training videos prepared by Syracuse University before collecting data. After training was completed, the evaluators did a practice trial of the audit on Yale University. Practice trials were reviewed to ensure an IRR score no less than 80% was met. Once IRR was met, data collection for UNL began. Once the survey was completed, the information gathered was entered into Qualtrics (Qualtrics Labs Inc., Provo, UT, Version 2015) by the evaluator. To begin the audit, the evaluators completed a series of general questions including, evaluator name, date audit was completed, audit type, estimated time spent doing online data collection, collecting evidence, scoring each topic, entering the data into Qualtrics, state evaluated, campus type, campus name, zip code, and campus population size. Next, evaluators searched the campus policy database or PDF version of the campus policy handbook and did a thorough web search of campus webpages regarding health, nutrition, and wellness. Each key topic was assessed to determine if the campus had a program, intervention, or policy implemented. If a policy, program, or intervention was found, evaluators answered policy/pledge criteria sub-questions and provided the URL links to these programs, interventions, or policies found. A basic Google search using the key topic search terms and campus name was required before scoring a topic "0." The search terms and list of topics included on the survey are listed in Table 11.

Scoring and Analysis

This audit was composed of 34 questions with 2 sub-questions per question if the campus had a policy, program, or intervention in each topic area under the four main categories. (Table 12.). Each obesity-prevention/wellness topic was scored using the POINTS scale descriptions and criteria (Table 12.). The types of questions and an example of the scoring are provided in Table 13. Data analysis included usage of a 3-point semantic differential scale to assess each policy topic (0=no policy; 1=initiative/interventions; 2=written policy). A maximum policy score indicates that there is a fully formal documented policy in place for a given category. If a policy rating does not reach its maximum score, the points that are allocated are given due to the presence of other initiatives, programs, interventions, pledges, commitments, or policies in place regarding some or all of the key topics under the given category. A maximum policy supports score is indicative of no missing definitions relating to the policy such as the mission, vision, goals, outcomes, plan for implementation, department/ individual charged to implement, rules regarding sanctions/fines, and the monitoring, reassessment, reviewing and evaluation plan.

CHAPTER FOUR
RESULTS

FRESH Audit

There were 22 dining establishments audited (Table 14.). Approximately 64% were located off campus within a 1.5-mile radius. Regarding dining establishment type, almost half of the venues audited were fast food establishments, with approximately one-fourth being sit down restaurants and one-fourth being dining halls/cafeterias/buffets. Almost 80% of establishments audited had their own cash register (free standing) and the remainder had a meal plan or prepaid system (dining hall). Each establishment was located within one of five zip codes in Lincoln, Nebraska, with 20-30% falling into zip codes 68503, 68504, and 68588. Half to two-thirds of establishments were open for 9-12 hours on Tuesdays, Saturdays, and Sundays. Eight facilities were not open on Saturdays and seven were closed on Sundays. Survey questions (excluding dining establishment characteristics described above) were separated into nine subcategories including: Accessibility, Healthy Entrees, Healthy Side Dishes, Healthy Beverages, Healthy Desserts, Nutrition Information, Healthy Eating Facilitators and Barriers, Green Eating/ Sustainability, and Sustainability (Table 15.).

Accessibility

There were three questions in this category involving distance from the dining facility to the campus boundary and parking availability. Over 75% of evaluators reported that audited facilities were less than two-thirds of a mile or equivalent to a 10-minute walk from the center of campuses. Most facilities were less than 1.2 miles from

the center of campus (86%). The majority of facilities had meter parking and or a pay/lot or garage (59%) available for customers.

Healthy Entrees

Questions in this category involved menu descriptions, and the variety and availability of lean meat and vegetarian entrees. About 86% of menu descriptions were slightly or primarily promoting unhealthy items through food descriptions or were neutral and/or equal in terms of specific descriptions of healthy and unhealthy items. Most establishments offered two or fewer (82%) lean meat entree options and about 91% of restaurants offered four or less vegetarian entree options.

Healthy Side Dishes

There were nine questions in this category, which included items on dressing serving options, side choices with meals, the number of vegetable side options, fruit type offered, labeled whole grain options, healthy cereal options, the quality of lettuce served on the salad bar, and the number of fresh vegetables and healthy additions available on the salad bar. Most restaurants offered different sides and portion sizes that could be selected by the consumer from a list and the side was not automatically selected or offered with the meal (55%). Half of the audited establishments did not have labeled whole grain options, and about 40% only carried up to two varieties. Over two thirds of facilities did not offer cereal, but of those that did, the majority offered anywhere from one to four healthy varieties. About half of the restaurants offered one to three or more fresh fruit options without added sugars or syrups (55%), while the other half carried only processed/dried fruit or none available. More than three-fourths of establishments offered

two or fewer healthy vegetable side options. Over half of the facilities lacked a salad bar, but of those that did, the majority offered five to eight fresh vegetables, and they all included one to four healthy salad bar additions. Most evaluators rated the lettuce on the salad bar as neutral, with the remaining percentage falling into appealing to very appealing categories. Over 85% of high fat sauces, condiments and/or salad dressings were served on the side automatically, by request, or was self-served.

Healthy Beverages

There was only one question in this category. Almost 82% of dining facilities carried one to four healthy beverage categories, with one to more than seven as a selection option on the survey.

Healthy Desserts

Similarly, there was only one question in this category. Forty-five percent of facilities only offered up to one healthy dessert category, and about 32% did not offer any desserts.

Nutrition Information

This category included three questions on nutrition information provided, meal planning tools available, and how substitutions were handled. About two-thirds of facilities did not provide any nutrition information or offered it online only and more than 95% did not offer any menu planning tools. All establishments allowed some items to be substituted at no charge.

Healthy Eating Facilitators and Barriers

There were eight questions in this category involving portion sizes of main entrees, cup size options, fried food main and side menu options, board and/or menu labeling, price differences on healthy and unhealthy meals or items, healthy signage and/or advertisements, facility pricing system, and pricing differences of items per pound. About 55% of dining facilities do not charge to split or share a meal. Almost 73% only offered 1 cup size larger than a 16-ounce cup or the largest cup size available was 16 ounces or smaller. The majority of restaurants or dining centers had equally priced healthy and unhealthy options and almost half (46%) had items priced individually. None of the facilities priced items by weight. More than 85% of signage or advertisements were equally or neutrally healthy and/or unhealthy, or there were no signs promoting unhealthy or healthy habits. Similarly, almost 87% of board or menu labels included neutral, equal, and/or no labels that encouraged unhealthy or healthy choices. About 82% of facilities offered one to four fried food main and/or side menu options.

Green Eating/Sustainability

There was only one question in this category. Almost two-thirds of facilities did not offer any sustainability signage/labels on site or information online.

Sustainability

There were two questions in this category. Almost 41% of dining establishments evaluated had disposable flatware and reusable plastic plates and over half provided styrofoam/plastic disposable to-go containers.

On average, dining hall/cafeteria venues at UNL received the highest healthfulness of foods (38.2±1.8) and dining environment supports (26.6±0.5) scores compared to the other establishment types evaluated (fast food, sit-down, and delivery). (Table 16.). Fast food/café's establishments received the lowest healthfulness of foods score (15.90±4.1) and sit-down restaurants had the lowest score for dining environment supports (18.67±2.7). There was only one delivery venue assessed, and results may not be representative of delivery venues on and around the UNL campus; therefore, delivery was omitted from the following analysis. Dining hall venues scored significantly higher for healthfulness of foods compared to fast food and sit-down restaurants ($p<001$). Other significant differences were found among both fast food and sit down compared to dining halls for dining environment supports ($p=.002$), with dining hall environments scoring significantly higher. No statistical differences were found between fast food and sit-down venues for dining environment supports ($p=.615$).

Among all schools who participated in this analysis, UNL received an average score of 23.91±10.2 for the healthfulness of foods and 21.0±4.5 for dining environment scores, whereas the total institution average received a score of 25.4±6.8 for the healthfulness of foods and 24.3±5.6 for dining environment scores. UNL scored above the total institution average for the healthfulness of foods for sit down restaurants, but scored lower averages in all other areas across all venue types compared to the mean total institution scores. On average, all institutions scored higher among the healthfulness of foods (91.8%) and dining environment supports (79.6%) for dining-hall/cafeteria/buffet

venues compared to the other dining types. Sit-down and fast food/café establishments had more evenly distributed scores.

SHELF Audit

There were 39 store facilities audited in total (Table 17.). Approximately 80% of the facilities evaluated were in the convenience store/mini mart category, with about 10% categorized as drug stores or dollar/discount stores. Most stores were located off campus (64%) and one-third were within zip code 68503. There were 21 questions on the survey (excluding general questions) separated into four subcategories: Healthy Food Availability, Checkout Environment, Food Shopping Environment, and Daily Hours of Operation (Table 18.).

Healthy Food Availability

Questions in this category focused on the availability, variety, quality and pricing of fresh, processed, frozen fruits and vegetables, low fat dairy products or dairy substitutes, healthy staple foods (high fiber/low sugar grain products), frozen entrees, and fountain drink size options. Most stores offered 3 or fewer varieties of fresh fruits (87%) and/or vegetables (97%), but among those that provided fresh options nearly all were reported as being good quality (lacked bruises/not overripe) produce. About three-fourths of stores carried no more than three varieties of processed vegetables and up to five varieties of processed fruits. Nearly 41-49% of stores did not carry healthy and regular versions of processed produce, but of those that did, most were priced similarly or at least one, but not all, had a light and/or low sodium variety that was more expensive than regular. Roughly, all stores did not carry any frozen produce or lacked a store freezer

area. Only one store carried frozen vegetables. Almost ninety percent of stores carried five or fewer varieties of healthy staple foods and three or fewer types of healthy prepackaged frozen entrees. About two-thirds of facilities did not carry regular or healthy frozen entrees, but of those that did, the majority offered healthier and regular versions of the same frozen entree at the same price or at least one but not all healthier versions cost more than regular versions. About 75% of stores had no more than three varieties of low-fat dairy options or dairy substitutes. About half of the stores offered a self-service drink fountain and of those, most provided at least two-cup sizes larger than a 16-ounce cup.

Checkout Environment

There were two questions in this category, which included items on the varieties of unhealthy and healthy products adjacent to the checkout counter. Over three-quarters of stores had one to six varieties of unhealthy products available while all stores had three or less healthy varieties available.

Food Shopping Environment

Questions in this category involved distance from the store to the center of campus and the number of programs used to advertise healthy choices. About 75% of stores assessed were between a 10-minute walk to 1 mile away from the geographic center of campus and almost 90% of stores lacked advertisement regarding healthy choices.

Daily Hours of Operation

This section of the audit assessed hours of operation on a weekday and weekend day. About 87% of stores evaluated were open for at least 13 hours on Tuesdays and 86% of stores were open for at least 10 hours on Sundays.

Over half of stores were ranked in the "least healthy" score range (56.4%) (Table 19.). To fall into this score range, the store must have earned anywhere between zero to eleven points. The "least healthy" stores scored on average 6.95±2.9 points. Almost 39% of stores were considered "moderately healthy" (range=12-21 points). UNL's "moderately healthy" stores earned a mean of 15.47±2.2 points. Lastly, about 5% were "most healthy" (range=22-52 points) and had an average score of 24.5±0.71.

UNL's overall average score was 11.13±5.8 compared to the total school average score of 18.1±4.6. UNL had lower mean scores for each store category classification, but "least healthy" and "moderately healthy" scores only varied by 0.45 to 0.93 compared to the total school averages. However, in the "most healthy" store classification, UNL scored 6.1 lower mean points than the total school average. Only 25% of all stores evaluated with the SHELF audit scored in the "most healthy" score range.

VENDING Audit

In total, there were 29 vending machines audited (Table 20.). All machines were rated as appropriately accessible (no more than 25% of the machine items were empty by the end of the day/when the building closes). Across both campuses, approximately 70% were located in academic buildings, with the next highest percentage in recreation facilities at 14%, and smaller percentages in residential, library, and shopping areas.

About half of the machines had 31 to 40 slots available and filled, but ranged from 9 to 50 slots available and occupied. Most machines offered about 41 to 45 different types of snacks (47%) and 6-10 different beverages (60%). Out of the 29 machines assessed 14 offered snacks (21% had snacks and prepared foods) and 15 offered beverages (6.7% of machines had beverages and prepared food). Excluding the general machine characteristics described above, the survey was composed of Healthy Dense Snack Scores (HDSS) 0-7 (0=least healthy to 7=most healthy), Healthy Dense Beverage Scores (HDBS) 0-2 (0=least healthy to 2=most healthy), unlisted snack/beverage list, snack/beverage pairing price analysis, and summary questions including inquiries about price, promotion, and green eating information. Each HDSS/HDBS category included a list of snacks or beverages that were evaluated if present in the machine. Many items from each category were not evaluated due to not being present in the machines.

Snack Machines

Healthy Dense Snack Score 0. (Tables 21-22.).

There were two products in HDSS 0 that could have been evaluated, and 100% was found on UNL campus. However, there was at least one item from this category in 11 of the 14 snack machines (79%). There was a total of 61 products in this category found. For the machines that had these snacks, most carried between five to seven of either gum, mints, or both.

Healthy Dense Snack Score 1. (Table 23-24.).

There were 20 products in HDSS 1 that could have been evaluated, but only 35% was found on UNL campus. However, there was at least one snack from this category

present in all 14 snack machines. Out of the products present, Mini Sandwich Crèmes Vanilla Cookies *(Grandma's) 3.71/4.1 oz.*, Snickers *(Mars) 1.86/2.07 oz.,* and Twix *(Mars) 2 oz.* were the most common items appearing once in 13 machines. There were 54 repeating products from HDSS 1 found. For those that carried some of these snacks, most provided four items per machine.

Healthy Dense Snack Score 2. (Tables 25-26.).

There were 58 products in HDSS 2 that could have been evaluated, but only 31% was found on UNL campus. However, there was at least one snack from this category present in all 14 snack machines. Out of the products present, Cheetos *(Crunchy, Flamin' Hot Lime, or Jalapeno Cheddar) (Frito Lay) 1.5/2 oz.* was the most common item appearing once in all snack machines. Chocolate Chip Cookies *(Famous Amos) 3 oz.,* Doritos *(Cool Ranch, Four Cheese, or Nacho Cheese) (Frito Lay) 1.75 oz.,* Fritos *(Corn Chips, Chili Cheese, Honey BBQ or Spicy Jalapeno Twists) (Frito Lay) 2/2.1 oz.,* and M&M's *(Plain or Peanut Butter) (Hershey's) 1.69/1.74 oz.* were the next most frequently reported items appearing at least once in 12-13 machines. There were 110 products in this category found at UNL. For the machines that had some of these snacks, most carried nine items per machine.

Healthy Dense Snack Score 3. (Tables 27-28.).

There were 61 products in HDSS 3 that could have been evaluated, but only 31% was found on UNL campus. However, there was at least one snack from this category present in all 14 snack machines. Out of the products present, Friday's Potato Skins *(Bacon Cheddar) TGI Friday's 1.75/1.95/3 oz.* was the most common item appearing

once in all snack machines. Other popular snacks, included Elfin Crackers *Keebler 2.12 oz.,* M&M's (Peanut) *Hershey's 1.74 oz.,* and Rold Gold Pretzels *(Frito-Lay) 2 oz.* which appeared once across 10-12 machines. There were 105 products in this category found at UNL. For the machines that had some of these snacks, most carried eight items per machine.

Healthy Dense Snack Score 4. (Table 29-30.).

There were 63 products in HDSS 4 that could have been evaluated, but only 32% was found on UNL campus. However, there was at least one snack from this category present in all 14 snack machines. Out of the products present, Pop-tarts *(Frosted Blueberry, Frosted Cherry or Frosted Strawberry) Kellogg's 3.52/3.67 oz.* was the most common item appearing up to two times across 13 machines. Cheez It Crackers *(Baked Cheese) Sunshine 3 oz*., Rice Krispies Treats *Kellogg's 2.1 oz.*, and Trail Mix *(Sweet n Salty Mix) Kar's 3.5 oz.* were other recurring snacks appearing one to two times in 10-12 machines. There were 108 products in this category found at UNL. For the machines that had some of these snacks, most carried seven items per machine.

Healthy Dense Snack Score 5. (Tables 31-32.).

There were 54 products in HDSS 5 that could have been evaluated, but only 17% was found on UNL campus. However, there was at least one snack from this category present in all 14 snack machines. Out of the products present, Smokehouse Almonds *(Jalapeno or Strawberry) Blue Diamond 1.5 oz.* was the most common item appearing up to two times across 10 machines. The next most frequent item was Fruit Snacks *Black Forest 2.25 oz.* appearing once in 9 machines. There were 35 products in this category

found at UNL. For the machines that had some of these snacks, most carried two or three items per machine.

Healthy Dense Snack Score 6. (Tables 33-34.).

There were 23 products in HDSS 6 that could have been evaluated, but only 17% was found on UNL campus and there was at least one snack from this category present in 12 out of the 14 snack machines. Out of the products present, Ruffles Potato Chips *(Cheddar and Sour Cream) Frito Lay 1.25 oz.* was the most common item appearing once in 11 machines. The next most frequent item only appeared once in four machines. There were 19 products in this category found at UNL. For the machines that had some of these products, most carried two items per machine.

Healthy Dense Snack Score 7. (Tables 35-36.).

There were eight products in HDSS 7 that could have been evaluated, but only 12% was found on UNL campus and there was only one snack from this category present in six out of the 14 snack machines. The only item present was a Clif Bar *(Crunchy Peanut Butter) Clif 2.4 oz.* that appeared once in 6 machines.

Unlisted Snack. (Table 37.).

There were seven categories of unlisted snacks including, lunch items, chips, loose candy, compact desserts (e.g. snickers), nuts, dried meat, salty crackers or chex-mix, and breakfast items. The most common unlisted snack category was lunch items (20%) followed by compact desserts (17%). Within the lunch item category, the most frequent unlisted item was a 7-oz. turkey and cheese sandwich that costs $3.00. Within the compact dessert category, the most frequent unlisted item was 1.5 oz. Butterfinger

cups that costs $1.00. This unlisted snack list is from 2015 data. The updated survey now includes some of these missing products.

Snack Pairing Price Analysis. (Table 38.).

The average healthy snack pair size and price was 1.64 oz.±0.51 and $1.14±0.27. The average unhealthy snack pair size and price was 2.09 oz.±0.63 and $1.00±0.00. The difference between both snack pair size is 0.45 oz. and in price, $0.14.

Beverage Machines

Healthy Dense Beverage Score 0. (Tables 39-40.).

There were 61 beverages in HDBS 0 that could have been evaluated, but only 21% was found on UNL campus. However, there was at least one snack from this category present in 14 out of the 15 beverage machines. Out of the products present, Pepsi -Regular/Wild Cherry or Mountain Dew *(Any Flavor) (PepsiCo) Any Size* were the most common items, appearing at least once in nine machines. The next most frequently occurring item was Sierra Mist -Lemon Lime or Cranberry Splash *(PepsiCo) Any Size* appearing once in six machines. There were 131 products in this category found at UNL. For the machines that had some of these items, most carried four beverages per machine.

Healthy Dense Beverage Score 1. (Tables 41-42.).

There were 49 beverages in HDBS 1 that could have been evaluated, but only 22% was found on UNL campus. However, there was at least one snack from this category present in 14 out of the 15 beverage machines. Out of the products present, Diet Pepsi -Regular/Wild Cherry, or Diet Mountain Dew *(PepsiCo) 12 or 20 oz.* was the most commonly seen items appearing up to four times in 9-10 machines. There were 58

products in this category found at UNL. For the machines that had some of these beverages, most carried two products per machine.

Healthy Dense Beverage Score 2. (Tables 43-44.).

There were 21 beverages in HDBS 2 that could have been evaluated, but only 24% was found on UNL campus. However, there was at least one snack from this category present in 11 out of the 15 beverage machines. Out of the products present, Aquafina -Plain Purified Water or *Any Flavor Splash (PepsiCo) Any Size* was the most commonly seen item appearing one to three times across nine machines. The remaining items occurred up to two times in four machines. There were 23 products in this category found at UNL. For the machines that had some of these beverages, most carried one to two items per machine.

Unlisted Beverage (Table 45.).

There were seven categories of unlisted beverages including, soda pop, espresso, juice, smoothie, flavored water, and flavored tea. The most common unlisted beverage category was juice (25%) followed by smoothies (21%). Within the juice category, the most frequent unlisted item was a 15.2 oz. orange juice that costs $1.50. Within the smoothie category, the most frequent unlisted item was a 15.2 oz. of Naked (all flavors) that costs $3.00. This unlisted beverage list is from 2015 data. The updated survey now includes some of these missing products.

Beverage Pairing Price Analysis (Table 46.).

The average healthy beverage pair size and price is (18.06 oz.±2.25) and ($1.57±0.58). The average unhealthy beverage pair size and price was (18.32 oz. ±1.91)

and ($1.45±0.51). The difference between both beverage pair sizes are 0.26 oz. and in price, $0.12.

Summary Questions (Table 47.).

The majority of healthy and unhealthy snacks and beverages inside the machines were evenly priced (83%). There was no presence of nutrition information or green eating promotion on the vending machine or products available. Although, 69% of logos on the vending machine pictured healthy products or no logos at all.

Overall, UNL evaluated 29 vending machines that carried an approximate even distribution of snack (n=14) and beverage (n=15) products. Among all machines, UNL scored an average of 13.9±1.23 points, with a higher score from snacks (14.7±0.57) (score range: 6-24) compared to beverages (13.0±1.89) (score range: 6-20). Scores were determined not only from the weighted average nutrient density item score, but also machine accessibility, pricing, and promotion scores. Compared to other institutions who participated in this analysis, UNL scored higher in both snack and beverage categories, and had a higher total average by 1.35 points.

POINTS Audit

There were four categories in the POINTS audit including campus stimulant standards, campus chronic disease management and health promotion, active environment, and nutrition living. Each category is discussed separately below (Table 49.).

Campus Stimulant Standards

This category included questions involving smoking and alcohol usage. UNL received a policy score of 100 out of 50-100 points possible in this category. UNL received a policy support score of 10, with the maximum score possible being 16.

Campus Chronic Disease Management and Healthy Promotion

UNL received a policy score of 65 out of 70 points possible in this category, but received a policy support score of 8 out of 8 possible points. This category included questions involving health education, nutrition education, and physical education not for credit and course requirements, health promotion, campus health fairs and screenings, chronic disease education, and healthy habit challenges.

Active Environment

UNL received a policy score of 41.67 out of 25 to 91.67 points possible in this category and a policy support score of 19 out of 24 possible points. This category included questions involving active environment, closed campus, sustainable transportation, campus health and wellness department, healthy campus fundraising, and healthy employee insurance premiums.

Nutrition Living

UNL received a policy score of 56.5217 out of 30.43 to 69.57 points possible in this category, while receiving a policy support score of 18 out of 24 possible points. This category included questions involving healthy food options, nutrient minimum/maximum standards, healthy food labels and point of purchase nutrition information, campus food taxes and healthy food subsidies, designated eating environments and mindful eating,

local and sustainable food, organic waste reduction and disposal, nearby farmer's market, local food access on campus, on campus housing, dining hall contract, off campus walkable dining, and food security initiative.

Overall, UNL received the highest policy score in the Campus Stimulant Standards category and the highest policy support score in the Campus Chronic Disease Management and Health Promotion category. The Active Environment category had the lowest policy score and the Nutrition Living and Campus Stimulant Standards categories had the lowest policy support scores.

CHAPTER FIVE
DISCUSSION

UNL took part in a multi-state research effort to evaluate post-secondary food environments and policy associated supports during 2015-2016. In this time frame, data was collected from 22 dining establishments, 39 convenience stores, and 29 vending machines. All establishments and machines were chosen to be evaluated based on factors such as student body usage, campus location, and aiming for approximately 30% of each venue type. The information gathered was used to determine the availability and extensiveness of healthy foods and supports in place to help UNL students make healthy choices in comparison to the availability and extensiveness of healthy foods and supports from other U.S. college institutions in the NC1193 multi-state research group. Policies, programs, initiatives, and/or pledges regarding health and wellness were also assessed to evaluate the level of support given to the promotion of healthy environments at UNL.

FRESH Audit

On average, dining hall/cafeteria venues at UNL received the highest healthfulness of foods and dining environment supports scores compared to fast food, sit-down, and delivery venues. Fast food/café establishments received the lowest healthfulness of foods score and sit-down restaurants had the lowest score for dining environment supports. In general, there were several strengths across venues evaluated. The distance from dining facilities to campus was within a 1/2 mile or equivalent to a 10-minute walk. There were fewer than four offerings of main and side fried food items, and there tended to be at least one type of fresh fruit available with no added sugars of syrups. Most facilities sold items separately and did not charge for some substitutions, or to split/

share a meal. Most salad dressing, condiments, or other high fat sauces were self-served, served on the side, or served on the side by request. Most sides and side portions were selected by the consumer from a list and were not automatically selected or offered. There was typically only up to one cup size larger than 16 ounces available for fountain drinks.

In general, many weaknesses also appeared across establishments. Most menu items were described as primarily unhealthy, slightly unhealthy, or neutral. Many venues only offered up to one healthy dessert category, no more than two lean meat options, vegetable sides and labeled whole grain options, and up to four vegetarian entrée options, healthy salad bar additions and healthy beverage categories. Most facilities did not offer any nutrition information or menu planning/nutrient analysis tools. Healthier options tended to cost more or be equally priced to unhealthy items of comparable weight. There were very few green eating/sustainability signage or promotion displays, and most flatware and to-go containers were not made of recyclable material.

The remaining question topics had average scores, thus were neither a strength nor weakness. Most establishments offered meter parking or a pay lot/garage. There were typically three to four healthy cereal varieties available, five to eight fresh vegetables on the salad bar, and the appearance of the lettuce on the salad bar was ranked as neutral. Most facilities had neutral, equal, and/or no labels or signage to encourage healthy or unhealthy choices, and the majority offered healthy and unhealthy items/meals at similar prices.

UNL scored the best among dining hall/cafeteria venues compared to other establishment types, but when considering the amount of points possible, (60 points for healthfulness of foods and 50 points for dining environment supports) only a little over half of the maximum total points were achieved in both categories. These findings indicate that even UNL's highest scoring venues still need improvement among healthfulness of foods and dining environment supports. Of the maximum points available for each category, the average all institution scores reflect that there was a lack of healthy foods and dining supports across venues and most would benefit from positive environmental changes.[55] The best total institution score for healthfulness of foods and dining environment supports were almost 18 points short of reaching the maximum score per category.[55] Considering UNL and other institution data, dining halls appear to be better equipped with healthier foods and/or more dining supports compared to other venue types, and similar research aligns with these findings.[55]

Although comparable dining facility auditing research in the college setting was limited, many US college dining departments are starting to create healthier environments for students on-campus by offering healthy foods and/or dining supports. A few institutions making positive changes include Duke University, Stephen F. Austin State University, St. Olaf College, and Lewis and Clark College. Duke University purchases local and organic foods, promotes recycling, and uses biodegradable or minimal packaging.[58] Stephen F. Austin State University pays the school's registered dietitian to label selected healthy meals to help make food selection easier and healthier for students.[59] St. Olaf College's cafeteria is 100% sustainable and environmentally friendly

because most produce comes from a student-run organic farm located near campus.[60] Lewis & Clark College has a sustainability council that oversees kitchen projects to ensure a minimal environmental footprint.[61]

Although numerous modifications and/or updates to food/nutrition policy or programs are beginning to arise on college grounds, only one article considered the off-campus food environment, which also affects students. This study was an older version of the HCEA published in 2012 that evaluated health differences among institution size and dining environments (sit down, fast casual, fast food, on campus, dining hall, and student unions). This study found that dining halls had higher scores on healthy entrees, side dishes/salad bar, and beverage offerings compared to student unions or cafes, but had more barriers related to healthful dietary habits, whereas, fast food restaurants offered the most facilitators for practicing healthful dietary habits.[62]

SHELF Audit

On average, most stores evaluated on or nearby the UNL campus ranked in the least healthy classification, while only a small percentage came from the most healthy category. In general, strengths across stores included good quality fresh fruits and vegetables available, no more than three varieties of unhealthy products adjacent to the checkout counter, and long store hours most days of the week (at least 10-13).

There were several weaknesses seen across stores. Most stores did not offer any healthy frozen entrees, processed fruits, or processed vegetables, and of those that did, healthier versions tended to be similarly priced to regular versions. The majority carried less than three fresh fruits, no more than five processed fruits, and no frozen fruit.

Likewise, stores typically carried no fresh or frozen vegetables and no more than three varieties of processed vegetables. It was common to find no more than three low fat dairy or dairy substitutes available, and only up to five healthy staple foods (high fiber/low-sugar grain products). Most stores had at least three cup sizes larger than a 16-ounce available for fountain drinks, no healthy products adjacent to the checkout counter, and no healthy advertisements or programs visible for customers.

Overall, most convenience stores accessible from UNL campuses were considered "least healthy" (56%), while, most stores from all institutions were ranked "moderately healthy" (45%).[56] From this assessment, UNL could benefit from exploring ways to improve on campus and nearby store environments, especially because only 5% of stores were found to be in the "most healthy" store classification. The total school average shows that "most healthy" stores only make up a quarter of stores accessible to many post-secondary institutions.[56] This indicates that most school and nearby school convenience stores' also need improvement.

Comparable food store auditing research was limited, especially in the college setting. Only one of the four studies found evaluated convenience type stores on and nearby post-secondary institutions. This analysis was from an older version of the HCEA published in 2013 that evaluated the availability of healthy foods. Similar to this analysis, earlier research also showed that 81 food stores near 15 postsecondary institutions lacked availability of healthy foods and many were not consistent with dietary recommendations for obesity prevention.[63]

Unlike the college setting, there are many healthy convenience store initiatives occurring in other communities and settings. A few include the Healthy Corner Stores Network, Change Lab Solutions, and the Capitol Roots' Healthy Stores Program. The Healthy Corner Stores Network is a chain of convenience stores that promote fresh, healthy, and affordable foods in underserved neighborhood stores and communities.[64] Change Lab Solutions provides ideas for convenience stores to increase promotion of healthy foods and behaviors.[65] For example, this organization encourages displaying healthy, fresh produce at the front of the store and healthy products available at the checkout counter.[65] The Capitol Roots' Healthy Stores Program provides convenience stores in two counties in New York State with refrigeration units stocked twice a week with fruits and vegetables, and collaborates with storeowners to ensure affordability among healthy foods.[66]

VENDING Audit

Overall, UNL vending scores indicated that the most available snacks ranged from unhealthy to healthy, although as health increased, availability and variety of snacks tended to decrease. Unhealthy to moderately healthy beverages were more widely available compared to healthy beverages, but as health increased, variety tended to increase. Unlisted snacks and beverages were important to note because missing products across schools indicate items that may need to be added to the master list of items on the surveys. Many products that were missing when data was collected have been added to the updated vending survey. Healthier snacks and beverages tended to cost slightly more, but were lighter in weight compared to their unhealthy counterparts. Most machines did

not provide nutrition information or green eating promotion on packaging or machines but many pictured healthy or no product logos.

Audit questions were categorized by the accessibility and variety of Healthy Dense Snack/Beverage Scores (HDSS/HDBS), unlisted snack/beverage list, snack/beverage pairing price analysis, and summary questions including inquiries about price, promotion, and green eating information.

Snack Accessibility

Snack scores ranging from "unhealthy" to "healthy" (HDSS 1-5) were the most widely available snacks because at least one option was accessible in all 14 snack machines. Snacks with scores of 0, 6, and 7 were only in 6-12 of the 14 snack machines and; therefore, less accessible. "Unhealthy" to "average" snacks (2-4) offered the most snacks per category and per snack machine on average.

Snack Variety

offered 100% of snacks in this category

Snacks from category 0 were most widely available because 100% of these snacks were present in the machines and thus offered the most variety. The remaining categories offered only 13-35% of all snacks possible in each category. As Health Density Score increased, the variety of snack availability tended to stay the same or decrease, with an exception to HDSS 3 (31%) and 4 (32%). It is important to note that category 0 only offered two total snacks (gum and mints) whereas the remaining categories carried eight to 63 items. Categories that ranged from "unhealthy" to "healthy" (HDSS 2, 3, 4, and 5)

carried the most snacks per category ranging from 54 to 63 snacks, while HDSS 1 and 6 carried 20 to 23 items and HDSS 7 carried only eight items.

Beverage Accessibility

Beverage scores ranging from "unhealthy" to "average" (HDBS 0-1) were the most widely available beverages because at least one option was accessible in 14 out of 15 beverage machines. HDBS 2 beverages were only in 11 of the 15 beverage machines and; therefore, less accessible than the other categories. HDBS 0 ("unhealthy") offered the most beverages per category.

Beverage Variety

As Health Density Score increased, the variety of beverage availability increased 1 to 2 percentages. Beverages from HDBS 2 offered 24% of products in this category, compared to HDBS 0 (21%) and HDBS 1 (22%). It is important to note that HDBS 0 offered almost three times more products compared to HDBS 2 and HDBS 1 offered more than twice the options as HDBS 2.

Unlisted Snack/ Beverages and Snack/Beverage Pairing Price Analysis.

Common missing snacks and/or beverages across participating states and institutions signal that some items may need to be added to the survey to improve the analysis. UNL vending audits were completed in 2015 but a revised and updated version was released in early 2017; therefore, some of the unlisted snacks or beverages missing in 2015 were no longer missing on the updated version. Four out of the seven most common snacks from each snack category that were missing in 2015 were also missing on the updated survey. The other three items were found but in different package sizes or other

flavors. Similarly, all unlisted beverages noted in 2015 were added except two were missing common flavors found. Some of the items commonly found on UNL campus may not be present on other college campuses and may be the reason that some items were not added to the updated survey. The same price trend was found for both snacks and beverages. On average, healthier options were relatively more expensive and were lighter in weight.

Summary Questions

UNL received a "healthy" mean score for picturing healthy or no product logos on vending machines, an "average" score for mostly offering similarly priced healthy and unhealthy snacks and beverages (83%), and "unhealthy" for no presence of nutrition information or green eating promotion on the vending machine or products available.

UNL earned a better score for snacks, beverages, and overall average compared to other schools. However, this does not indicate that UNL is exceeding in this area, but rather was ranked the best out of a collection of many low scoring machines. UNL's average snack and beverage scores were roughly seven to nine points away from achieving the highest score possible in each category. Other institutions participating in this analysis are in greater need for increasing the healthfulness of products and/or increasing their environment supports regarding vending machine nutrition and health promotion.

Comparable vending machine audit research was not found in the college setting but a similar evaluation took place in several U.S. primary schools in previous years. Ten Massachusetts middle schools participated in a study where vending machine purchases

were evaluated among nearly 1,500 students. Results showed that youth tended to purchase sugar-sweetened beverages compared to any other vending item category.[67] Other studies showed the positive impact of policy implementation on school vending options. One analysis observed that U.S. middle schools tended to improve their vending options when obesity prevention policies for school nutrition programs were adopted.[68] Vending improvements were based on the elimination of beverages with added sugars and only offering dessert/snack foods with no more than 200 calories per single serving package.[68] Similarly, another study found that vending machine selections improved (less low-nutrient, energy-dense food/beverage availability) over a two-year period when middle and high schools implemented district and school wellness councils.[69] An organization called Change Lab Solutions targets more than just primary and secondary school settings and aims to improve communities through the development of laws and policies, including those that pertain to vending machine selection.[70] Recently they have been working towards a plan for making vending healthier for municipalities. Their model is designed for nutrition advocates to negotiate contracts, work towards a healthy vending policy, and ensure affordability and reasonable cash flow.[70]

Out of all the literature found, only two reflected positive vending changes occurring on college campuses specifically, which included Miami University and the University of North Carolina Wilmington. Miami University created green selection buttons that represented healthy snacks based on the American Heart Association snack guidelines. [71] Other stipulations included the availability of at least five healthy options per machine and offering online student access to review snack availability and variety

through a campus website.[71] The University of North Carolina Wilmington pays the school's registered dietitian to select all vending products.[72] In addition, items may be more accessible because students can choose to pay with their student ID cards that have funds attached to them.[72]

POINTS Audit

Audit questions were organized into four categories including Campus Stimulant Standards, Campus Chronic Disease Management and Health Promotion, Active Environment, and Nutrition Living. UNL received the highest policy mean score in the campus stimulant standards category, while the active environment category had the lowest policy mean score. The highest policy support score was in the campus chronic disease management and healthy promotion category. The initiatives, programs, pledges and/or policies regarding the food environment in the Nutrition Living category at UNL received an above average mean policy and policy supports score. These findings indicate that UNL puts campus stimulant standards as one of the higher priorities, whereas, ensuring an active environment is a lower campus priority. All areas could benefit from improvement, whether it is establishing a policy or ensuring that all policy supports are in place to create more stable guidelines.

Policy-related literature has tended to focus on other areas outside of health and obesity prevention and/or was more common in settings other than post-secondary. Well-documented physical activity/wellness and/or nutrition policies or programs are common in primary schools[73, 74] and worksite settings, [75] whereas in the college setting, policy assessments have occurred to some extent, but in areas other than health and obesity

prevention. Examples include gun violence and weapon regulation after the April 2007 Virginia Tech school shootings and similar acts of violence occurring on school grounds,[76] the implementation of sustainable/green practices driving new environmental standards,[77] stipulations around college drinking and alcohol usage,[78] and the push for new guidelines that support pedestrian friendly campuses.[79]

The following studies demonstrate positive outcomes that can result from the implementation of well-developed policies and supports on college campuses. One analysis showed that policies restricting mobile phone usage in the post-secondary classroom setting has been well-supported by faculty and students.[80] Thus, it is hypothesized that a no or silent-mode only cell-phone policy in the classroom setting would be followed and reinforced due to many faculty and students noting cell phone sounds as a source of serious irritation and distraction. Another study analyzed the effect of a no-smoking policy on one university campus compared to a campus without a smoking policy. Results indicated that less students continued to smoke post-policy implementation on the intervention campus compared to the control campus.[77] An additional examination found that the diversity of peoples attending post-secondary institutions has increased due to federal and state financial aid polices and changes to admission practices.[82] Established policies and procedures have also helped campuses contest discrimination and resolve incidents of harassment if they should occur.[82] These are just a few examples of how the execution of policies or initiatives can influence a campus and similar positive results may occur from health/nutrition related policies and/or programs.

CHAPTER SIX
CONCLUSION

College students are a vulnerable population to unhealthy weight gain that could possibly lead to weight related health conditions. Some of which could be stemming from the food environment. Beyond the implementation of PSE interventions taking place in on-campus dining halls, there is a lack of PSE research in the college setting regarding the food environment as a whole. The use of environmental audits or other health-based PSE strategies are still an emerging area of research for the college-age population and setting. This study of an in-depth environmental audit on a college campus demonstrates that understanding the environment and its supports and/or oppositions are essential prior to implementing a successful obesity prevention PSE strategy. Childcare, primary school, community, and family settings are a few areas where health-based PSE approaches have been researched and strategies have been implemented as a result. The well-established Supplemental Nutrition Assistance Program Education (SNAP-Ed) program now incorporates evidenced based PSE approaches to complement their nutrition education program. Based on findings from the literature review, many colleges rely on direct education alone to encourage lasting healthy behaviors. Because of the success of PSE implementation approaches in other settings, the post-secondary environment is an area where more research including PSE strategies should be tested and implemented.

Strengths and Limitations

The strengths of this research were that this study had been pilot tested, revised, updated, and continues to be improved as more institutions utilize the tool. There were uniform instructions (written and visual/audio) available to the research team. The

completion of mandatory IRR ensured that all evaluators were interpreting questions similarly and thus evaluating establishments/machines appropriately to reduce possible errors. As the validated tools improve, more post-secondary institutions can utilize them to evaluate their own campuses, which may lead to positive environmental and/or policy changes affecting college students. Despite the many strengths of this study, there were also limitations present.

Limitations of this analysis include the cross-sectional nature of this study. This research could be designed as a longitudinal analysis if funding and evaluators were consistently available. To date, only members of the NC1193 multi-state research group have participated in this audit process. There may be some survey questions that need to be re-worded and the process for entering data online also calls for some improvements for clarity purposes. This data provides objective observations and would be complimented by a subjective component as well from the student/consumer perspective. A subjective component would address student's opinions, perceptions, behaviors, awareness, and utilization of healthful environmental supports.[83] For example, if students are not aware of what foods are available or do not perceive certain foods as healthy or would not choose to eat healthy foods if they were available, then gathering information about the environment can only do so much. Overall, assessing the environment through comprehensive audits serves as a good first step but would be improved with the inclusion of a subjective component.

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Table 1. The Number of Articles Reviewed by Category

Areas of Research that Support the Usage of an Educational or Environmental Intervention	**Number of Studies Examined**
Educational Research	11
Environmental Research	7
Educational and Environmental Research	2
Techniques for Addressing Unhealthy Eating Behaviors among the College Age Population	
Educational Interventions	9
Environmental Interventions	4
Total	33

Table 2. Dining Venue Structure Descriptions

Dining Venue Structure	**Description**
Free Standing	Own cash register
Dining Hall	Meal plan or prepaid system
Food Court Style	Variety of restaurants, stations or a buffet that funnels into one set of cash registers and have shared seating

Table 3. Dining Venues Included in the Audit

Dining Venue	**Description**
Fast Food/Cafe (FF)	Orders are placed at counter/window and either picked up at counter/window or delivered to the customer's table. This also includes food trucks. They may be national chains or local establishments.
Sit-Down Restaurant (SD)	Food orders are taken and served by wait staff at the customer's table.
Dining Hall/Cafeteria/ Buffet (DH)	This is a food environment with a serving line or food stations. Consumers have multiple choices. They may differ on how a consumer pays, one price for all or by the item. This is more than a salad bar and may contain hot meal items, sides, and desserts. The buffet concept may be within a restaurant that also has menu service; if it is combined, a restaurant is evaluated separately for each classification. If all stations are funneled to one set of cash registers and do not have chain restaurants then the environment is cafeteria and is evaluated as one unit (since a patron can easily pick and choose from all stations to make their plate).
Delivery	Orders are placed by phone or online and delivered to a home or office. This audit involves a menu/website review only.

Table 4. Dining Audit Question Type

Question Type	
Customary	The distance from the center of campus, parking options, and primary descriptions of food items.
Number of Options	Number of lean meat, vegetarian, and fried food main entree options. Number of healthy beverages, healthy dessert categories, labeled whole grain products, and low sugar whole grain/high fiber cereal options.
Side Options	Side option inclusion, and the number of vegetable and fried food side options.
Availability	Fruit type availability.
Salad Bar	Number of fresh vegetables and healthy options (excluding vegetables) provided on the salad bar, and the level of appeal of the lettuce on the salad bar.
Pricing	The general facility pricing system, the pricing differences between healthy and unhealthy options, and the pricing involved with making healthy substitutions.
Serving Style	The way in which salad dressing is served, and the portion sizes of main entrees.
Health Promotion	The prevalence of nutrition information, the extent of menu planning/nutrient analysis tools available, the ability to make substitutions if inquired or listed on menus, the themes involving health on signage and the degree and number of board/ menu labeling that support healthfulness.
Other	The number of sustainability/ Green Eating signs posted, the type of plate/flatware/ trays used, the availability of to-go containers, and any other comments.

Table 5. Dining Audit Example Questions

Questions	**Scoring**					
	1	2	3	4	5	N/A
1. How are high fat condiments/salad dressing served?	Placed automatically on entrée, side, or salad	More items are served on the entrée, etc.	Served on the side by request	More items served on side/ self-served.	Self-served Served on the side.	
2. Labeled Whole Grain options Bread products: bagels, bread, English muffins, count as one option (maximum 2 if extensive variety)	None	1-2 options	3-4 options	5-6 options	> 7 options	

Count each unique option available in main or side dishes: Amaranth/Barley/Buckwheat, Millet/Oats/Quinoa Teff/Triticale/Sorghum, Brown or Wild Rice, or Wheat (Might find in Pancakes/Pizza/Tortillas)						

Table 6. Convenience Store Venue Descriptions

Convenience Venue	**Description**
Mini-Mart / Convenience Store	May be on campus or off campus; Sells food items and snacks; grocery items are limited; Usually has<2 cash registers; May or may not sell gas.
Drug store	May be on campus or off campus; Sells primarily self care items and pharmacy items; Limited food and grocery choices
Dollar/Discount Store	Off campus; Sells wide variety of household, personal care, and food items; Advertises very low prices; Not the same as high volume discount stores (i.e. Costco)
Bodega/Corner Store	Off campus; Sells mostly food products but does not specialize in any one item; Has<2 cash registers
Food Cart	Mobile food vendor - may not be in the same location daily; Serves canned/bottled drinks, packaged snack foods, etc.

Table 7. Convenience Store Audit Question Type

Customary	Distance from the center of campus, and the daily hours of operation and the average number of hours the store is on Tuesdays and Sundays.
Number of Varieties	The number of varieties of fresh, processed, and frozen fruits and vegetables, low-fat dairy or dairy substitutes, healthy grain products, and healthy prepackaged frozen entrees/meals available.
Pricing	The pricing of processed fruits, healthy prepackaged frozen entrees/meals, and variations of processed vegetables (low sodium versus regular).
Quality	The quality of the fresh fruit and vegetables.
Sizing Options	The cup size options for self-service or fountain drinks.
Promotion	The number of healthy and unhealthy products adjacent to the checkout counter and the number of healthy choice advertisements present.

Table 8. Convenience Store Audit Example Questions

Questions	**Scoring**					
	1	2	3	4	5	N/A
1. Which statement best describes the quality of the fresh fruit?	All or most of fruit is poor quality: bruised, overripe	Slightly more poor-quality fruit (bruised, overripe) than good quality	Mixed: equal proportions of poor and good quality	Slightly more good quality fruit than poor quality	All or most of fruit is good quality: fresh, not overripe, few blemishes	
2. How many varieties of low-fat dairy products or dairy substitutes are available? Examples: *Cow, soy, almond, or lactose-free milk that is low-fat (1%) or nonfat, and either plain or flavored *Low-fat or nonfat yogurt (cow's milk or soy, regular or Greek) *Low-fat cheese (single serving or brick, cow's milk or soy) or cottage cheese (less than 4% milkfat) Do NOT include: * Eggs, Butter, Cream (i.e. fat-free half and half), Muscle Milk or other high-calorie milk blends, or Ice cream or other dairy-based desserts Instructions: *Count only categories of dairy products and not individual containers (i.e. If 1% milk is available in half-gallon and quart containers, count only once). *Regular milk and flavored milk should be counted separately. *All yogurts can be counted as one choice, regardless of how many types and flavors are available. *Be sure to look on interior shelving for dairy substitutes and not just in the coolers.	None available	1-3 varieties	4-6 varieties	7-9 varieties	≥10 varieties	

Table 9. VENDING Machine Audit Question Type

Customary	Machine/product accessibility, total number of VENDING slots, type of product in the machine, and total number of occupied VENDING slots.
Snack	Total number of different snack/food available in machine, snack availability and their range of healthfulness, unlisted snack list, and unhealthy versus healthy snack prices.
Beverage	Total number of different beverages available in machine, beverage availability and their range of healthfulness, unlisted beverage list, and unhealthy versus healthy beverage prices.
Other	Average price conclusions, nutrition information or product logos present on the VENDING machine or on the products, green eating information displayed, and additional comments.

Table 10. VENDING Machine Audit Example Questions

Snack Availability Check Off Form: Healthy Dense Snack Score of 1. (Tally all the Snacks with a Score of 1.)	
Product Name (Brand) Package Size in oz.	Score
Cheese Crumb Cake (Parkside Bakery) 4	0
Chocolate Chip Supreme Cookie (Daisy's) 4	1
Cinnamon Crumb Cake (Parkside Bakery) 4	1
Total	2

Table 11. Keyword Search Terms by Topic Area for Policy Audit

Key Topic	**Search Terms**
Campus Stimulant Standards	
Smoking	Smoking, Tobacco, Stimulant
Alcohol	Alcohol, Stimulant
Chronic Disease	
Health education NOT for credit	Health Program, Education, Event
Nutrition education NOT for credit	Nutrition Education, Program, Event
Physical Education NOT for credit	Physical Education, Program, Event
Health Promotion- All forms of media	Health Magazine, Newsletter, Blog
Campus Health Fair	Health Fair

Campus Health Screening	Health Screening, Blood Pressure Reading
Chronic Disease Education	Education, Class, Diabetes, Cholesterol, Blood Pressure, Weight Management)
Healthy Habit Challenges	Weight Loss, Exercise, Competition, Prize, Incentive
Health Education FOR CREDIT	Graduation Requirement, Health Course
Nutrition Education FOR CREDIT	Graduation Requirement, Nutrition Course
Physical Education FOR CREDIT	Graduation Requirement, Physical Education Course)
Physical Activity during Work Hours	Exercise, During Work, Recreation Facility Use, Employees
Active Environment	
Active Environment	Bike lanes, Stair-wells and Sidewalks, Maintenance, Initiative, Program, Sedentary Alternatives
Closed Campus to Limit Car Traffic and Encourage Physical Activity	Campus, Driving, Traffic Restrictions
Sustainable Transportation-to limit single occupancy vehicle use	Car Pooling, Transportation to Campus
Campus Health and Wellness Department	Wellness Department, Health Department
Healthy Campus Fundraising	Fundraising, Campus, Guidelines, Restrictions, Policy
Healthy Employee Insurance Premium	Employee, Student, Health Insurance
Nutrition Living	
Healthy Food Options: Procured/Served/Marketed/Strategically Placed	Healthy Food Options, Healthy Labels, Healthy Symbols, Healthy Food Marketing
Nutrient Minimum/Maximum Standards	Nutrient Requirements, Minimal Nutritional Standards, Sodium Limits, Trans/Saturated Fat Maximums, Nutrient Limits, Nutrition Guidelines
Healthy Food Labels and Point-of-Purchase Nutrition Information	Healthy Food Options, Healthy Labels, Healthy Symbols, Healthy Food Marketing
Food Taxes/Healthy Food Subsidies	Soda or Unhealthy Food-Tax, Healthy Reduced/Free Meal/Item Program (i.e. Free Fruit with Sandwich)
Designated Eating environments and Encouraged Mindful Eating	Places to Eat, Eating on Campus, Mindful Eating Program/Class/Seminar
Local and Sustainable Food (Free-range, organic, local or fair-trade)	Local Food, Sustainable/Organic Food, Local Food Vendors/ Farmers, Campus Dining

Organic Waste Reduction and Disposal	Food and Sustainability, Food Waste on Campus
Does this campus have a nearby local farmers market? (<10 miles from campus)	City of Lincoln Farmers Market
Local Food Access On-Campus-Campus farmers market, community supported agriculture, campus gardens	Farmers Market on Campus, CSA Delivery on Campus, UNL Garden, Campus Student Food/Sustainability Groups/Organizations
Does this campus have a campus garden that grows food?	Farmers Market on Campus, CSA Delivery on Campus, UNL Garden, Campus Student Food/Sustainability Groups/Organizations
On-campus Housing	Office of Residence Life, Student Life, On-Campus Housing, Dormitories, Off-Campus Housing Policy/Exceptions
Open Campus-Students can choose to eat on/off-campus	Nearby UNL Campus Restaurants, Off-Campus Dining
Dining Hall Contract	Meal Plan Services, Dining Services, Meal Plans, Paying for Food On-Campus, Office of Residence Life, Student Services
Food Security Initiative	UNL Campus Food Bank, Food Security, UNL Campus SNAP-Supplemental Nutrition Assistance Program, Student Services-Paying for Groceries/Food

Table 12. Point Scale Descriptions and Criteria

Score	**The Point Scale Descriptions and Criteria**
0: No Point	No program, intervention or mention of this topic online. You completed a basic Google search to confirm that there is no topic initiative on this campus. For the Google search use the name of the name of the university and the key search terms for each topic.
1: Opportunity, Initiative or Notable Topic	There is an ongoing/past topic initiative, program or intervention. There might be a pledge or commitment for the topic but there is no mention of the word “policy” in any of the supporting evidence. Evidence of the initiative or program must be submitted in Qualtrics.
2. Policy	There is evidence of a written policy. The title of the policy includes the word “Policy” and the text of the policy includes information about the obesity-prevention/wellness topic. The policy must be submitted in Qualtrics.

Table 13. Policy Audit Example Question

Policy Topic	**Scoring**			
	0	1	2	99.
1a. Campus health Fair	No evidence of a campus health fair or promotion of a community health fair.	Campus advertises a local health fair; Campus has its own health fair.	A health fair policy is online that requires a health fair on campus or promotion of community health fair for campus members to attend.	This topic does not apply to this campus for this campus population.
If a "1 or 2" was selected: then the evaluator would need to answer the following sub-questions:				
1b. Regarding this policy/pledge (check all that apply):	Definition of: • Mission or vision • Specific goals or aims • Specific outcomes • Sanctions and fines. • A plan for monitoring and evaluating. • A plan for reassessing or reviewing Outline of: • A Plan for implementation Charges: • The department or individual to implement it			
1c. Campus health fair evidence:	Please provide supporting evidence for a program or policy in the form of UNL links to webpages. If you indicated that this topic was a policy, you MUST provide a web link to the policy page.			

FRESH

Table 14. FRESH General Questions and Establishment Characteristics

Questions	**Results**
Location	**n (%)**
Off Campus (within 1.5-mile radius)	14 (63.6)
On Campus	8 (36.4)
Dining Establishment Type	
Fast Food	10 (45.5)

Questions	Results
Sit Down Restaurant	6 (27.3)
Dining Hall/Cafeteria/Buffet	5 (22.7)
Delivery	1 (4.5)
Venue Organization	
Free-standing (own cash register)	17 (77.3)
Dining hall (meal plan or prepaid system)	5 (22.7)
Food court style (variety of restaurants/ stations/ buffet that funnels into one set of cash registers and have shared seating)	0 (0)
Facility Zip Code	
68503	6 (27.3)
68504	5 (22.7)
68508	3 (13.6)
68510	1 (4.5)
68588	7 (31.8)
Number of hours facility is open on Tuesdays	
1-4	1 (4.5)
5-8	6 (27.3)
9-12	13 (59.1)
13-16	1 (4.5)
17 or more	1 (4.5)
Not Applicable (closed)	0 (0)
Number of hours facility is open on Saturday	
1-4	0 (0)
5-8	2 (9.1)
9-12	7 (31.8)
13-16	3 (13.6)
17 or more	2 (9.1)
Not Applicable (closed)	8 (36.4)

Questions	Results
Number of hours facility is open on Sunday	
1-4	0 (0)
5-8	2 (9.1)
9-12	10 (45.5)
13-16	1 (4.5)
17 or more	1 (4.5)
Not Applicable (closed)	8 (36.4)

Table 15. FRESH Survey Questions

Questions	n (%)
Category I: Accessibility	
How far is the facility away from the geographic center of campus?	
Accessible only by car	0 (0)
Accessible by public transportation	2 (9.1)
Bike-able distance	1 (4.5)
2/3 mile to 1 mile	1 (4.5)
Less than 2/3 mile or 10-minute walk	17 (77.3)
Not Applicable (e.g. delivery)	1 (4.5)
Distance of dining facility from center of campus	
More than 5.2 miles	0 (0)
Between 3.9-5.1 miles	0 (0)
Between 2.6-3.8 miles	0 (0)
1.3 to 2.5 miles	2 (9.1)
Less than 1.2 mile	19 (86.4)
Not Applicable (e.g. delivery)	1 (4.5)
Parking Availability	
No parking-facility in the middle of campus	2 (9.1)

Questions	n (%)
Very limited parking (e.g. permit parking)	0 (0)
Meter Parking and/ or pay lot/garage	13 (59.1)
Street parking	0 (0)
Establishment has own parking lot/sufficient spaces	6 (27.3)
No Parking-Drive Thru	0 (0)
Not Applicable (e.g. delivery)	1 (4.5)
Category II: Healthy Entrees	
Which of the following statements most closely describes the menu at this establishment?	
Specific description of food items that primarily promotes unhealthy items	4 (18.2)
Specific description of food items that slightly promotes unhealthy items	6 (27.3)
Neutral or equal food descriptions of healthy and unhealthy foods	9 (40.9)
Specific description of food items that slightly promotes healthy items	2 (9.1)
Specific descriptions of food items that primarily promotes healthy items	1 (4.5)
How many distinct lean meat options are available?	
None Available	5 (22.7)
1-2	13 (59.1)
3-4	3 (13.6)
5-6	1 (4.5)
More than or equal to 7	0 (0)
Not Applicable (e.g. all vegetarian and/or no entrees)	0 (0)
How many vegetarian entree options are available?	
None Available	4 (18.2)
1-2	7 (31.8)
3-4	9 (40.9)
5-6	0 (0)
More than or equal to 7	2 (9.1)
Not Applicable (e.g. no entrees)	0 (0)

Questions	n (%)
Category III: Healthy Side Dishes	
Side Dishes Included with the Meal (Select all that apply question - only reporting "yes" responses for the following six statements)	**Yes** n (%)
Entrees automatically come with a side that cannot be substituted	1 (4.5)
Entrees come with a side, if requested some can be substituted	7 (31.8)
Entrees come with a side and allowed substitutions are noted	5 (22.7)
Sides can be selected by consumer from list of standard portions	11 (50.0)
Sides and portions are selected by the consumer from a list and the side does not come with the meal nor is not offered with the meal	12 (54.5)
Not Applicable (e.g. no sides)	0 (0)
What type of fruit is available?	
None Available	9 (40.9)
Only processed (added sugars/syrup) and dried fruits available	1 (4.5)
1 fresh fruit available with no added sugars/syrup	1 (4.5)
2 fresh fruits with no added sugars/syrups	4 (18.2)
More than or equal to 3 fresh fruits with no added sugars/syrup	7 (31.8)
How many vegetable side options are there?	
None Available	7 (31.8)
1-2	10 (45.5)
3-4	5 (22.7)
5-6	0 (0)
More than or equal to 7	0 (0)
Not Applicable (e.g. no sides)	0 (0)
How many labeled whole grain options are there?	
None Available	11 (50.0)
1-2	9 (40.9)
3-4	2 (9.1)
5-6	0 (0)

Questions	n (%)
More than or equal to 7	0 (0)
Not Applicable (e.g. no grains)	0 (0)
How many varieties of healthy cereal varieties are available?	
No healthy cereals are available	1 (4.5)
1-2	2 (9.1)
3-4	4 (18.2)
5-6	0 (0)
More than or equal to 7	0 (0)
Not Applicable (no cereals available)	15 (68.2)
How many fresh vegetables are there on the salad bar?	
None	0 (0)
1-4	1 (4.5)
5-8	8 (36.4)
9-12	0 (0)
More than or equal to 13	0 (0)
Not Applicable (no salad bar)	13 (59.1)
The lettuce on the salad bar was fresh and appealing.	
Strongly Disagree	0 (0)
Disagree	0 (0)
Neutral	5 (22.7)
Agree	3 (13.6)
Strongly Agree	1 (4.5)
Not Applicable (no salad bar)	13 (59.1)
How extensive are the healthy additions to the vegetables on the salad bar?	
None	0 (0)
1-4	9 (40.9)
5-8	0 (0)

Questions	n (%)
9-12	0 (0)
More than or equal to 13	0 (0)
Not Applicable (no salad bar)	13 (59.1)
How are high fat sauces/dressings served?	
Placed automatically on entree or sandwich	2 (9.1)
Placed automatically on side dish	0 (0)
Placed automatically on salad	1 (4.5)
Served on the side by request	4 (18.2)
Self-served or served on the side automatically	15 (68.2)
Not Applicable (no condiments)	0 (0)
Category IV: Healthy Beverages	
How many healthy beverage categories are offered?	
None	0 (0)
1-2	7 (31.8)
3-4	11 (50.0)
5-6	4 (18.2)
More than or equal to 7	0 (0)
Category V: Healthy Desserts	
How many healthy dessert categories are offered?	
None	7 (31.8)
1 option	3 (13.6)
2 options	0 (0)
3 options	5 (22.7)
More than or equal to 4	0 (0)
Not Applicable (No desserts offered)	7 (31.8)
Category VI: Nutrition Information	
Nutrition information provided	

Questions	n (%)
None available	11 (50.0)
Information provided online only	4 (18.2)
Information visible at site: provided in take-away sources, by request, and/or via scannable link/kiosk	0 (0)
Information visible at site: provided at point of purchase, menu, and/or board	5 (22.7)
Information provided on site and at least one additional source	2 (9.1)
Menu planning/ nutrient analysis tools	
No menu planning tools available	21 (95.5)
Only static nutrition information for each menu item available	1 (4.5)
Simple nutrient analysis tool to show total fat or calories for a meal choice	0 (0)
Can adjust serving sizes to adjust contribution of items selected to overall analysis	0 (0)
Dynamic menu nutrient analysis/menu tool; allows you to delete sauces or add more nutrients in designing a meal	0 (0)
Substitutions (Select all that apply question - only reporting "yes" responses for the following five statements)	**Yes** n (%)
No substitutions are allowed	0 (0)
Some substitutions require an extra fee	5 (22.7)
Substitutions are available/marketed on terms of disease state (gluten-free)	11 (50.0)
Substitutions for some items are free of charge	22 (100.0)
Ability to make substitutions is advertised or promoted	7 (31.8)
Category VII: Healthy Eating Facilitators and Barriers	
What kinds of signage are posted?	
All unhealthy signage that encourages overeating and/or unhealthy food choices	0 (0)
Majority unhealthy signage with limited healthy signage	6 (27.3)
Neutral, equal, or no healthy signs nor unhealthy signage	14 (63.6)
Majority healthy signage with limited unhealthy signage	2 (9.1)
All healthy signage that encourages healthy eating behaviors and/or healthy food choices	0 (0)
Board/Menu labeling	
All unhealthy labels that encourages overeating and/or unhealthy food choices	0 (0)

Questions	n (%)
Majority unhealthy labels with limited healthy labels	1 (4.5)
Neutral, equal, and/or no labels to encourage unhealthy or healthy choices	19 (86.4)
Majority healthy labels with limited unhealthy labels	2 (9.1)
All healthy labels that encourages healthy eating behaviors and/or healthy food choices	0 (0)
Portion Sizes of Main Entrees (Select all that apply question - only reporting "yes" responses for the following)	**Yes** n (%)
There are no supersize or extra-large portion sizes available	8 (36.4)
There are small, medium, and large portion size options	8 (36.4)
Option to share portions available (e.g. Dinner for two)	9 (40.9)
Option for smaller size portions available	1 (4.5)
There is no charge to split or share a meal	12 (54.5)
Not Applicable (e.g. no entrees/ dining hall/ cafeteria/buffet)	5 (22.7)
Which is the best description of the largest cup size available for fountain drinks?	
3 or more cup sizes available larger than 16 oz. OR every size available is larger than 16 oz.	0 (0)
3 cup sizes available larger than 16 oz.	1 (4.5)
2 cup sizes available larger than 16 oz.	5 (22.7)
1 cup size available larger than 16 oz.	9 (40.9)
Largest cup size available is 16 oz. and smaller	7 (31.8)
Not Applicable (e.g. no fountain beverages)	0 (0)
Fried food main & side menu options	
More than 7	1 (4.5)
5-6	0 (0)
3-4	7 (31.8)
1-2	11 (50.0)
None available	3 (13.6)
General facility pricing system (Select all that apply question - only reporting "yes" responses for the following six statements)	**Yes** n (%)
All-you can eat buffet or one meal card swipe for all you can eat	5 (22.7)

Questions	n (%)
Combo meals (add a side or drink at a reduced cost than items would total individually)	6 (27.3)
One meal card swipe for one portioned meal	1 (4.5)
Items are priced individually	10 (45.5)
Items priced by weight	0 (0)
Not Applicable	0 (0)
Price differences for comparable individually priced meals or items	
Healthy options cost more than unhealthy options and additional costs to make healthy substitutions	0 (0)
Healthy options cost more than unhealthy options and no additional costs to make healthy substitutions	2 (9.1)
Healthy options and unhealthy options equally priced	11 (50.0)
Healthy options cost less than unhealthy options with additional costs to make healthy substitutions	0 (0)
Healthy options cost less than unhealthy options and no additional costs to make healthy substitutions	0 (0)
Not Applicable (e.g. no items are individually priced/ dining hall/buffet)	9 (40.9)
Pricing of items by weight for a comparable weight (per pound)	
Most healthier options cost more	0 (0)
Many healthier options cost more	1 (4.5)
All items priced the same	1 (4.5)
Many healthier options cost less	0 (0)
Most healthier options cost less	0 (0)
Not Applicable (nothing priced by weight)	20 (90.9)
Category VIII: Sustainability/ Green Eating Signage	
Sustainability/ Green Eating Signage	
No sustainability signage/labels on site or information online	14 (63.6)
Sustainability information online only	0 (0)
1 type of sustainability signage/label on site	8 (36.4)
2 types of sustainability signage/label on site	0 (0)

Questions	n (%)
3 or more types of sustainability signage/label on site	0 (0)
Category IX: Sustainability	
Flatware Type (Select all that apply question - only reporting "yes" responses for the following six statements)	**Yes** n (%)
Disposable plates	8 (36.4)
Disposable flatware	9 (40.9)
Reusable plastic plates	9 (40.9)
Reusable china	7 (31.8)
Reusable plates with nutrition information	1 (4.5)
Not Applicable (e.g. delivery)	1 (4.5)
To-go container Type (Select all that apply question - only reporting "yes" responses for the following six statements)	**Yes** n (%)
Paper to-go containers	2 (9.1)
Styrofoam/ plastic disposable to-go containers	12 (54.5)
Reusable to-go containers	0 (0)
Reusable trays	4 (18.2)
Tray-less	2 (9.1)
Not Applicable (e.g. delivery/dining hall/cafeteria)	6 (27.3)

Table 16. FRESH Score Comparisons

Dining Type	Survey Categories[(a)]	UNL n (%)	UNL M±SD	All Institutions n (%)	All Institutions M±SD
Fast food/café	Healthfulness of Foods	10 (45.5)	15.90±4.1	193 (45.8)	20.97±7.33
	Dining Environment Supports		19.60±4.6		24.44±5.86
Sit-down restaurant	Healthfulness of Foods	6 (27.3)	27.17±5.7	153 (36.3)	21.41±5.22
	Dining Environment Supports		18.67±2.7		22.77±4.63
	Healthfulness of Foods	5 (22.7)	38.20±1.8	49 (11.6)	42.36±10.4

Dining-hall/cafeteria/buffet	Dining Environment Supports		26.60±0.5		33.14±7.50
Delivery	Healthfulness of Foods	1 (4.5)	13.00	26 (6.2)	16.92±4.35
	Dining Environment Supports		21.00		16.96±4.3
Healthfulness of Foods Overall Average			23.91±10.2		25.4±6.8
Dining Environment Supports Overall Average			21.0±4.5		24.3±5.6
[a] Note: The maximum score possible for each category: Healthfulness of Foods (60) & Dining Environment Supports (50)					

SHELF Audit

Table 17. SHELF General Questions and Store Characteristics

Questions	Results
Zip code of store location	n (%)
68503	13 (33.3)
68504	7 (17.9)
68508	7 (17.9)
68521	5 (12.8)
68588	7 (17.9)
Type of Facility	
Convenience Store/Mini-Mart	31 (79.5)
Drug Store	4 (10.3)
Dollar/Discount Stores	4 (10.3)
Bodega/Corner Store	0 (0)
Food Cart	0 (0)
Facility Location	
Off Campus	25 (64.1)

On Campus	14 (35.9)

Table 18: SHELF Survey Questions

Questions	n (%)
Category 1: Healthy Food Availability	
How many varieties of fresh fruit are available?	
None Available	26 (66.7)
1-3	8 (20.5)
4-6	5 (12.8)
7-9	0 (0)
More than or equal to 10	0 (0)
Not Applicable	0 (0)
Which statement best describes the quality of the fresh fruit?	
All or most of fruit is poor quality: bruised or overripe	0 (0)
Slightly more poor-quality fruit (bruised or overripe) than good quality	0 (0)
Mixed: equal proportions of poor and good quality fruit	0 (0)
Slightly more good quality fruit than poor quality	0 (0)
All or most of fruit is good quality: fresh, not overripe, few blemishes	7 (17.9)
Not Applicable (No fresh fruit offered)	32 (82.1)
How many varieties of processed fruits are available?	
None Available	13 (33.3)
1-5	16 (41.0)
6-10	8 (20.5)
11-15	2 (5.1)
More than or equal to 16	0 (0)
Not Applicable	0 (0)
Which statement best describes the pricing of processed fruits?	
No light variety available	17 (43.6)
Light varieties are all more expensive than regular	1 (2.6)

Questions	n (%)
Light and Regular varieties are the same price OR at least 1 fruit, but not all, has a light version that is more expensive than regular	3 (7.7)
At least 1 fruit, but not all, has a light version that is less expensive than regular	0 (0)
Light varieties are all less expensive than regular OR all varieties available are light options	2 (5.1)
Not Applicable	16 (41.0)
How many varieties of frozen fruits are available?	
None Available	36 (92.3)
1-3	0 (0)
4-6	0 (0)
7-9	0 (0)
More than or equal to 10	0 (0)
Not applicable (e.g. no freezer area)	3 (7.7)
How many varieties of fresh vegetables are available?	
None Available	31 (79.5)
1-3	7 (17.9)
4-6	0 (0)
7-9	0 (0)
More than or equal to 10	0 (0)
Not applicable	1 (2.6)
Which statement best describes the quality of the fresh vegetables?	
All or most of the vegetables are of poor quality: bruised, overripe, wilted	0 (0)
Mixed: More vegetables are poor quality than good quality	0 (0)
Mixed: equal proportions of good and poor quality	0 (0)
Mixed: more vegetables are good quality than poor quality	1 (2.6)
All or most of vegetables are good quality: fresh, not overripe, few blemishes	6 (15.4)
Not Applicable (no fresh vegetables available)	32 (82.1)
How many varieties of processed vegetables are available?	
None Available	19 (48.7)

Questions	n (%)
1-3	11 (28.2)
4-6	7 (17.9)
7-9	0 (0)
More than or equal to 10 Varieties Available	2 (5.1)
Not Applicable	0 (0)
Which statement best describes the pricing of processed vegetables?	
No low sodium version available	19 (48.7)
All low sodium varieties are more expensive than the regular versions	0 (0)
Low sodium and regular varieties are the same price OR at least 1, but not all, low sodium variety is more expensive than regular	2 (5.1)
Mixed Pricing: at least 1, but not all, low sodium variety is less expensive than the regular	0 (0)
All low sodium varieties are less expensive than the regular versions OR all available varieties are low sodium	0 (0)
Not Applicable	18 (46.2)
How many varieties of frozen vegetables are available?	
None Available	31(79.5)
1-3	1 (2.6)
4-6	0 (0)
7-9	0 (0)
More than or equal to 10	0 (0)
Not Applicable	7 (17.9)
How many varieties of low-fat dairy products or dairy substitutes are available?	
None Available	10 (25.6)
1-3	20 (51.3)
4-6	8 (20.5)
7-9	1 (2.6)
More than or equal to 10	0 (0)
Not Applicable	0 (0)

Questions	n (%)
Which is the best description of the largest cup size available for self-service or fountain drinks?	
More than or equal to 3 up sizes available larger than 16 ounces OR all cup sizes available are larger than 16 ounces	8 (20.5)
3 cup sizes available larger than 16 ounces	7 (17.9)
2 cup sizes available larger than 16 ounces	6 (15.4)
1 cup size available larger than 16 ounces	1 (2.6)
Largest cup size available is 16 oz. or smaller	0 (0)
Not Applicable (No Drink Fountain)	17 (43.6)
How many varieties of the following healthy staple foods (e.g. high fiber bread products) are available?	
None Available	12 (30.8)
1-5	23 (59.0)
6-10	3 (7.7)
11-15	0 (0)
More than or equal to 16	0 (0)
Not Applicable	1 (2.6)
How many varieties of healthier prepackaged frozen entrees/meals are available?	
None Available	24 (61.5)
1-3	11 (28.2)
4-6	2 (5.1)
7-9	1 (2.6)
More than or equal to 10	0 (0)
Not Applicable	1 (2.6)
Which statement best describes the pricing of the prepackaged frozen entrees/meals?	
No healthy options available	14 (35.9)
All healthier versions cost more than regular versions	0 (0)
Healthier and regular versions are the same price OR at least 1, but not all, healthier versions cost more than regular versions	12 (30.8)

Questions	n (%)
At least one, but not all, healthier versions cost less than regular versions	1 (2.6)
All healthier versions cost less than regular versions	0 (0)
Not Applicable (no frozen entrees available)	12 (30.8)
Category II. Checkout Environment	
How many healthy products are adjacent to the checkout counter?	
None Available	25 (64.1)
1-3	14 (35.9)
4-6	0 (0)
7-9	0 (0)
More than or equal to 10	0 (0)
Not Applicable	0 (0)
How many unhealthy products are adjacent to the checkout counter?	
More than or equal to 10 varieties	9 (23.1)
7-9	0 (0)
4-6	12 (30.8)
1-3	18 (46.2)
None Available	0 (0)
Not Applicable	0 (0)
Category III. Food Shopping Environment	
Approximately how far is this store from the geographic center of campus?	
Accessible by car only	1 (2.6)
Accessible by public transportation	6 (15.4)
Bike-able distance	3 (7.7)
2/3 mile to 1 mile	5 (12.8)
Less than or equal to 2/3 of one mile (10-minute walk)	24 (61.5)
Not Applicable	0 (0)
What programs are in use to advertise healthy choices?	

Questions	n (%)
None present	35 (89.7)
One program in use	2 (5.1)
Two programs in use	2 (5.1)
Three programs in use	0 (0)
Four or more programs in use	0 (0)
Not Applicable	0 (0)
Category IV. Daily Hours of Operation	
How many hours is the store open on Tuesdays? (store only; pharmacy not included)	
Less than 3	0 (0)
4-9	4 (10.3)
10-12	1 (2.6)
13-15	14 (35.9)
More than or equal to 16	20 (51.3)
Not Applicable (closed)	0 (0)
How many hours is the store open on Sundays? (store only; pharmacy not included)	
Less than 3	0 (0)
4-9	5 (12.8)
10-12	7 (17.9)
13-15	6 (15.4)
More than or equal to 16	18 (46.2)
Not Applicable (closed)	3 (7.7)

Table 19. SHELF Score Comparisons

Class (score range)	UNL n (%)	UNL M ± SD	All Institutions n (%)	All Institutions M ± SD
1: Least Healthy (0-11)	22 (56.4)	6.95±2.9	34 (29.7)	7.4±2.8
2: Moderately Healthy (12-21)	15 (38.5)	15.47±2.2	52 (44.9)	16.4±2.7
3: Most Healthy (score range 22-52)	2 (5.1)	24.5±0.71	29 (25.4)	30.6±8.4

Totals	39 (100)	11.13±5.8	116 (100)	18.1±4.6

Table 20. VENDING General Questions and Machine Characteristics

Questions	**Results**
Primary descriptor for building	**n (%)**
Residential	1 (3.4)
Recreation Facility	4 (13.8)
Academic	21 (72.4)
Library	1 (3.4)
Shopping	2 (6.9)
Machine Accessibility	
Not Appropriately Accessible	0 (0)
Somewhat Accessible	0 (0)
Appropriately Accessible	29 (100.0)
The total number of available VENDING slots	
1-10	1 (3.4)
11-20	5 (17.2)
31-40	14 (48.3)
41-50	9 (31.0)
Type of product in the machine (Select all that apply question - only reporting "yes" responses for the following)	**Yes n (%)**
Snack	14 (48.3)
Prepared foods	4 (13.8)
Cold beverage	15 (51.7)
Hot Beverage	0 (0)
Ice Cream Novelties	0 (0)
Total number of occupied VENDING slots	
1-10	1 (3.4)
11-20	5 (17.2)

Questions	Results
21-30	1 (3.4)
31-40	13 (44.8)
41-50	9 (31.0)
Total number of different snack/food available in machine (Not including beverage machine--there is one beverage and prepared food machine that is included*)**	
15-20	1 (6.7)
31-35	4 (26.7)
36-40	2 (13.3)
41-45	7 (46.7)
46-50	1 (6.7)
Total number of different beverages available in machine (Not including snack machine--there is one beverage and prepared food machine that is included*)**	
1-5	1 (6.7)
6-10	9 (60.0)
16-20	2 (13.3)
21-25	1 (6.7)
26-30	2 (13.3)

Table 21: Frequency of Machines That Have Items with a Healthy Dense Snack Score of 0

Number of Items Available per Machine	Machines n (%)
Zero Items	
Gum *(various flavors)*	19 (65.5)
Mint *(various flavors)*	18 (62.1)
One Item	
Gum *(various flavors)* Mint *(various flavors)*	1 (3.4)
Two Items	
Gum *(various flavors)*	6 (20.7)
Mint *(various flavors)*	3 (10.3)
Three Items	
Gum *(various flavors)*	0 (0)
Mint *(various flavors)*	2 (6.9)
Four Items	

Number of Items Available per Machine	Machines n (%)
Gum *(various flavors)*	0 (0)
Mint *(various flavors)*	5 (17.2)
Five Items	
Gum *(various flavors)*	3 (10.3)
Mint *(various flavors)*	0 (0)

Table 22: Healthy Dense Snack Score 0 Total

Products Available	Machines n (%)
0	18 (62.1)
6	4 (13.8)
5, 7	3 (10.3)
1	1 (3.4)
Total (61)	29 (100.0)

Table 23: Frequency of Machines That Have Items with a Healthy Dense Snack Score of 1

Number of Items Available per Machine	Machines n (%)
Zero Items	
Beef Pot Pie *(Banquet) 7 oz.,* Cheez-It *(Sunshine) 1.48/2 oz.,* Chocolate Chip Supreme Cookie *(Daisy's) 4 oz.,* Cinnamon Crumb Cake *(Parkside Bakery) 4 oz.,* Chocolate Bells *(Mrs. Freshley's) 3.5 oz.,* Crème Sandwiches *(Snackwells) 1.75 oz.,* Kit Kat Bar *(Hershey's) 2.04 oz.,* Nutter Butter Cookies *(Nabisco) 1.9 oz.,* Oatmeal Cream Pie *(Little Debbie's) 2 oz.,* Shortbread Cookies *(Blueberry, Strawberry, or Raspberry) (Knotts Berry Farm) 2.0/3.0 oz.,* Take 5 *(Hershey's) 1.75 oz.,* Twinkies *(Hostess) 2 oz.* Oreo Cookies *(Nabisco) 2.4 oz.*	29 (100.0)
Cheese Crumb Cake *(Parkside Bakery) 4 oz.*	28 (96.6)
Zingers Devil's Food *(Hostess) 3.81 oz.*	27 (93.1)
Reese's Nutrageous *(Hershey's) 1.66 oz.*	25 (86.2)
Other	21 (72.4)
Mini Sandwich Cremes Vanilla Cookies *(Grandma's) 3.71/4.1 oz.* Snickers *(Mars) 1.86/2.07 oz.* Twix *(Mars) 2 oz.,*	16 (55.2)
One Item	

Number of Items Available per Machine	Machines n (%)
Mini Sandwich Crèmes Vanilla Cookies *(Grandma's) 3.71/4.1 oz.* Snickers *(Mars) 1.86/2.07* Twix *(Mars) 2 oz.*	13 (44.8)
Other	8 (27.6)
Reese's Nutrageous *(Hershey's) 1.66 oz.*	4 (13.8)
Zingers Devil's Food *(Hostess) 3.81 oz.*	2 (6.9)
Cheese Crumb Cake *(Parkside Bakery) 4 oz.*	1 (3.4)

Table 24: Healthy Dense Snack Score 1 Total

Products Available	Machines n (%)
0	15 (51.7)
4	8 (27.6)
3	3 (10.3)
2, 5, 6	1 (3.4)
Total (54)	29 (100.0)

Table 25: Frequency of Machines That Have Items with a Healthy Dense Snack Score of 2

Number of Items Available Per Machine	Machines n (%)
Zero Items	
Almond Joy *(Hershey's) 1.61 oz.* Apple Cinnamon Muffin *(Otis Spunkmeyer) 4 oz.* Butterfinger Minis *(Nestle) 3.5 oz.* Cadbury Caramello *(Hershey's) 1.6/1.7 oz.* Chester's Fries (Flamin' Hot) *(Frito Lay) 1.75 oz.* Chocolate Chip Cookie *(Grandma's) 2.5 oz.* Combos (Cheddar Cheese or Pizzeria Pretzel) *(Mars) 1.7/1.8 oz.* Fig Newtons Bar *(Nabisco) 2 oz.* Flavor Doubles *(Snyder's Hanover) 2.25 oz.* Hershey's Milk Chocolate Candy Bar (Plain) *(Hershey's) 1.45/1.55 oz.* Hershey Milk Chocolate with Almonds *(Hershey's) 1.45 oz.* Hot Fries *(Andy Capp's) 1.5/3.5 oz.* Junior Mints *(Tootsie Roll) 1.84 oz.* King Bing Bar *(Palmer's) 2.85 oz.* Lorna Doone Shortbread Cookie *(Nabisco) 1.5 oz.* M & M Cookies (Bite Size) *(Hershey's) 1.8 oz.* Milano Cookies *(Pepperidge Farm) 1.5 oz.* Mini Chocolate Chip Cookies *(Grandma's) 3 oz.*	29 (100.0)

Number of Items Available Per Machine	Machines n (%)
Mini Donuts (Powdered and Chocolate) *(Mrs. Freshley's) 2.5 oz.* Munchies Peanut Butter on Toast Crackers *(Frito-Lay) 1.42 oz.* Nekot Crackers (Chocolate) *(Lance) 3 oz.* Nutter Butter Cookies *(Nabisco) 5.25 oz.* Nutty Bars *(Little Debbie's) 2 oz.* Oatmeal Cookie *(Grandma's) 2.5 oz.* Payday *(Hershey's) 2 oz.* Peanut Butter and Cheese Crackers *(Lance) 1.48 oz.* Peanut Butter Crispy *(Hudson Baking Company) 3 oz.* Pretzel Pieces (Honey Mustard & Onion or Cheddar Cheese) *(Snyder's Hanover) 2.25 oz.* Reese's Fast Break Candy Bar *(Hershey's) 2 oz.* Reese's Nutrageous *(Hershey's) 1.8 oz.* Reese's Pieces *(Hershey's) 1.53 oz.* Ritz Toasted Chips (Sour Cream and Onion) *(Nabisco) 1.75 oz.* Ruger's Flavored Wafers (Vanilla or Strawberry) *(The Reward)1.05/2.12 oz.* Twix (Plain and Peanut Butter) *(Mars) 1.75/1.79 oz.* Vanilla Crème Cookies *(Lance) 1.65 oz.* Vanilla Sandwich Cookies *(Grandma's) 3.71 oz.* Whatchamacallit *(Wonka) 3 oz.* Zero Candy Bar *(Hershey's) 1.85 oz.* Zoo Animal Crackers *(Austin's) 2/2.07 oz.* Other	
Crunch Bar *(Nestle) 1.9 oz.* Popcorn *(Butter Lover's) (Act II) 2.75 oz.* Snickers (Almond or Peanut Butter Squared) *(Mars) 2 oz.*	28 (96.6)
Baby Ruth *(Nestle) 2.1 oz.* Butterfinger *(Nestle) 2.1 oz.* Peanut Butter Cookie *(Grandma's) 2.5 oz.* Gardetto Original *(General Mills) 1.75 oz.*	27 (93.1)
Bugles (Plain and Nacho Cheese) *(General Mills or Tom's) 2 oz.*	26 (89.7)
Kit Kat (Extra Crispy) *(Hershey's) 1.61 oz.* Milky Way *(Mars) 1.84/2.05 oz.*	24 (82.8)
Twizzlers (Original) *(Hershey's) 2.5 oz.*	22 (75.9)
3 Musketeers *(Mars) 2/2.13 oz.* Reese's Peanut Butter Cups *(Hershey's) 1.5/2.1 oz.*	21 (72.4)
Chocolate Chip Cookies *(Famous Amos) 3 oz.* Doritos (Cool Ranch, Four Cheese, or Nacho Cheese) *(Frito Lay) 1.75 oz.* Fritos (Corn Chips, Chili Cheese, Honey BBQ or Spicy Jalapeno Twists) *(Frito Lay) 2/2.1 oz.*	17 (58.6)
M & M's (Plain or Peanut Butter) *(Hershey's) 1.69/1.74 oz.*	16 (55.2)
Cheetos (Crunchy, Flamin' Hot Lime, or Jalapeno Cheddar) *(Frito Lay) 1.5/2 oz.*	15 (51.7)

Number of Items Available Per Machine	Machines n (%)
One Item	
Cheetos (Crunchy, Flamin' Hot Lime, or Jalapeno Cheddar) *(Frito Lay) 1.5/2 oz.*	14 (48.3)
Chocolate Chip Cookies *(Famous Amos) 3 oz.* Doritos (Cool Ranch, Four Cheese, or Nacho Cheese) *(Frito Lay) 1.75 oz.* Fritos (Corn Chips, Chili Cheese, Honey BBQ or Spicy Jalapeno Twists) *(Frito Lay) 2/2.1 oz.* M & M's (Plain or Peanut Butter) *(Hershey's) 1.69/1.74 oz.*	12 (41.4)
3 Musketeers *(Mars) 2/2.13 oz.* Reese's Peanut Butter Cups *(Hershey's) 1.5/2.1 oz.*	8 (27.6)
Twizzlers (Original) *(Hershey's) 2.5 oz.*	7 (24.1)
Kit Kat (Extra Crispy) *(Hershey's) 1.61 oz.* Milky Way *(Mars) 1.84/2.05 oz.*	5 (17.2)
Bugles (Plain and Nacho Cheese) *(General Mills or Tom's) 2 oz.*	3 (10.3)
Baby Ruth *(Nestle) 2.1 oz.* Butterfinger *(Nestle) 2.1 oz.* Gardetto Original *(General Mills) 1.75 oz.* Peanut Butter Cookie *(Grandma's) 2.5 oz.*	2 (6.9)
Crunch Bar *(Nestle) 1.9 oz.* Popcorn *(Butter Lover's) (Act II) 2.75 oz.* Snickers (Almond or Peanut Butter Squared) *(Mars) 2 oz.*	1 (3.4)
Two Items	
M & M's (Plain or Peanut Butter) *(Hershey's) 1.69/1.74 oz.*	1 (3.4)

Table 26. Healthy Dense Snack Score 2 Total

Products Available	Machines n (%)
0	15 (51.7)
9	4 (13.8)
6, 8	3 (10.3)
7	2 (6.9)
5, 13	1 (3.4)
Total (110)	29 (100.0)

Table 27: Frequency of Machines That Have Items with a Healthy Dense Snack Score of 3

Number of Items Available per Machine	Machines n (%)
Zero Items	
100 Grand Bar *Nestle 1.5 oz.* Almond Joy *Hershey's 2 oz.* Apple Danish *Mrs. Freshley's 4 oz.* Breakstone Cottage Cheese *(Kraft Foods) 4 oz.* Buddy Bars *Mrs. Freshley's 3 oz.* Bugles General *Mills or Tom's 1/1.48 oz.* Cheetos (Puffed) *Frito Lay 1.375 oz.* Cheez It Crackers (Baked White Cheddar) *Sunshine 3 oz.* Chex Mix (Traditional and Cheddar) *General Mills 2.5 oz.* Chips Ahoy *Chips Ahoy 1.4 oz.* Chocolate Chip Cookie *Sweet Pete's 3.5 oz.* Chocolate Chip Muffin *(Otis Spunkmeyer) 4 oz.* Chocolate Cupcakes *Mrs. Freshley's 4 oz.* Cinnamon Roll *Cloverhill Pastries 4 oz.* Combos (Cheddar Cheese) *Mars 1.06 oz.* Cookies and Cream Candy Bar *Hershey's 1.55 oz.* Corn Chips (Barbeque) *Tom's 1.38 oz.* Crackers (Cheddar Cheese) *Lance 1.5 oz.* Cream Cheese Bagel *Bagel Time 4.6 oz.* Danish (Cinnamon Supreme or Apple) *Broad Street Bakery 5 oz.* Doritos (Buffalo Ranch or Nacho Cheese) *Frito Lay 1.38 oz.* Duplex Crèmes Cookies *Uncle Al's 5 oz.* Ham and Swiss Cheese Sandwich *Outtakes 4.5 oz.* Hard Candy *Jolly Rancher 3 oz.* Hershey's Milk Chocolate Bar (Almond) *Hershey's 1.85 oz.* Hickory Smoked Jerky *(All American Value) 1.1 oz.* Honey Bun (Jumbo) *Mrs. Freshley's 4 oz.* Jalapeno Poppers *Herr's 1 oz.* Mini Pretzels *Snyder's Hanover 3 oz.* Munchies Sandwich Crackers (Peanut Butter) *Frito Lay 1.42 oz.* Peanut Butter Cookies *Lance 1.75 oz.* Potato Chips (Bacon Cheddar, Vinegar and Sea Salt, and Plain) *Tom's 1 oz.* Pretzels (Plain) *Snyder's Hanover 2.25 oz.* Pringles (Original, Cheddar Cheese, or Sour Cream and Onion) *Pringles 1.41 oz.* Snackwells Vanilla Cookie Sandwich *Nabisco 1.7 oz.* Supreme French Bread Pizza *(Pizza Parlor) 5.3 oz.* Tootsie Roll Twin Bar Pack *Tootsie Roll 2 oz.* Tuna Salad with Crackers *(Bumblebee) 3.5 oz.* Twizzlers Bites (Cherry) *Hershey's 1.85 oz.* Van-O-Lunch Cookies *Lance 3 oz.* White Cheddar Popcorn *Smart Food 1 oz.* Other	29 (100.0)
Cheese Danish *Cloverhill Pastries 4 oz.* Cheez-It Crackers *(Sunshine) 1.5* Gummy Bears or Worms (Regular or Sour) *Sconza 4 oz.*	28 (96.6)

Number of Items Available per Machine	Machines n (%)
Junior Mints *Tootsie Roll 4 oz.* Party Mix (Original) *Keystone 1.5/2.25 oz.* Salsitas Spicy *Salsa El Sabroso 1.5 oz.*	
Honey Bun (Glazed) *Cloverhill Pastries 4 oz.* Reese's Pieces *Hershey's 3.5 oz.*	27 (93.1)
Mike and Ike *Just Born Candy 2.12 oz.*	25 (86.2)
Funyuns *Frito Lay 1.25 oz.*	23 (79.3)
Nut Roll (Salted) *Pearsons 1.8 oz.* Triple Salami *Trail's Best 1.5 oz.*	22 (75.9)
Chocolate Brownie Cookie *Grandma's 2.5 oz.* Oreo *(Nabisco) 1.8 oz.* Poptarts (Brown Sugar, Hot Fudge Sundae, and Smores) *Kellogg's 3.52/3.67 oz.*	21 (72.4)
M & M's (Peanut) *Hershey's 1.74 oz.*	19 (65.5)
Elfin Crackers *Keebler 2.12 oz.*	18 (62.1)
Rold Gold Pretzels *(Frito-Lay) 2 oz.*	17 (58.6)
Friday's Potato Skins (Bacon Cheddar) *TGI Friday's 1.75/1.95/3 oz.*	15 (51.7)
One Item Available per Machine	
Friday's Potato Skins (Bacon Cheddar) *TGI Friday's 1.75/1.95/3 oz.*	14 (48.3)
Rold Gold Pretzels *(Frito-Lay) 2 oz.*	12 (41.4)
Elfin Crackers *Keebler 2.12 oz.*	11 (37.9)
M & M's (Peanut) *Hershey's 1.74 oz.*	10 (34.5)
Chocolate Brownie Cookie *Grandma's 2.5 oz.* Oreo *(Nabisco) 1.8 oz.* Poptarts (Brown Sugar, Hot Fudge Sundae, and Smores) *Kellogg's 3.52/3.67 oz.*	8 (27.6)
Nut Roll (Salted) *Pearsons 1.8 oz.* Triple Salami *Trail's Best 1.5 oz.*	7 (24.1)
Funyuns *Frito Lay 1.25 oz.*	6 (20.7)
Mike and Ike *Just Born Candy 2.12 oz.*	4 (13.8)
Honey Bun (Glazed) *Cloverhill Pastries 4 oz.* Reese's Pieces *Hershey's 3.5 oz.*	2 (6.9)

Number of Items Available per Machine	Machines n (%)
Cheese Danish *Cloverhill Pastries 4 oz.* Cheez-It Crackers *(Sunshine) 1.5* Gummy Bears or Worms (Regular or Sour) *Sconza 4 oz.* Junior Mints *Tootsie Roll 4 oz.* Party Mix (Original) *Keystone 1.5/2.25 oz.* Salsitas Spicy *Salsa El Sabroso 1.5 oz.*	1 (3.4)

Table 28: Healthy Dense Snack Score 3 Total

Products Available	Machines n (%)
0	15 (51.7)
8	5 (17.2)
6	3 (10.3)
9, 10	2 (6.9)
4, 5	1 (3.4)
Total (105)	29 (100.0)

Table 29: Frequency of Machines That Have Items with a Healthy Dense Snack Score of 4

Number of Items Available per Machine	Machines n (%)
Zero Items	
Baked Doritos (Nacho) *Frito Lay 1.125/1.38/1.75 oz.* Beef Jerky (Teriyaki Flavor) *Trail's Best 1 oz.* Buddy Bars (Peanut Butter) *Mrs. Freshley's 3 oz.* Cheese Curls (Baked) *Snyder's Hanover 7 oz.* Cheetos (Baked) *Frito Lay 1.5 oz.* Chuckles Jelly Candy *Chuckles 2 oz.* Classic Plain Bagel with Cream Cheese *(Toufayan Bakeries) 4.3 oz.* Corn Nuts (Barbeque, Ranch, or Chile Picante) *Corn Nuts 1.4 oz.* Crackers (Whole Grain) *Lance 1.52 oz.* Fish and Cheese Sandwich *(Fast Choice) 5.75 oz.* Friday's Potato Skins (Bacon Cheddar) *TGI Friday's 1 oz.* Funyuns *Frito Lay 1 oz.* Gobstopper *Wonka 1.77 oz.* Good 'n Plenty Licorice Candy *Hershey's 1.8 oz.* Grandito Burrito *(Don Miguel) 5 oz.* Gummy Worms *(Original Gummi Factory) 1.5 oz.* Hot Fries *Andy Capp's 1.5 oz.*	29 (100.0)

Number of Items Available per Machine	Machines n (%)
Jolly Rancher Sour Bites *Jolly Rancher 2 oz.* Lays Kettle Cooked Potato Chips (Jalapeno) *Frito Lay 1.5 oz.* M & M's (Pretzel) *Hershey's 1.14 oz.* Macaroni and Cheese *(Michelina's) 7.5 oz.* Munchies (Plain or Flamin' Hot) *Frito Lay 1.75 oz.* Old Market Ham & Cheese *Tielke 6.5 oz.* Payday *Hershey's 2.4 oz.* Peanut Butter Crackers (Plain and Whole Grain) *Lance 1.27/1.5 oz.* Peanut Butter Crackers *Frito Lay or Austin 1.38 oz.* Peppermint Patties *York 1.43 oz.* Planters Trail Mix Spicy Nuts and Cajun Sticks *(Kraft Foods) 2 oz.* Potato Chips (Plain or Garlic and Herb) *Dirty 2 oz.* Potato Chips (Zesty Jalapeno) *Dale Jr. Foods 1.4 oz.* Potato Chips (Barbeque) *Tom's 1 oz.* Pretzel Twists (Honey Wheat) *Snyder's Hanover 1.75 oz.* Pringles (Originial, Cheddar Cheese, or Sour Cream and Onion) *Pringles 1.3 oz.* Puff Curls *Jax 0.7 oz.* Quaker Oatmeal Bar (Chocolate Chip or Brown Sugar & Cinnamon) *Frito Lay 1.4 oz.* Quaker Snack Mix (Baked Cheddar) *Frito Lay 1.75 oz.* Raisinets *Nestle 1.58 oz.* Sea Salt Chips *Miss Vickies 1.75 oz.* Sour Jacks (Watermelon) *Sour Jacks 0.8 oz.* Swedish Fish *Swedish Fish 1.42/2 oz.* Tuna Salad *Outtakes 4.5 oz.* Veggie Chips *EatSmart or Flat Earth 1.25 oz.* Veggie Crisps *Veggie Chips 1.25 oz.*	
Chocolate Chip Cookies *Famous Amos 2 oz.* Fruit Snacks – *Fat Free Welch's 2.25 oz.* Sunchips (French Onion, Garden Salsa, or Harvest Cheddar) *Frito Lay 2 oz.* Twizzlers, *Original (Hershey's) 5 oz.*	28 (96.6)
Gardetto's Original Snack Mix *General Mills 1.6 oz.* Pretzels (Plain) *Rold Gold 1.5 oz.* Ruffles Potato Chips (Thick Cut Cheddar) *Frito Lay 1.5 oz.* Wheat Thins (Original or Veggie Toasted Chips) *Nabisco 1.75 oz.* Beef Jerky (Original) *Link Snacks 3.25 oz.*	27 (93.1)
Sweettarts (Mini and Chewy) *Wonka 1.5/3 oz.*	26 (89.7)
Peanut Butter and Cheese Crackers *Frito Lay or Austin 1.3/1.38 oz.*	25 (86.2)
Lays Potato Chips (BBQ, Classic, Wavy, Sour Cream and Onion, Salt and Vinegar, or Cheesy Garlic Bread) *Frito Lay 1.5 oz.* Other	22 (75.9)
Skittles *Mars 2.17 oz.* Starburst *Mars 2.07 oz.*	21 (72.4)
Rice Krispies Treats *Kellogg's 2.1 oz.*	19 (65.5)

Number of Items Available per Machine	Machines n (%)
Cheez It Crackers (Baked Cheese) *Sunshine 3 oz.* Trail Mix (Sweet n Salty Mix) *Kar's 3.5 oz.*	17 (58.6)
Poptarts (Frosted Blueberry, Frosted Cherry or Frosted Strawberry) *Kellogg's 3.52/3.67 oz.*	16 (55.2)
One Item Available per Machine	
Cheez It Crackers (Baked Cheese) *Sunshine 3 oz.*	12 (41.4)
Poptarts (Frosted Blueberry, Frosted Cherry or Frosted Strawberry) *Kellogg's 3.52/3.67 oz.* Rice Krispies Treats *Kellogg's 2.1 oz.*	10 (34.5)
Trail Mix (Sweet n Salty Mix) *Kar's 3.5 oz.*	9 (31.0)
Starburst *Mars 2.07 oz.*	8 (27.6)
Lays Potato Chips (BBQ, Classic, Wavy, Sour Cream and Onion, Salt and Vinegar, or Cheesy Garlic Bread) *Frito Lay 1.5 oz.* Other	7 (24.1)
Skittles *Mars 2.17 oz.*	6 (20.7)
Peanut Butter and Cheese Crackers *Frito Lay or Austin 1.3/1.38 oz.*	4 (13.8)
Sweettarts (Mini and Chewy) *Wonka 1.5/3 oz.*	3 (10.3)
Gardetto's Original Snack Mix *General Mills 1.6 oz.* Pretzels (Plain) *Rold Gold 1.5 oz.* Ruffles Potato Chips (Thick Cut Cheddar) *Frito Lay 1.5 oz.* Wheat Thins (Original or Veggie Toasted Chips) *Nabisco 1.75 oz.*	2 (6.9)
Beef Jerky (Original) *Link Snacks 3.25 oz.* Chocolate Chip Cookies *Famous Amos 2 oz.* Fruit Snacks – *Fat Free Welch's 2.25 oz.* Sunchips (French Onion, Garden Salsa, or Harvest Cheddar) *Frito Lay 2 oz.* Twizzlers, Original *(Hershey's) 5 oz.*	1 (3.4)
Two Items Available per Machine	
Poptarts (Frosted Blueberry, Frosted Cherry or Frosted Strawberry) *Kellogg's 3.52/3.67 oz.* Trail Mix (Sweet n Salty Mix) *Kar's 3.5 oz.*	3 (10.3)
Skittles *Mars 2.17 oz.*	2 (6.9)
Beef Jerky (Original) *Link Snacks 3.25 oz.*	1 (3.4)

Table 30: Healthy Dense Snack Score 4 Total

Products Available	**Machines n (%)**
0	15 (51.7)
7	3 (10.3)
5, 6, 8, 13	2 (6.9)
4, 9, 10	1 (3.4)
Total (108)	29 (100.0)

Table 31: Frequency of Machines That Have Items with a Healthy Dense Snack Score of 5

Number of Items Available per Machine	**Machines n (%)**
Zero Items	
Baked Ruffles (Cheddar & Sour Cream) *Frito Lay 1.125 oz.* Bruschetta Chips Jensen's *Orchard 1 oz.* Cape Cod Kettle Cooked Chips (Plain) *Cape Cod 1.5 oz.* Cashews (Salted) *Planters or Kar's 1/1.5 oz.* Cinnamon Raisin Bagel with Cream Cheese *(Toufayan Bakeries) 4.3 oz.* Coffee Cake Drake's *Hostess 1 oz.* Goldfish (Original or Cheddar) *Pepperidge Farm 2.25 oz.* Granola Bar (Oats and Honey) *Nature Valley 1.5 oz.* Granola Bar (Strawberry Yogurt) *Nature Valley 1.2 oz.* Kettle Corn (Salty & Sweet) *Whole Earth 1 oz.* Lay's Kettle Cooked Jalapeno Cheddar Potato Chips *(Frito-Lay) 1.375 oz.* Lays Kettle Cooked Potato Chips (Plain) *Frito Lay 1 oz.* Low Sodium Ham Sandwich (12 Grain Bread) *Balanced Choices 6 oz.* Muffin (Banana Nut, Blueberry, or Chocolate) *Daisy's 5.75 oz.* Munchies *Frito Lay 1 oz.* Nutrigrain Bar (Blueberry or Strawberry) *Kellogg's 1.3 oz.* Oats and Peanut Butter Bar *Fiber One 2 oz.* Peanuts (Lightly Salted) *Planters (any size)* Peanut Butter Crunchy Granola Bar *(Nature Valley) 1.5 oz.* Pepperoni & Cheese *Bridgford Foods 1.125 oz.* Pirate's Booty (White Cheddar) *Pirate Brand 1 oz.* Pita Chips (Cinnamon Sugar) *Bobby O's 1.5 oz.* Pita Chips (Cinnamon Sugar, Salted, or Parmesan Garlic) *Stacy's 1.375/1.5 oz.* Popchips (Barbeque) *Popchips 1 oz.* Popcorn (Unpopped Light Butter) *Act II 2.75 oz.* Potato Chips (Sour Cream and Onion) *Tom's 1 oz.* Pretzels (Hard Sourdough) *Snyder's Hanover 1.65 oz.* Pretzels (Honey Mustard) *Snyder's Hanover 1 oz.* Pretzels (Honey Wheat) *Rold Gold 2 oz.* Quaker Rice Cakes (Plain or Chocolate) *Frito Lay 0.91 oz.*	29 (100.0)

Number of Items Available per Machine	Machines n (%)
Quaker Rice Snack *Frito Lay 0.95 oz.* Rice Krispies Treats *Kellogg's 1.7 oz.* Ritz Bitz (Cheese) *Nabisco 3 oz.* Roasted Almond Crunchy Granola Bar *(Nature Valley) 1.5 oz.* Runts (Chewy) *Wonka 3 oz.* Sprees (Chewy) *Wonka 3 oz.* Tortilla Chips (Nacho Cheese) *Tom's 1 oz.* Trail Mix *Mr. Nature 2 oz.* Trail Mix (Salty) *Lear's 2 oz.* Trail Mix (Unsalted Energizer Mix) *Mr. Nature 2 oz.* Trail Mix (Unsalted) *Mr. Nature or Kar's 2 oz.* Turkey and Swiss *Tielke 6.5 oz.* White Cheddar Popcorn *Smart Food 1.5 oz.* Oats and Honey Crunchy Granola Bar *(Nature Valley) 1.5 oz.* Other	
Fruit Snacks (Mixed Berry or Strawberry) *Kellogg's 2.5 oz.* Granola Bar (Sweet & Salty Nut Almond) *Nature Valley 1.2 oz.* Peanuts (Salted) *Planters 1.5 oz.* Trail Mix (Sweet n Salty Mix) *Kar's 2 oz.*	28 (96.6)
Baked Lays Potato Chips (Plain, BBQ, Sour Cream and Cheddar, or Sour Cream Onion) *Frito Lay 1.125 oz.*	26 (89.7)
Chex Mix (Traditional, Sweet n Salty, Bold, or Pretzel Mix) *General Mills 1.75 oz.* Cracker Chips (Sour Cream and Onion) *Kellogg's 0.88 oz.*	25 (86.2)
Fruit Snacks *Black Forest 2.25 oz.*	20 (69.0)
Smokehouse Almonds (Jalapeno or Strawberry) *Blue Diamond 1.5 oz.*	19 (65.5)
One Item	
Fruit Snacks *Black Forest 2.25 oz.* Smokehouse Almonds (Jalapeno or Strawberry) *Blue Diamond 1.5 oz.*	9 (31.0)
Chex Mix (Traditional, Sweet n Salty, Bold, or Pretzel Mix) *General Mills 1.75 oz.* Cracker Chips (Sour Cream and Onion) *Kellogg's 0.88 oz.*	4 (13.8)
Baked Lays Potato Chips (Plain, BBQ, Sour Cream and Cheddar, or Sour Cream Onion) *Frito Lay 1.125 oz.*	3 (10.3)
Fruit Snacks (Mixed Berry or Strawberry) *Kellogg's 2.5 oz.* Granola Bar (Sweet & Salty Nut Almond) *Nature Valley 1.2 oz.* Peanuts (Salted) *Planters 1.5 oz.* Trail Mix (Sweet n Salty Mix) *Kar's 2 oz.*	1 (3.4)
Two Items	
Smokehouse Almonds (Jalapeno or Strawberry) *Blue Diamond 1.5 oz.*	1 (3.4)

Table 32: Healthy Dense Snack Score 5 Total

Products Available	**Machines n (%)**
0	15 (51.7)
2, 3	6 (20.7)
1, 4	1 (3.4)
Total (35)	29 (100.0)

Table 33: Frequency of Machines That Have Items with a Healthy Dense Snack Score of 6

Number of Items Available per Machine	**Machines n (%)**
Zero Items	
Almonds (Roasted) *Kar's 1 oz.* Banana Nut Bar *Odwalla 2 oz.* Berries GoMega Bar *Odwalla 2 oz.* Cashews (Roasted and Salted) *Kar's 1 oz.* Corn Muffin *Daisy's 5.75 oz.* Doritos (Cool Ranch) *Frito Lay 1 oz.* FiberOne Bar (Oats and Chocolate) *FiberOne 1.4 oz.* Fruit 'n Yogurt Snacks *Welch's 1.9 oz.* Hummus Chips (Caramelized Onion) *Kashi 1 oz.* Lays Potato Chips (Barbeque) *Frito Lay 1 oz.* Maple and Brown Sugar Oatmeal *(Quaker) 1.51 oz.* Nutter Butter Bites *Nabisco 3 oz.* Pastry Crisp *Kellogg's 0.83 oz.* Pita Chips (Cinnamon Sugar) *Stacy's 1.375 oz.* Planters Honey Roasted Peanuts *(Kraft Foods) 1 oz.* Potato Chips (Plain) *Tom's 1 oz.* Potato Chips (Mesquite BBQ or Salt and Vinegar) *Deep River Snacks 2 oz.* Trail Mix Bar *Kashi 1.2 oz.* Other	29 (100.0)
Granola Bar (Crunchy Peanut Butter or Oats and Dark Chocolate) *Nature Valley 1.5 oz.*	28 (96.6)
Rice & Bean Snack Chips (Chipotle Cheese) *Boulder Canyon 1.5 oz.*	26 (89.7)
Cracker Chips (Cheddar) *Kellogg's 1.06 oz.*	25 (86.2)
Ruffles Potato Chips (Cheddar and Sour Cream) *Frito Lay 1.25 oz.*	18 (62.1)
One Item	
Ruffles Potato Chips (Cheddar and Sour Cream) *Frito Lay 1.25 oz.*	11 (37.9)

Cracker Chips (Cheddar) *Kellogg's 1.06 oz.*	4 (13.8)
Rice & Bean Snack Chips (Chipotle Cheese) *Boulder Canyon 1.5 oz.*	3 (10.3)
Granola Bar (Crunchy Peanut Butter or Oats and Dark Chocolate) *Nature Valley 1.5 oz.*	1 (3.4)

Table 34: Healthy Dense Snack Score 6 Total

Products Available	**Machines n (%)**
0	17 (58.6)
2	7 (24.1)
1	5 (17.2)
Total (19)	29 (100.0)

Table 35: Frequency of Machines That Have Items with a Healthy Dense Snack Score of 7

Number of Items Available per Machine	**Machines n (%)**
Zero Items	**Machines n (%)**
Apple *(whole fruit)* Banana *(whole fruit)* Chocolate Chip Peanut Protein Bar *(Odwalla) 1.98 oz.* Golden Grahams Cereal Bar *(General Mills) 1.42 oz.* Orange *(whole fruit)* Strawberry Pomegranate Superfood Bar *(Odwalla) 2 oz.* Other	29 (100.0)
Clif Bar (Crunchy Peanut Butter) *Clif 2.4 oz.*	23 (79.3)
One Item	
Clif Bar (Crunchy Peanut Butter) *Clif 2.4 oz.*	6 (20.7)

Table 36: Healthy Dense Snack Score 7 Total

Products Available	**Machines n (%)**
0	23 (79.3)
1	6 (20.7)
Total (6)	29 (100.0)

Table 37: Unlisted Snack[(d)]

Unlisted Snacks: Categories 1-7	**n (%)**	**Highest Frequency of snack type from each unlisted snack category (n)**	**Highest Frequency of snack size (oz.)**	**Highest Frequency of snack price ($)**
Lunch Items	14 (20.29%)	Turkey and cheese sandwich (4)	7.0	3.00
Chips	8 (11.59%)	Olive Oil Kettle Cooked Potato Chips (5)	1.5	1.00
Loose Candy	10 (14.49%)	Skittles-Wild berry (4)	2.17	1.00
Compact Dessert	12 (17.39%)	Butterfinger Cups (4)	1.5	1.00
Nuts	4 (5.80%)	Almonds (3)	1.0	1.50
Dried Meat	7 (10.14%)	Teriyaki or Original Beef Steak (4)	2.0	1.25
Salty crackers or chex mix	10 (14.49%)	Gardetto's (8)	2.5	1.00
Breakfast	4 (5.80%)	Sausage Egg (+/- Cheese) Croissant (2)	5.0	2.25
Total	**69**			

[(d)]Note: This data is from 2015. The updated survey now includes some of these products.

Table 38: VENDING Snack Price Comparison

Questions	**Results** M +/- (SD)
Healthy Snack Pair Size	1.64 oz. (0.50689)
Healthy Snack Pair Price	$1.14 (0.26636)
Unhealthy Snack Pair Size	2.09 oz. (0.63069)
Unhealthy Snack Pair Price	$1.00 (0.00000)
Difference among snack pair size	0.45 oz.
Difference among snack pair price	$0.14

Table 39: Frequency of Machines That Have Items with a Healthy Dense Beverage Score of 0

Number of Items Available per Machine	**Machines n (%)**
Zero Items	
7 Up *(7 Up) Any Size* Arnold Palmer *(Arizona) Any Size* Barq's Root Beer *(Coca-Cola) Any Size* Brisk (Lemonade or Fruit Punch) *(Lipton) 20 oz.* Brisk Iced Tea -Any Flavor *(Lipton) Any Size* Citrus Punch *(Tampico) 20 oz.* Coke - Original or Cherry *(Coca-Cola) Any Size* Cream Soda -Vanilla *(A&W) Any Size* Dr. Pepper *(Dr. Pepper) Any Size* Energy Drink -Any Flavor *(Big Red Jack or SoBe) Any Size* Fanta -Orange *(Coca-Cola) Any Size* Fresca *(Coca Cola) Any Size* Fruit Punch *(Brisk) 20 oz.* Full Throttle *(Coca-Cola) Any Size* Fuze (Cranberry, Raspberry or Banana Colada) *(Coca-Cola) 16.9 oz.* Fuze Iced Tea (Lemon) *(Coca-Cola) 20 oz.* Ginger Ale *(Canada Dry, Seagram's or Schweppes) Any Size* Grape Soda *(Crush) Any Size* Grapico *(PepsiCo) Any Size* Green Tea *(Lipton) 20 oz.* Honest Ade (Cranberry Lemonade or Pomegranite Blue) *(Coca Cola) 16.9 oz.* Honest Tea (Honey Green) *(Coca Cola) 16.9 oz.* Iced Black Tea *(Tazo) 12 fl. oz.* Iced Coffee *(Starbucks) 13 oz.* Iced Green Tea *(Tazo) 16 fl. Oz.* Lemonade *(Tropicana, Minute Maid, or Country Time) Any Size* Lizard Lava *(SoBe) Any Size* Mellow Yellow *(Coca-Cola) Any Size* Monster Energy Drink - *Lo Carb (Monster) Any Size*	29 (100.0)

Number of Items Available per Machine	Machines n (%)
Mountain Dew Amp - Any Flavor *(PepsiCo) Any Size* Moxie *(PepsiCo) Any Size* Nestea *(Coca-Cola) Any Size* Orange Punch *(Tampico) 20 oz.* Pibb Xtra *(Coca-Cola) Any Size* Pibb Zero *(Coca Cola) 12 oz.* Pink Coconut Punch *(Tampico) 20 oz.* Pink Lemonade *(Country Time or Tropicana) Any Size* Powerade -Any Flavor *(Coca-Cola) 20 fl. Oz.* Riptide Rush *(PepsiCo) Any Size* Schwepps Ginger Ale *(PepsiCo) Any Size* Sprite *(PepsiCo) Any Size* Squirt *(Squirt) Any Size* Strawberry Melon Soda *(Tropicana) Any Size* Sunkist -Any Flavor *(Sunkist) Any Size* Twister Orange Soda *(Tropicana) Any Size* Vault *(Coca-Cola) Any Size* Yoo-Hoo *(Mott's) Any Size* Other	
DOC 360 *(DOC 360) 20 oz.* Orange Soda *(Crush) Any Size* RockStar Energy Drink *(Any Flavor) 16 oz.*	28 (96.6)
Gatorade Any Flavor *(PepsiCo) 20 fl. oz* Root Beer *(A&W or Mug) Any Size*	26 (89.7)
Pureleaf Tea (Sweet, Peach or Raspberry) *(Lipton) Any Size*	25 (86.2)
Amp Energy Boost (Any Flavor) *(Amp) 16 oz.* Double Shot Energy -Vanilla or Mocha *(Starbucks) 15 fl. oz.* Frappucino -Any Flavor *(Starbucks) Any Size* Mountain Dew Kickstart *(Any Flavor) Any Size*	24 (82.8)
Sierra Mist -Lemon Lime or Cranberry Splash *(PepsiCo) Any Size*	23 (79.3)
Mountain Dew -Any Flavor *(PepsiCo) Any Size* Pepsi Regular or Wild Cherry *(PepsiCo) Any Size*	20 (69.0)
One Item Available per Machine	
Sierra Mist -Lemon Lime or Cranberry Splash *(PepsiCo) Any Size*	6 (20.7)
Root Beer *(A&W or Mug) Any Size*	3 (10.3)
Amp Energy Boost (Any Flavor) *(Amp) 16 oz.* Mountain Dew -Any Flavor *(PepsiCo) Any Size*	2 (6.9)
DOC 360 *(DOC 360) 20 oz.* Doubleshot Energy -Vanilla or Mocha *(Starbucks) 15 fl. oz.*	1 (3.4)

Number of Items Available per Machine	Machines n (%)
Gatorade -Any Flavor *(PepsiCo) 20 fl. oz* Mountain Dew Kickstart *(Any Flavor) Any Size* Orange Soda *(Crush) Any Size* Pureleaf Tea (Sweet, Peach or Raspberry *(Lipton) Any Size* RockStar Energy Drink *(Any Flavor) 16 oz.*	
Two Items Available per Machine	
Pepsi Regular or Wild Cherry *(PepsiCo) Any Size*	6 (20.7)
Doubleshot Energy -Vanilla or Mocha *(Starbucks) 15 fl. oz.* Mountain Dew -Any Flavor *(PepsiCo) Any Size*	3 (10.3)
Gatorade -Any Flavor *(PepsiCo) 20 fl. oz.* Mountain Dew Kickstart *(Any Flavor) Any Size* Pureleaf Tea - (Sweet, Peach or Raspberry) *(Lipton) Any Size*	1 (3.4)
Three Items Available per Machine	
Frappucino -Any Flavor *(Starbucks) Any Size*	4 (13.8)
Mountain Dew -Any Flavor *(PepsiCo) Any Size* Pepsi Regular or Wild Cherry *(PepsiCo) Any Size*	2 (6.9)
Amp Energy Boost (Any Flavor) *(Amp) 16 oz.* Doubleshot Energy -Vanilla or Mocha *(Starbucks) 15 fl. oz.* Mountain Dew Kickstart *(Any Flavor) Any Size* Pureleaf Tea (Sweet, Peach or Raspberry) *(Lipton) Any Size*	1 (3.4)
Four Items Available per Machine	
Mountain Dew -Any Flavor *(PepsiCo) Any Size* Mountain Dew Kickstart *(Any Flavor) Any Size*	2 (6.9)
Amp Energy Boost (Any Flavor) *(Amp) 16 oz.* Frappucino -Any Flavor *(Starbucks) Any Size* Pureleaf Tea - (Sweet, Peach or Raspberry) *(Lipton) Any Size*	1 (3.4)
Five Items Available per Machine	
Gatorade -Any Flavor *(PepsiCo) 20 fl. oz.*	1 (3.4)
Six or More Available Items per Machine	
Amp Energy Boost *(Any Flavor) (Amp) 16 oz.* Pepsi Regular or Wild Cherry *(PepsiCo) Any Size*	1 (3.4)

Table 40: Healthy Dense Beverage Score 0 Total

Products Available	**Machines n (%)**
0	15 (51.7)
5	4 (13.8)
6, 7	2 (6.9)
2, 11, 12, 14, 22, 24	1 (3.4)
Total (131)	29 (100.0)

Table 41: Frequency of Machines That Have Items with a Healthy Dense Beverage Score of 1

Number of Items Available per Machine	**Machines n (%)**
Zero Items	**Machines n (%)**
Arizona Lemonade (Light) *Arizona 20 oz.* Black Tea (Unsweetened) *Lipton 16 oz.* Charley's Fat Free Chocolate Milk *Coca-Cola 20 oz.* Chocolate Drink (YooHoo) *Yoohoo 11 oz.* Chocolate Milk (1%) *Babcock 8 or 16 oz.* Citrus Punch *Sunny D 20 oz.* Coke Zero *Coca-Cola 20 oz.* Coke Zero (Vanilla and Cherry) *Coca-Cola 12 oz.* Core Power Chocolate Milk *Core Power 11.5 oz.* Diet Coke *Coca-Cola 20 oz.* Diet Dr. Pepper (Plain or Cherry Vanilla) *Dr. Pepper 20 oz.* Diet Ginger Ale *Seagram's 20 oz.* Diet Green Tea with *Citrus Lipton 20 oz.* Diet Iced Tea (Lemon) *Lipton 20 oz.* Diet Orange Soda *Crush 20 oz.* Diet Root Beer *A&W 20 oz.* Diet Sierra Mist *PepsiCo 12 oz.* Diet Sunkist *Sunkist 20 oz.* Fanta Zero *Coca-Cola 20 oz.* Gatorade G2 (Any Flavor) *PepsiCo 16 or 20 oz.* Gold Peak Iced Tea *Gold Peal 18.5 oz.* Green Tea (Citrus or With Honey) *Lipton or SoBe 16 or 20 oz.* Hawaiian Punch (Any Flavor) *Hawaiian Punch 20 oz.* Iced Tea (Sweetened) *Arizona or Lipton 16 or 20 oz.* Iced Tea (Unsweetened (Plain or Lemon) *Lipton 16 oz.* Lemonade (Light) *Minute Maid 20 oz.* Orange Pineapple Juice *Welch's 15.2 oz.* Orange Strawberry Banana Juice *Florida Natural 16 oz.* Orangeade *Tropicana 20 oz.*	29 (100.0)

Number of Items Available per Machine	Machines n (%)
Pepsi One *PepsiCo 12 oz.* Powerade Zero (Any Flavor) *Coca-Cola 20 oz.* RockStar Energy Drink (Sugar Free) *RockStar 16 oz.* Sprite Zero *Coca-Cola 20 oz.* Strawberry Kiwi Juice Cocktail *OceanSpray 15.2 oz.* Vitamin Water (Any Flavor) *Coca-Cola 20 oz.* Vitamin Water Zero (Any Flavor) *Coca-Cola 20 oz.* Wild Berry Juice (non-100%) *Dole 15.2 oz.*	
Chocolate Milk *Hiland 8 or 16 oz.* Diet Pepsi Max *PepsiCo 20 oz.* Naked Juice *(Berry Blast, Strawberry Banana, or Power-C)* Ruby Red Grapefruit juice (30% juice) *Cocktail Ocean Spray 15.2 oz.*	28 (96.6)
Cranberry Juice Cocktail *OceanSpray 15.2 oz.* Life Water (Any Flavor) *SoBe 20 oz.* Muscle Milk (Chocolate or Vanilla) *Muscle Milk 14 oz.*	27 (93.1)
Cran-Grape or Cranberry Juice *OceanSpray 15.2 oz.*	26 (89.7)
Amp Energy Boost - Sugar Free (Any Flavor) *AMP 16 oz.* Pureleaf Tea (Unsweetened) *PepsiCo 18.5 oz.*	24 (82.8)
Diet Mountain Dew *PepsiCo 12 or 20 oz.*	20 (69.0)
Diet Pepsi (Plain or Wild Cherry) *PepsiCo 12 or 20 oz.*	19 (65.5)
One Item	
Diet Mountain Dew *PepsiCo 12 or 20 oz.*	8 (27.6)
Diet Pepsi (Plain or Wild Cherry) *PepsiCo 12 or 20 oz.*	7 (24.1)
Amp Energy Boost - Sugar Free (Any Flavor) *AMP 16 oz.* Pureleaf Tea (Unsweetened) *PepsiCo 18.5 oz.*	4 (13.8)
Cran-Grape or Cranberry Juice *OceanSpray 15.2 oz.* Cranberry Juice Cocktail *OceanSpray 15.2 oz.*	2 (6.9)
Chocolate Milk *Hiland 8 or 16 oz.* Diet Pepsi Max *PepsiCo 20 oz.* Naked Juice (Berry Blast, Strawberry Banana, or Power-C) Ruby Red Grapefruit juice (30% juice) Cocktail *Ocean Spray 15.2 oz.*	1 (3.4)
Two Items	
Diet Pepsi (Plain or Wild Cherry) *PepsiCo 12 or 20 oz.*	2 (6.9)
Amp Energy Boost - Sugar Free (Any Flavor) *AMP 16 oz.* Cran-Grape or Cranberry Juice *OceanSpray 15.2 oz.*	1 (3.4)

Number of Items Available per Machine	Machines n (%)
Diet Mountain Dew *PepsiCo 12 or 20 oz.* Pureleaf Tea (Unsweetened) *PepsiCo 18.5 oz.*	
Three Items	
Life Water (Any Flavor) *SoBe 20 oz.* Muscle Milk (Chocolate or Vanilla) *Muscle Milk 14 oz.*	2 (6.9)
Four Items	
Diet Pepsi (Plain or Wild Cherry) *PepsiCo 12 or 20 oz.*	1 (3.4)

Table 42: Healthy Dense Beverage Score 1 Total

Products Available	Machines n (%)
0	15 (51.7)
2	8 (27.6)
3	2 (6.9)
6, 7, 10, 13	1 (3.4)
Total (58)	29 (100.0)

Table 43: Frequency of Machines That Have Items with a Healthy Dense Beverage Score of 2

Number of Items Available per Machine	Machines n (%)
Zero Items	
100% Cranberry Juice *(Any Brand) Any Size* 100% Grape Juice *(Any Brand) Any Size* 100% Pineapple Peach Mango Juice *(Any Brand) Any Size* 100% Ruby Red Grapefruit Juice *(Any Brand) Any Size* 100% Strawberry Kiwi Juice *(Any Brand) Any Size* Dasani Flavored Water -Any Flavor *(Coca-Cola) Any Size* Dasani Water *(Coca-Cola) Any Size* Jack's Water *(Chippiwa) Any Size* Kiarburnn Water *(Kiarburnn) Any Size* Milk - 2% Milk *(Babcock) 8 fl. oz.* Milk - 1% Skim *(Any Brand) Any Size* Poland Springs Water *(Poland Springs) Any Size* Propel Water -Any Flavor *(PepsiCo) Any Size*	29 (100.0)

Number of Items Available per Machine	Machines n (%)
Seltzer Water *(Any brand) Any size* Smart Water *(Glaceau) 20 oz.*	
100% Apple Juice *(Any Brand) Any Size* 100% Orange Juice *(Any Brand) Any Size* V8 Splash -Any Flavor *(V8) Any Size* Other	28 (96.6)
Aquafina -Plain Purified Water or Any Flavor Splash *(PepsiCo) Any Size*	20 (69.0)
One Item	
Aquafina -Plain Purified Water or Any Flavor Splash *(PepsiCo) Any Size*	4 (13.8)
100% Apple Juice *(Any Brand) Any Size*	1 (3.4)
Two Items	
Aquafina -Plain Purified Water or Any Flavor Splash *(PepsiCo) Any Size*	4 (13.8)
100% Orange Juice *(Any Brand) Any Size* V8 Splash -Any Flavor *(V8) Any Size* Other	1 (3.4)
Three Items	
Aquafina -Plain Purified Water or Any Flavor Splash *(PepsiCo) Any Size*	1 (3.4)

Table 44: Healthy Dense Beverage Score 2 Total

Products Available	Machines n (%)
0	18 (62.1)
1, 2	4 (13.8)
4	2 (6.9)
3	1 (3.4)
Total (23)	29 (100.0)

Table 45: Unlisted Beverages[(d)]

Unlisted Beverages: Categories 1-7	n (%)	Highest Frequency of beverage type from each unlisted beverage category (n)	Highest Frequency of Beverage size in oz.	Highest Frequency of Beverage price in $
Soda Pop	3 (12.50%)	Pepsi or Wild Cherry Pepsi (2)	20	1.25
Expresso Drink	2 (8.33%)	Double Shot Energy-Coffee (2)	15	2.50
Juice	6 (25%)	Orange Juice (3)	15.2	1.50
Smoothie	5 (20.83%)	Naked Juice (5)	15.2	3.00
Flavored Water	4 (16.67%)	LifeWater (All Flavors) (3)	20	1.50
Flavored Tea	4 (16.67%)	Pure Leaf Honey Green Tea (2)	18.5	1.50
Total	**24**			

[(d)]Note: This data is from 2015. The updated survey now includes some of these products.

Table 46. Beverage Price Comparisons

Questions	M +/- SD
Healthy Beverage Pair Size	18.06 oz. (2.2520)
Healthy Beverage Pair Price	$1.57 (0.57811)
Unhealthy Beverage Pair Size	18.32 oz. (1.9146)
Unhealthy Beverage Pair Price	$1.45 (0.50780)
Difference among Beverage pair size	0.26 oz.
Difference among Beverage pair price	$0.12

Table 47: VENDING Summary Questions

Summary Questions	Results n (%)
Average prices of similar type/size healthy and unhealthy products in VENDING machine	
Healthy more expensive than unhealthy	3 (10.3)
Healthy and unhealthy equally priced	24 (82.8)

Summary Questions	Results n (%)
Healthy less expensive than unhealthy	2 (6.9)
Presence of nutrition information on machine and products	
No nutrition information	29 (100.0)
General nutrition information on machine	0 (0)
Specific nutrition information about products in machine	0 (0)
Presence of product logos on VENDING machine	
Only unhealthy product logos on machine	9 (31.0)
Both healthy and unhealthy product logos on machine	0 (0)
Only healthy or no product logos on machine	20 (69.0)
Presence of product logos on VENDING machine	
No green eating promotion	29 (100.0)
General promotion of green eating	0 (0)
Specific/creative/original promotion of green eating	0 (0)

Table 48. VENDING Score Comparisons

VENDING Type (Score Range)	n (%)	UNL M±SD	All Institutions M±SD
Snack (6-24)	14 (48.3)	14.7±0.57	13.9±1.6
Beverage (6-20)	15 (51.7)	13.0±1.89	11.2±1.3
Overall Average		13.9±1.23	12.55±1.45

POINTS

Table 49. UNL Policy Scores

Category	UNL Policy Score	Minimum	Maximum	UNL Policy Support Score	Maximum Policy Support Score
Campus Stimulant Standards	100.0	50	100	10	16
Campus Chronic Disease Management and Health Promotion	65.00	0	70	8	8
Active Environment	41.6667	25	91.67	19	24
Nutrition Living	56.5217	30.43	69.57	18	24
Total	55.000	3	63	55	72